TRANSPORTATION PLANNING
& TRAFFIC ENGINEERING CONSULTANTS
2690 Lake Forest Road
PO Box 5875
Tahoe City, CA 96145
530/583-4053 FAX: 530/583-5966
lsctahoe.com

# MEMORANDUM

DATE: March 8, 2012

TO: Rob Brueck, HBA

FROM: Gordon Shaw, PE, AICP, LSC

SUBJECT: North Tahoe Dollar Creek Trail Traffic/Bicycle/Pedestrian Data Collection

As part of the environmental analysis for the North Tahoe Dollar Creek Trail project, LSC Transportation Consultants, Inc. conducted a series of counts and observations at the SR 28 crossing location during the peak summer period of 2011 and reviewed available traffic counts. This memo presents the data collected as part of this effort.

**Intersection Counts**

Table A presents intersection turning movement volumes observed on September 2nd, 2011 (Friday afternoon of Labor Day weekend. The peak hour total volume through the intersection was observed to be 1,013 vehicles.

**Roadway Counts**

Table B presents roadway directional traffic volumes on SR 28 just east of Dollar Drive, for the 2011 Memorial Day weekend. The busiest traffic day was Sunday, September 4th, with a total 2-way traffic volume of 13,796. The busiest hour of traffic activity on Friday and Saturday was in the late afternoon (around 4:00 PM), while on Sunday and Monday it occurred in the late morning (around 11:30 AM). In general, traffic volumes reach relatively high levels on a consistent basis between approximately 10:00 AM and 6:00 PM.

**Historical Caltrans Traffic Counts**

Caltrans maintains a count program throughout the state highway network , including along SR 28. The segment that includes the study location extends from Lake Forest Drive on the west to Lardin Way on the east. For the majority of count locations (including this one), counts are typically conducted on an annual basis in the summer and adjusted to reflect both average annual and peak month (August) traffic conditions, though not all locations are counted every year. Table C and Figure A show the counts for the period from 1994 to 2010 (the most recent available). As shown, traffic volumes (both average annual and peak month) increased between 1994 and 2007/2008, and have since been on a slight decline. Overall between 2000 and 2010, volumes declined by approximately 9 percent.

**Traffic Speed Study**

Two speed surveys were conducted of vehicles on SR 28 just east of Dollar Drive. One was conducted by LSC staff using a radar gun counting 100 vehicles in each direction, on July 27th 2011, between 12:48 PM and 1:48 PM. The staffer was instructed to count only through traffic (not drivers turning into and out of the adjacent streets and driveways). In the westbound direction, this yielded an average speed of 41 mph, and 85th percentile speed of 45 mph, and a maximum speed of 52 mph. In the eastbound direction, the average speed was observed to be 43 mph, the 85th percentile speed was 48 mph, and the maximum speed was 55 mph.

Counts were also conducted on August 5th, 2011 between 12:58 PM and 2:03 PM using an automated radar counter. A total of 1,063 vehicles were observed, including both through traffic on SR 29 as well as vehicles turning onto and off of the highway at nearby intersections. This count indicated an average speed of 37 mph and 38 mph in the eastbound and westbound directions, respectively, and an 85th percentile speed of 42 mph in both directions.

**Gap Survey**

An important consideration regarding a crossing of SR 28 by the proposed trail is whether adequate gaps are present in the traffic streams to allow trail users to perceive crossing opportunities that would not require drivers to slow or stop. This is a function of the time needed to cross the roadway, the traffic volume, and the distribution of traffic activity.

The width of SR 28 just to the east of Dollar Drive between the fog lines (edge of travel lanes) to the fog line on the east side of the highway is approximately 35 feet. With the existing striped westbound left turn lane, a trail user would need to cross the entire roadway, requiring gaps in both directions. An adequate gap for bicycle/pedestrian crossing at this location is 13 seconds. This includes a start-up time of 3 seconds (per ITE recommendations) and a walk speed of 3.5 feet per second (per recent changes in ITE and ADA recommendations), and assumes that bulb-outs allow trail users to wait just outside the edge of the existing traveled way.

