PROCEDURES FOR

TRAFFIC IMPACT ANALYSIS (TIA)

City of Visalia

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Updated February of 2019

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INTRODUCTION

Goal one of the City of Visalia Circulation Element Update is to provide an integrated transportation system for the safe and efficient movement of people and goods in the Visalia planning area. The review and management of development-generated traffic is an integral part of operating and maintaining a safe and efficient roadway system and meeting this goal. The Traffic Impact Analysis (TIA) Procedures as outlined in this document have been established to meet this objective. The procedures establish a range of traffic impact study categories based on the characteristics of the development and the estimated peak hour traffic volumes, while also outlining the analysis approach and methods.

A Traffic Impact Analysis, TIA, identifies existing traffic volumes and conditions, development traffic volumes and conditions and their combined impacts on the existing and future roadway system. The TIA is a useful tool for early identification of potential traffic problems and can play an important part in the success of a development as well as the overall City network. When insufficient attention is given to the assessment of traffic impacts, the following problems may result:

- On-site congestion and/or congestion on adjacent roadways
- Inadequate site access
- High accident experience
- Limited flexibility to modify the development to eliminate problems or adjust to changed conditions

These problems can negatively affect the success of a development and can damage the marketability and return on investment of the development. The performance of a TIA provides an opportunity for the City and the developer to share information and jointly address traffic related problems. It provides a means of balancing development needs with the functional integrity of the roadways that serve both the development and the region.

The need for a Traffic Impact Analysis should be assessed as early as possible in the development process when there is maximum flexibility for eliminating traffic-related problems directly and indirectly adjacent to the proposed development. Preparation of a TIA, at this stage in the development process, is also recommended in Chapter 2 "Site Planning" of the Institute of Transportation Engineers publication `Transportation and Land Development'.

The procedures contained herein are provided to:

- Assist developers through the approval process by outlining the requirements and level of detail of traffic analysis that will be required of them during the approval process.
- Standardize the types and details of analysis required in the assessment of traffic impacts for developments with similar levels of size and intensity.
- Ensure consistency in the preparation and review of a TIA through standardization of the reports.

TIA STUDY

The City Engineer or designee in accordance with Table 1 and the intent of these guidelines will determine the scope for the initial TIA or the need for a revised TIA. This can be done through the City's pre-application process or through a separate meeting for this purpose. If a TIA was done for the project at a site plan review level or with a discretionary entitlement, an addendum or update will be required if the original study is greater than two years old, if additional intersections or driveways are being added, if the new development is different from what was assumed in the master study causing an increase in trips generated, or if surrounding development has changed the background assumptions in the original study.

TIA CLASSIFICATIONS AND REQUIREMENTS

Completing a Traffic Impact Questionnaire (TIQ) is the first step in determining the size and scope of TIA required for the site, whether it be a simple Traffic Impact Statement (TIS) as described under TIS - Category I to a comprehensive Traffic Impact Analysis under TIA – Categories II through IV. Although the TIQ and TIS do not require a Registered Professional Engineer or a Registered Traffic Engineer in California to prepare it, a Traffic Impact Analysis does. A TIA per the following guidelines will be required of all developments or additions to existing developments. The number of trips generated is to be determined from the Institute of Transportation (ITE) Trip Generation Manual, most recent edition. The developer must first estimate the number of vehicle trips generated by the proposed development using the procedures outlined in this document. The TIA category is determined by the number of trips generated in the development’s peak hour. The development then needs to be analyzed to determine how their peak hour affects the surrounding streets. The developer must obtain the concurrence of the City Engineer or designated representative on the number of new trips generated by the development, and the appropriate analysis category. The TIA must

document all assumptions made such as for capture, pass-by, trip reduction, etc. Should the developer be unable to meet the approval of the City Engineer the developer may make an appeal to the City Engineer. The specific analysis requirements and level of detail are determined by the following categories:

