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September 13, 2016

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SUBJECT: Review of Draft Program Environmental Impact Report for the Southeast Area Specific Plan in the City of Long Beach - Transportation and Traffic Comments

Dear Ms. Black:

As authorized by the Los Cerritos Wetlands Land Trust, I have reviewed the July 2016 Draft Program Environmental Impact Report (Draft EIR) prepared by Placeworks for the Southeast Area Specific Plan (Project) in the City of Long Beach. My review focused on Section 5.16 of the Draft EIR, Transportation and Traffic. I have also reviewed various other sections of the Draft EIR including Section 3 (Project Description), Section 7 (Alternatives), and Appendix J, the April 2016 Final Long Beach Southeast Area Specific Plan Transportation Impact Analysis (TIA) prepared by Fehr & Peers.

Education and Experience

Since receiving a Bachelor of Science in Engineering from Duke University in Durham, North Carolina in 1969, I have gained over 45 years of professional engineering experience. I am licensed as a Professional Civil Engineer both in 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 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. Several recent assignments are highlighted in the enclosed resume.

Southeast Area Specific Plan Draft EIR and TIA Are Flawed

As discussed throughout this letter, the Draft EIR and the supporting TIA for the Southeast Area Specific Plan are flawed. Gridlocked conditions will result on weekdays from the development of 5,439 condominiums-townhomes and 701,344 square feet of retail. Only one of the 15 significant traffic impacts will be mitigated. Additional significant traffic impacts will be identified when weekend traffic conditions are included in the TIA. An alternative to the Proposed Project that does not create any significant traffic impacts must be considered.

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Density of Residential and Retail Land Use Increases Significantly

At buildout, the Proposed Project will significantly increase the density of development in the Southeast Area Specific Plan area in the City of Long Beach. As discussed in the sections that follow in this letter, these significant increases in residential and retail development create significant additional volumes of peak hour trips during weekdays and during weekends as well.

According to Table 3-2 on Page 3-13 of the Draft EIR, the Proposed Project includes these significant increases in development:

- The number of dwelling units will increase from 4,079 units today up to 9,518 units at buildout, an increase of 5,439 residential units. In comparing Table 4-3 on Page 30 with Table 4-1 on Page 29 of the TIA, all of the additional dwelling units will be condominiums-townhomes.

- Population in the Southeast Area Specific Plan will increase from 6,486 people today up to 15,134 people at buildout, a net increase of 8,648 people.

- Commercial/employment space in the Southeast Area Specific Plan area will increase from 2,091,476 square feet today up to 2,665,052 square feet at buildout, a net increase of 573,576 square feet. In comparing Table 4-3 on Page 30 with Table 4-1 on Page 30 of the TIA indicates there will be an increase of 701,344 square feet of retail development, with a slight decrease in the amount of office space making up the difference.

- Employees in the Southeast Area Specific Plan will increase from 3,555 people today up to 4,115 people at buildout, a net increase of 560 employees.

- Hotel rooms in the Southeast Area Specific Plan will increase from 375 rooms today up to 425 rooms at buildout, a net increase of 50 hotel rooms.

While not stated directly, the Proposed Project essentially includes 5,439 new condominium-townhome units and 701,344 square feet of new retail space. Both of these significant increases in land use will result in major increases in peak hour trips on weekdays and on weekends as well. These very large development increases must be tempered and reduced to eliminate the number of resulting significant traffic impacts that are currently forecast to occur.

Increased Land Use Density Adds Significant Weekday Peak Hour Trips

Page 5.16-29 of the Draft EIR states: "The Proposed Project would generate additional vehicular travel in the study area." Table 5.16-5 provides trip generation forecasts for the Proposed Project. The significant increases in

development outlined above are forecast to generate significant additional vehicular trips on area roadways in the Southeast Area Specific Plan as follows:

- AM peak hour trips in the Southeast Area Specific Plan are forecast to increase from 3,047 trips today up to 5,021 trips at buildout, a net increase of 1,974 trips.

