CITY OF CARLSBAD TRANSPORTATION IMPACT ANALYSIS GUIDELINES

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1. BACKGROUND

Projects in the City of Carlsbad may require an analysis and evaluation of project-specific transportation impacts to comply with the California Environmental Quality Act (CEQA) and City regulations. These *Transportation Impact Analysis Guidelines* provide direction for this review consistent with the General Plan Mobility Element vision that "seeks to enhance vehicle, walking, bicycling, and public transportation systems options within Carlsbad, and improve mobility through increased connectivity and intelligent transportation management." The *Transportation Impact Analysis Guidelines* define the process used to review projects to reflect the Carlsbad Community Vision core values related to sustainability, neighborhood revitalization, access to recreation, active transportation, and healthy lifestyles.

The *Transportation Impact Analysis Guidelines* eliminate the requirement to evaluate intersections using methodologies based on auto delay that have historically been used in the City of Carlsbad consistent with the following statement taken from the Governor's Office of Planning and Research website:

> *Governor Brown signed Senate Bill (SB) 743 (Steinberg, 2013), which creates a process to change the way that transportation impacts are analyzed under CEQA. Specifically, SB 743 requires OPR to amend the CEQA Guidelines to provide an alternative to LOS for evaluating transportation impacts. Particularly within areas served by transit, those alternative criteria must "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." (Public Resources Code Section 21099(b)(1).) Measurements of transportation impacts may include "vehicle miles traveled, vehicle miles traveled per capita, automobile trip generation rates, or automobile trips generated." (Ibid.) Once the CEQA Guidelines are amended to include those alternative criteria, auto delay will no longer be considered a significant impact under CEQA. (Id. at subd. (b)(2).) Transportation impacts related to air quality, noise and safety must still be analyzed under CEQA where appropriate. (Id. at subd. (b)(3).) (http://www.opr.ca.gov/ceqa/updates/sb-743/)*

While the analysis of auto delay will no longer be required to comply with CEQA, the Growth Management Program (GMP) established by the City of Carlsbad in 1986 requires an evaluation of roadway facilities. The GMP ensures that "development does not occur unless adequate public facilities and services exist or will be provided concurrent with new development." The *Citywide Facilities and Improvements Plan* (last amended August 22, 2017) states that "when individual development projects are considered, a public facilities adequacy analysis will be provided as part of the report on the project to ensure that it is consistent with both the Citywide and Local Zone Plan." The Transportation Impact Analysis reports on the adequacy of the transportation facilities according to the following performance standards established in the current *Citywide Facilities and Improvements Plan*:

> *Implement a comprehensive livable streets network that serves all users of the system – vehicles, pedestrians, bicycles and public transit. Maintain LOS D or better for all modes that are subject to this multi-modal level of service (MMLOS) standard, as identified in Table 3-1 of the General Plan Mobility Element, excluding LOS exempt intersections and streets approved by the City Council.*

These concepts are codified in Section 21.90.080 of the Carlsbad Municipal Code (Growth Management) that states:

> *If at any time after preparation of the local facilities management plan the performance standards established by a plan are not met then no development permits or building permits shall be issued within the local zone until the performance standard is met or arrangements satisfactory to the City Council guaranteeing the facilities and improvement have been made.*

An annual Traffic Monitoring Program (TMP) was also established as part of the Growth Management Plan to monitor the transportation facilities according to the established performance standards at that time. The TMP historically evaluated key intersections and roadway segments using traffic data collected each summer reflecting traditional morning and afternoon peak hour traffic conditions. The findings and recommendations were summarized in an annual TMP report, which provided the basis for determining if the annual growth in traffic was compliant with the GMP. The GMP monitoring program will be updated to be consistent with these *Transportation Impact Analysis Guidelines*.

In 2015, the City of Carlsbad adopted the General Plan Update (GPU) Mobility Element, which includes a "Livable Streets Vision and Strategies" section. It is consistent with the California Complete Streets Act (AB-1358) which requires cities in California to plan for a balanced, multi-modal transportation system that meets the needs of all travel modes. It is a fundamental shift in how the city will plan and design the street system viewing streets as a public space that serves all users of the system (e.g., elderly, children, bicycles, pedestrians). The *Mobility Element* recognizes that each street within the city is unique given its geographic setting, adjacent land use, and the desired use of that facility. It identifies a street typology (Fig. 1) appropriate for the uniqueness of the street and identifies which modes of travel (pedestrian, bicycle, vehicles, transit) should be accommodated on that street. According to the *Mobility Element,* vehicular level of service "will be determined by the most recent version of the Highway Capacity Manual." The *Mobility Element* also established a new Multi-Modal Level of Service (MMLOS) methodology for pedestrian, bicycle and transit transportation modes.

The *Transportation Impact Analysis Guidelines* provide a detailed description of the methodology to be followed in identifying project impacts for applicable transportation facilities in compliance with applicable federal, state and local requirements (e.g., CEQA, GMP and the 2015 General Plan Mobility Element).

2. PURPOSE & OBJECTIVES OF TRANSPORTATION IMPACT ANALYSES

2.1 Purpose of Transportation Impact Analyses

Transportation Impact Analyses (TIA's) forecast, describe, and analyze the effect a development will have on the existing and future circulation infrastructure for all transportation modes. The purpose of the TIA is to assist engineers and planners in both the development community and public agencies when making land use and other development decisions. A TIA quantifies the changes in traffic levels and translates these changes into transportation system impacts in the vicinity of a project. These findings can then be used to determine project specific improvements or mitigation measures to offset the project's impacts to the transportation system. If certain circumstances are met the General Plan Update allows some street facilities to be exempt from the LOS standard as approved by the City Council.

2.2 Objectives of TIA Guidelines

The following guidelines were prepared to assist the City of Carlsbad in promoting consistency and uniformity in TIAs. All Mobility Element roadways, all State routes and freeways (including metered and unmetered ramps), and all pedestrian, bicycle and transit facilities that are impacted should be included in each study.

The following Mobility Element Implementing Policies provide direction for the *Traffic Impact Analysis Guidelines*:

- *Apply and update the city's multi-modal level of service (MMLOS) methodology and guidelines…. Utilize the MMLOS methodology to evaluate impacts of individual development projects and amendments to the General Plan on the city's transportation system. (Policy 3-P.3)*

- *Implement the city's MMLOS methodology and maintain LOS D or better for each mode of travel for which the MMLOS standard is applicable… (Policy 3-P.4)*

- *Require developers to construct or pay their fair share toward improvements for all modes consistent with this Mobility Element, the Growth Management Plan, and specific impacts associated with their development. (Policy 3-P.5)*

- *Utilize transportation demand management strategies, non-automotive enhancements (bicycle, pedestrian, transit, train, trails, and connectivity), and traffic signal management techniques as long-term transportation solutions and traffic mitigation measures to carry out the Carlsbad Community Vision. (Policy 3-P.8)*

- *Develop and maintain a list of street facilities where specific modes of travel are exempt from the LOS standard (LOS exempt street facilities), as approved by the City Council. For LOS exempt street facilities, the city will not implement improvements to maintain the LOS standard outlined in Policy 3-P.4 if such improvements are beyond what is identified as appropriate at build out of the General Plan... (Policy 3-P.9)*

- *Require new development that adds vehicle traffic to street facilities that are exempt from the vehicle LOS standard (consistent with Policy 3-P.9) to implement (Policy 3-P-11):*

- *Transportation demand management strategies that reduce the reliance on single-occupancy automobile and assist in achieving the city's livable streets vision.*

- *Transportation systems management strategies that improve traffic signal coordination and improve transit service*

Caltrans has slightly different LOS objectives for State highway facilities. For example, Caltrans has a target LOS "C" standard for State highway facilities. Caltrans may defer to the lead agency to determine the appropriate target LOS consistent with the following Mobility Element Implementing Policy:

- *Encourage Caltrans to identify and construct necessary improvements to improve service levels in Interstate-5 and State Route 78. (Policy 3-P.7)*

These guidelines are subject to update as future conditions and experience become available.