TIQ – TRAFFIC IMPACT QUESTIONNAIRE

At the Site Plan Review level, all developments, including additions and/or changes in use to existing developments, are to complete the traffic impact section of the Site Plan Review application, or a Traffic Impact Questionnaire (TIQ). In many cases if the information provided by the applicant within the Site Plan Review application is completed in its entirety, it may be sufficient to serve as the project's initial TIQ. The TIQ is a tool used by the City to gather information regarding the type and scope of development. Information provided in this questionnaire will be reviewed to determine if a Traffic Impact Analysis (TIA) outlined herein needs to be completed in order to address a traffic concern..

TIS – TRAFFIC IMPACT STATEMENT (CATEGORY I)

Developments (nonresidential) generating less than 100 peak hour trips. This will require a lesser analysis and shall include at a minimum: The existing condition analysis, including any existing driveways or intersections in the vicinity, a sight distance evaluation, the traffic generation, the access number and spacing, an access queuing evaluation, and an on-site circulation evaluation.

TIA - CATEGORY II

Developments (nonresidential) which generate 100 or more peak hour trips but fewer than 500 trips; and residential developments generating 200 or more peak hour trips but fewer than 500 trips.

TIA - CATEGORY III

All developments which generate 500 or more peak hour trips but fewer than 1,000 trips.

TIA - CATEGORY IV

All developments which generate 1,000 or more peak hour trips but fewer than 1,500 trips.

TIA - CATEGORY V

All developments which generate more than 1,500 trips.

ANALYSIS APPROACH AND METHODS

STUDY AREA

The minimum study area will be determined by project type and size in accordance with the criteria in Table 1. The City Engineer or designee may require expansion of the study area when the minimum study areas identified in Table 1 do not provide sufficient information to meet the intent of the Traffic Impact Analysis guidelines. For example, a large development in a rural area located two miles from a freeway interchange from which most of the trips are anticipated to access the development may require an enlarged study area to include assessment of the freeway interchange. Also an arterial intersection that falls just outside the study area radii shall also be included in the study area.

STUDY TIME FRAME

The study should include, as a minimum, an analysis of the expected traffic conditions for the time period when the development is expected to open. The opening day conditions should include all of the proposed development traffic as if the development was fully completed and occupied.

The study horizon year is the future year that should be studied with the development. The existing background traffic shall be adjusted to provide a reasonable estimation of the traffic without the site in the horizon year. The horizon years are determined by the project type and size in accordance with the criteria in Table 1.

The study for phased construction developments should include an analysis for each year that planned new phase construction is to be started. In addition, the required 5, 10 or 20 year analysis after the start of the last phase of the development as stated above for the specific categories.

TABLE 1

Analysis Category	Development Characteristic (a)(f)	Study Horizons (b)	Minimum Study Area (c)(d)(e)
I	Traffic Impact Statement Less than 100 peak hour trips (Not required for residential)	• Opening year	• Site access drives • Any existing driveways or intersections in the vicinity
II	Small Development 100-499 peak hour trips Residential Development 200-499 peak hour trips	• Opening year • 5 year	• Site access drives • All major intersections within ½ mile of the study site, either signalized or unsignalized • All driveways/intersections where traffic movements could be affected by new driveway traffic movements • Additional locations as requested by the reviewing agency
III	Moderate Development 500-999 peak hour trips	• Opening year • 5 year • 10 year	• Site access drives • All major intersections within 1 mile, either signalized or unsignalized • All driveways/intersections where traffic movements could be affected by new driveway traffic movements • Additional locations as requested by the reviewing agency
IV	Large Development 1000-1500 peak hour trips	• Opening year • 5 year • 10 year • 20 year	• Site access drives • All major intersections within 1 mile, either signalized or unsignalized • All driveways/intersections where traffic movements could be affected by new driveway traffic movements • Additional locations as requested by the reviewing agency
V	Regional Development 1500 plus peak hour trips	• Opening year • 5 year • 10 year • 20 year	• Site access drives • All signalized intersections and major street intersections without signal control within 3 miles, • All driveways/intersections where traffic movements could be affected by new driveway traffic movements • Additional locations as requested by the reviewing agency

(a) The developer should first estimate the number of vehicle trips that will be generated by the proposed development and provide this information along with the other suggested study elements of the Traffic Impact Analysis to the City for review and approval prior to the start of any work.

