

TRAFFIC IMPACT STUDY

A Traffic Impact Study (TIS) shall be required for all developments which generate 100 or more peak hour trips (See Table 1.2). A TIS identifies existing traffic volumes and conditions, development traffic volumes and conditions and their combined impacts on the existing and future roadway system.

- I. TIS Evaluation: The specific analysis requirements and level of detail are determined by the following categories:

CATEGORY I – Developments which generate 100 or more peak hour trips but fewer than 500 trips during the morning or afternoon peak hour. A Category I Traffic Impact Analysis may also be required for sites generating less than 100 trips during the morning or afternoon peak hour for any of the following reasons:

1. The existence of any current traffic problems or concerns in the local area such as an offset intersection, a high number of traffic accidents, etc.
2. The sensitivity of the 'adjacent neighborhoods or other areas where the public may perceive an adverse impact
3. The proximity of project drive approaches to other drives or intersections.
4. Other specific problems or concerns that may be aggravated by the proposed development

Should such conditions arise the City Engineer will evaluate the need for the study based on technical merit.

CATEGORY II – Developments which generate 500 or more peak hour trips but fewer than 1,000 trips during the morning or afternoon peak hour.

CATEGORY III – Developments which generate 1,000 or more peak hour trips but fewer than 1,500 trips during the morning or afternoon peak hour.

CATEGORY IV – Developments which generate more than 1,500 trips during the morning or afternoon peak hour.

- II. Analysis Approach and Methods

- A. Study Area - The minimum study area will be determined by project type and size in accordance with the criteria in Table 1.1. The study area for the proposed development includes traffic signal controlled intersections; intersections without signal control and driveways to ensure their operation and level of service are adequately assessed. The City Engineer may require expansion of the study area when the minimum study areas identified in Table 1.1 do not provide sufficient information to meet the intent of the TIS guidelines. For example, a large (Category III) 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.
- B. Study Horizon Years - The study horizon years will be determined by project type and size in accordance with the criteria below:

Table 1.1

Analysis Category	Development Characteristic	Study Horizons	Minimum Study Area (b)
I	Small Development 100-499 peak hour trips	1. Opening Year	1. Site Access Drives 2. Adjacent signal controlled intersections within 1/4 mile and/or major street intersections without signal control and driveways within 500 feet
II	Moderate Development 500-999 peak hour trips	1. Opening Year 2. 5 years after opening	1. Site Access Drives 2. All signal controlled intersections within 1/2 mile and/or major street intersections without signal control and major driveways within 1/2 mile
III	Large Development 1,000 - 1,500 peak hour trips	1. Opening Year 2. 5 years after opening	1. Site Access Drives 2. All signal controlled intersections within 1 mile and/or major street intersections without signal control and major driveways within 1 mile
IV	Regional Development >1,500 peak hour trips	1. Opening Year 2. 20 years after opening	1. Site Access Drives 2. All signal controlled intersections within 1 mile and/or major street intersections without signal control and major driveways within 1 mile

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. Analysis Time Period

1. Both the morning and afternoon weekday peak hours are 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.
2. Where the peak traffic hour in the study area occurs during a time period other than the normal morning or afternoon peak travel periods (for example midday), or occurs on a weekend, or if the proposed project has unusual peaking characteristics, these peak hours must also be analyzed.

D. Seasonal Adjustments - The traffic volumes for the analysis hours should be adjusted for the peak season if appropriate. Use of seasonal adjustment factors should be approved by the City Engineer. The intent is not to assess maximum peak hourly volumes, such as the day after Thanksgiving for a retail development, but to address peak seasonal volumes. For example, if traffic counts were collected in a retirement community in July, and the peak traffic period occurs

during the winter months, the counts should be adjusted to winter months.