Gap counts were conducted during two busy summer periods: on Friday, August 5th between 1 PM and 2 PM and on Friday September 2nd between 4 PM and 5 PM. As shown in Table D, during the August 5th counts, 23 adequate gaps per hour were observed, while the September 2nd counts identified 19 adequate gaps per hour. Considering the proportion of randomly-arriving trail users that would arrive during periods of adequate gap and the average wait for an adequate gap of the remainder of trail users, during peak hours trail users would be required to wait an average of 77

seconds (1 minute 17 seconds) for an adequate gap in two-way traffic during the August 5th counts, and 94 seconds (1 minute 34 seconds) during the September 2nd counts[1]. The 2010 edition of the *Highway Capacity Manual* (Institute of Transportation Engineers, 2010) provides Level Of Service (LOS) criteria for pedestrian crossings at uncontrolled legs of a Stop sign controlled intersection or at mid-block locations. These average delays would far exceed the LOS F standard of 45 seconds. This LOS is defined as "*delay exceeds tolerance level, high likelihood of pedestrian risk taking.*" (TRB, p 19-2). It can be concluded from this evaluation that simply striping a crosswalk at this location would not provide adequate crossing conditions. Evaluation of more extensive crossing options will be conducted in future tasks, once the trail use estimates have been completed.

Driver Sight Distance

Another key factor in assessing trail crossings is driver sight distance, specifically "stopping sight distance." This is the minimum distance along a direction of travel that a driver can observe an object or person in the roadway (such as someone crossing at-grade), react, and bring the vehicle to a safe stop. This distance varies, of course, with speed. With a posted speed limit of 45 mph and observed 85th percentile speeds of 42 to 48 mph, a design speed of 50 mph is appropriate. At this speed, Table 201.1 of the Caltrans Highway Design Manual (6th Edition, 2006 as updated) indicates that a stopping sight distance of 430 feet is needed.

LSC staff conducted sight distance measurements, consistent with Caltrans methodology. Sight distance was measured at three locations: mid-way between the Dollar Drive intersection and the 7-11 driveway, just east of the Dollar Drive intersection, and approximately 370 feet to the east at the widest point of the painted median formed by the redirect taper for the westbound left turn pocket for Dollar Drive. As sight distance can differ across the roadway, this distance was measured both at the north and south edges of the existing pavement. As shown in Table E, the minimum sight distance was found to be 750 feet for the westernmost location, 640 for the center location, and 490 feet for the easternmost location, all of which meet the minimum required stopping sight distance. This distance is generally better to the west than to the east, where the vertical curve at the crest of Dollar Hill limits the available sight distance.

These sight distances can be used along with the observed speeds to estimate the length of time (in seconds) that a trail users can perceive oncoming traffic, in order to judge a gap of sufficient length to avoid needing to rely on drivers needing to slow or stop. As shown in the right portion of Table E, a minimum of 11.1 seconds would be provided looking west for trail users at the location between Dollar Drive and 7-11, and 10.7 looking east. As 13 seconds would be required to cross the entire roadway, trail users at this location would not be able to determine if they have adequate time in the westbound traffic stream. If a median refuge area were to be provided at this location that would allow a two-stage crossing (with trail users needing to observe a gap in only one traffic stream at a time), 8 seconds would be required to cross each travel lane. The northbound trail user at the south edge of pavement (or the southbound trail user at the south edge of the center median) would only need to judge gaps in one direction at a time, and would have more than adequate sight distance to do so.

At the Dollar Drive location, 13.5 seconds would be provided for trail users looking to the west, but only 9.1 to 9.9 seconds looking to the east. As 13 seconds would be required to cross the entire roadway, trail users at this location would not be able to determine if they have adequate time in the westbound traffic stream.

---

[1] To be conservative, it was assumed that no drivers yield to pedestrians waiting at the crossing, at all locations.

At the location 370' to the east of Dollar Drive, there is more than adequate time to observe gaps in the traffic coming from the west, but only 7.0 seconds (at the south edge of pavement) to 9.5 seconds (at the north edge of pavement) available to observe traffic coming from the east. A median refuge could also potentially be provided at this location.

References

ITE Manual of Transportation Engineering Studies, Institution of Transportation Engineers, 2010

HCM 2010: Highway Capacity Manual, Transportation Research Board, 2010

Highway Design Manual, 6th Edition, California Department of Transportation, 2006 as amended

Caltrans Traffic Volume Webpage at http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/index.htm

## *TABLE A: Intersection Count*

**Intersection:** SR28/ Dollar Drive
**Location:** Tahoe City/ Dollar Hill
**North/South Street:** Dollar Drive
**East/West Street:** SR 28