(b) Assume full occupancy and build-out for single-phase developments. Multi-phase developments may require assessment of up to three (3) horizon years corresponding to key phases as directed by the City Engineer.

(c) An enlarged study area may be required when the minimum study areas identified in Table 1 do not provide sufficient information to meet the intent of the TIA guidelines.

(d) Vicinity (where traffic movements could be affected) shall be the area along the perimeter of and adjacent to the development.

(e) Intersections, if just outside of the designated radius of site to be studied, shall also be included in the study area.

(f) For residential developments, TIA not required unless generating 200 or more peak hour trips.

ANALYSIS TIME PERIODS

The study should include an analysis of the impact of the development traffic for the typical adjacent street peak hour conditions on a typical weekday and an analysis of the impact of the development daily weekday traffic generation on the adjacent street system and site driveways. Typical periods for analysis are the morning and evening peak hours of the adjacent street system. Contact the City Engineer for the peak hour times to be analyzed. If the proposed project is expected to generate no trips or a very low number of trips during either the morning or evening peak periods, the requirement to analyze one or both of these periods may be waived by the City Engineer or designee.

In addition, if requested by the City for situations where the peak hour is not during the typical peak periods, additional time periods and or weekend analyses may be required in the study. If the development has unusual peaking characteristics or if the adjacent non-site traffic conditions warrant an analysis of other peak traffic time periods, these peak hours must also be analyzed.

DATA COLLECTION

All data is to be collected in accordance with the latest edition of the ITE Manual of Transportation Engineering Studies or as directed by the City Engineer or designee if not specifically covered in the ITE Manual. The Traffic Impact Analysis should include information on the following existing and proposed conditions within the study area as determined within the analysis category:

Traffic Volumes

- Existing and proposed traffic volumes for the adjacent existing and proposed intersections and driveways to include daily weekday, a.m. peak hour and p.m. peak hour (and other time periods as noted in the previous section). Daily traffic volumes should be provided as a 24-hour directional roadway section count and peak hour volumes should be provided by specific intersection or driveway turning movement directions.
- Available counts may be extrapolated a maximum of two years with concurrence of the City Engineer. Where daily count data are not available, mechanical counts may be required at the City Engineer's discretion.
- Projected traffic volumes should be based on available traffic projections from the Tulare County Association of Governments (TCAG), other appropriate documented traffic projection sources or historical traffic volume trends as approved by the City

Engineer. Projected traffic volumes shall include adjustments, as necessary, to reflect other adjacent future development

Land Use

- Existing and proposed land use in the study area that has been approved should be discussed and included in the study as it impacts the proposed development street system or driveways.

Roadway Conditions

- Existing and proposed roadway conditions shall be identified including pavement type, width, number of traffic lanes and configuration, medians, curb and gutter, speed limits, horizontal and vertical curvature, and traffic control devices.

Crash Experience

- Crash experience shall be documented for the past 36 month time period for the adjacent roadway system included within the study area. This data is to be used to help determine traffic control and identify potential corrections to the roadway system.

TRIP GENERATION

The trip generation for the proposed development shall be estimated using the latest edition of Trip Generation published by ITE. Exceptions to the use of this document must be approved by the City and may include actual traffic generation counts from a similar existing facility having the same size and surrounding area characteristics or from other recognized sources that provide trip generation data not included in the ITE manual.

