Tom Brohard and Associates

June 20, 2011

Ms. Catherine Engberg
Shute, Mihaly, & Weinberger
396 Hayes Street
San Francisco, California 94102

SUBJECT: Subsequent Mitigated Negative Declaration (SMND) for the Proposed Amendment to the Oakland Zoo Master Plan in the City of Oakland – Traffic Issues

Dear Ms. Engberg:

Tom Brohard, P.E., has reviewed the February 11, 2011 Subsequent Mitigated Negative Declaration (SMND) for the Proposed Amendment to the Oakland Zoo Master Plan (Proposed Project) in the City of Oakland. This review focused on the Project Description (Chapter 2), Transportation and Circulation (Chapter 3.11), data contained in the Transportation Study Technical Appendices (Appendix K), and data contained in the November 2010 Analysis of Oakland Zoo Attendance Related to the New California Exhibit (Appendix D).

It is my understanding that the California Environmental Quality Act (CEQA) requires complete analyses of the environmental effects of the Proposed Project. The traffic and circulation analyses in the SMND, together with several other topics such as air quality, greenhouse gas, and noise, are based on forecast attendance levels at the Oakland Zoo in 2015 and 2035. From my review, these attendance levels appear to be significantly underestimated. The SMND forecast of generally declining attendance levels does not seem to support the significant investments that will be required at the Zoo for the California Exhibit including the aerial people mover.

As discussed throughout this letter, my review disclosed a number of errors in the Transportation and Circulation Section and the related appendix materials. When these errors in the traffic analysis are corrected, a number of additional significant traffic impacts will be created by the Proposed Project at other study intersections such as Golf Links Road at Mountain Boulevard/Zoo Drive where the peak hour traffic signal warrant is already nearly satisfied. In response to issues and concerns outlined in this letter and those expressed by others, an environmental impact report (EIR) must be prepared for the Oakland Zoo Master Plan Amendment to properly identify, evaluate, and analyze the significant traffic impacts that will occur and to propose feasible mitigation measures.

Education and Experience

Since receiving a Bachelor of Science in Engineering from Duke University in Durham, North Carolina in 1969, I have gained over 40 years of professional engineering experience. I am licensed as a Professional Civil Engineer both in

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California and Hawaii and as a Professional Traffic Engineer in California. I formed Tom Brohard and Associates in 2000 and now serve as the City Traffic Engineer for the City of Indio and as Consulting Transportation Engineer for the Cities of Big Bear Lake, Mission Viejo, and San Fernando. I have extensive experience in traffic engineering and transportation planning. During my career in both the public and private sectors, I have reviewed numerous environmental documents and traffic studies for various projects.

Proposed Project Will Result in Significant Traffic Impacts

Based on my review of the SMND for the Proposed Amendment to the Oakland Zoo Master Plan, it is my opinion that the Proposed Project will result in significant traffic impacts as follows:

1) Adjustments Must Be Made to Peak Month, Not Average Summer Month – Appendix K-6 provides data regarding the number of vehicles parked on site at the Oakland Zoo during June, July, and August in 2007, 2008, and 2009. The number of parked vehicles during these nine months were averaged to develop a "peak summer month" of 21,877 parked vehicles. This approach is not consistent with requirements of CEQA to analyze what can be reasonably expected with the Proposed Project.

   In 2010, the Institute of Transportation Engineers published Transportation Impact Analyses for Site Development, an ITE Recommended Practice. In regard to seasonal adjustments, Page 22 states "For peak period analysis, the site's anticipated design hour volume will often occur during a seasonal peak period. It is important to select a day that is not the absolute peak but one that might rank as having the 20th to 40th highest hourly volume." Following this accepted industry practice would capture the 95th percentile of the traffic volumes across the year.