2.3 Analysis Strategy for Transportation Impact Analysis

The General Plan Update (GPU) Mobility Element states that:

> *The transportation system envisioned in the 1994 General Plan has largely been realized, with the majority of the street infrastructure constructed to its ultimate configuration. As the city looks increasingly to infill development rather than outward expansion, the primary transportation issues relate to protecting and enhancing the community's quality of life, as reflected in the core values of the Carlsbad Community Vision. The community's vision includes better pedestrian and bicycle connections between neighborhoods, destinations, and different parts of the community, and a balanced transportation system rather than a singular focus on automobile movement.*

Increasing regional travel demand leads to more trips using City of Carlsbad roadway facilities that neither originate nor terminate within the City limits (i.e., "cut-through" or "bypass" traffic). The GPU Mobility Element acknowledged that policies aimed at continuing to expand our roadway facilities to meet ever-expanding demand is counterproductive and likely to conflict with competing community values and objectives listed in the city's Climate Action Plan (CAP). Rather, the City of Carlsbad should best manage and maintain the transportation facilities planned for and constructed consistent with the City's General Plan. As noted above, "auto delay will no longer be considered a significant impact under CEQA." Intersection analysis based on auto delay used for planning purposes have been found to produce:

- recommended mitigation measures that induce traffic and therefore increase congestion
- recommended mitigation measures that do not directly resolve a project's specific impact
- questionable nexus studies
- questionable estimates of reserve capacity
- very specific, but highly inaccurate results (especially in forecasted scenarios)

2.4 Basis for Limiting Delay- Based Intersection LOS

The intersection level of service methodology according to the Highway Capacity Manual involves an evaluation of the average delay experienced by all vehicles using the intersection. The accuracy of these average vehicle delay calculations is directly related to the accuracy of very specific traffic data. This methodology reflects a snapshot in time and is highly appropriate for evaluating intersection geometrics, determining intersection signal timing, or evaluating design alternatives. However, the generalized traffic

data available for planning level decisions does not provide the precision required for this specific level of service calculation, and may yield unreliable or inconsistent results. That is, it is unrealistic to accurately forecast the numerous variables that are required to calculate level of service based on delay. Variations in input variables, variations in peak hour volumes and other factors can result in fluctuations in intersection level of service from one study to another and across different study scenarios for a given project.

The delay-based intersection LOS analysis has a critical limitation; it cannot adequately determine how close traffic volumes are to an operational capacity. The estimate for average delay is related to so many independent variables that it is not designed to determine when an intersection will reach a specific LOS threshold. Specifically, the impact of increased traffic volume depends on what movements are impacted. This means that an intersection experiencing an increase of 10 vehicles turning left at an intersection could result in a failing LOS result, while an increase of 100 vehicles turning right could improve the overall intersection LOS (i.e., the added right turn traffic experiencing below average delay offsets the few vehicles expected to experience above average delay). As noted below, this is the reason why mitigation measures for traffic impacts to signalized intersections often implement improvements to the right turn movements.

Using average delay to evaluate transportation impacts to an intersection tends to identify mitigation measures that don't directly address the main cause of congestion. Furthermore, the proposed improvements may not directly correlate to the traffic generated by the specific project. For example, a significant impact is reported for a proposed project because the traffic at an intersection is forecasted to increase the average delay beyond the LOS E threshold. For this example, the direct project impact is identified to be an excessive queue in the westbound left turn lane. However, to reduce the project's impact to less than significant, an improvement is identified for the southbound right turn movement even though it does not have a queuing problem; that is a southbound right-turn overlap improves overall delay but does not address the excessive queue for the westbound left turn movement. Although the overall delay in this example is reported to fall below the level of significance, the proposed project does not include a mitigation measure that directly addresses the project's impact.

These are the primary reasons why the *Transportation Impact Analysis Guidelines* transitioned from the granular detail of the intersection LOS methodology based on the Highway Capacity Manual. The City Traffic Engineer / City Engineer will retain the discretion to add specific intersections to the study area to be analyzed using a methodology consistent with the latest version of the Highway Capacity Manual.

2.5 New Approach for Evaluating Traffic Impacts

These guidelines shift the focus of auto level of service from the subjective nature of intersection delay calculations to an approach evaluating traffic impacts using two methodologies:

- a corridor operations analysis based on roadway capacity according to the Highway Capacity Manual and subject to the LOS standard; and
- a turning movement needs assessment for intersections.

Evaluating corridors allows the City to assess the ability for the existing and future facilities to carry through traffic (i.e., how is the experience of drivers traveling through several intersections along the corridor). The methodology proposed for analyzing corridors includes factors that reflect the

understanding that signalized intersections tend to be the controlling factor for determining a roadway's capacity. The corridor analysis is focused on identifying the need to add travel lanes necessary to serve the mainline traffic; and a separate evaluation is needed of the capacity of the side streets and turning lanes at intersections along a corridor.

To address potential operational and capacity issues at signalized intersections, TIA's will be required to include an analysis of the queues for left and right turning movements. The queue analysis will determine if adequate turn lanes and adequate queue storage is provided at the signalized intersections within the project study area. Queues that exceed capacity affect the carrying capacity of the roadway (i.e., automobiles that can't queue up in the turn lane will block the lanes serving through movements and reduce main-line capacity). The queue analysis will determine where new turn lanes are needed and where existing turn pockets may need to be lengthened to improve corridor performance and address potential safety issues. **As stated above, transportation impacts related to safety must still be analyzed under CEQA where appropriate.**

Traffic signal warrants will also need to be conducted for unsignalized intersections in the study area.

2.6 Approach to Mitigating Impacts

The corridor LOS analysis coupled with a turning movement needs assessment will identify the appropriate roadway facility improvements needed to be identified in the TIA according to the city's GMP.

The City of Carlsbad recognizes that trying to build its way out of congestion is unsustainable and may conflict with objectives in the Climate Action Plan and General Plan. The General Plan allows for exemptions to the levels of service standards when specific criteria are met. Theses exemptions require mitigation measures that rely on management tools that include: a) Transportation Demand Management (TDM)[1] strategies that provide goods and services to the public in a way that reduces the demand for auto travel- especially during peak periods; and b) Transportation Systems Management (TSM)[2] strategies that improve traffic flow so that people can travel in autos more efficiently without widening roadways. TIAs are expected to include mitigation measures that support TDM objectives to provide viable options to single occupancy vehicle trips and TSM measures that improve the efficiency of the existing roadway system.

The General Plan prioritized shifting travel modes away from the single occupancy vehicle to shared mobility choices, such as vanpool, carpool, walking, bicycling and taking transit. These Transportation Impact Analysis Guidelines integrate the new MMLOS methodology that will be used to determine gaps in the existing infrastructure for all modes. It also identifies requirements for mitigating project impacts and providing enhanced and expanded vehicle, bicycle, pedestrian and transit facilities adjacent to the project site.

[1] Also known as "Travel Demand Management" and "Traffic Demand Management"
[2] Also known as "Traffic Signal Management" and "Traffic Systems Management"

3. TIA SCOPING REQUIREMENTS

Prior to initiating a TIA, a scope of work shall be submitted, reviewed, and approved by City staff. Special situations may call for variation from these guidelines, which will be discussed during the scoping process. When state facilities are included within a project study area, Caltrans and the City of Carlsbad should agree on the specific methods used in TIAs involving any State Route facilities, including metered and unmetered freeway ramps.

3.1 Scoping Agreement

Early consultation among the development community, City of Carlsbad, other affected jurisdictions, and Caltrans is required to establish the base input parameters, assumptions, and analysis methodologies for the TIA. A Scoping Agreement with City of Carlsbad shall be filed prior to initiating the Transportation Impact Analysis report (refer to **Appendix A** of these guidelines).

The Scoping Agreement ensures an understanding of the level of detail and the assumptions required for the analysis. Always check with City staff for their concerns prior to preparing the initial Scoping Agreement. For straightforward studies prepared by consultants familiar with these TIA procedures, a telephone call or e-mail may suffice. For consultants unfamiliar with City requirements or for more complex projects, a project initiation meeting is recommended prior to submitting or concurrently with the submittal of the initial Scoping Agreement.

3.2 Facilities to be Included in the Study Area

All projects access points and on-site circulation will be identified in the study area. The geographic extent of the study area is described for each mode that is subject to evaluation below. All TIAs shall include a project study map according to Section 3.3 that defines all transportation facilities to be evaluated according to this section.

The modes that will be evaluated are based on the street typology for roadways connecting the project to the citywide transportation system and the location of the project. **Figure 1** on the following page illustrates the mode analysis required for each Mobility Element roadway in the City of Carlsbad. The extent to which the analysis is conducted is described later in these guidelines. The following outlines the guidelines for determining the geographic area to be examined in the studies:

AUTO:

INTERSECTIONS: All intersections within 0.25 miles of a project access points serving vehicles will be included in the study area. Additional intersections within 0.25 to 0.5 miles from the project access points may also be added to the study area at the discretion of the City Engineer / City Traffic Engineer.