If proposed within the Traffic Impact Analysis, adjustments to the site traffic generation should be documented to reflect site traffic interaction, pass-by traffic, use of other modes of transportation, carpooling or other means of trip reduction. Trip reduction methods should be discussed with the City prior to use within the report.

TRIP DISTRIBUTION AND ASSIGNMENT

Site traffic shall be assigned to the proposed site driveways and street intersections included within the study area based on an analysis of the market area for the proposed development. The market area will vary based on the type and location of the development. However, as a minimum, the following guidelines should be used:

- Residential trip distribution should be based on the locations of employment and commercial attractions and the available street system.
- Commercial, industrial and office trip distribution should be based on the surrounding population densities and the available street system.

The area to be considered in the development of the site trip distribution should normally be within a 10-mile radius of the study site. However, other conditions of the proposed development, the adjacent street system and the location of site traffic attractors and generators may indicate the need to expand or reduce the area of influence.

TRAFFIC ANALYSIS

The study should include an analysis of 1) the current year existing traffic conditions, 2) the future 'no-build' traffic conditions, and 3) traffic conditions with the addition of site traffic. Additional analysis years may be required if the project is phased. The following minimum items shall be included:

Capacity Analysis

a. Level of service shall be computed for signal controlled and non-signal controlled intersections as identified in the Study Area in Table 1, in accordance with the latest edition of the Highway Capacity Manual.

b. For signal-controlled intersections, operational analyses shall be performed for time horizons up to 5 years. Operational analyses shall also be performed for street sizing to ensure the appropriate classification 'width' is correct given the demand. The planning method will be acceptable for time horizons beyond 5 years and is also acceptable for Traffic Impact Analysis prepared at the Development Master Plan level, unless used for street sizing.

c. For urban roadways, and rural highways where signal controlled intersections are at or less than 1 mile apart, the capacity of the roadway is generally dominated by the capacity of the adjacent signal controlled intersections. Roadway levels of service need not be computed for these facilities.

d. For rural highways where the signal-controlled intersections are more than 1 mile apart, the level of service on the highway shall be estimated in accordance with the latest edition of the Highway Capacity Manual.

Traffic Control Devices

Study should include intersection and driveway traffic control device requirements using the Federal Highway Administration's (FHWA's) Manual on Uniform Traffic Control Devices for Streets and Highways (edition adopted by the California Department of Transportation).

Traffic Signal Needs

A traffic signal needs study shall be conducted for all arterial/arterial, arterial/collector and collector/collector intersections within the Study Area for the opening year. If the warrants are not met for the opening year, they should be evaluated for a 5-year horizon for Categories II, III, IV and V. The date at which the traffic signal is projected to be needed shall be provided in the analysis. When performing warrant analysis, the 8-Hour Warrant shall be considered as the minimum warrant required for a signal. All supporting documentation shall be included in the study. Coordination with the City of Visalia before submittal is recommended.

Intersection and Driveway Geometrics

The study should use recognized accepted formulas with documentation provided in the report. All roadway improvements need to comply with the City of Visalia General Plan and associated documents.

1. Analyze adequacy or need for additional through traffic lanes or auxiliary right or left turn lanes and include storage requirements.
2. Analyze potential conflicts of proposed driveway locations with existing and/or proposed adjacent driveways or intersection traffic lane configurations for the future total traffic conditions.

Deceleration Lane Criteria

If any of the criteria listed below is met, a deceleration lane is required.

1. At least 5,000 vehicles per day are using or are expected in the near future (five years after the development is built-out) to be using the adjacent street.

2. The posted speed limit is 35 mph or the 85th percentile speed limit is greater than 35 mph.

3. At least 1,000 vehicles per day are using or are expected to use the driveway(s) for the development or adjacent developments(s) (existing or future).

4. At least 40 vehicles are expected to make right turns into the driveway(s) for a one-hour period for the development or adjacent developments (existing or future).

