

Requirements for Transportation Impact Studies

Executive Summary

Prepared for
City of Lawrence, Kansas

Prepared by
TranSystems Corporation

December 2003

Table of Contents

I. INTRODUCTION

II. EXTENT OF STUDY REQUIRED

III. QUALIFICATIONS TO CONDUCT AND REVIEW A STUDY

IV. REVIEW AND USE OF STUDY

V. STANDARD TRANSPORTATION IMPACT STUDY PROCEDURES

- Step 1 Study Methodology Determination
- Step 2 Analysis of Existing Conditions
- Step 3 Background Traffic Growth
- Step 4 Trip Generation
- Step 5 Trip Distribution
- Step 6 Mode Split
- Step 7 Trip Assignment
- Step 8 Existing Plus Development Conditions Analysis
- Step 9 Future Conditions Analysis
- Step 10 Pedestrian, Bicyclist, Transit and Truck Considerations
- Step 11 Documentation

I. INTRODUCTION

Background

Land use and transportation are strongly interdependent. Transportation facilities and services are essential for development to occur, and high levels of mobility and accessibility are needed to attract the economic development to provide and maintain a high quality of life.

The transportation decisions made in the land development process have a significant cumulative effect on the safety and efficiency of a community's street system. There is a strong correlation between the amount of access provided to major streets and the safety and efficiency on those streets. Therefore, it is in the long-term interests of all parties to balance the mobility and safety needs of the traveling public with the accessibility to development.

Purpose

The primary purpose for evaluating the impact of development through transportation impact studies is to protect the integrity of the transportation systems. Neither public nor private interests are well served if transportation systems needlessly degrade due to poor planning and design.

In order to accomplish this objective, the review of transportation systems associated with development needs to be more extensively scrutinized and needs to take a long-term perspective. What might be acceptable today may not be as an area develops and matures. This is certainly consistent with the City's long-range planning for land use, major streets and other infrastructure.

These transportation impact study guidelines, and the resulting work products, will allow for more informed decision-making and could lead to a framework for the negotiation of mitigation measures for the impacts created by development.

II. EXTENT OF STUDY REQUIRED

The necessity to review all land development applications from a transportation perspective as well as the wide variety of land use types and intensities suggest that multiple thresholds or triggers be established to warrant a transportation impact study. The following guidelines will be followed.

All Applications

1. Identify the specific development plan under study and any existing development on and/or approved plans for the site. Also identify land uses on property abutting the proposed development site, including property across public streets.
2. Identify the land uses shown in the Lawrence/Douglas County Comprehensive Plan for the proposed development site under study, as well as the ultimate arterial and collector street network in the vicinity of the site.

3. Identify the functional classification of the public street(s) bordering the site and those streets on which access for the development is proposed.
4. Identify allowable access to the development site as defined by City design criteria and/or access management guidelines.
5. Document current public street characteristics adjacent to the site, including the nearest arterial and collector streets.
6. Compare proposed access with established design criteria. Identify influences or impacts of proposed access to existing access for other properties. If appropriate, assess the feasibility of access connections to abutting properties, including shared access with the public street system.
7. Estimate the number of trips generated by existing and proposed development on the site for a typical weekday, weekday peak hours, and other peak periods.

Development or Site Plan Generates 100 to 499 Trips in a Peak Hour

A transportation impact study will be required. The study area may tend to be confined to the street or streets on which access is proposed but should be extended to at least the first major intersection in each direction.

Development or Site Plan Generates 500 or More Trips in a Peak Hour

A transportation impact study will be required. The study area may extend beyond the streets onto which access is proposed.

Proposed Land Use Deviates from Comprehensive Plan

Determine the extent of a transportation impact study based on anticipated trip generation. Conduct comparative analyses using the proposed land use and the land use identified in the comprehensive plan.

III. QUALIFICATIONS TO CONDUCT AND REVIEW A STUDY

The parties involved in a land development application sometimes have different objectives and perspectives. Further, the recommended elements of a transportation impact study require skills found only in a trained professional engineer with specific experience in the field of traffic engineering.