ROADWAY SEGMENTS:

- Non-freeway roadway segments that are subject to Auto MMLOS Criteria and expected to experience an increase in project traffic equal to 50 or more peak-hour trips in either direction of travel.
- Freeway Mainline Segments where the project adds 50 or more peak-hour trips in either direction of travel
- Freeway Entrance and Exit Ramps where the proposed project will add 20 or more peak-hour trips and/or cause any traffic queues to exceed ramp storage capacities.

PEDESTRIAN:

- All pedestrian facilities that are directly connected to project access points will be included in the study area
- All pedestrian facilities adjacent to the project development site that provide direct pedestrian access to the project site will be included in the study area.
- The analysis of each pedestrian facility will extend in each direction to the nearest intersection or connection point to a multiuse trail or path. The study area will extend from the project site (northbound and southbound OR eastbound and westbound) until a Mobility Element Road or Class I trail is reached in each direction.
- Pedestrian facilities shall include all existing and proposed sidewalks, crosswalks, signalized pedestrian phases, and ADA-compliant facilities.
- Pedestrian analysis need only be conducted for the side of the street where the project is located unless the project is located on both sides of the street, in which case both sides of the street should be studied.
- Pedestrian analysis shall be conducted for all roadway segments included in the study area that are subject to the Pedestrian MMLOS standards (see Figure 1).

BICYCLE:

- All facilities that bicyclists can legally use shall be included in the study area from each project access point extending in each direction of travel to the nearest intersection, dedicated bicycle facility, or connection point to a multiuse trail or path. Inventory and evaluation shall include all off-street and on-street bicycle paths, lanes and routes.
- Bicycle analysis shall be conducted for both directions of travel (e.g., both sides of the street) of each facility included in the study area.
- Bicycle analysis shall be conducted for roadway segments subject the Bicycle MMLOS standards (see Figure 1).

TRANSIT:

- All existing transit lines and transit stops within a ½ mile walking distances of the project site shall be included in the study area.
- If the roadways within the study area are not subject to Transit MMLOS standards (see Figure 1) no further transit analysis is required.
- All transit lines located within a ½ mile walking distance of the project site will be analyzed according to the Transit MMLOS
- All pedestrian routes linking the project site to a transit line within the ¼ mile walking distance boundary.
- If no transit lines are provided, but the roadways within the study area are identified as subject to transit MMLOS, the project shall complete the MMLOS worksheet for "No Transit Located within ½ Mile Walk from Subject Site or Roadway Segment".
- Transportation Demand Management Measures shall be identified for the project, which may include on-demand transit, flex or other measures.

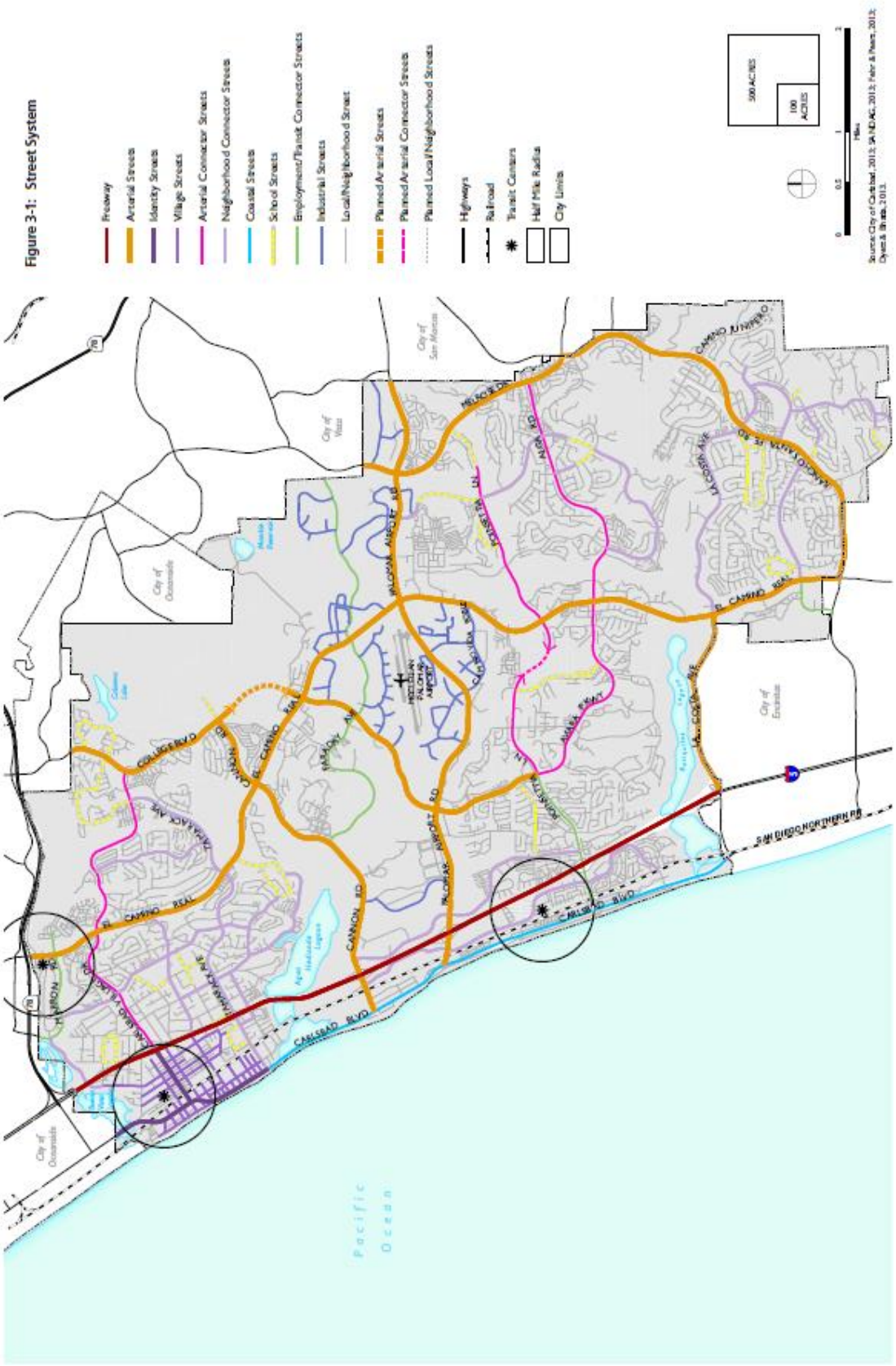

Figure 1: MMLOS Required Analysis by Mobility Element Roadway

3.3 Project Study Area Maps

The project study area shall be clearly reflected in a map included in the TIA report and shall be provided with the Scoping Agreement. Depending upon the size and complexity of the study area, the study area map may need to be represented on multiple figures (study roadways, study intersections, etc.).

Facilities that the City Council have identified as exempt from LOS standards must be clearly identified in the project study area map.

3.4 Vehicle Traffic Data Collection

The vehicle traffic data used in the TIA should generally not be more than 2 years old and should not reflect a temporary interruption (special events, construction detour, etc.) in the normal traffic patterns unless that is the nature of the project itself. If recent traffic data are not available, current counts must be made by the project applicant/consultant. Use of traffic data that does not conform to this requirement must be approved by the City Engineer / City Traffic Engineer as part of the Scoping Agreement prior to inclusion in the TIA.

3.5 Report Categories

The type of TIA required for a project is based on consistency with the General Plan, Specific Plan or zoning as well as the number of vehicular trips generated by the site. The type of TIA required will be determined during the Scoping Agreement phase of the project.

Table 1 outlines the ADT volume threshold requirements used to determine the type of TIA required and the elements included in each level of TIA.