**Date:** 9/2/2001 Friday
***Time:*** 3:30PM-5:30 PM
**Name:** Jason
**Project #:** 117250

| | Time Period | | | NB - Dollar Dr | | | SB | | | EB - SR 28 | | | WB | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Beginning | Ending | | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right |
| | 3:30PM | 3:45PM | | 3 | 0 | 9 | 0 | 0 | 0 | 0 | 128 | 18 | 6 | 104 | 0 |
| | 3:45PM | 4:00PM | | 9 | 0 | 6 | 0 | 0 | 0 | 0 | 115 | 8 | 5 | 95 | 0 |
| | 4:00PM | 4:15PM | | 7 | 0 | 7 | 0 | 0 | 0 | 0 | 112 | 13 | 4 | 83 | 0 |
| Peak Hour | 4:15PM | 4:30PM | | 6 | 0 | 8 | 0 | 0 | 0 | 0 | 139 | 9 | 6 | 87 | 0 |
| | 4:30PM | 4:45PM | | 5 | 0 | 6 | 0 | 0 | 0 | 0 | 132 | 8 | 9 | 83 | 0 |
| | 4:45PM | 5:00PM | | 11 | 0 | 10 | 0 | 0 | 0 | 0 | 117 | 9 | 4 | 102 | 0 |
| | 5:00PM | 5:15PM | | 10 | 0 | 5 | 0 | 0 | 0 | 0 | 128 | 11 | 6 | 102 | 0 |
| | 5:15PM | 5:30PM | | 6 | 0 | 3 | 0 | 0 | 0 | 0 | 116 | 11 | 3 | 80 | 0 |
| | **PM Peak Hour Volume** | | | **32** | **0** | **29** | **0** | **0** | **0** | **0** | **516** | **37** | **25** | **374** | **0** |
| | PM Peak Hour Factor | | | 0.73 | -- | 0.73 | -- | -- | -- | -- | 0.93 | 0.84 | 0.69 | 0.92 | -- |

Source: LSC Transprotation Consultants, Inc.