   Averaging the number of parked vehicles recorded over three years for the 92 days in June, July, and August does not provide the 20th to 40th highest hourly volume that would occur at the zoo. Averaging the number of parked vehicles recorded in 2007 during these three months significantly lowers the overall monthly average. According to Page 4 of Appendix D, "Zoo hours were extended throughout the summer in 2008 and 2009..." This certainly could account for the higher numbers of parked vehicles on site recorded during 2008 and 2009 during the months of June, July, and August. The numbers of parked vehicles in the same month in 2008 and 2009 are also very consistent with 20,288 in 2008 and 20,047 in 2009 in June, with 23,723 in 2008 and 23,452 in 2009 in July, and with 25,627 in 2008 and 25,024 in 2009 in August.

   To properly adjust traffic counts made at study intersections and to account for higher vehicle parking and attendance at the Oakland Zoo during summer,

factoring to an August baseline using 2008 and 2009 parked vehicle data would provide a proper baseline of what can be reasonably expected. The resulting peak month during the summer (August) would be 25,326 parked vehicles, not 21,877 parked vehicles that were used in the adjustments and subsequent analysis. This will result in factoring of the April weekday counts by 136 percent and factoring of the January Saturday counts by 235 percent.

2) Incorrect Factoring of Traffic Counts to Obtain Baseline Data – Peak hour turning movement traffic counts were made at the seven study intersections on an April weekday in 2009 and on a January Saturday in 2010. To account for seasonal changes in zoo activity, Page 3.11-14 of the SMND states "Weekday AM and PM peak hour turning movement counts, conducted in April, were factored up 117 percent and weekend midday peak hour turning movement counts, conducted in January, were factored up 203 percent." While these adjustments should have been made based on data from August 2008 and August 2009 as discussed above, the factoring based on nine summer months was incorrectly applied in the SMND as discussed below.

   The actual turning movement counts for the AM, PM, and Saturday midday peak hours are included in Appendix K-1. The adjusted turning movement counts for the AM, PM, and Saturday midday peak hours are included in Figure 3.11-3 on Page 3.11-9 of the SMND. The adjusted turning movement counts were then used as the baseline volumes to calculate delay and level of service for existing conditions and as part of the delay and level of service calculations for 2015 and 2035.

   Intersection #1 (Golf Links Road at Mountain Boulevard/Zoo Drive) is the primary vehicle access point for the Oakland Zoo. The actual peak hour factoring at this intersection is significantly less than the factoring identified on Page 3.11-14 as follows:

   - During the weekday PM peak hour in April, 208 northbound left turns from Zoo Drive to Golf Links Road were counted. Figure 3.11-3, the seasonally adjusted volumes, identifies 213 northbound left turns from Zoo Drive to Golf Links Road. The increase of 5 northbound left turns for the seasonal adjustment indicates factoring up by 102 percent, not the 117 percent reported on Page 3.11-14.

   - During the Saturday midday peak hour in January, 109 northbound left turns from Zoo Drive to Golf Links Road were counted. Figure 3.11-3, the seasonally adjusted volumes, identifies 118 northbound left turns from Zoo Drive to Golf Links Road. The increase of 9 northbound left turns for the seasonal adjustment indicates factoring up by 108 percent, not the 203 percent reported on Page 3.11-14.

- During the Saturday midday peak hour in January, 162 eastbound right turns from Golf Links Road to Zoo Drive were counted. Figure 3.11-3, the seasonally adjusted volumes, identifies 259 eastbound right turns from Golf Links Road to Zoo Drive. The increase of 97 eastbound right turns for the seasonal adjustment indicates factoring up by 160 percent, not the 203 percent reported on Page 3.11-14.

The comparison of factoring above to "adjust for the seasonal changes in zoo activity" was done incorrectly at the major vehicle access (the intersection of Golf Links Road at Mountain Boulevard/Zoo Drive) for traffic to and from the Oakland Zoo. This error in developing the baseline traffic volumes at the study intersections for existing conditions also carries through the entire traffic analysis for 2015 and 2035. As a result, the baseline volumes used in the traffic analysis for existing conditions as well as for 2015 and 2035 are much lower than would occur under the properly factored volumes. When corrected, the existing delays will be greater and the level of service will be worse at many of the study intersections. The revised traffic analysis for traffic to and from the Proposed Project will likely show additional significant traffic impacts that have not been identified, evaluated, analyzed, and mitigated.