Table 1: Types of Transportation Impact Analysis Report Required & Elements to be Included

Land Use	Forecast Project Generated Auto Trips			
	<500 ADT or <50 peak hour trips	500 to 1,000 ADT or 50 to 100 peak hour trips	1,000 to 2,400 ADT or 100 to 200 peak hour trips	>2,400 ADT or >200 peak hour trips
Conforms to Approved Specific Plan or Master Plan	Level I			
Conforms to General Plan or Zoning	Level I	Level III	Level V	Level VII
Does not Conform to General Plan or Zoning	Level II	Level IV	Level VI	Level VIII

	MMLOS (ped, bike, transit)	Study Area Map	Trip Generation Table	Trip Distribution & Assignment Figure	Signalized Intersection Analysis	Unsignalized Intersection Analysis	Scenarios to be Evaluated: Existing Conditions Analysis	Scenarios to be Evaluated: Cumulative Conditions Analysis	Scenarios to be Evaluated: Horizon Year Analysis	Scenarios to be Evaluated: Regional Travel Demand Model Run	LFMP Specific TIA
Level I	●	●	●								
Level II	●	●	●	●	●	●	●				●
Level III	●	●	●	●	●	●	●				
Level IV	●	●	●	●	●	●	●	●			●
Level V	●	●	●	●	●	●	●	●			
Level VI	●	●	●	●	●	●	●	●	●		●
Level VII	●	●	●	●	●	●	●	●	●	●	
Level VIII	●	●	●	●	●	●	●	●	●	●	●
Section Reference:	Section 7.6	Section 3.3	Section 5.0	Section 6.0	Section 7.1	Section 7.2	Section 4.0				Section 3.7

Note: All TIA's will require MMLOS Analysis. The modes evaluated for each study will be determined by street typology and project location, not total vehicular trips. Refer to Section 3.2 for additional information.

3.6 VMT Analysis

In September 2014, the California Governor signed Senate Bill 743 (SB743), which requires the use of methods other than LOS to define Transportation Impacts in environmental documents. SB743 Guidelines published by the Office of Planning and Research has recommended the use of Vehicle Miles Traveled (VMT) as the replacement for LOS. At the time these guidelines were published, the CEQA checklist had not been updated to reflect this transition from LOS to VMT. And the San Diego Region had yet to adopt a method for calculating and reporting impacts related to VMT.

In November 2017, the Governor's Office of Planning & Research (OPR) released Technical Advisory on Evaluating Transportation Impacts in CEQA, which provides guidance in evaluating transportation impacts under the SB743 changes to CEQA. The document includes a two-year transition period, which will allow regional and local agencies to establish methodologies and metrics for identifying impacts using VMT. Hearings related to the amendments and additions to the State CEQA Guidelines, including changes related to SB743, will occur in March 2018. Following the hearings, the Natural Resources Agency will consider all comments and make appropriate changes. The Natural Resources Agency will then consider the adoption of the new CEQA guidelines.

Local agencies in San Diego County are working toward developing regionally accepted guidelines for conducting VMT analysis consistent with the requirements of SB743. The SANTEC/ITE Transportation Mobility Task Force has established a SB743 working group that is drafting and testing methods for evaluating VMT at both the regional and project level. In addition, SANDAG has published a white paper on VMT modeling in the region. At the time these Transportation Impact Analysis Guidelines were published, a methodology for evaluating impacts and thresholds of significance related to VMT had not been adopted for the San Diego region. Until the methodology and thresholds are adopted, Transportation Impact Analysis reports in the City of Carlsbad may not be required to submit VMT with their technical analysis. However, the need for and approach to VMT analysis may be required for large scale projects, specific plans or project that are anticipated to result in a significant change in community VMT. The need for VMT analysis shall be discussed during the approval of the Scoping Agreement.

The U.S. Department of Transportation published the report *Evolving Use of Level of Service Metrics in Transportation Analysis- California Case Study* stating: "…while VMT is a useful umbrella metric for transportation impacts, it is not designed to be a performance metric for the functioning of the transportation system. Operating an effective transportation system requires a focus on accessibility for people and goods to reach destinations in an efficient manner."

3.7 Local Facility Management Zones

There are 25 local facility management zones in the City of Carlsbad. Each zone has an adopted Local Facility Management Plan (LFMP), which outlines how the zone will be developed, how it will comply with the Growth Management standards, and what public facilities will be provided. In addition, the plan outlines how the facilities will be funded.

Projects that amend the General Plan must conduct an LFMP Specific Traffic Impact Analysis to evaluate the impacts of the General Plan amendment on the facilities located in local facility management zones. The study area for the LFMP Specific Traffic Impact Analysis report will be defined as: a) the entire local facilities management zone where the general plan amendment is located and b) all intersections and

roadways in other local facility management zones expected to have auto traffic increase by 20% or more due to trips generated by the General Plan amendment. The SANDAG Regional Travel Demand Forecast Model shall be used to determine the extent of the 20% threshold. The scope and extent of the LFMP study area shall be discussed and confirmed with city staff prior to proceeding with the technical analysis.

All technical analysis for intersections and roadway segments within the LFMP Specific Traffic Impact Analysis shall conform to the methodologies outlined in these guidelines.

4. SCENARIOS TO BE STUDIED

After documenting existing conditions, both near-term (within approximately the next five years) and long-term (usually for a 20-year planning horizon or build-out of the area), analyses are needed. All of the following scenarios shall be addressed in the TIA (unless there is concurrence with the City Traffic Engineer or City Engineer that one or more of these scenarios may be omitted):

- **Existing Conditions –** Document existing traffic volumes and peak-hour levels of service in the study area. The existing deficiencies and potential mitigation should be identified.

- **Existing + Proposed Project -** Analyze the impacts of the proposed project on top of existing conditions. This scenario is typically evaluated to determine if the addition of project traffic to existing traffic will directly impact the existing roadway network.

- **Cumulative Conditions –** Analyze the cumulative condition impacts from "other" approved and "reasonably foreseeable" pending projects that are expected to influence the study area as identified by City staff (e.g., application on file, project in the pipeline). This is the baseline against which project impacts are assessed. City of Carlsbad should provide copies of the TIAs for the "other" projects if available. If data is not available for near-term cumulative projects, an ambient growth factor should be used.

- **Cumulative Conditions + Proposed Project –** Analyze the impacts of the proposed project on top of existing conditions and near-term projects (along with their committed or funded mitigation measures, if any).

- **Horizon Year (Baseline Condition) –** Identify Horizon Year (20+ years) future conditions through the output of the most recent SANDAG Regional Transportation Demand Model or the model approved by the City Engineer/City Traffic Engineer in the Scoping Agreement. For projects less than 2,400 new project trips per day, no new model runs are required. Baseline Horizon Year volumes can be determined using existing available Horizon Year model data provided by SANDAG for the City of Carlsbad. If the proposed project is consistent with the land uses represented in the model, the project traffic should be removed from the Horizon Year forecast volumes to establish the baseline condition. For projects with more than 2,400 new project trips per day, a new model run will be necessary for the "baseline condition".

- **Horizon Year + Proposed Project –** For projects with less than 2,400 new project trips per day, the project trips shall be added to the Baseline Horizon Year volumes based on trip distribution and assignment approved by the City Engineer / City Traffic Engineer in the Scoping Agreement. For projects with more than 2,400 new project trips per day, a new model run will be necessary for the "with project" conditions to determine both the distribution of traffic (select zone model run) and Horizon Year volumes

In order to use LOS criteria to measure traffic impact significance, proposed model or manual forecast adjustments must be made to address scenarios both with and without the project. Model data should be carefully verified to ensure accurate project and "other" cumulative project representation. In these cases, regional or sub-regional models conducted by SANDAG need to be reviewed for appropriateness.

5. TRAFFIC GENERATION

Use of the SANDAG *"Traffic Generators"* manual and "*(Not So) Brief Guide…*" trip generation rates should first be considered. Next, consider rates from ITE's latest "*Trip Generation"* manual or *"ITE Journal"* articles. If local and sufficient national data do not exist, conduct trip generation studies at sites with characteristics similar to those of the proposed project. If this is not feasible due to the uniqueness of the land use, it may be acceptable to estimate defensible trip rates – only if appropriate documentation is provided. Refer to the section below on special generators and non-conforming land uses for further information on methodology for conducting trip generation studies.

Reasonable reductions to trip rates may also be considered, including:

- **Pass-by and Diverted Traffic on Adjacent Roadways:** SANDAG trip reduction factors may be used.

- **Transit Oriented Development Transit Trip Reductions:** SANDAG trip reduction factors may be used for developments within a ¼ mile walking distance to a local transit station. This includes this Poinsettia, Carlsbad Village and The Shoppes at Carlsbad Transit Center.

- **Mixed-use Development Trip Reduction:** SANDAG MXD and/or ITE Mixed Use trip reduction methods may be used for projects where multiple, compatible land uses are located within a project site, within a densely populated region of the city or within a ¼ mile walking distance of compatible supporting land uses. It should be noted that a project may be considered mixed use based on the surrounding environment in addition to the land uses within the project boundary. For example, a retail project located within a high density residential area may be considered "mixed use" if the site is accessible by bicycle and by foot and is within ¼ mile of the high density residential area. The applicant shall work with City staff to determine if a project is considered mixed use and must demonstrate using GIS or other land use evaluation tool to determine the potential for mixed use trip reduction credits. (e.g. If a restaurant reduces vehicle trips by 50 patrons, then applicant must show there are 50 residents within walking distance of the restaurant use).