- PM peak hour trips in the Southeast Area Specific Plan are forecast to increase from 5,299 trips today up to 8,569 trips at buildout, a net increase of 3,270 trips.

- Daily trips in the Southeast Area Specific Plan are forecast to increase from 65,731 trips today up to 101,170 trips at buildout, a net increase of 35,439 trips.

The additional weekday peak hour trips that will be created by the proposed development directly result in numerous significant traffic impacts at intersections and at freeway locations. Further significant traffic impacts are expected to occur when weekend peak hour trips are analyzed as discussed immediately below.

Additional Weekend Peak Hour Trips Have Not Been Quantified, Analyzed, or Mitigated

Using basic trip generation rates published by the Institute of Transportation Engineers in Trip Generation, 9th Edition, the 5,439 new condominium-townhome units and the new 701,344 square feet of retail development will generate about 62,000 new Saturday daily trips including about 5,600 new Saturday midday peak hour trips. Both of these forecasts are higher than the weekday daily and the weekday PM peak hour trips that have been evaluated in the Draft EIR, even after considering internal trips between the residential and the retail uses. In addition, it is reasonably foreseeable that baseline weekend trips on Saturdays in the Southeast Area Specific Plan are higher than weekday trips, particularly in July when trips to and from the beach and other attractions along the coast are already included.

The Draft EIR and the TIA did not evaluate traffic conditions that already occur in the study area on weekends and did not evaluate cumulative traffic conditions in Year 2035 that are likely to occur without and then with Proposed Project traffic added. To properly evaluate and analyze weekend trips that are higher than weekday trips for the new condominium-townhome and retail development, Saturday conditions in July must be studied and analyzed. Until this additional work is completed, the Draft EIR and the TIA are incomplete as they do not evaluate, analyze, or mitigate the reasonably foreseeable worst case conditions on a Saturday in July when traffic volumes are at their highest in the Southeast Area Specific Plan.

Significant Traffic Impacts Are Not Mitigated In a Timely Manner as Required

Page 3-18 of the Draft EIR states "No specific phasing program has been identified. The proposed project would be implemented on a parcel-by-parcel basis as future development applications are submitted. Public realm improvements would occur as funding becomes available. A generalized phasing plan for development and infrastructure is provided in Section 9.3.2, Implementation Actions and Phasing. However, for purposes of environmental analysis, the Proposed Project is expected to be built out by 2035."

The discussion of project phasing is so generalized that it has no value in determining when construction of various mitigation measures will be required during the 20 years of project buildout. For transportation and traffic, only two scenarios have been analyzed in the Draft EIR – "Existing" as well as "Year 2035 Buildout" both without and then with project traffic. The Draft EIR should have forecast trip generation at the midway point between existing and cumulative buildout, say in Year 2025, but it did not.

The California Environmental Quality Act (CEQA) mandates that mitigation measures must be implemented in a timely manner as they are needed. The Draft EIR and the TIA have failed to address this requirement.

Only One of 15 Significant Traffic Impacts Will Be Mitigated in Year 2035

According to the analysis of "Existing with Project" conditions in Table 5.16-6 on Page 5.16-32, the Proposed Project will create significant traffic impacts at nine of the 21 intersections evaluated in the TIA. Five study intersections will suffer significant traffic impacts in both the AM and in the PM peak traffic hours plus an additional four of the study intersections will suffer significant traffic impacts in the PM peak hour. As shown in Table 5.16-11 on Page 5.16-40, four freeway segments, off-ramps, and on-ramps will operate at a deficient LOS during peak traffic hours with Project traffic. As shown in Table 5.16-14 on Page 5.16-43, both of the CMP intersections studied in the TIA on Pacific Coast Highway at 7th Street and on Pacific Coast Highway at 2nd Street will also be significantly impacted under "Existing with Project" conditions in the PM peak hour.