3) Baseline Traffic Counts Do Not Properly Reflect Extended Summer Hours – Peak hour counts for the traffic analysis were conducted on Tuesday, April 16, 2009 between 7 and 9 AM and from 4 to 6 PM, and on Saturday, January 30, 2010 from Noon to 2 PM. Page 3.11-14 states "In general, the zoo is open daily from 10:00 AM to 4:00 PM. Operating hours are extended on Friday, Saturday, and Sunday during the peak summer months when the zoo is open from 9:30 AM to 6:00 PM."

Weekday peak hour traffic counts conducted in April 2009 that ended at 9 AM would include only a few, if any, visitors to the zoo which opened one hour later at 10 AM. Extended summer hours with the zoo opening at 9:30 AM would be expected to generate some arrivals at the zoo toward the end of 7 to 9 AM count period, but these also were not captured by the April counts.

Weekday peak hour traffic counts conducted in April 2009 that began at 4 PM would include some visitors leaving the zoo after closing at 4 PM. However, the April 2009 PM peak hour counts would not include visitors leaving the zoo between 4 and 6 PM under the extended summer hours with the zoo closing at 6 PM.

According to Page 4 of Appendix D, "Zoo hours were extended throughout the summer in 2008 and 2009 and scaled back to summer weekends only in 2010." Counting of vehicles in peak hours when the zoo was open from 10 AM to 4 PM does not properly include arriving and departing zoo traffic associated with the extended hours from 9:30 AM to 6 PM. The traffic counts

that were made and then "factored" incorrectly as discussed above to obtain the baseline traffic volumes for the traffic analysis also do not include the zoo traffic during weekday peak hours associated with the extended hours. As a result, shorter delays and better associated levels of service at study intersections for baseline conditions are reported in the SMND, and the significant traffic impacts associated with the Proposed Project have not been correctly determined.

4) Baseline Traffic Volume Discrepancies Between Adjacent Intersections – While some peak hour traffic volume forecasts are nearly identical between 2015 and 2035 such as at Intersection #1, Golf Links Road at Mountain Boulevard/Zoo Drive, there are significant traffic volume increases in 2015 and in 2035 at Intersection #2, Golf Links Road at the I-580 Freeway Ramps. Intersections #1 and #2 on Golf Links Road are very close together, separated by only a few hundred feet. In this reach, there is a single driveway on the north side of Golf Links Road serving a Shell Gas Station and there are no driveways along the south side.

   Under these conditions, westbound traffic volumes on Golf Links Road leaving Mountain Boulevard/Zoo Drive should arrive at the I-580 Freeway Ramps. Similarly, eastbound traffic on Golf Links Road leaving the I-580 Freeway Ramps should arrive at Mountain Boulevard/Zoo Drive. However, my review of the departing and arriving traffic volumes shown for 2015 in Figure 3.11-9 on Page 3.11-35 and those shown for 2035 in Figure 3.11-11 on Page 3.11-42 indicate the following major discrepancies:

   a) 2015 Westbound AM Peak Hour – There are 606 westbound vehicles on Golf Links Road west of Mountain Boulevard/Zoo Drive (8 northbound left turns from Zoo Drive plus 370 westbound thru on Golf Links Road plus 228 southbound right turns from Mountain Boulevard) but only 523 westbound vehicles are on Golf Links Road east of the I-580 Freeway Ramps (333 westbound thru on Golf Links Road plus 190 westbound right turns to the I-580 Freeway Ramp). The departing and arriving peak hour volumes between Intersection #1 and #2 must be balanced to account for the decrease of 83 vehicles.