## *TABLE B: Directional Traffic Counts -- SR 28 just East of Dollar Drive*

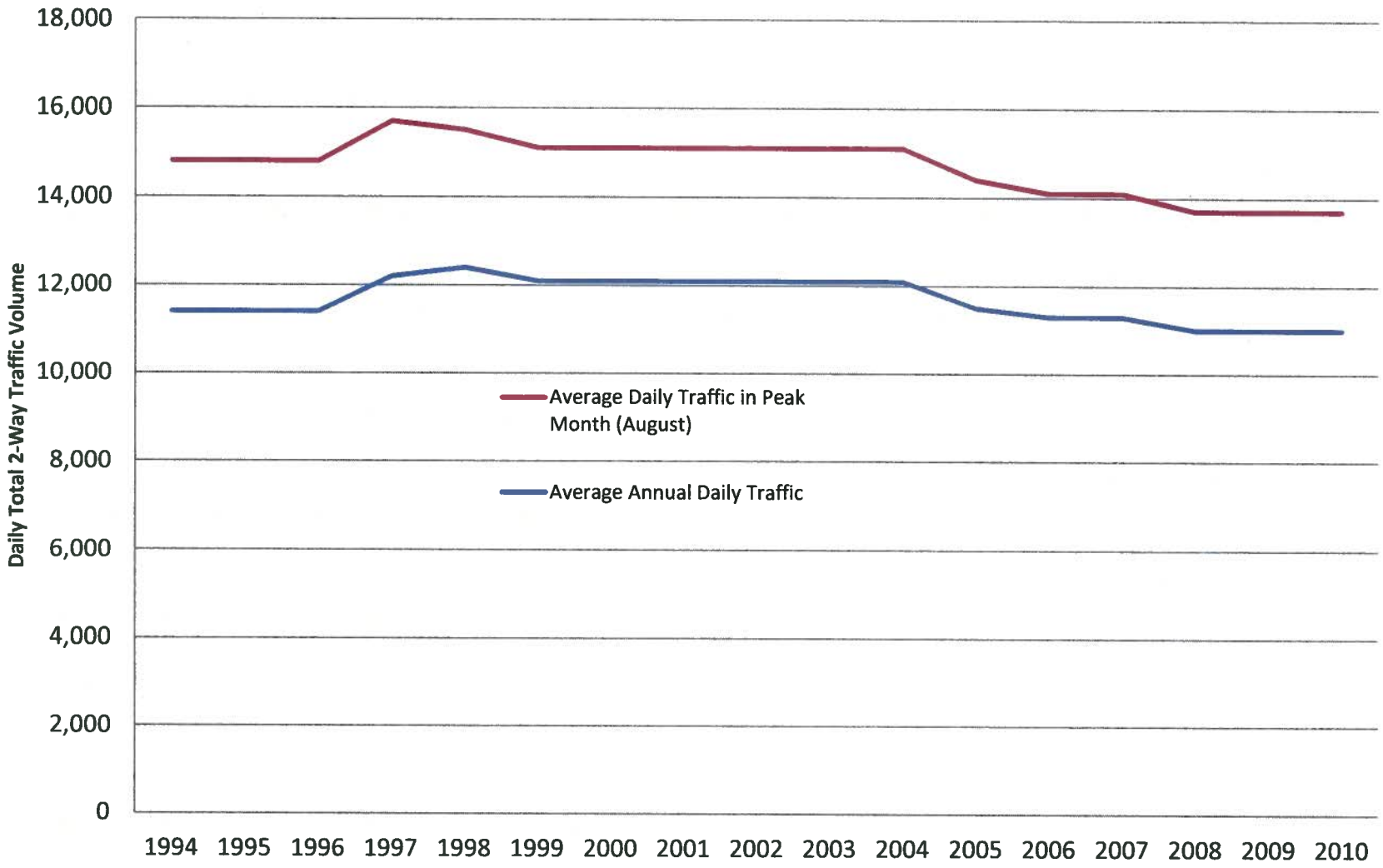
| 15-Min | Westbound | | | | Eastbound | | | | 2-Way 15-Minute Total | | | | Total 2-Way Hourly Total | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Period | Fri | Sat | Sun | Mon | Fri | Sat | Sun | Mon | Fri | Sat | Sun | Mon | Fri | Sat | Sun | Mon |
| Beginning | 9/2/2011 | 9/3/2011 | 9/4/2011 | 9/5/2011 | 9/2/2011 | 9/3/2011 | 9/4/2011 | 9/5/2011 | 9/2/2011 | 9/3/2011 | 9/4/2011 | 9/5/2011 | 9/2/2011 | 9/3/2011 | 9/4/2011 | 9/5/2011 |
| 0:00 | 5 | 10 | 22 | 13 | 11 | 17 | 17 | 25 | 16 | 27 | 39 | 38 | 45 | 116 | 111 | 127 |
| 0:15 | 5 | 9 | 5 | 16 | 10 | 22 | 24 | 12 | 15 | 31 | 29 | 28 | 38 | 115 | 84 | 110 |
| 0:30 | 3 | 4 | 15 | 13 | 8 | 25 | 9 | 12 | 9 | 29 | 24 | 25 | 26 | 104 | 74 | 91 |
| 0:45 | 2 | 8 | 9 | 16 | 3 | 21 | 10 | 20 | 5 | 29 | 19 | 36 | 23 | 87 | 70 | 80 |
| 1:00 | 2 | 8 | 7 | 9 | 5 | 20 | 5 | 12 | 7 | 28 | 12 | 21 | 23 | 81 | 62 | 59 |
| 1:15 | 2 | 9 | 7 | 4 | 3 | 11 | 12 | 5 | 5 | 20 | 19 | 9 | 22 | 67 | 66 | 45 |
| 1:30 | 2 | 3 | 9 | 7 | 4 | 9 | 11 | 7 | 6 | 12 | 20 | 14 | 20 | 60 | 53 | 52 |
| 1:45 | 3 | 13 | 3 | 8 | 2 | 10 | 8 | 9 | 5 | 23 | 11 | 15 | 17 | 55 | 48 | 42 |
| 2:00 | 2 | 6 | 8 | 5 | 4 | 6 | 8 | 2 | 6 | 12 | 16 | 7 | 15 | 34 | 42 | 30 |
| 2:15 | 2 | 3 | 5 | 6 | 1 | 10 | 1 | 6 | 3 | 13 | 6 | 18 | 10 | 26 | 31 | 30 |
| 2:30 | 2 | 4 | 3 | 3 | 1 | 3 | 10 | 1 | 3 | 7 | 13 | 4 | 9 | 21 | 32 | 19 |
| 2:45 | 1 | 1 | 3 | 1 | 2 | 1 | 4 | 2 | 3 | 2 | 7 | 3 | 6 | 16 | 32 | 19 |
| 3:00 | 1 | 3 | 2 | 5 | 0 | 3 | 3 | 2 | 1 | 6 | 5 | 7 | 6 | 19 | 30 | 18 |
| 3:15 | 1 | 2 | 6 | 2 | 1 | 4 | 1 | 3 | 2 | 6 | 7 | 5 | 10 | 17 | 32 | 12 |
| 3:30 | 0 | 1 | 3 | 3 | 0 | 1 | 10 | 1 | 0 | 2 | 13 | 4 | 11 | 15 | 34 | 11 |
| 3:45 | 3 | 3 | 2 | 1 | 2 | 2 | 3 | 1 | 5 | 5 | 5 | 2 | 16 | 23 | 33 | 12 |
| 4:00 | 2 | 2 | 4 | 0 | 1 | 2 | 3 | 1 | 3 | 4 | 7 | 1 | 19 | 27 | 39 | 15 |
| 4:15 | 1 | 1 | 6 | 2 | 2 | 3 | 3 | 2 | 3 | 4 | 9 | 4 | 21 | 24 | 35 | 21 |
| 4:30 | 3 | 3 | 5 | 3 | 2 | 7 | 7 | 2 | 5 | 10 | 12 | 5 | 28 | 22 | 31 | 26 |
| 4:45 | 5 | 4 | 7 | 5 | 3 | 5 | 4 | 0 | 8 | 9 | 11 | 5 | 36 | 24 | 34 | 36 |
| 5:00 | 4 | 1 | 1 | 4 | 1 | 0 | 2 | 3 | 5 | 1 | 3 | 7 | 80 | 25 | 34 | 50 |
| 5:15 | 6 | 1 | 4 | 8 | 2 | 1 | 1 | 1 | 8 | 2 | 5 | 9 | 93 | 37 | 49 | 73 |
| 5:30 | 12 | 10 | 4 | 11 | 3 | 2 | 11 | 4 | 15 | 12 | 15 | 15 | 139 | 61 | 67 | 81 |
