CITY OF SCOTTS VALLEY

GUIDE FOR THE PREPARATION

OF

TRAFFIC IMPACT STUDIES

CITY OF SCOTTS VALLEY

PUBLIC WORK DEPARTMENT

JUNE 2003

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I. INTRODUCTION

The City of Scotts Valley (City) desires to provide a safe and efficient transportation system for the citizens of Scotts Valley pursuant to various Sections of the California Streets and Highway Code. This is done in partnership with regional agencies through procedures established by the California Environmental Quality Act (CEQA) and other land use planning processes. The intent of this guide is to provide a starting point and a consistent basis in which City evaluates traffic impacts to street facilities. The applicability of this guide for streets and roads is at the discretion of City.

City reviews development projects [1], and land use change proposals for their potential impact to street facilities. The primary objectives of this guide are to provide:

- ❑ Guidance in determining if and when a traffic impact study (TIS) is needed
- ❑ Consistency and uniformity in the identification of traffic impacts generated by local land use proposals
- ❑ Consistency and equity in the identification of traffic impacts generated by local land use proposals
- ❑ Developers and their consultants with the information necessary to make informed decisions regarding the existing and proposed transportation infrastructure (see Appendix A, Minimum Contents of a TIS)
- ❑ TIS requirements early in the planning phase of a project (i.e., initial study, notice of preparation, or earlier) to eliminate potential delays later
- ❑ A quality TIS by agreeing to the assumptions, data requirements, study scenarios, and analysis methodologies in advance of beginning the study, and
- ❑ Early coordination during the planning phases of a project to reduce the time and cost of preparing TIS

II. WHEN A TRAFFIC IMPACT STUDY IS NEEDED

The level of service[2] (LOS) for operating street facilities is based upon measures of effectiveness (MOEs). These MOEs (see Appendix B) describe the measures best suited for analyzing street facilities (i.e. signalized intersections, etc.). City endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" (see Appendix "B") on street facilities; however, City acknowledges that this may not always be feasible and recommends that the lead agency consult with City to determine the appropriate target LOS. If an existing street facility is operating at less than the appropriate target LOS, the existing MOE should be maintained.

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[1] "Project" refers to activities directly undertaken by developers, financed by developers, or requiring a permit or other approval from government as defined in Section 21065 of the Public Resources Code and Section 15378 of the California Code of Regulations.

[2] "Level of Service" as defined in the latest edition of the Highway Capacity Manual, Special Report 209, Transportation Research Board, National Research Council.

A. Trip General Thresholds

The following criterion is a starting point in determining when a TIS is needed. When a project:

1. Generates over 50 peak hour trips assigned to a street facility.

2. Generates 20 to 50 peak hour trips assigned to a street facility - and, affected street facilities are experiencing noticeable delay or approaching unstable traffic flow conditions (LOS "C" or "D").

3. Generates 1 to 49 peak hour trips assigned to a street facility - the following are examples that may require a full TIS or some less analysis[3]:

    a. Affected street facilities experiencing significant delay; (unstable or forced traffic flow conditions LOS "E" or "F").

    b. The potential risk for a traffic incident is significantly increased (i.e., congestion related collisions, non-standard sight distance considerations, increase in traffic conflict points, etc.).

    c. Change in local circulation networks that impact a street facility (i.e., direct access to street facility, a non-standard highway geometric design, etc.).

Note: A traffic study may be as simple as providing a traffic count to as complex as a microscopic simulations. The appropriate level of study is determined by staff considering the particulars of a project, the prevailing highway conditions, and the forecasted traffic.

B. Exceptions

Exceptions require consultation between City and those preparing the TIS. When a project's traffic impact to a street facility can clearly be anticipated without a study and all the parties involved (City and the developer) are able to negotiate appropriate mitigation, a TIS may not be necessary).

C. Updating An Existing Traffic Impact Study

A TIS requires updating when the amount or character of traffic is significantly different from an earlier study. Generally, a TIS requires updating every two years. A TIS may require updating sooner in rapidly developing areas and not as often in slower developing areas. In these cases, consultation with City is strongly recommended.