   b) 2015 Westbound PM Peak Hour – There are 729 westbound vehicles on Golf Links Road west of Mountain Boulevard/Zoo Drive (191 northbound left turns from Zoo Drive plus 208 westbound thru on Golf Links Road plus 330 southbound right turns from Mountain Boulevard) but only 537 westbound vehicles are on Golf Links Road east of the I-580 Freeway Ramps (398 westbound thru on Golf Links Road plus 139 westbound right turns to the I-580 Freeway Ramp). The departing and arriving peak hour volumes between Intersection #1 and #2 must be balanced to account for the decrease of 192 vehicles.

c) 2015 Eastbound AM Peak Hour – There are 395 eastbound vehicles on Golf Links Road east of the I-580 Freeway Ramps (140 northbound right turns from I-580 Freeway Ramp plus 255 eastbound thru on Golf Links Road) but 523 eastbound vehicles are on Golf Links Road west of Mountain Boulevard/Zoo Drive (267 eastbound left turns to Mountain Boulevard plus 216 eastbound thru on Golf Links Road plus 40 eastbound right turns to Zoo Drive). The departing and arriving peak hour volumes between Intersection #2 and #1 must be balanced to account for the increase of 128 vehicles.

d) 2015 Eastbound PM Peak Hour – There are 474 eastbound vehicles on Golf Links Road east of the I-580 Freeway Ramps (170 northbound right turns from I-580 Freeway Ramp plus 304 eastbound thru on Golf Links Road) but 625 eastbound vehicles are on Golf Links Road west of Mountain Boulevard/Zoo Drive (290 eastbound left turns to Mountain Boulevard plus 328 eastbound thru on Golf Links Road plus 7 eastbound right turns to Zoo Drive). The departing and arriving peak hour volumes between Intersection #2 and #1 must be balanced to account for the increase of 151 vehicles.

e) 2035 Westbound AM Peak Hour – There are 610 westbound vehicles on Golf Links Road west of Mountain Boulevard/Zoo Drive (7 northbound left turns from Zoo Drive plus 375 westbound thru on Golf Links Road plus 228 southbound right turns from Mountain Boulevard) but 1,251 westbound vehicles are on Golf Links Road east of the I-580 Freeway Ramps (796 westbound thru on Golf Links Road plus 455 westbound right turns to the I-580 Freeway Ramp). The departing and arriving peak hour volumes between Intersection #1 and #2 must be balanced to account for the increase of 641 vehicles.

f) 2035 Westbound PM Peak Hour – There are 732 westbound vehicles on Golf Links Road west of Mountain Boulevard/Zoo Drive (191 northbound left turns from Zoo Drive plus 211 westbound thru on Golf Links Road plus 330 southbound right turns from Mountain Boulevard) but 1,027 westbound vehicles are on Golf Links Road east of the I-580 Freeway Ramps (801 westbound thru on Golf Links Road plus 226 westbound right turns to the I-580 Freeway Ramp). The departing and arriving peak hour volumes between Intersection #1 and #2 must be balanced to account for the increase of 295 vehicles.

g) 2035 Westbound Saturday Peak Hour – There are 377 westbound vehicles on Golf Links Road west of Mountain Boulevard/Zoo Drive (112 northbound left turns from Zoo Drive plus 205 westbound thru on Golf Links Road plus 60 southbound right turns from Mountain Boulevard) but 945 westbound vehicles are on Golf Links Road east of the I-580 Freeway

Ramps (512 westbound thru on Golf Links Road plus 433 westbound right turns to the I-580 Freeway Ramp). The departing and arriving peak hour volumes between Intersection #1 and #2 must be balanced to account for the increase of 568 vehicles.

With no other place for vehicles to go (other than the Shell gas station), the traffic volumes departing from one intersection must be approximately equal to the traffic volumes arriving at the adjacent intersection on Golf Links Road. As presented in the traffic analysis, there are significant decreases and increases in the traffic volumes between Intersections #1 and #2. The analysis of baseline conditions in 2015 and in 2035 for the two intersections along the main route used to and from the Oakland Zoo is based on these incorrect baseline volumes. In addition to these errors, there may be other inconsistencies between other adjacent study intersections. The analysis of the traffic impacts of the Proposed Project for 2015 and 2035, based upon the incorrect and unbalanced baseline volumes, is flawed.

