MISSOURI DEPARTMENT OF TRANSPORTATION – DISTRICT 6
TRAFFIC IMPACT STUDY
GUIDELINES

September 19, 2006

INTRODUCTION

The amount of traffic generated by a proposed development with access to the MoDOT system should be the basis for determining the contents of a traffic impact study. The specific content of a traffic impact study will vary depending on the site and prevailing conditions.

The performance standards of traffic impact studies as contained within this chapter are intended to be a general guideline. However, the specific details, methodologies, and study requirements shall be confirmed and agreed upon by the District and the Applicant, or an appropriate representative such as the traffic engineering consultant, prior to the formal submission of the study.

WHEN A TRAFFIC IMPACT STUDY IS REQUIRED

A traffic impact study (TIS) will be required under any of the following conditions:

1. When the proposed development is projected to generate 100 or more trips per hour during the peak generating time for the development.
2. When the proposed new approach is to an intersection already operating at LOS "D" or worse (LOS "C" in rural areas).
3. When the developer is requesting a new traffic signal.
4. When modifications of an existing traffic signal are being requested (timing/phasing changes, hardware modifications, etc).
5. If using an existing TIS in which the data is more than two years old.

When none of the five conditions above are met, a brief memorandum should be submitted to the Traffic Specialist (where the proposed development is located) summarizing why a TIS is not required. A TIS may not be required in situations where the project's impact on traffic is obvious and where the Traffic Specialist is agreeable to the proposed mitigation measures without conducting a TIS. As an alternative, it may be requested that an appropriate level of documentation be completed to illustrate the adequacy of the mitigation measures.

To determine if a Traffic Impact Study is required, the developer or consultant should contact the Traffic Specialist in the area where the development is proposed. Please refer to page 8 for the contact information. The Traffic Specialist will be the point of contact for every stage throughout the study process.

CERTIFICATION BY PROFESSIONAL ENGINEER

A professional engineer registered in Missouri must certify all traffic impact studies.

PRE-SUBMITTAL SCOPING MEETING AND REQUIREMENTS

Prior to beginning the TIS, the consultant shall contact the Traffic Specialist for the area where the proposed development is located to schedule a meeting at which to discuss the scope of the study. It may be determined that other agency representatives (from counties, cities, towns, etc) should attend the scoping meeting as well if MoDOT feels coordination is necessary. Scope topics will include identification of intersections that are to be studied (or excluded) in the TIS, locations and type of development planned, study horizon expectations, development or site-specific characteristics (e.g., directional distributions) and methodology (e.g., trip generation calculation methods, analytical tools or methods, etc.) to be used in the TIS. The applicant is highly encouraged to bring a plan showing:

- The location of the site
- Existing and proposed land use(s) and square footage and/or number of units for the subject site.
- Proposed access and its relationship to adjacent properties and their existing/proposed access
- Preliminary estimates of the development's trip generation at build out (or critical phases if a large, phased development). This should include both average daily traffic and peak hour traffic.
- The peak hours of analysis (AM, PM, weekend, other)

If a plan is unavailable, the applicant should be able to discuss the project characteristics above. This information will assist in determining the level of detail and extent to which the TIS will need to address the items within the Scope of Work. If the applicant is preparing a large, complex, or phased development, an additional meeting is encouraged prior to submittal to discuss appropriate requirements and strategies. During the pre-submittal scoping meeting, a general timeline for the study will be determined including when the study will be submitted and when review of the study will be completed.

Additionally, prior to beginning detailed analyses as part of the TIS, a preliminary submission should be made to the Traffic Specialist that will include proposed locations of new approaches, existing turning movement counts, trip generation estimates and directional distribution for all intersections and interchanges within the study area.

It is in the best interest of the development team to attend the scoping meeting and submit the TIS prior to the development plan layout being finalized, if possible. Only after review of the TIS will MoDOT and other coordinating agencies be able to comment on the access plan and proposed mitigation. Therefore, until the plan and mitigation are agreed upon, it is at MoDOT's discretion to request changes in the development plan layout prior to obtaining approval.