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[3]A "lesser analysis" may include obtaining traffic counts, preparing signal warrants, or a focused TIS, etc.

III. SCOPE OF TRAFFIC IMPACT STUDY

Consultation between the City and those preparing the TIS is recommended before commencing work on the study to establish the appropriate scope, At a minimum, the TIS should include the following:

A. Boundaries of the Traffic Impact Study

All street facilities impacted in accordance with the criteria in Section II should be studied. Traffic impacts to local streets and roads can impact intersections with street facilities. In these cases, the TIS should include an analysis of adjacent facilities, upstream and downstream of the intersection (i.e. driveways and intersections) with the street.

B. Traffic Analysis Scenarios

City is interested in the effects of general plan updates and amendments, as well as the effects of specific project entitlements (i.e., site plans, conditional use permits, subdivisions, rezoning, etc.) that have the potential to impact a street facility. The complexity or magnitude of the impacts of a project will normally dictate the scenarios necessary to analyze the project. Consultation between the City and those preparing the TIS is recommended to determine the appropriate scenarios for the analysis. The following scenarios should be addressed in the TIS when appropriate:

1. When only a general plan amendment or update is being sought, the following scenarios are required:

    a. Existing Conditions - Current year traffic volumes and peak hour LOS analysis of effected street facilities.
    b. Proposed Project Only with Select link[4] Analysis - Trip generation and assignment for build-out of general plan.
    c. General Plan Build-out Only - Trip assignment and peak hour LOS analysis. Include current land uses and other pending general plan amendments.
    d. General Plan Build-out Plus Proposed Project - Trip assignment and peak hour LOS analysis. Include proposed project and other pending general plan amendments.

2. When a general plan amendment is not proposed and a proposed project is seeking specific entitlements (i.e., site plans, conditional use permits, subdivision, rezoning, etc.) the following scenarios must be analyzed in the TIS:

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[4] "Select link" analysis represents a project only traffic model run, where the project's trips are distributed and assigned along the highway network. This procedure isolates the specific impact on the street network.

a. Existing Conditions - Current year traffic volumes and peak hour LOS analysis of effected street facilities.
b. Proposed Project Only - Trip generation, distribution, and assignment in the year the project is anticipated to complete construction.
c. Cumulative Conditions (Existing Conditions Plus Other Approved and Pending Projects Without Proposed Project) - Trip assignment and peak hour LOS analysis in the year the project is anticipated to complete construction.
d. Cumulative Conditions Plus Proposed Project (Existing Conditions Plus Other Approved Pending Projects Plus Proposed Project) - Trip assignment and peak hour LOS analysis in the year the project is anticipated to complete construction.
e. Cumulative Conditions Plus Proposed Phases (Interim Years) - Trip assignment and peak hour LOS analysis in the years the project phases are anticipated to complete construction.

3. In cases where the circulation element of the general plan is not consistent with the land use element or the general plan is outdated and not representative of current or future forecasted conditions, all scenarios from Sections III.B.1. and .2 should be utilized with the exception of duplicating item 2.a.

IV.TRAFFIC DATA

Prior to any fieldwork, consultation between the City and those preparing the TIS, is recommended to reach consensus on the data and assumptions necessary for the study. The following elements are a starting point in that consideration.

A. Trip Generation

The latest edition of the Institute of Transportation Engineers' (ITE) Trip Generation report should be used for trip generation forecasts. Local trip generation rates are also acceptable if appropriate validation is provided to support them.

1. Trip Generation Rates - When the land use has a limited number of studies to support the trip generation rates or when the Coefficient of Determination (R^2) is below 0.75, consultation between the lead agency, City and those preparing the TIS is recommended.
2. Pass-by Trips[5] - Pass-by trips are only considered for retail oriented development. Reductions greater that 15% require consultation and acceptance by City. The justification for exceeding a 15% reduction should be discussed in the TIS.

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[5]"Pass-by" trips are made as intermediate stops between an origin and a primary trip destination (i.e., home to work, home to shopping, etc.).

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3. Captured Trips[6] - Captured trip reductions greater than 5% requires consultation and acceptance by City. The justification for exceeding a 5% reduction should be discussed in the TIS.
4. Transportation Demand Management (TDM) - Consultation between the lead agency and City is essential before applying trip reduction for TDM strategies.