5) Trip Generation for Proposed Project Omits New Employees – Page 2-39 of the Project Description indicates there will be 30 new employees with the Proposed Project including 29 new employees at the proposed California Exhibit and one new employee at the proposed Veterinary Medical Hospital. Page 2-39 concludes that "To be conservative, the environmental analysis assumes that up to 30 new employees would be at the zoo at any one time." Page 3.11-17 also states "The California Exhibit included in the Master Plan amendment would employ approximately 29 new employees..."

Both the Trip Generation Table in Appendix K-6 and Table 3.11-6 on Page 3.11-18 indicate one new employee at the proposed Veterinary Medical Hospital with the Proposed Project. This one new employee is forecast to generate one inbound AM peak hour trip on weekdays and one outbound PM peak hour trip on weekdays. No trips are shown in these tables for the other 29 new employees at the California Exhibit.

Assuming that most, if not all, of the other 29 new employees will work regular 8 AM to 5 PM hours on weekdays and that most, if not all, will drive alone, then there will be 30 inbound AM peak hour trips on weekdays and 30 outbound PM peak hour trips on weekdays. The traffic analysis has not accounted for these additional 29 trips in each weekday peak hour.

The additional AM and PM peak hour trips created by the other 29 new employees must be added into the trip generation for the Proposed Project. These trips must then be distributed to the study intersections and analyzed to correctly determine the significant traffic impacts created by the Proposed Project, together with measures to mitigate these significant traffic impacts.

6) Vehicle Occupancy Less Than 3.6 Persons/Vehicle Results in More Trips – Table 3.11-3 on Page 3.11-15 provides annual Zoo attendance of 670,700 for fiscal year 2008/09. The column identifying "Vehicles" shown in this table is footnoted by "3.6 visitors/vehicle, ratio provided by Oakland Zoo staff." This table indicates 186,306 parked vehicles on site during fiscal year 2008/09. This number of parked vehicles derived by using 3.6 visitors per vehicle does not match the actual parked vehicle data provided in the SMND Appendices.

Appendix K-6 provides data regarding the number of vehicles parked on site at the Zoo from month to month between September 2006 and October 2009. From July 2007 through June 2008, there were 185,267 vehicles parked on site at the Zoo during the 2007/08 fiscal year. From July 2008 through June 2009, there were 194,037 vehicles parked on site at the Zoo during the 2008/09 fiscal year. With 670,700 visitors in fiscal year in 2008/09, the number of visitors per vehicle was actually 3.46, not 3.6 visitors per vehicle. Importantly, there were actually 8,770 more vehicles on the streets traveling to and from the Zoo during fiscal year 2008/09 than the assumption of 3.6 visitors per vehicle yields.

The number of visitors per vehicle appears to be dropping from fiscal year to fiscal year. According to Table 2 on Page 3 of Appendix D of the SMND, recent attendance at the Oakland Zoo, indicates 653,400 visitors in fiscal year 2007/08. Dividing this number of visitors by the number of parked vehicles counted on site in Appendix K-6 (185,267) results in an average of 3.53 persons per vehicle for fiscal year 2007/08. This value is also less than the assumption of 3.6 used to forecast future traffic flow based on annual attendance at the Oakland Zoo.

The number of parked vehicles on site is not provided in Appendix K-6 beyond October 2009, although the SMND does provide annual attendance for fiscal year 2009/10. The number of visitors per vehicle for fiscal year 2009/10 must be calculated to determine if the decreasing vehicle occupancy trend is continuing so that the number of future vehicle trips can be properly forecast in the traffic analysis.