SCOPE OF WORK

A. Study Area and Data

At a minimum, the study area shall contain:

- Adjacent and boundary streets and/or natural barriers
- Nearest arterial/arterial intersection(s)
- Access roads
- All major signalized or potentially future signalized intersections, either current or future years where the project contributes 10 percent increase to any approach leg of the intersection during the critical time periods included in the analysis.

The peak hour and daily traffic counts utilized in the study may be up to two years old at the time of the application submission unless there has been development in the vicinity of the site or heavy regional growth that would significantly impact traffic within the study area. Under this scenario, more recent data may be necessary. Additional counts are the responsibility of the applicant. The validity of traffic counts will be determined at the scoping meeting.

B. Scenarios and Planning Horizons

Each traffic impact study shall present an analysis of the traffic conditions without and with the proposed project for a short term planning horizon. The short term horizon year is defined as the year the project is expected to be built out. If the project is proposed to occur over multiple phases, each phase shall be evaluated on its corresponding buildout year. Additionally, a long term horizon analysis with the proposed project shall be completed. The long term horizon is defined as 20 years after project buildout.

The "No Build" surface transportation network (without the proposed development) assumed for the short term planning horizon should reflect any existing facilities plus general traffic growth, any firmly committed transportation improvements, and other planned developments that would affect roadways within the study area. All planned transportation facilities within the study area shall be included in the assumptions for the long term planning horizon analyses. In addition, an analysis shall be completed for the Existing conditions in order to calibrate the analyses for the future scenarios.

To summarize, the following scenarios are required:

- Existing
- Short term – one year after occupancy (without and with proposed project)
- Long term – 20 years after build out (with proposed project)

A long term planning horizon analysis may not be required on small projects if the Traffic Specialist believes it is not necessary. This will be determined during the scoping meeting.

C. Peak Hours of Analysis

Each scenario (discussed above) will be analyzed during peak hours. The study peak hours will be determined during the pre-application scoping meeting and will be based on the type of development being proposed and the land uses in the vicinity of the site. All studies shall include at least two peak hour periods unless it is agreed otherwise during the scoping meeting.

D. Trip Generation and Distribution

Trip generation data is often available directly from the developer based on other similar built-out developments. The use of any available data versus other means of developing trip generation rates will be discussed at the scoping meeting. Trip generation may also be calculated from the data contained within the latest edition of the ITE Trip Generation Manual or other industry publications. Data limitations (sample sizes, R-squared values, etc), data age, choice of average rate versus statistical significant modification shall be presented and discussed. In the event data is not available, the applicant must conduct a local trip generation study and provide sufficient justification for the proposed generation rate. Methodologies for trip reductions associated with pass-by trips, common trips, and alternative transportation modes shall be discussed and agreed upon at the scoping meeting.

Trip distribution may be based on traffic forecasts from East-West Gateway COG, market analysis, existing traffic flows, applied census data, and professional judgment. A discussion on site-specific access issues and access management issues within the study area is required that may include the following, among others, if applicable:

- Cross-access
- inter-parcel access
- turn restrictions
- truck access
- new intersections (signalized and unsignalized)

Any study proposing changes to access shall refer to MoDOT's Access Management Guidelines.

Since on-site circulation affects off-site traffic conditions, it will be important to evaluate the on-site circulation system near the access points. The TIS must demonstrate that there will be enough stacking distance on-site to accommodate the ingress of traffic so as not to impact the off-site roadways. MoDOT's Access Management Guidelines address some of the on-site issues and shall be referred to for this evaluation. An on-site circulation evaluation may not be applicable for all proposed projects.

E. Capacity Analysis and Simulation

Peak hour intersection levels of service shall be determined for signalized and un-signalized intersections within the study area based on procedures described in the latest edition of the Highway Capacity Manual (or equivalent approved by MoDOT). Synchro is an acceptable analytical tool. SIDRA and other tools can be used where appropriate under the direction of the Traffic Specialist. Highway Capacity Software (HCS) will not be accepted for signalized intersection analyses unless it is deemed appropriate by the Traffic Specialist. Simulation using SimTraffic or VISSIM may be required in some applications. The use of simulation will be discussed during the scoping meeting and may not be necessary in all studies. MoDOT reserves the right to request simulation after the scoping meeting if it is determined necessary in order to adequately evaluate the impacts of the proposed development.