NOTE: Reasonable reductions to trip generation rates are considered when adjacent street volumes are sufficient (at least 5000 ADT) to support reductions for the land use.

B. Traffic Counts

Prior to field traffic counts, consultation between the City and those preparing the TIS is recommended to determine the level of detail (e.g., location, signal timing, travel speeds, turning movements, etc.) required at each traffic count site. All street facilities within the boundaries of the TIS should be considered. Common rules for counting vehicular traffic include but are not limited to:

1. Vehicle counts should be conducted on Tuesday, Wednesdays, or Thursdays during weeks not containing a holiday and conducted in favorable weather conditions.
2. Vehicle counts should be conducted during the appropriate peak hours (see peak hour discussion below).
3. Seasonal and weekend variations in traffic should also be considered where appropriate (i.e., school sessions, recreational routes, tourist attractions, harvest season, etc.).

C. Peak Hours

To eliminate unnecessary analysis, consultation between the lead agency, City, and those preparing the TIS is recommended during the early planning stages of a project. In general, the TIS should include a morning (a.m.) and an evening (p.m.) peak hour analyses. Other peak hours (e.g. 11:30 a.m. to 1:30 p.m., weekend, holidays, etc.) may also be required to determine the significance of the traffic impacts generated by a project.

D. Travel Forecasting (Transportation Modeling)

The local or regional traffic model should reflect the mot current land use and planned improvements (i.e. where programming or funding is secured). When a general plan build-out model is not available, the closest forecast model year to build-out should be used. If a traffic model is not available, historical growth rates and current trends can be used to project future traffic volumes.

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[6]"Captured Trips" are trips that do not enter or leave the driveways of a project's boundary within a mixed-used development.

The TIS should clearly describe any changes made in the model to accommodate the analysis of a proposed project.

V. TRAFFIC IMPACT ANALYSIS METHODOLOGIES

Typically, the traffic analysis methodologies for the facility types indicated below are used by City and will be accepted without prior consultation. When a street has saturated flows, the use of a micro-simulation model is encouraged for the analysis. Other analysis methods may be accepted, however, consultation between the City and those preparing the TIS is recommended to agree on the information necessary for the analysis.

A. Signalized Intesections[7] - HCM* Chapter 9, Highway Capacity Software**, operational analysis, TRAFFIX™**, Synchro**, see footnote 7
B. Unsignalized Intersection - HCM* Chapter 10, operational analysis, City Traffic Manual for signal warrants if a signal is being considered
C. Transit Capacity - HCM* Chapter 12, operational analysis
D. Pedestrians - HCM* Chapter 13
E. Bicycles - HCM* Chapters 14, use operational analysis when applying Chapter 9 and 10 HCM methods to bicycle analysis
F. City Criteria/Warrants - City Traffic Manual (stop signs, traffic signals, freeway lighting, conventional highway lighting, school crossings)
G. Channelization - City guidelines for Reconstruction of Intersections, August 1985, Ichiro Fukutome

* The most current edition of the Highway Capacity Manual, Special Report 209, Transportation Research Board, National Research Council, should be used.

** NOTE: City does not officially advocate the use of any special software; however, consistency with the HCM is advocated in most, but not all, cases. The City local development review units utilize the software mentioned above. If different software or analytical techniques are used for the TIS, then consultation between the City and those preparing the TIS is recommended. Results that are significantly different than those produced with the analytical techniques above should be challenged.

VI. MITIGATION MEASURES

The TIS should provide the nexus [Nollan v. California Coastal Commission, 1987, 483 U.S. 825 (108 S. Ct.314)] between a project and the traffic impacts to street facilities. The TIS should also establish the rough proportionality [Dolan v. City of

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[7]The procedures in the Highway Capacity Manual "do not explicitly address operations of closely spaced signalized intersections. Under such conditions, several unique characteristics must be considered, including spill-back potential from the downstream intersection to the upstream intersection, effects of downstream queues on upstream saturation flow rate, and unusual platoon dispersion or compression between intersections. An example of such closely spaced operations is signalized ramp terminals at urban interchanges. Queue interactions between closely spaced intersections may seriously distort the procedures in "the HCM." Scope of Manual, page 1-2, Highway Capacity Manual, Special Report 209, updated December 1997.