- E. Data Collection Requirements - 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 if not specifically covered in the *ITE Manual*.
1. Turning movement counts shall be obtained for all existing cross-street intersections to be analyzed during the morning and afternoon peak periods. Available turning movement counts may be extrapolated a maximum of two years with concurrence of the City Engineer.
 2. The current and projected daily traffic volumes shall be presented in the report.
 3. Traffic accident data shall be obtained for the most current three year period available.
 4. Roadway geometric information shall be obtained including roadway width, number of lanes, turning lanes, vertical grade, location of nearby driveways, and lane configuration at intersections.
 5. The location and type of traffic controls shall be identified.
- F. Trip Generation
1. The latest edition of *ITE's Trip Generation* shall be used for selecting trip generation rates.
 2. Site traffic shall be generated for daily; AM and PM peak hour periods. Adjustments made for "passer-by" and "mixed-use" traffic volumes shall follow the methodology outlined in the latest edition of *Trip Generation*. A "passer-by" traffic volume discount for commercial centers shall not exceed twenty five percent unless approved by the City Engineer or his representative.
- G. Trip Distribution and Assignment
1. Projected trips shall be distributed and added to the projected non-site traffic on the roadways and intersections under study. The specific assumptions and data sources used in deriving trip distribution and assignment shall be documented in the report.
 2. Future traffic volumes shall be estimated using information from transportation models, or applying an annual growth rate to the base line traffic volumes. The future traffic volumes shall be representative of the horizon year for the project development.
 3. In addition, any nearby proposed "on-line" development projects shall be taken into consideration when forecasting future traffic volumes. The increase in traffic from the proposed "on-line" projects shall be compared to the increase in traffic by applying the annual growth rate. If modeling information is unavailable, the greatest traffic increase from either the "online" developments, the application of an annual growth rate, or a combination of an annual growth rate and "on-line" developments, shall be used to forecast the future traffic volumes.
 4. The site generated traffic shall be assigned to the street network in the study area based on the approved trip distribution percentages. The site traffic shall be combined with the forecasted traffic volumes to show the

total traffic conditions estimated at development completion. A figure will be required showing daily and peak period turning movement volumes for each traffic study intersection. In addition, a figure shall be prepared showing the base-line volumes with site generated traffic added to the street network.

H. Capacity Analysis

1. Level of service shall be computed for signal controlled and non-signal controlled intersections as identified in the Study Area in Table 1.1, in accordance with the latest edition of the *Highway Capacity Manual*.
2. 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. The planning method will be acceptable for time horizons beyond 5 years and is also acceptable for Traffic Impact Studies prepared at the Development Master Plan level, unless used for street sizing.
3. 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 to be computed for these facilities.
4. 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*.

I. 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 and IV.

J. Accident Analysis - An analysis of the three year accident data shall be conducted to determine if the level of safety will deteriorate due to the addition of site traffic.

K. Speed Considerations - Vehicle speed is used to estimate safe stopping and cross-corner sight distances.

L. 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.

M. Certification - The TIS shall be prepared under the supervision of a Professional Engineer (Civil) registered in the State of Utah.

III. Study and Report Format

A. Introduction and Summary

1. Purpose of Report and Study Objectives

2. Executive Summary
 3. Site Location and Study Area
 4. Development Description
 5. Principal Findings
 6. Conclusions/Recommendations
- B. Proposed Development
1. Site Location (Vicinity Map)
 2. Land Use and Intensity
 3. Proposed Development Details
 4. Site Plan
 5. Access Geometry
 6. Development Phasing and Timing
- C. Study Area Conditions
1. Study Area
 2. Area of Significant Traffic Impact (Roadways, Intersections and Driveways)
 3. Influence Area
 4. Land Use
 5. Existing Land Use
 6. Anticipated Future Development
 7. Site Accessibility
 8. Existing and Future Area Roadway System
- D. Analysis of Existing Conditions
1. Physical Characteristics
 2. Roadway Characteristics
 3. Traffic Control Devices
 4. Transit/Pedestrian/Bicycle Facilities
 5. Traffic Volumes
 6. Daily, Morning and Afternoon Peak Periods
 7. Level of Service
 8. Morning Peak Hour, Afternoon Peak Hour, Other as Required
 9. Safety Related Deficiencies
 10. Data Sources
- E. Projected Traffic
1. Site Traffic Forecasts (Each Horizon Year)
 2. Trip Generation
 3. Mode Split (If Applicable)
 4. Pass-by Traffic (If Applicable)
 5. Trip Distribution
 6. Trip Assignment
 7. Non-site Traffic Forecasting (Each Horizon Year)
 8. Total Traffic (Each Horizon Year)