As shown in Table 5.16-9 on Pages 5.16-36 and 37 of the Draft EIR in the analysis of "Cumulative Year 2035 with Project" conditions, the Proposed Project will create significant traffic impacts at 15 of the 21 intersections evaluated in the TIA. Six of the study intersections will suffer significant traffic impacts in both the AM and in the PM peak traffic hours, one of the study intersections will suffer significant traffic impacts in the AM peak hour, and an additional nine of the study intersections will suffer significant traffic impacts in the PM peak hour. As shown in Table 5.16-14 on Page 5.16-43, both of the CMP intersections studied in the

TIA on Pacific Coast Highway at 7th Street and on Pacific Coast Highway at 2nd Street will also be significantly impacted under "Cumulative Year 2035 with Project" conditions in both the AM and in the PM peak hours. Traffic forecast for the Proposed Project would also result in a significant impact on the main-line segment of State Route 22 and at the Studebaker ramps at State Route 22.

Even with all of these traffic impacts on weekdays that are forecast in the Draft EIR and in the TIA, it is reasonably foreseeable that there will be even more significant traffic impacts on weekends as discussed above. In addition, the Draft EIR and the TIA conclude that only one of the impacted intersections will actually be mitigated, Intersection #15 at Marina Drive and 2nd Street, which is a part of the Proposed Project.

The significant traffic impacts at the other intersections are considered by the Draft EIR to be "significant and unavoidable". In many cases, this conclusion is reached as the significant traffic impact occurs at a location under the jurisdiction of another agency such as Caltrans rather than within the City of Long Beach. In those situations, the City of Long Beach cannot control whether or not Caltrans will implement the required improvements. This condition can be rather easily addressed as discussed on Page 5.16-53 of the Draft EIR regarding traffic signal coordination if the State relinquishes jurisdiction of the State Highways in the Southeast Area Specific Plan to the City of Long Beach.

Before reaching the conclusion that traffic impacts are "significant and unavoidable", CEQA requires lead agencies to impose all feasible alternatives and/or mitigation measures. The supporting TIA must document the geometry of intersections that the Draft EIR finds to have "significant and unavoidable" traffic impacts, then identify the specific traffic measures or alternatives evaluated, and discuss why each of these options cannot feasibly be implemented. Without doing this, the Draft EIR may not dismiss the potential mitigation measures as infeasible.

The Southeast Area Specific Plan must be responsible for reduction of and mitigation of its traffic impacts. Furthermore, an additional alternative that reduces peak hour trips to a level that creates no significant traffic impacts must be developed, analyzed, and evaluated. All feasible mitigation measures must also include significant additions to the proposed TDM plan as discussed below.

Transportation Management Demand (TDM) Plan Requires Enhancements

Page 5.16-50 of the Draft EIR indicates that the City shall establish a Transportation Management Association (TMA) but offers no specifics, evaluation, or enforcement of the potential vehicle trip reductions that could be required. Additional TDM measures must be required to mitigate traffic impacts considered to be "significant and unavoidable". At a minimum, the Draft EIR must

evaluate the potential effectiveness of these additional TDM measures and others that may also be appropriate.

Trip reductions are maximized when an employer provides a coordinated and comprehensive TDM program that includes support measures, transportation services, and economic incentives. The enclosed Pages 122 and 123 of Trip Generation Handbook, 2nd Edition published by the Institute of Transportation Engineers report the typical experience of various TDM measures identified as part of Transit Cooperative Research Program (TCRP) Project B-4. This project surveyed 49 employers with active TDM programs across the nation to ascertain the costs and benefits (both perceived and actual) of TDM programs to employers. Information was also gathered to enable computation of overall reductions in the number of commuter vehicles based on existing TDM programs. The TCRP report categorized the many different TDM programs into the following three categories and reported the following:

"Support measures are measures provided by employers to foster a work environment that supports commuting by alternative modes. Support measures include employee transportation coordinators, rideshare matching, promotional activities, on-site dependent care, and alternative work schedules (such as flexible work hours, compressed work weeks, staggered work hours, and telecommuting). The surveyed TDM programs that provide only support services were measured to have no effect on the number of vehicles (not number of vehicle-trips) used by commuters.