Queuing Analysis

A queuing analysis shall be conducted for all turn lanes under stop or signal control within the study area. Examples for estimating queue lengths for signal controlled and non-signal controlled intersections are given below. In addition to these calculations, the TIA can use software that provides analysis; however, supporting documentation is required. In the event that the roadway leg is an arterial, the City of Visalia requires a minimum turn pocket storage length of 300 feet.

For signal controlled intersections, find the number of vehicles arriving at the intersection

Vehicles/cycle (for random arrivals) = (vehicles/hour) / (cycles/hour)

Storage length =2 x (vehicles/cycle) x (25 feet)

> **Example:** Find the storage length required for 300 vph turning left if the signal cycle is 90 seconds. Vehicles/cycle = (300 veh/hr) / ((1 cycle/90 sec) x (3600 sec/hr)) = 7.5 veh/cycle
>
> Storage length = 2 x (7.5 veh/cycle) x (25 feet) = 375 feet **USE 375 feet**

For non-signal controlled intersections, find the number of vehicles per average 2-minute period (AASHTO Green Book).

Vehicles/2 min period = (vehicles/hour) / (30 periods/hour)

Storage length = (vehicles/2 min period) x 25 feet

> **Example:** Find the storage length required for 150 vehicles turning left at a nonsignal controlled intersection.
>
> Vehicles/2 min period = (150 veh/hr) / (30 periods/hr) = 5 vehicles

Storage length = 5 veh x 25 feet = 125 feet **USE 125 feet**

Crash Summary

Include crash summary and identification of trends and/or potential safety hazards.

Speed Considerations

Vehicle speed is used to estimate safe stopping and cross-corner sight distances. Sight distance shall conform to the American Association of State Highway and Transportation Officials (AASHTO) standards. The design speed used shall be ten miles above the posted speed limit.

Other Analyses

Other analyses as requested by the City or as may be required due to the type and location of the proposed development

1. Weaving Analyses
2. Parking Analyses
3. On-site circulation including queuing analyses at major on-site turning movement locations
4. Site access quantity, location and traffic lane configuration

IMPROVEMENT ANALYSIS

The roadways and intersections within the study area shall be analyzed with and without the proposed development to identify any projected impacts in regard to level of service and safety.

a. Where an intersection will operate at a level of service below D, alternatives which mitigate these impacts shall be evaluated and included as potential recommendations within the study.

b. Where a roadway will operate at a level of service below D, alternatives which mitigate these impacts shall be evaluated and included as potential recommendations within the study.

REPORT FORMAT

A TIS Category I will require a Traffic Impact Statement. The Traffic Impact Statement will be a lesser report and shall include at a minimum the following: The existing condition analysis, including any existing driveways or intersections in the vicinity, a sight distance evaluation, the proposed traffic generation, the access number and spacing, an access queuing evaluation, and an on-site circulation evaluation.

TIA Categories II, III, IV, and V will require a full Traffic Impact Analysis and shall include the following items and report sections:

INTRODUCTION AND SUMMARY

a) Title Page

b) Table of Contents and List of Figures and Tables

c) Introduction and Executive Summary

- Site location and study area
- Development description
- Principal findings
- Conclusions/Recommendations

PROPOSED DEVELOPMENT (Site and Nearby)

a) Site location

b) Land use and intensity

c) Site plan (copy must be legible)

- Access geometrics

d) Development phasing and timing

STUDY AREA CONDITIONS

a) Study area

- Area of significant traffic impact (including road segments, intersections and driveways)
- Market area

b) Land use

- Existing land use
- Anticipated future development

c) Site accessibility

- Existing and future area roadway system
- Site circulation

ANALYSIS OF EXISTING CONDITIONS

d) Physical characteristics

- Roadway characteristics (number of lanes, classification, etc.)
- Traffic control devices
- Transit service
- Pedestrian/bicycle facilities
- Nearby driveways

b) Traffic volumes

- Daily, morning, afternoon peak periods and others as required

c) Level of service

- Morning peak hour, afternoon peak hour, and others as required

d) Safety related deficiencies, crash experience

e) Data sources

PROJECTED TRAFFIC

a) Site traffic forecasting (each horizon year)