If the proposed development is located on a corridor with multiple traffic signals, it may be requested that a progression study be completed. The purpose of such a study would be to determine impacts along the corridor as a whole and would evaluate such Measures of Effectiveness (MOE's) as travel time and delay.

F. Safety Assessment

A safety assessment of similar scale to the development shall be completed for each TIS. The assessment should, at a minimum, include the points of access to the proposed development. The most current crash data can be obtained through the local police department and/or Missouri Highway Patrol. The locations for the safety assessment will be discussed in the scoping meeting.

G. Special Analysis/Issues

This section provides MoDOT with opportunities to request specific focused traffic analyses relevant to the proposed development. These could include access management, travel demand management plan, cut-through traffic and residential quality of life, truck estimates, ITS strategies, pedestrian/bicycle safety and access, safe routes to school, emergency routes, etc. Any special analyses and/or issues will be discussed during the scoping meeting.

H. Project Impacts and Mitigation

The key elements of the project impact analysis include:

- A peak hour intersection level of service for each study period– identify whether the traffic from the proposed project will result in a significant impact (see below)

- The appropriateness of access locations, access management strategies, and the need for future traffic signals per MoDOT's Access Management Guidelines
- Turn lane requirements per MoDOT's Access Management Guidelines
- Sight distance where new access points are recommended
- Appropriateness of acceleration or deceleration lanes
- Signal warrant analyses if new traffic signals are recommended
- Impacts on any special issues that were identified such as safety or community concerns

Project impact is measured by comparing "No Build" conditions with "Build" conditions. The specific measures of effectiveness used in the comparison will vary based on the analysis. For example, if an isolated intersection is being analyzed, then the v/c ratio, LOS, and delay shall be measured. However, if a corridor is being analyzed, then travel time shall be measured. The following conditions shall be used to determine if impacts are significant and warrant further examination:

1. Intersection v/c (volume/capacity) ratio – any of the following conditions are considered "significant"
    a. If No Build overall v/c <50%, then an increase in the v/c of 10% or greater
    b. If No Build overall v/c >=50% and <80%, then an increase in v/c of 5% or greater
    c. If No Build overall v/c >=80%, then an increase in v/c of 2% or greater; OR
2. Intersection LOS – if the level of service of any movement decreases; OR
3. Intersection delay – if the delay of any movement increases by at least 15 seconds; OR
4. Corridor travel time – if travel time along a study corridor increases by at least 5%

If any of the above conditions are met, then there will be further examination to determine if mitigation is necessary.

CONTENTS OF REPORT

At a minimum, five (5) copies of the completed report with appendices and two (2) copies of a CD containing all of the analyses shall be provided to the Traffic Specialist at the time of submittal. The completed traffic impact study shall contain at least the following:

- Brief Executive Summary
- Table of Contents
- Summary of the project scope and location
    - Illustration showing the project location and access plan
- Existing Conditions Summary
    - diagram showing existing roadway network, signalized intersections, and lane configuration within the study area
    - diagram showing existing traffic volumes during the study time periods
    - discussion of signal corridor: existing interconnection, system limits, current cycle lengths, and time of day strategies
    - discussion of level of service analyses
- Future No Build Summary
    - discussion of growth rates, planned improvements and/or planned developments
    - diagram showing future no build traffic volumes during the study time periods
    - discussion of level of service analyses
- Future Build Summary and Future Build Plus 20 Years Summary
    - Discussion of growth rates, planned improvements and/or planned developments
    - Discussion of trip generation and trip distribution
    - Diagram showing projected new trips during the study time periods
    - Diagram showing total future build traffic volumes during the study time periods
    - Discussion of level of service analyses
    - Discussion of project impacts and corresponding mitigating measures
- Summary of TIS
    - List recommended improvements
- Appendices

CONTACT INFORMATION

Location	Area Traffic Specialist Phone #
City of St. Louis	(314) 340-4333
North St. Louis and eastern St. Charles counties	(314) 340-4328
South St. Louis and North Jefferson counties	(314) 340-4332
South Jefferson and Franklin counties	(314) 340-4331
St. Charles County	(314) 340-4334
West St. Louis County	(314) 340-4318