CITY OF LAGUNA HILLS
TRAFFIC STUDY GUIDELINES
City of Laguna Hills, California

Prepared for:

CITY OF LAGUNA HILLS
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City of Laguna Hills Traffic Study Guidelines

I. Objectives

The City of Laguna Hills has prepared these traffic study guidelines to ensure that future developments are adequately assessed from a traffic impact and parking demand standpoint. Traffic impact study guidelines are needed to provide consistency throughout the City of Laguna Hills in the preparation of traffic and parking impact studies, while allowing flexibility for a variety of potential projects. Traffic and parking impact study guidelines establish procedures that the traffic engineer preparing the study can use to adequately assess the impacts of the project.

The guidelines have established procedures that can be implemented within the existing project review process of the City. These guidelines provide the City with a review process to analyze the potential impacts of a project and to ensure adequate mitigation measures are designated.

Attached to these guidelines is the City's Scoping Agreement for Traffic and Parking Studies. This agreement needs to be completed by the consulting traffic engineer and approved by the City prior to commencing the actual traffic or parking impact study. The scoping agreement follows the requirements of the Traffic Study guidelines and ensures that the traffic engineering consultant follows the appropriate City-approved procedures when completing the study. Traffic and parking studies need to be prepared under the direction of a registered traffic engineer or civil engineer experienced in the preparation of traffic/parking studies. The study is to be signed and stamped by the responsible engineer.

II. Study Requirements

A variety of projects may require traffic or parking impact studies. Three levels of studies are included in these guidelines. Each level of traffic or parking impact study will require different criteria with respect to the study requirements. The following are the requirements of various types of projects:

A. A project that generates less than 50 peak hour trips or less than 500 trip-ends per day, has less than a 0.01 impact to the ICU at a nearby intersection and is consistent with the zoning/general plan designation for the property would require an access circulation/parking review letter only. This type of study would analyze specific impacts at the site itself and ensure that appropriate design measures be implemented with the project.

B. A project that adds 50 or more AM/midday/PM peak hours or 500 trip-ends per day or raise the ICU at a nearby intersection at a value of 0.01 or greater and is consistent with the zoning/general plan designation for the property

would require a project buildout traffic impact study. This study would follow the "build-up method" of traffic analysis. The analysis scenarios would include the following:

1. Existing Conditions
2. Existing Plus Project Conditions
3. Project Buildout Without Project Conditions, without and with Mitigation
4. Project Buildout With Project Conditions, without and with Mitigation

C. If a project requires a zone change or a General Plan Amendment, a General Plan Buildout Analysis without and with the Project would be required, in addition to the requirements in item B above. However, if the proposed project can prove that it generates a similar or less number of trips than the approved zoning and general plan designation for the property, then it is exempt from providing a General Plan Buildout Analysis. If the project generates more trips than the approved zoning and general plan designation for the property, then the following two additional scenarios would be required in addition to item B above:

5. General Plan Buildout Without the Project without and with Mitigation
6. General Plan Buildout With Project without and with Mitigation

D. All traffic impact studies shall be consistent with the current OCTA version of OCTAM and the City of Laguna Hills traffic model.

III. Study Area

The study area for the traffic impact study should be determined in the traffic study specifications, including which intersections and roadway links should be studied. The specifications overall determine if Congestion Management Plan (CMP) impacts would need to be assessed. Generally speaking, any intersections where the project would generate 50 or more peak hour trips or raise the ICU by a value of 0.01 or greater would be assessed as part of the study. For smaller projects, analysis of the adjacent intersections and project driveways would be required and would be identified during the specification.

IV. Existing Conditions

The existing roadway conditions in the study area would be identified in this section of the study. This would include the existing roadway classification, traffic control, roadway geometrics (lane configurations), traffic signal phasing, and existing AM/PM traffic counts and roadway segment average daily traffic volumes. Depending upon the type of project and its location, mid-day traffic counts may also be required.