| 5:45 | 25 | 9 | 10 | 14 | 7 | 1 | 1 | 5 | 32 | 10 | 11 | 19 | 211 | 85 | 66 | 115 |
| 6:00 | 22 | 7 | 12 | 18 | 16 | 6 | 6 | 12 | 38 | 13 | 18 | 30 | 270 | 118 | 123 | 138 |
| 6:15 | 32 | 13 | 14 | 12 | 22 | 13 | 9 | 5 | 54 | 26 | 23 | 17 | 342 | 155 | 160 | 152 |
| 6:30 | 57 | 19 | 17 | 32 | 30 | 17 | 17 | 17 | 87 | 36 | 34 | 49 | 435 | 201 | 205 | 199 |
| 6:45 | 61 | 26 | 33 | 26 | 30 | 15 | 15 | 14 | 91 | 43 | 48 | 42 | 478 | 237 | 244 | 237 |
| 7:00 | 75 | 32 | 29 | 26 | 35 | 16 | 28 | 18 | 110 | 50 | 55 | 44 | 555 | 294 | 308 | 267 |
| 7:15 | 96 | 41 | 36 | 39 | 51 | 31 | 32 | 25 | 147 | 72 | 68 | 64 | 837 | 349 | 377 | 348 |
| 7:30 | 82 | 44 | 38 | 55 | 46 | 28 | 35 | 32 | 126 | 72 | 73 | 87 | 663 | 387 | 416 | 414 |
| 7:45 | 111 | 59 | 74 | 64 | 59 | 41 | 38 | 28 | 170 | 100 | 112 | 92 | 686 | 449 | 489 | 464 |
| 8:00 | 127 | 54 | 66 | 70 | 65 | 51 | 56 | 35 | 192 | 105 | 124 | 105 | 687 | 513 | 574 | 527 |
| 8:15 | 93 | 65 | 57 | 85 | 80 | 45 | 50 | 45 | 173 | 110 | 107 | 130 | 627 | 577 | 620 | 575 |
| 8:30 | 71 | 85 | 85 | 80 | 80 | 49 | 61 | 57 | 151 | 134 | 146 | 137 | 604 | 628 | 702 | 595 |
| 8:45 | 102 | 99 | 121 | 95 | 69 | 65 | 76 | 60 | 171 | 164 | 197 | 155 | 602 | 679 | 772 | 606 |
| 9:00 | 80 | 98 | 61 | 85 | 52 | 71 | 69 | 68 | 132 | 169 | 170 | 153 | 593 | 707 | 813 | 648 |
| 9:15 | 86 | 87 | 115 | 101 | 64 | 72 | 74 | 49 | 150 | 159 | 189 | 150 | 650 | 724 | 884 | 680 |
| 9:30 | 78 | 104 | 139 | 90 | 71 | 83 | 77 | 58 | 149 | 187 | 216 | 148 | 683 | 773 | 919 | 754 |
| 9:45 | 66 | 107 | 155 | 126 | 76 | 85 | 83 | 71 | 162 | 192 | 238 | 197 | 721 | 797 | 975 | 769 |
| 10:00 | 111 | 105 | 148 | 116 | 78 | 81 | 95 | 69 | 189 | 186 | 241 | 185 | 721 | 835 | 983 | 808 |
| 10:15 | 97 | 107 | 135 | 142 | 86 | 101 | 69 | 82 | 183 | 208 | 224 | 224 | 708 | 875 | 990 | 857 |
| 10:30 | 103 | 132 | 169 | 109 | 84 | 79 | 103 | 74 | 187 | 211 | 272 | 183 | 722 | 872 | 1069 | 825 |
| 10:45 | 89 | 149 | 148 | 128 | 73 | 81 | 98 | 90 | 162 | 230 | 246 | 216 | 727 | 898 | 1087 | 876 |
| 11:00 | 101 | 131 | 146 | 157 | 75 | 95 | 102 | 77 | 176 | 226 | 248 | 234 | 769 | 888 | 1121 | 887 |
| 11:15 | 94 | 115 | 147 | 111 | 103 | 90 | 156 | 81 | 197 | 205 | 303 | 192 | 809 | 921 | 1175 | 854 |
| 11:30 | 108 | 117 | 160 | 129 | 84 | 120 | 130 | 105 | 192 | 237 | 290 | 234 | 839 | 955 | 1179 | 926 |
| 11:45 | 102 | 116 | 137 | 138 | 102 | 104 | 143 | 89 | 204 | 220 | 280 | 227 | 830 | 947 | 1165 | 876 |