Caltrans or adjacent jurisdictions may use different trip reduction rates. Early consultation with all reviewing agencies is strongly recommended. All trip reduction factors shall be discussed in the Scoping Agreement with justification for the trip reduction approach and application.

Special generators and non-standard land uses are land uses not included in either the SANDAG "Traffic Generators, (Not So) Brief Guide of Vehicular Traffic Generation Rates", (April 2002, or most recent addition) or the Institute of Transportation Engineers (ITE) "*Trip Generation Manual"* (most recent edition). They may also be defined as land use types included in these manuals, but the project may have special circumstances that make the trip generation for the proposed facility unique compared to those included in these standardized manuals.

For projects with special generators or non-standard land uses, a trip generation study will be submitted to the City with the scoping letter documenting the proposed trip generation rates. The trip generation study will include data collected for a similar use within the region or other credible information that can clearly quantify the trips that may be generated by the proposed use. The data collection methodology shall be in compliance with ITE Trip Generation Study methodologies outlined in the Institute of Transportation Engineers *Trip Generation Manual Volume 1: User's Guide and Handbook*. Preparers are

encouraged to contact City staff prior to conducting the trip generation study to confirm assumptions and methodology. The City will review the trip generation study with the Scoping Agreement and may provide feedback or request additional information as appropriate prior to accepting the special generator or non-standard land use trip generation rates.

6. TRIP DISTRIBUTION AND ASSIGNMENT METHODOLOGY

Project trips can be assigned and distributed either manually or by the SANDAG model based upon review and approval of the City Engineer / City Traffic Engineer. The magnitude of the proposed project will determine which method is employed. All projects generating more the 2,400 new vehicle trips per day will be required to use SANDAG's Regional Transportation Demand Model for a select zone analysis to determine trip distribution. Projects generating less than 2,400 new vehicle trips per day will use the manual trip distribution method.

If the SANDAG model is used, the centroid connectors should accurately represent project access to the street network. Preferably the project access points would be consistent with the traffic zone connectors used in the model. Some adjustments to the output volumes may be needed (especially at intersections) to smooth out volumes, quantify peak volumes, adjust for pass-by and diverted trips, and correct illogical output.

If the manual method is used, the trip distribution percentages should be derived based on existing traffic patterns, similar projects or studies conducted within the study area and professional judgement. Trip distribution will be submitted with the Scoping Agreement and approved by the City Engineer / City Traffic Engineer prior to including in the TIA.

7. EVALUATION METHODOLOGY

The TIA shall determine the effect that a project will have for each of the previously outlined study scenarios. Analyses for freeways, roadway segments, intersections, and freeway ramps must be conducted to determine the transportation impacts associated with planned development or projects and are pertinent to the credibility and confidence the decision-makers have in the resulting findings, conclusions, and recommendations.

Table 2 outlines the City approved methodologies for TIA analysis to be used along with some suggested software packages and options. Any deviations from Table 2 must be included in the Scoping Agreement.

Table 2: Analysis Methodology

Study Location	Methodology	Appropriate Software or Application
Signalized Intersections	Queue & Storage Analysis	Refer to Section 7.1
Unsignalized Intersections	Warrant Analysis	MUTCD-CA (latest edition) Refer to Section 7.2
Roundabouts	Delay and queue analysis	SIDRA or Rodel, coordinate directly with City Staff Refer to Section 7.3
Arterial and Local Streets	2010 Highway Capacity Manual Urban Street Methodology	Capacity Tables Refer to Section 7.4
Freeway Segments	Caltrans District 11 freeway analysis methodology (peak hour V/C)	Caltrans Guidelines Refer to Section 7.5
Freeway Ramp Metering	Regional Transportation Impact Analysis Guidelines/Caltrans Methodology	Caltrans Guidelines Refer to Section 7.5
Transit, Pedestrians, and Bicycles	City of Carlsbad MMLOS Worksheets	City of Carlsbad MMLOS Tool Refer to Section 7.6

Note: *Neither the City of Carlsbad nor Caltrans officially advocate the use of any social software packages, especially since new ones are being developed all the time. However, consistency with the Highway Capacity Manual (HCM) is required based on the City's General Plan Mobility Element. The above-mentioned software packages have been utilized locally and found to be consistent with the latest version of the HCM. Because it is so important to have consistent end results, always consult with all affected jurisdictions, including Caltrans, regarding the analytical techniques and software being considered (especially if they differ from above) for the TIA.*

7.1 Signalized Intersections

All signalized intersections within the study area are subject to the signalized intersection analysis. The analysis will address the adequacy of the signalized intersection geometry to serve the existing, forecast and project traffic through the intersection. As stated previously, all signalized intersection within 0.25 miles of the project auto access driveway or intersection shall be evaluated if the project adds trips to the left turn or right turning movements at the intersection. The signalized study area will be based on trip generation and trip assignment for the project. Analysis will be based on the following criteria:

- **Left turn queue assessment:** Compare the left turn volume with the length of the left turn pocket(s). A general rule of thumb of one foot per left turning vehicle per lane may be used for this analysis.
- **Left turn volume:** If the left turn volume exceeds 250 vehicles per hour, a second left turn lane is recommended.
- **Right turn volume:** If the right turn volume exceeds 150 vehicles per hour, a dedicated right turn lane is recommended.

7.2 Unsignalized Intersections

Unsignalized intersections located along corridors subject to Auto MMLOS within the project study area may require a traffic signal warrant analysis. A warrant analysis is required if:

- The unsignalized intersection provides direct access to the project site, or
- The unsignalized intersection provides direct access to a cumulative project considered in the Transportation Impact Analysis, or
- The unsignalized intersection has been identified by the City as a potential signalized intersection.

A warrant analysis is not required for right turn in/right turn out only intersections or driveways that are physically restricted by raised center median.

7.3 Roundabout Analysis

Should a project recommend the construction of a new signalized intersection, the intersection shall be further analyzed using Caltrans Intersection Control Evaluation (ICE) methodology. If the analysis indicates that a roundabout should be evaluated, analysis shall be conducted using one of the following methodologies: SIDRA or RODEL. Both programs provide queue and roundabout performance data that should be integrated into the traffic analysis report for roundabout controlled intersections. Both programs provide results that are compatible with HCM 2010 and HCM Edition 6 roundabout capacity models, allowing the results of this analysis to be consistent with the requirements of the City General Plan Mobility Element.

According to the Highway Capacity Manual, roundabout operations are defined solely on the control delay of the intersection which is calculated for each approach as well as for the overall intersection. If the volume to capacity ratio of an approach exceeds 1.0 however, the overall intersection operation is determined to be LOS F. **Table 4** defines the levels of service for roundabouts.

Table 4: Roundabout Level of Service Thresholds

Control Delay (seconds)	Level of Service (LOS)	
	V/C <1.0	V/C>1.0
0-10	A	F
>10-15	B	F
>15-25	C	F
>25-35	D	F
>35-50	E	F
>50	F	F

Source: Highway Capacity Manual

7.4 Local & Arterial Street Operational Analysis

Vehicular LOS is a general measure of vehicle traffic operating conditions whereby a letter grade, from LOS A (no congestion) to F (high levels of congestion), is assigned. The flow of vehicles without significant impediments is considered "stable" whereas when traffic encounters interference that limits the capacity acutely, the flow becomes "unstable." These grades represent the perspective of drivers only and are an indication of the comfort and convenience associated with driving, as well as speed, travel time, traffic interruptions, and freedom to maneuver. The level of service grades are generally defined as follows:

- **LOS A** represents free flow travel for vehicles. Individual users are virtually unaffected by other vehicles in the traffic stream.
- **LOS B** represents stable flow, but the presence of other users in the traffic stream begins to be noticeable.
- **LOS C** represents a range in which the influence of traffic density on operations becomes noticeable. The ability to maneuver within the traffic stream and to select an operating speed is now clearly affected by the presence of other vehicles.
- **LOS D** borders on unstable flow. Speeds and ability to maneuver are severely restricted because of traffic congestion.
- **LOS E** represents unstable operating conditions at or near the capacity level where maneuverability is severely limited.
- **LOS F** is used to define forced or a breakdown traffic flow.