Transportation Services include employer-based efforts such as van-pool programs, shuttle bus service to off-site transit stations, guaranteed ride home programs, and the provision of on-site showers and changing facilities. TDM programs that involve transportation services provided by the employer were measured to have a noticeable impact on the number of vehicles (not number of vehicle-trips) used by commuters (an average 8 percent reduction in the number of vehicles at the survey sites).

Economic Incentives are any steps taken by an employer to provide a monetary incentive for employees to use an alternate travel mode. These include transit subsidies, parking fees for non-rideshare vehicles, parking discounts for rideshare vehicles, and transportation allowances. TDM programs with economic incentives to not drive alone were found to reduce the number of commuter vehicles generated by an employment site (not number of vehicle-trips) by an average of 16 percent.

Finally, TDM programs that combine economic incentives with transportation services produce the most significant effect on commuter vehicles (not vehicle-trips) generated by a site (an average 24 percent reduction at survey sites)."

TDM measures suggested must include support, transportation, and economic incentive measures. Only by adopting all feasible measures would the Southeast Area Specific Plan be able to realize the full benefits of TDM measures – benefits that the TCRP report found could result in an average 24% reduction in employee trips and benefits that also include reductions in customer trips.

Emergency Vehicle Access Will Be Significantly Impacted

Page 5.16-44 of the Draft EIR indicates that the Proposed Project will have a less than significant impact on emergency access, indicating that "traffic and circulation components of the proposed project would be designed and constructed in accordance with all applicable LBFD design standards for emergency access." While the Proposed Project must meet the City Fire Department standards, 12 of the 21 study intersections are forecast to operate at LOS E or LOS F during one or both peak hours in Year 2035. As defined in Table 5.16-1 on Pages 5.16-11 and 12, significant congestion with extreme traffic delays will occur under these conditions.

Under capacity conditions at LOS E and under gridlock conditions at LOS F, vehicles will be queued back significant distances in all traffic lanes on the approaches to congested signalized intersections. Stopped vehicles will not be able to maneuver out of the path of the emergency vehicle as the adjacent lanes on the approaches to the gridlocked traffic signals will already be occupied by other vehicles. This is a significant impact and must be fully evaluated and mitigated.

The City cannot simply find that impacts to emergency access are unavoidable. Instead, in a revised EIR, the City must fully explain and support the Draft EIR's broad statement that "...impacts on emergency access would be less than significant." A revised EIR must show that the City has analyzed both LOS E and gridlock conditions at LOS F throughout the Southeast Area Specific Plan and has mitigated these impacts to significantly reduce or eliminate health and safety risks resulting from delays to emergency vehicles.

Technical Errors in the Traffic Analysis Must Be Corrected

My review of the Draft EIR and the supporting TIA also indicates a number of technical errors and inconsistencies in the Transportation and Traffic Analysis of the Project. Some of the results reported in various tables throughout the Draft EIR are illogical as adding more traffic without providing physical improvements cannot reduce delay, and no physical improvements are planned.

In addition to the other concerns raised above, each of the technical errors identified below must be addressed and reevaluated through additional study in a revised and recirculated Draft EIR as follows:

1) Traffic Analyses for Year 2015 for Intersections Are Faulty – There are inconsistencies in the evaluation of baseline (Year 2015) conditions and those for cumulative (Year 2035) conditions for the same intersection without Project traffic. While not possible, intersection performance is shown to improve by adding traffic without making any physical improvements. The inconsistencies between Table 5.16-2 on Page 5.16-13 and Table 5.16-8 on Page 5.16-34 of the Draft EIR must be reconciled to provide proper traffic analyses of the Project. As one example of this, please see below regarding the faulty traffic analysis of the intersection of Channel Drive and Pacific Coast Highway (#10):

   a) Channel Drive and Pacific Coast Highway (#10) – AM Peak – For this intersection, Table 5.16-2 indicates delay of 16.0 seconds and Level of Service (LOS) B for the existing baseline conditions in the AM peak in 2015. In 2035 with higher traffic volumes than 2015 and without any identified traffic improvements, delay is reduced to 15.1 seconds with performance at LOS B without Project traffic. Without improvements, adding traffic to the intersection cannot reduce delay.