Tigard, 1994, 512 U.S. 374 (114 S. Ct. 2309] between the mitigation measures and the traffic impacts. One method for establishing the rough proportionality or a project proponent's equitable responsibility for a project's impacts is provided in Appendix "B." Consultation between the lead agency, City, and those preparing the TIS is recommended to reach consensus on the mitigation measures and who will be responsible.

Mitigation measures must be included in the traffic impact analysis. This determines if a project's impacts can be eliminated or reduced to a level of insignificance. Eliminating or reducing impacts to a level of insignificance is the standard pursuant to CEQA and the National Environmental Policy Act (NEPA). The City is responsible for administering the CEQA review process and has the principal authority for approving a local development proposal or land use change. City, as a responsible, is responsible for reviewing the TIS for errors and omissions that pertain to street facilities. The authority vested in the lead agency to administer the CEQA process does not take precedence over other authorities in law.

If the mitigation measures require work in the street right-of-way, an encroachment permit from City will be required. This work will also be subject to City standards and specifications. Consultation between the City and those preparing the TIS early in the planning process is strongly recommended to expedite the review of local development proposals and to reduce conflicts and misunderstandings in both the City CEQA review process as well as the City encroachment permit process.

APPENDIX A

MINIMUM CONTENTS

OF A

TRAFFIC IMPACT STUDY

MINIMUM CONTENTS OF TRAFFIC IMPACT STUDY REPORT

I. EXECUTIVE SUMMARY

II. TABLE OF CONTENTS

A. List of Figures (Maps)
B. List of Tables

III. INTRODUCTION

A. Description of the proposed project
B. Location of project
C. Site plan including all access to streets (site plan, map)
D. Circulation network including all access to streets (vicinity map)
E. Land use and zoning
F. Phasing plan including proposed dates of project (phase) completion
G. Project sponsor and contact person(s)
H. References to other traffic impact studies

IV. TRAFFIC ANALYSIS

A. Clearly stated assumptions
B. Existing and projected traffic volumes (including turning movements), facility geometry (including storage lengths), and traffic controls (including signal phasing and multi-signal progression where appropriate) (figure)
C. Project trip generation including references (table)
D. Project generated trip distribution and assignment (figure)
E. LOS and warrant analyses - existing conditions, cumulative conditions, and full build of general plan conditions with and without project

V. CONCLUSIONS AND RECOMMENDATIONS

A. LOS and appropriate MOE quantities of impacted facilities with and without mitigation measures.
B. Mitigation phasing plan including dates of proposed mitigation measures
C. Define responsibilities for implementing mitigation measures
D. Cost estimates for mitigation measures and financing plan

VI. APPENDICES

A. Description of how traffic was collected
B. Description of methodologies and assumptions used in analyses
C. Worksheets used in analyses (i.e., signal warrant, LOS, traffic count information, etc.)

APPENDIX B

MEASURES OF EFFECTIVENESS BY FACILITY TYPE

MEASURES OF EFFECTIVENESS BY FACILITY TYPE

TYPE OF FACILITY	MEASURE OF EFFECTIVENESS
Two-lane Roadways	Time Delay (percent)
Signalized Intersections	Average Control Delay (sec/veh)
Unsignalized Intersections	Average Control Delay (sec/veh)
Arterials	Average Travel Speed (mph)
Transit	Load Factor (pers/seat,veh/hr, people/hr)
Pedestrian	Space (sq.ft./ped)

Measures of effectiveness for level of service definitions located in Table 1-2, Chapter 1, of the 1997 Highway Capacity Manual, Special Report 209, Transportation Research Board, National Research Council.

Transition between LOS “C” and LOS “D” Criteria
(Reference 1997 Highway Capacity Manual)

Signalized Intersections

LOS	Control Delay Per Vehicle (Sec)
A	**10**
B	**20**
C	**35**
D	**55**
E	**80**
F	**>80**

Double line represents the transition between LOS “C” and LOS “D”