Roadways within the project study area subject to Auto MMLOS standards shall be evaluated using the most current version of the Highway Capacity Manual, as outlined in the City's General Plan Mobility Element (2015). Roadway Capacity Tables derived from the Highway Capacity Manual were developed specifically for each roadway subject to MMLOS in the City of Carlsbad. The specific capacity calculated for each roadway takes into account key geometric and operational factors including number of lanes, type of facility, intersection cycle length, distance between intersections, and other factors related to lane capacity and signal operations. The capacity for each roadway segment was calculated using the ARTPLAN software, which was developed using the capacity calculations outlined in the HCM. The ARTPLAN software package is used nationally as a planning tool, but alternative methods can be used to calculate roadway segment capacity.

The City of Carlsbad Roadway Capacity Tables provide the directional capacity for each roadway segment subject to MMLOS analysis in the General Plan Mobility Element. To evaluate the operating conditions along a study corridor, peak hour volumes should be compared to the Roadway Capacity Tables to determine the segment operating conditions. The LOS for each segment shall be reported for all study scenarios in the TIA. Roadway Capacity Tables shall be provided by the City Engineer / City Traffic Engineer at the time of project initiation when the Scoping Agreement is approved.

7.5 State Owned Facility Level of Service (Freeways, Interchanges, Ramps, Ramp Meters)

Analysis of State Owned facilities will be conducted in compliance with District 11 Transportation Impact Analysis requirements. At the time the Traffic Impact Analysis Guidelines was published, the *Guide for the Preparation of Traffic Impact Studies (December 2002)* was the guiding documents for State Owned facilities in San Diego County and it called for applying the following methodologies:

- Freeway Segments – Highway Capacity Manual (HCM), operational analysis
- Weaving Areas – Caltrans Highway Design Manual (HDM)
- Ramps and Ramp Junctions – HCM, operational analysis or Caltrans HDM, Caltrans Ramp Metering Guidelines (most recent edition)

7.6 Pedestrians, Bicycles and Transit Level of Service Analysis

The City's MMLOS methodology provides a qualitative "grade" assigned to travel modes, ranging from a level of service (LOS) A to LOS F. LOS A reflects a high service standard for a travel mode (e.g. outstanding characteristics and experience for that mode) and LOS F would reflect a poor service standard for a travel mode (e.g. congestion for vehicles, inadequate bicycle, pedestrian, or transit facilities, etc.). The City's General Plan established a standard of LOS D or better only for the travel mode(s) subject to the MMLOS standard for the designated roadway typology as identified in the table below consistent with Mobility Element Table 3-1.

In 2016, the City developed a method for evaluating MMLOS. Each non-auto travel mode (pedestrian, bicycle, and transit) receives its own LOS score and corresponding letter grade as shown in **Table 5**. The City strives to maintain LOS D or better on each roadway for each mode of travel that is subject to this standard.

As part of the City's Mobility Element, streets were classified into typologies as illustrated previously in **Figure 1** consistent with Table 3-1 of the Mobility Element**.** As stated in the Mobility Element, the typology of the roadway section determines witch modes of travel are subjected to the LOS D standard. The intent is to provide a balanced mobility system that emphasizes primary users as opposed to always providing ideal level of service for all modes on every facility.

Table 5: MMLOS Level of Service Thresholds

Point Score	LOS
90-100	A
80-89	B
70-79	C
60-69	D
50-59	E
0-49	F

Source: *City of Carlsbad, MMLOS Worksheet*

Street typologies are provided on the following pages.

The City has developed a detailed MMLOS Tool to aid in MMLOS analysis methodology. The City Engineer/ City Traffic Engineer shall provide the most current version of the electronic tool at the time the Scoping Agreement is approved. The following is a brief description of the MMLOS methodology and criteria outlined in the City's MMLOS Tool:

Pedestrian MMLOS for pedestrian priority streets, the MMLOS criteria evaluates the *quality* of the pedestrian system (e.g. number of vehicle lanes that need to be crossed and the speed of adjacent traffic) and the *friendliness* of the infrastructure at intersections (e.g. pedestrian countdown heads, dedicated pedestrian phases [e.g. a scramble phase], curb extensions, refuge median). In addition, the connectivity and contiguity of the pedestrian system along street sections (particularly ADA-compliant connectivity/contiguity) is a critical component of pedestrian priority streets.

Bicycle MMLOS for bicycle priority streets, the MMLOS criteria evaluates the *quality* of the bicycle system (e.g. bicycle route, bicycle lanes, or bicycle pathway; presence of bicycle buffers from the vehicle travel way), the *amenities* of the system (e.g. presence of bicycle parking), and the *friendliness* of the infrastructure (e.g. bicycle detection at intersections, pavement conditions, presence of vehicle parking). In addition, the connectivity and contiguity of the bicycle system along street sections is a critical component of pedestrian priority streets.

Transit MMLOS for transit priority streets, the MMLOS criteria evaluates the *transit vehicle right-of-way* (e.g. dedicated or shared, signal priority), *hours and frequency of service* (e.g. weekday/weekend hours, peak period highway); *performance* (e.g. on-time or late); *amenities and safety* (e.g. lighting, covered stop, bench, on-board bike/surfboard storage); and *connectivity* (e.g. to other transit routes, employment areas, schools, visitor attractions, and other major destinations).

STREET TYPOLOGY AND ACCOMMODATED MODES		
ACCOMMODATED MODES	**SUBJECT TO MMLOS STANDARD (Y/N)**	**STREET TYPOLOGY DESCRIPTION AND PREFERRED ATTRIBUTES**
Freeways		
	Y	• High-speed facilities designed to accommodate vehicles and buses moving through the city and region • Bicycles and pedestrians are prohibited
	Y	
Arterial Streets		
	Y	• These are the primary vehicle routes through the city for both local and regional vehicle trips. • Designed to safely move all modes of travel while efficiently moving vehicles and buses throughout the city. • Traffic signals shall be coordinated to optimize vehicle movements • Bicycle lanes shall be provided and can be further enhanced or complemented by other facilities or off-street pathways • Pedestrian facilities to be provided consistent with ADA requirements • Mid-block crossings should not be provided • On-street parking should be prohibited along these corridors • Vertical traffic calming techniques (such as speed tables, humps, etc.) should not be considered • Special considerations can be considered on arterials within proximity to schools to enhance Safe Routes to Schools for pedestrians and bicyclists.
	N	
	N	
	Y	
Identity Streets		
	N	• These streets provide the primary access to and from the heart of the city - the Village • Designed to safely move all modes of travel while enhancing mobility for pedestrians and bicyclists • Vehicle speeds should be managed to promote safe pedestrian and bicycle movement • No pedestrian shall cross more than five vehicular travel and/or turn lanes • In addition to ADA compliant ramps and sidewalks, sidewalks should support the adjacent land uses as follows: – Adjacent to retail uses, modified/new sidewalks should generally be a minimum of 10 feet (12 feet preferred) in width where feasible and taking into consideration the traffic volumes of the adjacent roadway, and allow for the land use to utilize the sidewalk with outdoor seating and other activities – Adjacent to residential uses, modified/new sidewalks should be a minimum of six feet in width Elsewhere, modified/new sidewalks should be a minimum of eight feet in width • Where feasible, bicycle lanes should be provided • Vehicle speeds should complement the adjacent land uses • Bicycle parking should be provided in retail areas • Bike racks should be readily provided within the public right-of-way and encouraged on private property • Traffic calming devices, such as curb extensions (bulbouts) or enhanced pedestrian crossings should be considered and evaluated for implementation • Street furniture shall be oriented toward the businesses • Mid-block pedestrian crossings could be provided at appropriate locations (e.g. where sight distance is adequate and speeds are appropriate) • On-street vehicle parking should be provided. In areas with high parking demand, innovative parking management techniques should be implemented / considered • Pedestrians should typically be "buffered" from vehicle traffic using landscaping or parked vehicles
	Y	
	Y	
	N	