   b) Channel Drive and Pacific Coast Highway (#10) – PM Peak – For this intersection, Table 5.16-2 indicates delay of 13.0 seconds and Level of Service (LOS) B for the existing baseline conditions in the PM peak in 2015. In 2035 with higher traffic volumes than 2015 and without any identified traffic improvements, delay is reduced to 11.6 seconds with performance at LOS B without Project traffic. Without improvements, adding traffic to the intersection cannot reduce delay.

2) Traffic Analyses for Year 2035 for Intersections are Faulty – There are inconsistencies in the evaluation of cumulative (Year 2035) conditions without Project traffic and those for cumulative (Year 2035) conditions for the same intersection with Project traffic. While not possible, intersection performance is shown to improve by adding traffic without making any physical improvements. The inconsistencies between Table 5.16-8 on Page 5.16-34 and Table 5.16-9 on Page 5.16-36 of the Draft EIR must be reconciled to provide proper traffic analyses of the Project. As examples, please see below regarding the faulty traffic analysis of several intersections:

   a) Channel Drive and Pacific Coast Highway (#10) – AM Peak – For this intersection, Table 5.16-8 indicates delay of 15.1 seconds and Level of Service (LOS) B for cumulative conditions in the AM peak in 2035 without project traffic added. In 2035 with higher traffic volumes with project traffic added and without any identified traffic improvements, delay is reduced to 14.5 seconds with performance at LOS B. Without improvements, adding traffic to the intersection cannot reduce delay.

b) Channel Drive and Pacific Coast Highway (#10) – PM Peak – For this intersection, Table 5.16-8 indicates delay of 11.6 seconds and Level of Service (LOS) B for cumulative conditions in the PM peak in 2035 without project traffic added. In 2035 with project traffic added and without any identified traffic improvements, delay is reduced to 10.0 seconds with performance at LOS A with Project traffic. Without improvements, adding traffic to the intersection cannot reduce delay.

c) Studebaker Road & SR-22 Eastbound Ramps (#11) – AM Peak – For this intersection, Table 5.16-8 indicates delay of 6.8 seconds and Level of Service (LOS) A for cumulative conditions in the AM peak in 2035 without project traffic added. In 2035 with higher traffic volumes and without any identified traffic improvements, delay is reduced to 6.5 seconds with performance at LOS A. Without improvements, adding traffic to the intersection cannot reduce delay.

d) Pacific Coast Highway & 1st Street (#21) – AM Peak – For this intersection, Table 5.16-8 indicates delay of 19.5 seconds and Level of Service (LOS) B for cumulative conditions in the AM peak in 2035 without project traffic added. In 2035 with project traffic added and without any identified traffic improvements, delay is reduced to 19.2 seconds with performance at LOS B with Project traffic. Without improvements, adding traffic to the intersection cannot reduce delay.

The Southeast Area Specific Plan in the City of Long Beach creates significant traffic impacts that have not been properly disclosed, analyzed or mitigated through alternatives and/or traffic improvements. The errors identified in this letter require that each of these issues be reanalyzed and reevaluated through additional study in a revised and recirculated EIR. If you should have any questions regarding these findings, please contact me at your convenience.

Respectfully submitted,

Tom Brohard and Associates

Tom Brohard

Tom Brohard, PE
Principal

Enclosures

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:	45+ Years
Memberships:	1977 / Institute of Transportation Engineers – Fellow, Life 1978 / Orange County Traffic Engineers Council - Chair 1982-1983 1981 / American Public Works Association – Life 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 for 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 $10 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 2008 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 conditions.