| 12:00 | 97 | 131 | 155 | 123 | 119 | 126 | 147 | 78 | 216 | 259 | 302 | 201 | 825 | 986 | 1135 | 841 |
| 12:15 | 99 | 116 | 145 | 148 | 128 | 121 | 162 | 116 | 227 | 239 | 307 | 264 | 828 | 959 | 1093 | 847 |
| 12:30 | 83 | 108 | 136 | 95 | 100 | 121 | 140 | 91 | 183 | 229 | 276 | 186 | 798 | 976 | 1066 | 805 |
| 12:45 | 83 | 130 | 124 | 94 | 116 | 129 | 126 | 96 | 199 | 259 | 250 | 190 | 819 | 951 | 1050 | 812 |
| 13:00 | 95 | 112 | 126 | 107 | 122 | 120 | 134 | 100 | 217 | 232 | 260 | 207 | 829 | 959 | 1075 | 825 |
| 13:15 | 102 | 112 | 139 | 117 | 97 | 144 | 141 | 105 | 199 | 256 | 280 | 222 | 857 | 953 | 1090 | 810 |
| 13:30 | 97 | 95 | 129 | 103 | 107 | 109 | 131 | 90 | 204 | 204 | 260 | 193 | 863 | 955 | 1105 | 787 |
| 13:45 | 103 | 141 | 158 | 108 | 106 | 126 | 117 | 95 | 209 | 267 | 275 | 203 | 911 | 991 | 1148 | 786 |
| 14:00 | 101 | 100 | 139 | 100 | 144 | 126 | 138 | 92 | 245 | 226 | 275 | 192 | 945 | 954 | 1134 | 787 |
| 14:15 | 77 | 107 | 135 | 102 | 128 | 151 | 160 | 97 | 205 | 258 | 295 | 199 | 946 | 954 | 1150 | 789 |
| 14:30 | 115 | 100 | 170 | 85 | 137 | 140 | 133 | 107 | 252 | 240 | 303 | 192 | 967 | 928 | 1111 | 792 |
| 14:45 | 103 | 90 | 125 | 100 | 140 | 140 | 136 | 104 | 243 | 230 | 261 | 204 | 970 | 926 | 1056 | 774 |
| 15:00 | 104 | 100 | 136 | 91 | 142 | 126 | 155 | 103 | 246 | 228 | 291 | 194 | 964 | 942 | 1051 | 787 |
| 15:15 | 83 | 91 | 116 | 76 | 143 | 141 | 138 | 124 | 226 | 232 | 256 | 202 | 938 | 966 | 1031 | 782 |
| 15:30 | 100 | 107 | 117 | 76 | 155 | 133 | 131 | 98 | 255 | 240 | 248 | 174 | 957 | 995 | 1053 | 776 |
| 15:45 | 106 | 100 | 121 | 83 | 131 | 144 | 135 | 114 | 237 | 244 | 256 | 197 | 932 | 1015 | 1082 | 788 |
| 16:00 | 91 | 114 | 129 | 101 | 129 | 138 | 142 | 108 | 220 | 250 | 271 | 209 | 936 | 1029 | 1117 | 777 |
| 16:15 | 86 | 101 | 133 | 93 | 157 | 160 | 145 | 103 | 245 | 261 | 278 | 196 | 975 | 1048 | 1119 | 739 |
| 16:30 | 67 | 118 | 128 | 80 | 143 | 142 | 149 | 106 | 230 | 260 | 277 | 186 | 946 | 1049 | 1093 | 738 |
| 16:45 | 110 | 109 | 139 | 81 | 131 | 149 | 152 | 105 | 241 | 256 | 291 | 186 | 926 | 999 | 1046 | 748 |
| 17:00 | 116 | 106 | 122 | 55 | 143 | 163 | 151 | 116 | 259 | 269 | 273 | 171 | 897 | 960 | 989 | 741 |
| 17:15 | 84 | 101 | 91 | 103 | 132 | 161 | 161 | 92 | 216 | 262 | 252 | 195 | 850 | 926 | 938 | 716 |
| 17:30 | 71 | 101 | 92 | 73 | 139 | 109 | 138 | 121 | 210 | 210 | 230 | 194 | 816 | 890 | 922 | 676 |