STREET TYPOLOGY AND ACCOMMODATED MODES		
ACCOMMODATED MODES	**SUBJECT TO MMLOS STANDARD (Y/N)**	**STREET TYPOLOGY DESCRIPTION AND PREFERRED ATTRIBUTES**
Village Streets		
	N	• Primary purpose is to move people throughout the Village; providing access to businesses, residences, transit and recreation within the Village area. • Designed to safely move all modes of travel while enhancing mobility for pedestrians and bicyclists. • Vehicle speeds should be managed to promote safe pedestrian and bicycle movement • Promote pedestrian and bicycle connectivity through short block lengths • Bicycle lanes should be provided • Bicycle boulevards can be considered • Pedestrians should be accommodated on sidewalks adjacent to the travel way (minimum 5' wide sidewalk) • Mid-block pedestrian crossings and traffic calming devices should be considered, but only at locations with high pedestrian activity levels or major destinations/attractions • On-street parking may be provided
	Y	
	Y	
	N	
Arterial Connector Streets		
	Y	• Primary purpose is to connect people to different areas and land uses of the city by connecting to/from arterial streets • Designed to safely move all modes of travel while enhancing mobility for pedestrians and bicyclists and efficiently moving vehicles between arterial streets. • Bicycle lanes should be provided • Pedestrians should be accommodated on sidewalks adjacent to the travel way (minimum 5' wide sidewalk) • Mid-block pedestrian crossings and traffic calming devices should be considered, but only at locations with high pedestrian activity levels or major destinations/attractions • On-street parking may be provided
	Y	
	Y	
	N	
Neighborhood Connector Street		
	N	• Primary purpose is to connect people to different neighborhoods and land uses of the city • Designed to safely move all modes of travel while enhancing mobility for pedestrians and bicyclists. • Vehicle speeds should be managed to promote safe pedestrian and bicycle movement • Bicycle lanes should be provided • Bicycle boulevards can be considered • Pedestrians should be accommodated on sidewalks adjacent to the travel way (minimum 5' wide sidewalk) • Mid-block pedestrian crossings and traffic calming devices should be considered, but only at locations with high pedestrian activity levels or major destinations/attractions • On-street parking may be provided
	Y	
	Y	
	N	

STREET TYPOLOGY AND ACCOMMODATED MODES		
ACCOMMODATED MODES	**SUBJECT TO MMLOS STANDARD (Y/N)**	**STREET TYPOLOGY DESCRIPTION AND PREFERRED ATTRIBUTES**
Employment/Transit Connector Streets		
	N	• Primary purpose is to connect people to and from the employment areas of the city, as well as important destinations and major transit facilities. • Designed to safely move all modes of travel while enhancing mobility for pedestrians and bicyclists and efficiently moving buses to employment, transit stations and major destinations. • Vehicle speeds should be managed to promote safe pedestrian and bicycle movement • Direct connections to bus stops should be provided • Enhanced bus stops should be considered that include shelters, benches, and lighting • Bicycle lanes and sidewalks should be provided • Pedestrian crossing distances should be minimized • On-street parking may be provided
	Y	
	Y	
	Y	
Coastal Streets		
	N	• Primary purpose is to move people along the city's ocean waterfront and connect people to the beach, recreation, businesses and residences in close proximity to the waterfront. The street serves as a destination for people who seek to drive, walk and bicycle along the ocean waterfront. • Designed to safely move all modes of travel while enhancing mobility for pedestrians and bicyclists. • Vehicle speeds shall be managed to support uses along the coast • Enhanced bicycle and pedestrian crossings should be provided, including: – High visibility crosswalks – Enhanced pedestrian notifications (e.g. responsive push-button devices) – Enhanced bicycle detection – Bicycle lanes shall be provided and can be further enhanced or complemented by other facilities (such as bicycle lane buffers or off-street pathways) • Pedestrian facilities should be a minimum of five feet and shall strive for six to eight feet in width and shall conform to ADA requirements • Pedestrian crossing distances should be minimized • Trail facilities should be encouraged • Opportunities for mid-block pedestrian crossings should be investigated • On-street parking should be provided • Transit facility and operation improvements should be encouraged
	Y	
	Y	
	N	

STREET TYPOLOGY AND ACCOMMODATED MODES		
ACCOMMODATED MODES	**SUBJECT TO MMLOS STANDARD (Y/N)**	**STREET TYPOLOGY DESCRIPTION AND PREFERRED ATTRIBUTES**
School Streets		
	N	• Primary purpose is to connect people to schools from nearby residential neighborhoods. • Designed to safely move all modes of travel with an emphasis on providing safe pedestrian and bicycle access for students traveling to and from nearby schools. • Vehicle speeds shall be managed to support school uses (typically 25 MPH) • Enhanced bicycle and pedestrian crossings should be provided, including: – High visibility crosswalks – Enhanced pedestrian notifications (e.g. responsive push-button devices) – Enhanced bicycle detection – Bicycle lanes shall be provided and can be further enhanced or complemented by other facilities or off-street pathways • Pedestrian facilities should be a minimum of six feet and shall strive for eight feet in width and shall conform to ADA requirements • Pedestrian crossing distances should be minimized • Opportunities for mid-block pedestrian crossings should be investigated • Traffic calming devices that improve service levels and safety for pedestrians and bicyclists should be considered
	Y	
	Y	
	N	
Industrial Streets		
	Y	• Primary purpose is to connect people to businesses within the city's industrial parks. • Designed to safely move all modes of travel while efficiently moving vehicles and buses from arterial streets and employment/transit connector streets to businesses. • Traffic calming devices are generally discouraged given the propensity for larger trucks and heavy vehicles in this area • On-street parking may be provided as long as it does not interfere with the turning radii of heavy vehicles.
	N	
	N	
	Y	
Local/Neighborhood Street		
	N	• Primary purpose is to connect people to and through residential neighborhoods and local areas of the city. • Designed to safely move all modes of travel while enhancing mobility for pedestrians and bicyclists. • Vehicle speeds should be managed to promote safe pedestrian and bicycle movement • Pedestrians should be accommodated on a sidewalk or soft surface trail (such as decomposed granite) unless those facilities are inconsistent with the existing desirable neighborhood character • Bicycles can be accommodated with a bicycle lane or route if vehicle volumes and/or speeds necessitate; otherwise bicycles can share the street • Bicycle boulevards can be considered • Traffic calming measures should be considered when supported by the neighborhood or when warranted for safety reasons • On-street parking should be considered
	Y	
	Y	
	N	

8. SIGNIFICANCE OF AUTO IMPACTS TO CONSIDER MITIGATION

8.1 Thresholds of Significance

The City of Carlsbad Growth Management Program "*Citywide Facilities and Improvements Plan (last amended August 22, 2017)*" states that the performance standard for the circulation system is as follows:

> *Implement a comprehensive livable streets network that serves all users of the system – vehicles, pedestrians, bicycles and public transit. Maintain LOS D or better for all modes that are subject to this multi-modal level of service (MMLOS) standard, as identified in Table 3-1 of the General Plan Mobility Element, excluding LOS exempt intersections and streets approved by the City Council.*

Section 21.90.080 of the Carlsbad Municipal Code (Growth Management) states that:

> *If at any time after preparation of the local facilities management plan the performance standards established by a plan are not met then no development permits or building permits shall be issued within the local zone until the performance standard is met or arrangements satisfactory to the City Council guaranteeing the facilities and improvement have been made.*

To comply with the Growth Management Program, all roadway facilities identified as not meeting the performance standard (LOS D) in the existing conditions scenario (see Section 4) must be fully mitigated regardless of the project impact to that facility, or the TIA must request an exemption from the LOS D standard according to the Mobility Element Implementing Policy 3-P.9:

> *Develop and maintain a list of street facilities where specific modes of travel are exempt from the LOS standard (LOS exempt street facilities), as approved by the City Council. For LOS exempt street facilities, the city will not implement improvements to maintain the LOS standard outlines in Policy 3-P.4 if such improvements are beyond what is identified as appropriate at build out of the General Plan. In the case of street facilities where the vehicle mode of travel is exempt from the LOS standard, other non-vehicle capacity-building improvements will be required to improve mobility through implementation of transportation demand and transportation system management measures as outlined in Policy 3-P.11, to the extent feasible, and/or to implement the livable streets goals and policies of this Mobility Element. Evaluate the list of exempt street facilities, as part of the Growth Management monitoring program, to determine if such exemptions are still warranted.*
>
> *To exempt the vehicle mode of travel from the LOS standard at a particular street intersection or segment, the intersection or street segment must be identified as built-out by the City Council because:*

a. *Acquiring the rights of way is not feasible; or*

b. *The proposed improvements would significantly impact the environment in an unacceptable way and mitigation would not contribute to the nine core values of the Carlsbad Community Vision; or*

c. *The proposed improvements would result in unacceptable impacts to other community values or General Plan policies; or*

d. *The proposed improvements would require more than three through travel lanes in each direction.*

The project causes a significant impact to the transportation facility in the study area if one or more of the following criteria is met:

- The roadway facility is projected to exceed the LOS D standard (see Section 7.4) and the project's traffic meets or exceeds the thresholds of significance listed in Table 6; or
- A ramp meter delay exceeds 15 minutes (see Section 7.5) and the project's traffic meets or exceeds the thresholds of significance listed in Table 6; or
- The addition of project results in a change in LOS from acceptable (LOS D or better) to deficient (LOS E or F) on a roadway segment, freeway segment or ramp; or
- The project results in a change in conditions on a roadway segment, freeway segment or ramp that exceeds the allowable thresholds (outlined in **Table 6**) for locations operating at a deficient LOS without the project (baseline conditions).