Additional vehicles parked off site would further lower the average number of persons per vehicle ratio, and correspondingly increase the number of vehicle trips to and from the Zoo. Page 3.11-11 states "Visitors do not routinely use on-street parking or parking within the residential areas adjacent to the zoo because space is typically available in the zoo parking lots and long walking distances make off-site parking less desirable." In my experience, some people park significant distances away from their destination to either avoid paying for parking at the venue or to gain a quicker departure and avoid congestion within the on-site parking areas. Without actually counting the number of vehicles parked within the residential areas or on other streets

outside the Zoo, more parked vehicles may be generated than just those who chose to park on site. This would result in higher traffic forecasts than have been assumed and subsequently analyzed in the SMND, increasing the number of significant traffic impacts created by the Proposed Project.

7) Significant Traffic Impact at Intersection #2 in 2035 Requires Mitigation – Page 3.11-26 provides the CEQA Thresholds/Criteria of Significance used by the City of Oakland. For a study signalized intersection operating at Level of Service "F", criteria e) indicates the project would have a significant traffic impact if:

   - Total intersection average vehicle delay increases by 2 or more seconds, **OR**
   - Average delay for any of the critical movements increases by 4 or more seconds, **OR**
   - Volume to capacity ratio increases by more than three percent (but only if delay values cannot be measured accurately).

   Page 3.11-48 indicates there is no significant traffic impact at this intersection "Because delay values over 120.0 seconds tend to increase exponentially and are thus generally considered unreliable, the increase in v/c ratio as a result of the buildout of the amended Master Plan traffic was evaluated instead."

   Over the last 11 years, I have reviewed environmental documents prepared for seven different projects in the City of Oakland. In each of these projects, a significant project traffic impact at signalized intersections operating at LOS F occurs in one of three ways as indicated above. None of those traffic analyses have claimed that delay values over 120 seconds are unreliable, and none of those traffic analyses have chosen to ignore any of the three parts of the significance criteria.

   Table 3.11-11 on Page 3.11-44 indicates project traffic will increase average delay by 6.4 seconds in the PM peak hour and by 4.8 seconds in the weekend peak hour, both greater than 2 seconds. The City of Oakland criterion therefore indicates that the Proposed Project creates a significant traffic impact at the intersection of Golf Links Road at the I-580 Freeway Ramp. This significant traffic impact has not been disclosed by the SMND and no mitigation measures have been proposed.

8) Visitor and Traffic Projections Appear to be Underestimated - The SMND's projected attendance after project completion in 2015 and in 2035 appear to be underestimated with little support provided to justify these estimates. The traffic analysis is sensitive to changes in attendance, such that these estimates could greatly alter the traffic analysis. Each 100,000 additional

annual attendance is forecast to generate 7 more AM peak trips, 35 PM peak trips, and 72 Saturday trips. If annual attendance were to reach 1,000,000, then there would be 21 more AM trips every weekday, 105 more PM peak hour trips every weekday, and 216 more midday trips every Saturday. Therefore, adjustments to the annual attendance are likely to result in significant traffic impacts during the PM peak times and on Saturday.

In my opinion, the traffic generated by the Proposed Amendment to the Oakland Zoo Master Plan has the potential to significantly impact study intersections on Golf Links Road and on 106th Avenue. Further study must be undertaken to properly identify the traffic impacts of the Proposed Project. The Proposed Project will have potentially significant traffic impacts that have not been properly disclosed, analyzed, and mitigated. The Project will also have cumulative significant traffic impacts that should be studied through an EIR process. An EIR to propose feasible and effective mitigation measures should be prepared and circulated for public comment. If you have questions regarding these comments, please call me at your convenience.

Respectfully submitted,

Tom Brohard and Associates

Tom Brohard

Tom Brohard, PE
Principal

Enclosure

Tom Brohard, PE

Licenses:	1975 / Professional Engineer / California – Civil, No. 24577 1977 / Professional Engineer / California – Traffic, No. 724 2006 / Professional Engineer / Hawaii – Civil, No. 12321
Education:	1969 / BSE / Civil Engineering / Duke University
Experience:	40 Years
Memberships:	1977 / Institute of Transportation Engineers – Fellow, Life 1978 / Orange County Traffic Engineers Council - Chair 1982-1983 1981 / American Public Works Association - Member

Tom is a recognized expert in the field of traffic engineering and transportation planning. His background also includes responsibility for leading and managing the delivery of various contract services to numerous cities in Southern California.