For these reasons, the person conducting and the person reviewing the study must be registered professional engineers with at least five years of demonstrated experience either in the preparation or review of transportation impact studies for land development. Beginning January 1, 2007, these persons shall be certified Professional Traffic Operations Engineers (PTOE).

IV. REVIEW AND USE OF STUDY

A transportation impact study should be viewed as a technical assessment of existing and projected transportation conditions. The extent to which individual professional judgment has to

be applied will be minimized by provision of community policies and practices with respect to street and traffic control design and land development.

Ultimately, a transportation impact study will be used by professional staff to make recommendations to the planning commissions and governing bodies charged with reviewing and approving development applications. Transportation is one element amongst many that must be considered.

V. STANDARD TRANSPORTATION IMPACT STUDY PROCEDURES

Step 1 Study Methodology Determination

Prior to conducting any transportation impact study it is necessary to determine the minimum technical responsibilities and analyses that will be performed. It is the applicant's responsibility to ensure that the study utilize the techniques and practices accepted by the City and other participating agencies.

Study items shall be considered, discussed and agreed to by the City Traffic Engineer (and others if appropriate) and the applicant for transportation impact studies. These items include, but are not limited to, the study area, analysis periods, analysis tools, and analysis scenarios.

Step 2 Analysis of Existing Conditions

Once the parameters for the transportation impact study have been established, the first step in the study process is to collect relevant data and assess existing conditions. This step includes reviewing the development plan relative to surrounding land uses and transportation facilities.

Existing traffic operations shall be compared to current design standards and acceptable levels of service (LOS) which are LOS D on arterial streets and LOS C on collector streets. Vehicle queues shall be evaluated to ensure that turn lanes are adequate and queues do not impede traffic at adjacent intersections.

Step 3 Background Traffic Growth

Background traffic is the expected increase in traffic volumes over time except for the specific development under study. Background traffic needs to be estimated out to the applicable horizon year in order to assess future traffic conditions.

Step 4 Trip Generation

Trip generation is the process used to estimate the amount of travel associated with a specific land use or development. Trip generation is estimated through the use of "trip rates" that are based on some measure of the intensity of development, such as gross leasable area (GLA).

Trip Generation published by ITE is the most comprehensive collection of trip generation available. The rates provided are based on nationwide data but many rates are not supported with a large amount of data. Nevertheless, this manual is generally accepted as the industry standard and the latest edition shall be used for studies in the City of Lawrence. Caution needs to be applied when limited data points exist for a land use category. Local trip generation

characteristics may be used if deemed to be properly collected and are consistent with the subject development application.

Step 5 Trip Distribution

Trip distribution is the general direction of approach and departure to/from a development site. Trip distribution will typically be estimated using existing travel patterns exhibited in the area, the position of the development in the community, and the likely market area of the development. Data from similar development in the immediate vicinity could be useful as well. Good judgment is necessary to develop reasonable estimates of trip distribution.

Step 6 Mode Split

Mode split is the estimate of number of travelers anticipated to use transportation modes other than automobiles. Data associated with most transportation impact studies is taken from suburban locations where there is little to no alternative to automobile transportation. Further, the trip generation rates are based on the actual number of vehicles, not persons, entering and departing a particular land use. Therefore, mode split will not be applicable to most transportation impact studies. Mode split, or modified trip generation rates, can be applied where the influence of alternative transportation modes is clearly demonstrated and documented.

Step 7 Trip Assignment

Trip assignment involves the determination of traffic that will use each access point and route on the street network. While it certainly uses the trip distribution estimates, it is a different process. This is also the step where trip-reduction factors such as pass-by and diverted traffic are applied.

The assignments should reflect the conditions anticipated to occur in the analysis year. Assignments are estimates of how drivers will travel and need to account for physical and operational characteristics of the roadway and the habits of typical drivers.

Since some of these factors conflict, good judgment is necessary. Further, an iterative process might be necessary based on internal circulation alternatives and/or traffic mitigation alternatives considered.