- F. Traffic and Improvement Analysis
 - 1. Site Access
 - 2. Level of Service Analysis
 - 3. Without Project (Include Programmed Improvements for Each Horizon Year)
 - 4. With Project (Include Programmed Improvements for Each Horizon Year)
 - 5. Roadway Improvements
 - 6. Improvements by Layton City or Others to Accommodate Non-site Traffic
 - 7. Additional Alternative Improvements to Accommodate Site Traffic
 - 8. Traffic Safety
 - 9. Sight Distance
 - 10. Acceleration/Deceleration Lanes, Left-turn Lanes
 - 11. Adequacy of Location and Design of Driveway Access
 - 12. Pedestrian Considerations
 - 13. Speed Considerations
 - 14. Traffic Control Needs
 - 15. Traffic Signal Needs (Base Plus 5-year Horizon)

- G. Internal Project Site Circulation (If Applicable)
 - 1. Conflict Points
 - 2. Vehicle/Vehicle
 - 3. Vehicle/Pedestrian
 - 4. Sight Distances
 - 5. Building Access Delivery Points
 - 6. Drive-through Lanes
 - 7. Design Features
 - 8. Widths of Internal Circulation Roadways
 - 9. Fire Lanes
 - 10. Access to Waste Containers

- H. Conclusions

- I. Recommendations
 - 1. Roadway Improvements and Phasing
 - 2. Site Access
 - 3. Internal Site Circulation
 - 4. Other

- J. Appendices
 - 1. Traffic Counts
 - 2. Capacity Analyses Worksheets
 - 3. Traffic Signal Warrant Studies
 - 4. Accident Data Summaries

- K. Figures and Tables – Category I Figures and Tables may be documented within the text. The following information should be provided:

1. Site Location
2. Site Plan
3. Existing Transportation System(s)
4. Existing and Future Area Development
5. Existing Peak Hour Turning Volumes
6. Future Transportation System
7. Estimated Site Traffic Generation (Daily and Peak Period)
8. Directional Distribution of Site Traffic (Daily and Peak Period)
9. Site Traffic (Peak Period)
10. Non-site Traffic (Peak Period)
11. Total Future Traffic (Peak Period)
12. Protected Levels of Service Including Existing, Horizon Year Non-site and Total Horizon Year (With Site Development) Conditions
13. Recommended Improvements

Table 1.2

Threshold for Traffic Impact Study Project Sizes Generating 100 Peak Hour Trips		
Land Use	Unit	Threshold
<u>Residential</u>		
Single Family	DU	100 DU
Condominiums/Townhomes	DU	175 DU
Apartments	DU	150 DU
Mobile Home	DU	180 DU
R.V. Park	SPACE	400 DU
Retirement Community	DU	250 DU
<u>Commercial</u>		
Walk-in Bank	1000 SF	5000 SF
Drive-in Bank	1000 SF	2000 SF
Shopping Center	1000 SF	6000 SF
Grocery Store	1000 SF	10000 SF
Convenience Store	1000 SF	1500 SF
Discount Store	1000 SF	16000 SF
Furniture Store	1000 SF	250000 SF
Lumber Store	1000 SF	30000 SF
Hardware / Paint Store	1000 SF	20000 SF
Auto Sales	1000 SF	40000 SF
Nursery Garden Center	ACRE	13.5 ACRES
Vehicle Repair	1000 SF	35000 SF
Bowling Alley	LANE	30 LANES
Gas Station	PUMP	6 SINGLE PUMPS
Health Club	1000 SF	24000 SF
High Quality Restaurant	1000 SF	13000 SF
Sit Down (High Turnover)	1000 SF	6000 SF
Fast Food (Drive through)	1000 SF	2000 SF
<u>Offices</u>		
Office	1000 SF	43000 SF

Office Park	1000 SF	60000 SF
Business Park	1000 SF	70000 SF
Research and Development	1000 SF	100000 SF
Government Office	1000 SF	9000 SF
Post Office	1000 SF	10000 SF
DU = Density Unit, SF = Square Feet		