| 17:45 | 100 | 98 | 89 | 79 | 112 | 121 | 145 | 102 | 212 | 219 | 234 | 191 | 780 | 874 | 904 | 608 |
| 18:00 | 92 | 102 | 92 | 66 | 120 | 135 | 130 | 80 | 212 | 237 | 222 | 146 | 724 | 823 | 892 | 559 |
| 18:15 | 83 | 105 | 86 | 66 | 101 | 119 | 150 | 67 | 184 | 224 | 236 | 155 | 643 | 736 | 677 | 522 |
| 18:30 | 62 | 71 | 75 | 59 | 90 | 123 | 137 | 67 | 172 | 194 | 212 | 126 | 591 | 873 | 856 | 465 |
| 18:45 | 67 | 76 | 90 | 59 | 69 | 92 | 132 | 73 | 156 | 168 | 222 | 132 | 521 | 621 | 851 | 424 |
| 19:00 | 50 | 68 | 91 | 47 | 61 | 84 | 116 | 62 | 131 | 152 | 207 | 109 | 461 | 563 | 800 | 383 |
| 19:15 | 58 | 89 | 89 | 50 | 74 | 90 | 126 | 48 | 132 | 159 | 215 | 98 | 420 | 529 | 754 | 358 |
| 19:30 | 51 | 61 | 61 | 42 | 51 | 61 | 146 | 43 | 102 | 142 | 207 | 85 | 394 | 504 | 670 | 331 |
| 19:45 | 40 | 52 | 62 | 32 | 56 | 59 | 109 | 59 | 96 | 110 | 171 | 91 | 391 | 476 | 567 | 311 |
| 20:00 | 36 | 63 | 75 | 31 | 54 | 55 | 86 | 53 | 90 | 118 | 161 | 84 | 392 | 491 | 510 | 276 |
| 20:15 | 37 | 50 | 41 | 27 | 69 | 84 | 90 | 44 | 106 | 134 | 131 | 71 | 397 | 487 | 439 | 255 |
| 20:30 | 26 | 53 | 35 | 21 | 71 | 61 | 69 | 44 | 99 | 114 | 104 | 65 | 400 | 445 | 418 | 244 |
| 20:45 | 35 | 46 | 50 | 22 | 62 | 79 | 64 | 34 | 97 | 125 | 114 | 56 | 366 | 417 | 403 | 231 |
| 21:00 | 27 | 40 | 35 | 24 | 66 | 74 | 55 | 39 | 95 | 114 | 90 | 63 | 360 | 376 | 376 | 211 |
| 21:15 | 35 | 38 | 41 | 17 | 74 | 56 | 69 | 43 | 109 | 92 | 110 | 60 | 342 | 354 | 362 | 174 |
| 21:30 | 28 | 27 | 35 | 21 | 37 | 59 | 54 | 31 | 65 | 86 | 89 | 52 | 299 | 346 | 327 | 156 |
| 21:45 | 22 | 41 | 34 | 15 | 69 | 45 | 53 | 21 | 91 | 86 | 87 | 36 | 292 | 332 | 316 | 133 |
| 22:00 | 26 | 35 | 29 | 12 | 51 | 55 | 47 | 14 | 77 | 90 | 76 | 26 | 280 | 305 | 285 | 116 |
| 22:15 | 22 | 34 | 31 | 14 | 44 | 50 | 44 | 28 | 66 | 64 | 75 | 42 | 251 | 275 | 272 | 111 |
| 22:30 | 16 | 37 | 31 | 10 | 40 | 35 | 47 | 19 | 56 | 72 | 78 | 29 | 242 | 251 | 250 | 83 |
| 22:45 | 27 | 31 | 24 | 6 | 52 | 26 | 32 | 15 | 79 | 59 | 56 | 21 | 239 | 233 | 222 | 73 |
| 23:00 | 13 | 25 | 29 | 6 | 35 | 35 | 34 | 13 | 48 | 60 | 63 | 19 | 211 | 210 | 192 | 63 |
| 23:15 | 14 | 19 | 19 | 5 | 43 | 41 | 34 | 9 | 57 | 60 | 53 | 14 | | | | |
| 23:30 | 22 | 24 | 19 | 9 | 33 | 30 | 31 | 10 | 55 | 54 | 50 | 19 | | | | |
| 23:45 | 11 | 17 | 16 | 5 | 40 | 19 | 10 | 6 | 51 | 36 | 26 | 11 | | | | |
| Total | 5377 | 5802 | 6696 | 5136 | 6212 | 6455 | 7100 | 4806 | 11589 | 12257 | 13796 | 9942 | | | | |