Step 8 Existing Plus Development Conditions Analysis

The analysis of existing plus development conditions is based on the combination of existing traffic and development traffic anticipated on opening.

Two sets of conditions shall be analyzed in this step:

- Existing Plus Development Traffic with No Improvements
- Existing Plus Development Conditions with Improvements

In the first scenario, existing plus development traffic is analyzed with the current street geometry and traffic control except for the proposed access. The purpose is to demonstrate likely traffic conditions before mitigation measures are considered.

The second scenario is typically an iterative process where mitigation measures are necessary to achieve acceptable levels of service and/or to manage vehicle queuing. The final results of that process are to be documented along with the mitigation measures associated with those results. Improvements that become warranted by City design criteria or access management guidelines shall be identified and included in this process.

Mitigation measures might include:

- Additional turn lanes on the public streets and/or the site access.
- Additional through lanes on public streets.
- Revised traffic control, including new traffic signals.
- Access management strategies, e.g. build a raised median on the public street.
- Site plan or land use changes.

Step 9 Future Conditions Analysis

The analysis of future conditions is important to further assess proposed access in relation to the configuration of the public streets at a more mature stage of development. What might be deemed acceptable today might not fit with the long-range configuration of a street corridor. It may also prove useful in determining when improvements to major streets need to be planned.

Step 10 Pedestrian, Bicyclist, Transit and Truck Considerations

While transportation impact studies primarily address automobile traffic, recognition of other vehicle types and travel modes is appropriate, particularly in a community that strives for multi-modal choice. The following text by no means represents a comprehensive list of site planning elements but each must be addressed.

Pedestrians

Sidewalks along public streets or off-street paths provide mobility for pedestrians. Pedestrians should be provided the opportunity to readily travel between these public infrastructure and adjacent land uses. All development plans should provide this connectivity.

Bicyclists

Similar to pedestrians, development sites should provide reasonable opportunities to travel between adjacent public streets or bicycle trails and the land use. Adequate and properly placed parking facilities for bicycles are a key component to encouraging bicycle travel.

Public Transportation

Bus transportation is currently provided by several private and publicly funded agencies, generally to targeted customers. More widespread public transit could be implemented in the future. Site development should account for both current and potential bus services. Some of these considerations are similar to trucks due to the relatively large size of buses; however, the primary difference is that buses need to circulate with customer traffic flow. Bus turnouts may be planned for specific corridors or intersections, or adjacent to major generators.

Trucks

Site driveways and internal circulation must be designed to accommodate the largest truck anticipated to serve the development. Vehicle turning paths need to be provided such that trucks do not encroach over curbs and medians. Encroachment into opposing turning lanes should be

minimized but can be consistent with the scale of the development and the frequency and timing of truck movements. Truck circulation through a development site should minimize conflicts with customer traffic and loading docks should be configured such that parked trucks do not impede normal traffic flow.

Step 11 Documentation

The transportation impact study shall be documented in a typewritten, bound report outlining the findings and conclusions of the study, including exhibits illustrating the site plan, traffic volumes (current and projected), and existing and proposed street conditions (lane configurations and intersection traffic controls). The report, or an appendix, shall include all analysis worksheets. Four (4) bound copies and one PDF of the final report shall be submitted to the Planning Department.

The report shall be well organized and generally follow the study process chronology. The report should be divided into sections to clearly distinguish between the site plan details, assessment of existing conditions, assessment of existing plus development conditions, and the assessment of future conditions. The concluding section of the report shall summarize the significant findings and outline the mitigations measures needed to meet accepted standards.

Documentation of the mitigation measures shall include a detailed description of the proposed improvements. For example, turn lanes shall include a recommended length. It is expected that sufficient due diligence has been conducted to reasonably conclude that the mitigation measures can be implemented without disruption to existing roadside facilities, other public street facilities, e.g., another turn lane, and/or existing access. If proposed access or a mitigation measure will cause such a disruption, the impact shall be clearly described.

It is not appropriate to define or suggest funding responsibilities in the study report.