- Trip generation
- Mode split (if applicable)
- Pass-by traffic (if applicable)
- Trip distribution
- Trip assignment

b) Non-site traffic forecasting (each horizon year)

- Projections of non-site traffic by Tulare County Association of Governments (TCAG) may be used. For larger developments and study areas, a transportation planning model run may be required.
- Total traffic (each horizon year)

TRAFFIC AND IMPROVEMENTS ANALYSIS

a) Site access

b) Level of service analysis

- Without project (including programmed improvements for each horizon year)
- With project (including programmed improvements for each horizon year)

c) Roadway improvements

- Improvements by City of Visalia or others to accommodate non-site traffic
- Additional improvements necessary to accommodate site traffic

d) Traffic safety

- Sight distance
- Acceleration/deceleration lanes, left-turn lanes
- Adequacy of location and design of driveway access

e) Pedestrian considerations

f) Speed considerations

g) Traffic control needs

h) Traffic signal needs (base plus 5-year horizon)

i) Effect on Signal Progression (if applicable)

INTERNAL PROJECT SITE CIRCULATION (IF APPLICABLE)

a) Conflict points

- Vehicle/vehicle
- Vehicle/pedestrian
- Sight distances
- Building access delivery points
- Drive-through lanes

b) Design features

- Widths of internal circulation roadways
- Parking dimensions
- Sight distance per AASHTO Standards

c) Other features

- Fire lanes
- Delivery truck circulation/truck docks
- Access to waste containers

CONCLUSIONS / RECOMMENDATIONS

a) Roadway improvements
   - Phasing

b) Site access

c) Internal site circulation

d) Transportation demand management actions (if appropriate)

e) Other

APPENDICES

a) Traffic counts

b) Capacity analyses worksheets

c) Traffic signal needs studies

d) All supporting documentation for any warrants, studies, etc.

EXHIBITS

The following information shall be provided on clear and legible figures:

a) Site location

b) Site plan

c) Existing transportation system(s) (Number of lanes, traffic control, etc.)

d) Existing and future area development

e) Existing daily traffic volumes
f) Existing peak hour turning volumes
g) Future transportation system
h) Estimated site traffic (daily and peak periods)
i) Directional distribution of site traffic (daily and peak periods)
j) Total future traffic (peak periods)
k) Queuing distance at study intersections, per lane (total traffic in peak periods)
l) Protected levels of service including existing, horizon year non-site and horizon year total (with site development) conditions
m) Recommended improvements

REPORT SUBMITTALS

The report shall be submitted at a minimum as four hard copies, a Word document, and PDF to the City for review. Additional copies of the report may be required for review by other adjacent public agencies. Communication with the City of Visalia before submittal of the Study is recommended.

DESIGN STANDARD REFERENCE

- Design in accordance with the current City of Visalia Standards, current edition of the Highway Design Manual and other current California Department of Transportation policies, procedures and standards.

- Capacity analyses in accordance with the latest edition of the Highway Capacity Manual.

- Traffic Signal needs studies in accordance with the latest edition of Federal Highway Administration's (FHWA's) Manual on Uniform Traffic Control Devices for Streets and Highways (edition adopted by the California Department of Transportation).

- Data collection in accordance with the latest edition of the ITE Manual of Transportation Engineering Studies

- Trip generation in accordance with the latest edition of the ITE publication Trip Generation report.

COORDINATION WITH OTHER PUBLIC AGENCIES

If applicable, the requirements for a Traffic Impact Analysis as noted in this document may need to be coordinated with the requirements of other local agencies such as adjacent cities or towns, the County of Tulare, or the California Department of Transportation (Caltrans). Any deviation from the requirements of this document due to the requirements of other agencies should be presented in written form to the City for review and approval or denial.