

# **Scope of Work For Traffic Impact Studies**

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Public Works Department  
**City of Chandler**



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## 1.0 Introduction

The purpose of this document is to provide guidelines for preparing Traffic Impact Studies for proposed land development projects or additions to existing developments in the City of Chandler. This Scope of Work is a general guideline only, and additional requirements may be required for specific developments. Users of this document may wish to contact the Traffic Engineering Division of the City of Chandler to confirm these requirements.

## 2.0 Study Requirements

The need to conduct a Traffic Impact Study (T. I. S.) is based on the land use and size of the development as per Section 7.1.2 of the Street Design and Access Control Manual (Technical Design Manual #4). More specifically, a T. I. S. is required where the development intensity meets or exceeds the following figures:

Land Use	Size	
Commercial	80,000	Square feet
Office	150,000	Square feet
Industrial	200,000	Square feet
Residential – Single Family	300	Dwelling units
Residential – Multi-Family	500	Dwelling units

The above figures are roughly equivalent to a site that generates approximately 300 trips during the peak hour. For mixed-use developments, a Traffic Impact Study is required when the combined trips generated by the individual land uses exceed 300 trips per peak hour.

A Traffic Impact Study may also be required at the discretion of the City Transportation Engineer where site conditions indicate:

- Existing traffic problems or congestion,
- Public concerns regarding the development,
- Negative impacts on adjacent developments,
- The development proposes a deviation from City of Chandler standards, or
- Other local issues that may be present.

Where the need for a Traffic Impact Study has been identified, this study should be completed and submitted to the City Transportation Engineer for review within a reasonable period of time to allow traffic engineering stipulations, and other requirements to be included in the Planning & Zoning staff report.

### 3.0 Study Magnitude

Traffic Impact Studies for the City of Chandler are classified into three categories:

- Category I - Developments that generate between 100 and 500 vehicle trips during any peak hour.
- Category II - Developments that generate between 500 and 1,000 vehicle trips during any peak hour.
- Category III - Developments that generate more than 1,000 vehicle trips during any peak hour.

The developer should estimate the numbers of trips generated by the development and confirm with the City of Chandler the Category of study before initiating any work.

### 4.0 Methodology

#### 4.1 Study Area

The study area for the proposed development should include:

	Category I	Category II	Category III
All site driveways.	✓	✓	✓
All intersections abutting the development.	✓	✓	✓
All signalized intersections within 1/2 mile.		✓	✓
All signalized intersections within 1 mile.			✓
Additional locations as required by the City			✓

#### 4.2 Study Horizon

The T.I.S. should include an analysis of the expected traffic conditions for the following scenarios:

- Background (existing) conditions
- Opening day conditions
- Each phase of the proposed development
- 5-year horizon beyond the full build-out of the development

Additional scenarios are required for the following categories:

- Category 2: 10-year horizon

Category 3: 10 and 20-year horizon

#### 4.3 Analysis Time Periods

The study should include an analysis of the impact of the development traffic on the adjacent street's weekday A.M. peak and P.M. peak hours, which normally occurs between 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. respectively.

For developments with unusual peak hours, an analysis of the peak hour of the traffic generator is also required. For example, schools require an analysis of the peak period during the school start-up, and school let-out. For banquet or church facilities, an analysis of evening and/or weekends will be required.

#### 4.4 Data Collection

The Traffic Impact Study should include information on the existing and proposed conditions within the study area.

Existing and proposed turning movement counts for the adjacent existing and proposed intersections and driveways should include the 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 24-hour volumes, and peak hour volumes at intersections and driveways should be provided as turning movements. The analysis shall be based on traffic counts that are no more than two years old (or less if there are significant changes in traffic patterns). If current traffic volume data is not available from the City, the consultant shall be responsible to collect all necessary data. The estimation of existing peak hour turning movements based on automatic machine counts is not acceptable.

Projected traffic volumes should be based on the latest available traffic projections from the Maricopa Association of Governments Transportation and Planning Office (MAGTPO), the City of Chandler Transportation Study, or historical traffic volume trends. Projected traffic volumes shall include adjustments, as necessary, to reflect other adjacent future development.

#### 4.5 Background Information

The background information should include a discussion of the existing and proposed land use of the development site. Roadway geometric conditions within the study area should include, but not limited to, intersection and driveway spacing, road width, traffic lanes, medians, turn lanes, curb and gutter, speed limits, horizontal and vertical curvature, traffic control devices, and traffic signal phasing. The discussion on geometric conditions should include locations of driveways and intersections across the street from the development, and how this may impact traffic operations.