- Oversaw preparation of fact sheets/design exceptions to reduce shoulder widths on Jackson Street and on Monroe Street over I-10 as well as justifications for protected-permissive left turn phasing at I-10 on-ramps, the first such installations in Caltrans District 8 in Riverside County; reviewed plans and provided assistance during construction of both $2 million projects to install traffic signals and widen three of four ramps at these two interchanges under Caltrans encroachment permits.

- Reviewed traffic signal, signing, striping, and work area traffic control plans for the County's $45 million I-10 Interchange Improvement Project at Jefferson Street.

- Reviewed traffic impact analyses for Project Study Reports evaluating different alternatives for buildout improvements of the I-10 Interchanges at Jefferson Street, Monroe Street, Jackson Street and Golf Center Parkway.

- Oversaw preparation of plans, specifications, and contract documents and provided construction assistance for over 50 traffic signal installations and modifications.

- Reviewed and approved over 1,200 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.

- Obtained $47,000 grant from the California Office of Traffic Safety and implemented the City's Traffic Collision Database System. Annually reviews "Top 25" collision locations and provides traffic engineering recommendations to reduce collisions.

- Prepared over 900 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 400 street segments.

- Reviewed and approved traffic impact studies for more than 35 major projects and special events including the annual Coachella and Stagecoach Music Festivals.

- Developed and implemented the City's Golf Cart Transportation Program.

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.

Trip Generation Manual, 9th Edition

Volume 1: User's Guide and Handbook

The Institute of Transportation Engineers is an international educational and scientific association of transportation professionals who are responsible for meeting mobility and safety needs. ITE facilitates the application of technology and scientific principles to research, planning, functional design, implementation, operation, policy development and management for any mode of ground transportation. Through its products and services, ITE promotes professional development of its members, supports and encourages education, stimulates research, develops public awareness programs and serves as a conduit for the exchange of professional information.

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ed at the site. For example, the TDM program may only affect commuters who travel outside the peak hour.

Data Isolating TDM Effects

There are **very little controlled before-and-after data** for which the only change is the initiation of TDM programs or transit services. Traditionally, the pre-TDM mode shares are determined by survey (e.g., asking the employee how he/she commuted six months before). This method relies on the memory of the survey respondent and may not adequately account for potential bias on the part of the respondent or on the impacts of any employee turnover.

The design, initiation and operation of TDM and transit programs for which trip reductions are being sought are traditionally the responsibility of individual employers, groups of employers (e.g., through a transportation management association), or a regional or local governmental agency. Therefore, these **actions are not site-driven** which is different from all other trip generation estimating applications. There are exceptions, of course. Some site-driven measures can have a significant bearing on TDM program effectiveness (e.g., the provision of on-site services, the limitation of the on-site parking supply) while others have merely minor effects (e.g., sidewalks to neighboring sites, bus stop shelters).

The concerns over the reported experience as described above may on first inspection appear to be relatively insignificant. However, the potential error introduced by these TDM/transit factors (for the sake of argument, between 5 and 10 percent) is nearly as great as the anticipated trip reductions attributable to TDM/transit (described later in Section B.3 as 5 to 20 percent). Therefore, these data need to be used with extreme caution.

B.3 Reported Typical Experience TCRP Project B-4—Cost-Effectiveness of TDM Programs

As part of Transit Cooperative Research Program (TCRP) Project B-4, 49 employers with active TDM programs were surveyed nationwide. The primary purpose of the survey was to ascertain the costs and benefits (both perceived and actual) of TDM programs to employers. In addition, information was gathered that would enable the computation of overall reductions in the number of commuter vehicles based on the TDM programs in place. The following presents a summary of the survey results as they pertain to trip generation.

CAUTION

The magnitude of the TDM program effects is only an estimate and is not based on actual before/after counts.