Table 6: Measure of Significant Project Traffic Impacts Roadways Subject to the Vehicle MMLOS Standard

Auto Facility Subject to MMLOS Thresholds	Threshold of Significance
Roadway Segment	Any trip added to a segment forecast to operate at deficient LOS requires project mitigation; Project mitigation will be determined based on project contribution to the identified impact.
Freeway Segment	1% increase in V/C or 1 mph decrease in speed
Ramp Meter	2-minute increase

The project can have either a direct or cumulative impact as follows:

- **Direct Impacts:** any significant impact identified under existing conditions. Direct impacts shall be fully mitigated by the project.
- **Cumulative Impacts:** any significant impact identified under Cumulative and Horizon Year conditions. Cumulative impacts may be mitigated through fair share contribution. Projects identified for fair share contribution should be included in the City's Capital Improvement Program (CIP) or Transportation Impact Fee (TIF) program.

Any roadway section that is identified as having a significant impact must either:

- Mitigate the traffic impact to pre-project conditions, or
- Request LOS exemption from City Council for the LOS standard and identify feasible TSM & TDM mitigation

8.2 Mitigation

The TIA report shall identify mitigation measures for all identified significant impacts. The TIA must demonstrate that the mitigation measures project that the roadway facilities in the study area will meet the applicable auto LOS standard under all scenarios studied (see Table 1 and Section 4).

The project can request the roadway facility to be exempt if the request complies with Mobility Element Implementing Policy 3-P.9. Exemptions are considered and approved by City Council. Should the exemption be granted by City Council, mitigation will include appropriate Travel Demand Management (TDM) and Transportation System Management (TSM) measures. Examples of TDM measures will be provided by the City Engineer / City Traffic Engineer at the time the Scoping Agreement is approved.

If the project adds traffic to a facility that has been previously classified as exempt from the auto LOS standard, project mitigation will include appropriate Travel Demand Management (TDM) and Traffic System Management (TSM) measures. Examples of TDM measures will be provided by the City Engineer / City Traffic Engineer at the time the Scoping Agreement is approved.

8.3 State Owned Facility Mitigation

In addition, the City of Carlsbad Mobility Element requires future development projects, which are determined during site-specific environmental review to have a significant impact on freeway facilities (I-5 and SR-78), to participate in a freeway traffic mitigation program that has been approved by the city that will avoid, reduce or offset the increase in freeway traffic directly attributable to the proposed project or the impact will be considered significant and unavoidable. The mitigation program may include, but is not limited to, payment of a fair share fee to Caltrans for necessary improvements to affected freeway facilities or to NCTD or such other transit agency for improvement of public transit on affected freeways, or such other activities as will avoid, reduce or offset the project's significant impacts on freeway facilities.

Note: *It is the responsibility of Caltrans, on Caltrans initiated projects, to mitigate the effect of ramp metering, for initial as well as future operational impacts, on local streets that intersect and feed entrance ramps to the freeway. Developers and/or local agencies, however, should be required to mitigate any impact to existing ramp meter facilities, future ramp meter installations, or local streets, when those impacts are attributable to new development and/or local agency roadway improvement projects.*

8.4 Transportation Demand Management & Transportation System Management

Not all mitigation measures must directly improve the facility directly impacted by the project (e.g., add a new lane to increase roadway capacity). Technology improvements that expand the transportation system capacity may also be considered as project mitigation. For example, the installation of adaptive signals that can be controlled from the City's Transportation Management Center (TMC) may be a feasible mitigation along one of the City's identified adaptive signal control corridors. Payment toward a TSM project may be considered feasible mitigation.

Other mitigation measures may include financial participation in Transportation Demand Management (TDM) strategies. Examples of these TDM projects include transit facilities, bike facilities, walkability, telecommuting, traffic rideshare programs, flex-time, carpool incentives, parking cash-out. Additional mitigation measure may become acceptable as future technologies and policies evolve.

8.5 Signalized and Unsignalized Intersection Operational Improvements

Operational improvements may be necessary at signalized and unsignalized intersections that have been identified as exceeding the operational standards outlined in Sections 7.1 and 7.2. The following will be used to determine the need for operational improvements at intersections included in the study area:

Signalized Intersections: The project will identify specific operational issues (e.g., queues projected to exceed storage capacity). Working with the City Traffic Engineer / City Engineer improvements will be identified to address the operational issues.

Unsignalized Intersections: The project will identify if signal warrants are met for all project scenarios evaluated. Based on the findings of the warrant analysis and the timing of the warrants met, the City Engineer/City Traffic Engineer will determine if a traffic signal is needed and the project responsibility for contributing or constructing the traffic signal.

9. SIGNIFICANCE OF PEDESTRIAN, BICYCLE, AND TRANSIT SYSTEM IMPACTS TO CONSIDER MITIGATION

This section presents the methodology to identify project-related impacts to pedestrian, bicycle and transit systems that would require mitigation measures. The following criteria are used to identify pedestrian, bicycle and transit system impacts in the defined study area:

- Pedestrian, bicycle and transit facilities within the study area (as defined in Section 3) where the existing condition is LOS E or F; or
- Identification of any "gaps" in the pedestrian and bicycle networks

Potential mitigation measures could include constructing or a fair share contribution toward the financing of feasible capital improvement projects related to pedestrian, bicycle, and transit facilities. Where applicable a project could contribute a fee toward local or citywide transit capital improvements, or participate in TDM measures that support transit operations.

Because of the qualitative nature of the MMLOS methodology, a project impact is significant if an existing pedestrian, bicycle or transit facility is determined to not meet the LOS D standard regardless of the forecasted number of project trips expected to use the facility. An impact occurs and is deemed significant if:

- an existing facility in the project study area does not meet the pedestrian, bicycle or transit LOS standard, or
- the project causes a standard facility to become substandard (e.g., removal of an existing bike lane or bus stop, or blocking pedestrian access), or
- a gap is identified in or directly adjacent to the study area related to pedestrian, bicycle or transit service to the project site.

APPENDIX A
SCOPING AGREEMENT

ATTACHMENT A

SCOPING AGREEMENT FOR TRANSPORTATION IMPACT STUDY

This letter acknowledges the City of Carlsbad Traffic Engineering Division requirements for the transportation impact analysis of the following project. The analysis must follow the latest City of Carlsbad Transportaion Impact Study Guidelines dated September 2017.

Case No. _____

Project Name: _____

Project Location: _____

Project Description: _____

Related Cases -

SP No. _____

EIR No. _____

GPA No. _____

CZ No. _____

	Consultant	Developer
Name:		
Address:		
Telephone:		

A. Trip Generation Source: _____

Extended Land Use _____ Proposed Land Use _____

Extended Zoning _____ Proposed Zoning _____

Total Daily Trips _____ Forcast Daily Trips _____

(Attach a trip generation table. Describe Trip Reduction Factors proposed and included in the trip generation table.)

B. Trip Distribution: ☐ Select Zone (Model Series ____)

(Provide exhibit for detailed trip distribution and assignment.)

C. Background Traffic

Phased Project ☐ No ☐ Yes Phases: _____

Please contact the Engineering Devision or use the most recently provided data

Model/Forcast Methodology: _____

D. Study Intersections: (NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments)

1. _____ 5. _____
2. _____ 6. _____
3. _____ 7. _____
4. _____ 8. _____

E. Study Roadway Segments: (NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments)

1. _____ 5. _____
2. _____ 6. _____
3. _____ 7. _____
4. _____ 8. _____

F. Other Jurisdictional Impacts

Is this project within any other Agency's Sphere of Influence or one-mile radius of boundaries? ☐ Yes ☐ No

If so, name of Jurisdiction: _____

G. Site Plan (Attach a legible 11'X17' copy)

H. Specific issues to be adressed in the Study (in addition to the standard analysis described in the Guidelines) (To be filled out by Engineering Devision)

_____

_____

Recommended by:

_____ _____
Consultant's Representative Date

Scoping Agreement Submitted on _____
Date

Scoping Agreement Resubmitted on _____
Date

Approved Scoping Agreement:

_____ _____
City of Carlsbad Date
Traffic Engineering Division