If applicable, the requirements for a Traffic Impact Study as noted in this document may need to be coordinated with the requirements of other local agencies such as adjacent cities or towns, the Maricopa County Department of Transportation or the Arizona Department of Transportation. Any deviation from the requirements of this document due to the requirements of other agencies should be presented in written form to the local reviewing agency for review and approval.

#### 4.6 Trip Generation

The trip generation for the proposed development shall be estimated using the latest edition of *Trip Generation* as published by the Institute of Transportation Engineers (I.T.E.). Actual measured trip generation rates from similar developments (in both land use and size) within the Phoenix Metropolitan area may be accepted, and must be approved by the City of Chandler before use.

If adjustments to the site traffic generation rates such as pass-by traffic or official trip reduction programs are proposed, this should be discussed with the City of Chandler before proceeding. This deviation should be clearly documented and documented in the report.

#### 4.7 Modal Split

Due to the low modal split for trips by transit, cycling and walking within in the City of Chandler, the combined mode split for these modes should be assumed to be zero. In special situations where the mode split may be significant, this should be discussed with City of Chandler before proceeding.

The Chandler Transportation Study (as approved by City Council) supports encouraging alternative travel modes. Therefore, the Traffic Impact Study should identify how transit vehicles and patrons, bicycle parking and storage, and pedestrian and sidewalk connections are accommodated.

#### 4.8 Trip Distribution

Trip distribution should be based on population and employment figures depending on the whether the development is a trip generator or attractor. The market area for commercial developments should be identified. The percentage of trips generated to and from each directional quadrant (North, South, East and West) should be identified in the report.

Market studies, in combination with traffic factors, should be used to develop the area of influence and trip distribution.

#### 4.9 Trip Assignment

Trips should be assigned to the existing and proposed road system based on the most direct route or the route offering the lowest average delay, and taking into consideration the capacity of the roadway network. For Category I and II developments, a manual trip assignment is acceptable. Category III type developments may require computer model simulation using EMME/2 or other similar type software.

#### 4.10 Traffic Analysis

A capacity analysis of all driveways, signalized and unsignalized intersections containing site-generated traffic are required. The software used for this analysis shall be the latest edition of the Highway Capacity Software (HCS), SYNCHRO, or other software acceptable to the City of Chandler.

The results of the above analysis shall be summarized in tabular form identifying the average delay, Level of Service (LOS), and volume-to-capacity (V/C) ratios for the intersection and all critical movements. All intersections and specific turning movements with a LOS D or higher shall clearly identified.

Where queuing is an issue, a queuing study should be conducted to determine the extent of queues spilling out of left turn bays, right turn bays, drive-thru facilities, and also from intersection to intersection.

Where appropriate, traffic signal warrants for unsignalized intersections shall be conducted using the criteria provided in the 2000 MUTCD.

Other analyses as requested by the City of Chandler may be required due to the type and location of the proposed development, such as weaving analyses, parking analyses, on-site circulation, pick-up and drop-offs, the number of accesses, sight distance calculations, among others.

#### 4.11 Traffic Impact Mitigation Measures

All intersections showing a LOS D or greater must be analyzed for on-site and off-site traffic and roadway improvements that are necessary to bring the intersection back to a LOS D. It is important to emphasize that this analysis is required regardless of whether congested conditions already exist without the proposed development.

A list of recommended on-site and off-site improvements required to mitigate the projected traffic congestion or safety issues shall be identified for comparison to the "before" conditions.

## 5.0 REPORT FORMAT

The traffic impact study should include the following items and report sections:

1. Title Page.
2. Table of Contents, List of Figures and Tables.
3. Introduction including description of project, purpose of report and executive summary.
4. Proposed development description including location, land use and proposed use. Include vicinity map and site plan.
5. Study Area description.
6. Existing conditions including study site land use, adjacent roadway description and traffic volumes. Include summary of existing traffic counts, graphic of existing daily and peak hour traffic and roadway condition diagram.
7. Projected traffic including site traffic generation, distribution and assignment and non-site traffic for each time period to be analyzed. Graphics should be included showing the daily and peak hour traffic volumes for each analysis time period and project phase for both the on and off-site traffic.
8. Background, Site Traffic, and Total Traffic volumes should be shown for each analysis time period.
9. Traffic analysis showing tabular and graphic results of the analyses.
10. Summary and Conclusions.
11. Appendix to include all HCS and/or SYNCHRO computer runs. Provide any material related to the traffic study data collection and study results.

Three copies of the Traffic Impact Study shall be submitted for review. Additional copies may be required for review by other public agencies.