Several notes of caution should be emphasized regarding the TCRP study data base.

◆ An employer survey was used to determine the number of vehicles (***not the number of vehicle-trips***) used for commuting by employees. Therefore, the "with-TDM" commute mode shares are only estimates and are **not based on actual vehicle counts.**

◆ Mode shares are **for commuters only.** The trip generation rates for non-commuter trips generated at a place of employment (e.g., visitors, deliveries, non-commute trips by on-site employees) are not included in the trip reduction estimates attributable to TDM programs.

◆ Trip reduction estimates are for commuter trips spread **throughout the day.** The values are at best suitable for an overall peak period but may not be valid estimates for a particular peak hour.

◆ To quantify the trip reduction benefits of a TDM program at an individual site, it is necessary to compare the "after" condition with the "before" condition. However, the data on **"pre-TDM" mode shares are not available.** The TCRP study assumed that the "before-TDM" baseline value should correspond to the overall mode share distribution for the surrounding area (i.e., ambient conditions), based on U.S. Bureau of the Census data.

◆ Trip reduction estimates are based on **small sample sizes** (typically 10 or fewer sites).

The following classification scheme was used in the TCRP report to categorize the many TDM programs into those that are *supportive* of persons willing to commute using an alternative travel mode, actual services that directly *enable* persons to commute using an alternative mode and financial (i.e., cash) incentives that *encourage* commuters to use an alternative travel mode.

Support Measures are measures provided by employers to foster a work environment that supports commuting by alternative modes. Support measures include employee transportation coordinators, rideshare matching, promotional activities, on-site dependent care and alternative work schedules (such as flexible work hours, compressed work weeks, staggered work hours and telecommuting).

> *The surveyed TDM programs that provide only **support services** were measured to have **no effect** on the number of vehicles (not number of vehicle-trips) used by commuters.*

Transportation Services include employer-based efforts such as vanpool programs, shuttle bus service to off-site transit stations, guaranteed ride home programs and the provision of on-site showers and changing facilities.

> *TDM programs that involve **transportation services** provided by the employer were measured to have a noticeable impact on the number of vehicles (not number of vehicle-trips) used by commuters (an average 8 percent reduction in the number of vehicles at the survey sites).*

Economic Incentives are any steps taken by an employer to provide a monetary incentive for employees to use an alternate travel mode. These include transit subsidies, parking fees for non-rideshare vehicles, parking discounts for rideshare vehicles and transportation allowances.

> *TDM programs with **economic incentives** to not drive alone were found to reduce the number of commuter vehicles generated by an employment site (not in number of vehicle-trips) by an average of 16 percent.*

> *Finally, TDM programs that **combine economic incentives with transportation services** produce the **most significant effect** on commuter vehicles (not vehicle-trips) generated by a site (an average 24 percent reduction at survey sites).*

Oregon Department of Transportation—Transportation Impact Factors

The State of Oregon sponsored a study with the intent of estimating the impacts of urban form, TDM programs and transit services on travel behavior. Tables B.1, B.2 and B.3 are extracted from that study as provided in the ITE Recommended Practice *Traditional Neighborhood Development Street Design Guidelines*, 1999.

CAUTIONS

- **Vehicle trip reduction factors are only for commute trips (not all trips generated by a site)**
- **Vehicle trip reduction factors are for all commute trips (not just those during a peak hour)**
- **Vehicle trip reduction factors include trip reductions attributable to multi-use development**

Table B.1 presents an estimated reduction in site vehicle trip generation for sites with no transit service and as a function of the development pattern and density, pedestrian and bicycle facilities, and other characteristics.

The analyst should note that the larger trip reduction factors are achieved with development patterns that ITE would consider multi-use (see Chapter 7 of this handbook). For example, the 7 percent reduction is associated with a "mixed-use commercial...development that includes residential units." For multi-use development sites, the guidelines and trip estimation methodology presented in Chapter 7 should be used rather