## *TABLE C: Summary of Caltrans Counts on SR 28*

For Segment Between Lake Forest Dr. (MP 1.845) and Lardin Way (MP 4.25)

| Year | Average Annual Daily Traffic | Average Daily Traffic in Peak Month (August) |
|---|---|---|
| 1994 | 11,400 | 14,800 |
| 1995 | 11,400 | 14,800 |
| 1996 | 11,400 | 14,800 |
| 1997 | 12,200 | 15,700 |
| 1998 | 12,400 | 15,500 |
| 1999 | 12,100 | 15,100 |
| 2000 | 12,100 | 15,100 |
| 2001 | 12,100 | 15,100 |
| 2002 | 12,100 | 15,100 |
| 2003 | 12,100 | 15,100 |
| 2004 | 12,100 | 15,100 |
| 2005 | 11,500 | 14,400 |
| 2006 | 11,300 | 14,100 |
| 2007 | 11,300 | 14,100 |
| 2008 | 11,000 | 13,700 |
| 2009 | 11,000 | 13,700 |
| 2010 | 11,000 | 13,700 |
| **Change: 2000 to 2010** | | |
| Value | -1,100 | -1,400 |
| Percent | -9.1% | -9.3% |
| **Average Annual Change: 2000 to 2010** | | |
| | -0.9% | -1.0% |

## Figure A: Historical Caltrans Traffic Counts on SR 28 at Dollar Hill



## *Table D: Gaps in SR 28 Traffic and Pedestrian Crossing LOS*

Adequate Gaps Shown in Box

| Count Interval | | | Number of Gaps per Hour by Length of Gap In Seconds | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | From | To | 2 to 3 | 4 to 5 | 6 to 7 | 8 to 9 | 10 to 11 | 12 to 13 | 14 to 15 | 16 to 17 | 18 to 19 | 20 to 21 | 22 to 23 | 24 to 25 | 26 to 27 | 28 to 29 | >29 | 2-Way Volume |
| 8/5/2011 | 1:00PM | 2:00PM | 126 | 118 | 46 | 28 | 22 | 20 | 10 | 5 | 2 | 1 | 2 | 1 | 0 | 0 | 2 | 988 |
| | Minimum Gap for Crossing Both Directions | | | | | 13 | Seconds | | | | | | | | | | | |
| | # of Adequate Gaps | | | | | 23 | Per Hour | | | | | | | | | | | |
| | Average Time Between Adequate Gaps | | | | | 2 | Minutes | | 37 | Seconds | | | | | | | | |
| | Average Trail User Wait Time for Adequate Gap | | | | | 77 | Seconds | | | | | | | | | | | |
| | Pedestrian LOS | | | | | F | | | | | | | | | | | | |
| 9/2/2011 | 4:00 PM | 5:00 PM | 116 | 81 | 50 | 32 | 21 | 20 | 9 | 4 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 936 |
| | Minimum Gap for Crossing Both Directions | | | | | 13 | Seconds | | | | | | | | | | | |
| | # of Adequate Gaps | | | | | 19 | Per Hour | | | | | | | | | | | |
| | Average Time Between Adequate Gaps | | | | | 3 | Minutes | | 9 | Seconds | | | | | | | | |
| | Average Trail User Wait Time for Adequate Gap | | | | | 94 | Seconds | | | | | | | | | | | |
| | Pedestrian LOS | | | | | F | | | | | | | | | | | | |

Source: LSC Transportation Consultants, Inc.

## *Table E: Existing Sight Distances on SR 28*

| Location | Stopping Sight Distance (feet) | | Estimated Observable Gap Time for Trail Users (Seconds) | |
|---|---|---|---|---|
| | To the West | To the East | To the West | To the East |
| **Between Dollar Drive and 7-11** | | | | |
| South Edge of Pavement | 880 | 750 | 12.5 | 10.7 |
| North Edge of Pavement | 780 | 860 | 11.1 | 12.2 |
| **East Approach to Dollar Drive** | | | | |
| South Edge of Pavement | 950 | 640 | 13.5 | 9.1 |
| North Edge of Pavement | 950 | 695 | 13.5 | 9.9 |
| **370' East of Dollar Drive (at Widest Point of Striped Median Island)** | | | | |
| South Edge of Pavement | 1,230 | 490 | 17.5 | 7.0 |
| North Edge of Pavement | 1,160 | 670 | 16.5 | 9.5 |

Note 1: At an 85th percentile vehicle speed of 48 mph.

Source: LSC Transportation Consultants, Inc.