Tom has extensive experience in providing transportation planning and traffic engineering services to public agencies. Since May 2005, he has served as Consulting City Traffic Engineer three days a week to the City of Indio. He also currently provides "on call" Traffic and Transportation Engineer services to the Cities of Big Bear Lake and San Fernando. In addition to conducting traffic engineering investigations for Los Angeles County from 1972 to 1978, he has previously served as City Traffic Engineer in the following communities:

- Bellflower ..... 1997 - 1998
- Bell Gardens ..... 1982 - 1995
- Huntington Beach ..... 1998 - 2004
- Lawndale ..... 1973 - 1978
- Los Alamitos ..... 1981 - 1982
- Oceanside ..... 1981 - 1982
- Paramount ..... 1982 - 1988
- Rancho Palos Verdes ..... 1973 - 1978
- Rolling Hills ..... 1973 - 1978, 1985 - 1993
- Rolling Hills Estates ..... 1973 - 1978, 1984 - 1991
- San Marcos 1981
- Santa Ana ..... 1978 - 1981
- Westlake Village ..... 1983 - 1994

During these assignments, Tom has supervised City staff and directed other consultants including traffic engineers and transportation planners, traffic signal and street lighting personnel, and signing, striping, and marking crews. He has secured over $5 million in grant funding for various improvements. He has managed and directed many traffic and transportation studies and projects. While serving these communities, he has personally conducted investigations of hundreds of citizen requests for various traffic control devices. Tom has also successfully presented numerous engineering reports at City Council, Planning Commission, and Traffic Commission meetings in these and other municipalities.

In his service to the City of Indio since May 2005, Tom has accomplished the following:

- Oversaw preparation and adoption of the Circulation Element Update of the General Plan including development of Year 2035 buildout traffic volumes, revised and simplified arterial roadway cross sections, and reduction in acceptable Level of Service criteria under certain constraints

- Oversaw preparation of fact sheets/design exceptions to reduce shoulder widths on Jackson Street over I-10 as well as justifications for protected-permissive left turn phasing at I-10 on-ramps, the first such installation in Caltrans District 8 in Riverside County; oversaw preparation of plans and provided assistance during construction of a $1.5 million project to install traffic signals and widen three of four ramps at the I-10/Jackson Street Interchange under a Caltrans encroachment permit issued under the Streamlined Permit Process

- Oversaw preparation of fact sheets/design exceptions to reduce shoulder widths on Monroe Street over I-10 as well as striping plans to install left turn lanes on Monroe Street at the I-10 Interchange under a Caltrans encroachment permit

- Oversaw preparation of traffic impact analyses for Project Study Reports evaluating different alternatives for buildout improvement of the I-10/Monroe Street and the I-10/Golf Center Parkway Interchanges

- Oversaw preparation of plans, specifications, and contract documents and provided assistance during construction of 22 new traffic signal installations

- Oversaw preparation of plans and provided assistance during construction for the conversion of two traffic signals from fully protected left turn phasing to protected-permissive left turn phasing with flashing yellow arrows

- Reviewed and approved over 450 work area traffic control plans as well as signing and striping plans for all City and developer funded roadway improvement projects

- Oversaw preparation of a City wide traffic safety study of conditions at all schools

- Prepared over 350 work orders directing City forces to install, modify, and/or remove traffic signs, pavement and curb markings, and roadway striping

- Oversaw preparation of engineering and traffic surveys to establish enforceable speed limits on over 125 street segments

- Reviewed and approved traffic impact studies prepared for more than 16 major development projects

Since forming Tom Brohard and Associates in 2000, Tom has reviewed many traffic impact reports and environmental documents for various development projects. He has provided expert witness services and also prepared traffic studies for public agencies and private sector clients.