All traffic counts should be obtained within one year of completion of the traffic impact study. The traffic engineering consultant can consult with the City's traffic engineer to identify potential sources of existing traffic volumes. New average daily traffic volumes should be obtained for roadway segments adjacent the project unless they are available from other sources. Other roadway segment Average Daily Traffic (ADT) volumes can be estimated from the peak hour volumes.

V. Project Trip Generation

A. The project trip generation should be based upon the latest edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual. When data listed in the ITE Trip Generation Manual is not available or is not appropriate to use for a particular project, other sources such as San Diego Association of Government (SANDAG) Traffic Generator's Manual or special trip generation studies can be obtained by the consultant and presented to the City staff prior to the approval of the traffic study specifications. Any trip credit for existing operating uses should be identified.

B. Pass-by Trips – The use of pass-by trip adjustments may be allowed for appropriate land uses (i.e. gas station, fast-food restaurants, etc.) and would be approved in conjunction with the traffic study specifications. The ITE Trip Generation Handbook can be consulted for pass-by trip adjustments. It should be noted that project access points and intersections directly adjacent to the project is to have the full project trip generation applied for analysis.

C. Internal capture – In the case of some mixed-use projects, internal capture adjustments can be made to eliminate double counting of project trips. Again, the ITE Trip Generation Handbook can be utilized to determine potential trip reductions as a result of internal capture. Any internal capture is to be identified and approved in the traffic study specifications.

D. Transit Adjustment – In most cases, there would be no adjustment to account for potential public transit uses. However, some types of projects located in specific locations within the City may be subject to having higher transit usage. Full documentation of the transit reduction would be included and approved in the traffic impact study.

VI. Background Traffic

Typically, for project buildout conditions without and with the project, the "build-up" method would be utilized to determine future traffic volumes. An ambient growth rate would be applied to existing traffic counts to determine the background traffic volumes in the traffic impact study. Additionally, any cumulative (related) projects would need to be identified and accounted for in the analysis, if they occur within one or one and a half

miles of the project site. These projects would be obtained from the City's Planning Department. The project buildout year would be based upon the time frame when the project would be fully built out and occupied. Identification of the project buildout year should be included and approved in the traffic study specifications.

VII. Capacity Analysis

The capacity analysis for all project conditions should include an assessment of level of service (LOS) at signalized intersections, unsignalized intersections, project driveways, and in some cases, roadway segments. The level of service analysis would be based upon the following:

1. Intersection Capacity Utilization (ICU) methodology should be used to analyze signalized study area intersections;

   A. Saturation flow value of 1,700 vehicles per lane per hour for all lanes; no adjustments are used for protected movements with dedicated lanes (including both right and left turns). An adjustment of 0.85 should be used for right turn movements where there is a right turn or "defacto" right turn lane adjacent to the curb lane (lane width > 20').

   B. A clearance interval factor of 5% (0.05) should be applied to the ICU calculations. The cycle time is 100 seconds for ICU analysis purposes.

   C. The Level of Service ranges are as follows:

Level of Service	Volume to Capacity Ratio	Description
A	0.00 - 0.60	Excellent operation. All approaches to the intersection appear quite open, turning movements are easily made, and nearly all divers find freedom of operation.
B	0.61 - 0.70	Very good operation. An occasional approach phase is fully utilized. Many drivers feel somewhat restricted within platoons of vehicles.
C	0.71 - 0.80	Good operation. Major approach phases fully utilized. Most drivers feel somewhat restricted.
D	0.81 - 0.90	Fair operation. Drivers may have to wait through more than one red signal indication. Queues may develop but dissipate rapidly, without excessive delays.
E	0.91 - 1.00	Poor operation. Volumes at or near capacity. Vehicle may wait through several signal cycles. Long queues form upstream from intersections.
F	≥1.00	Forced flow. Represents jammed conditions. Intersection operates below capacity with low volumes. Queues may block upstream intersections.

D. Weekday peak-hour analysis periods are defined as follows (unless otherwise defined in the traffic study specifications):

7:00 to 9:00 AM
4:00 to 6:00 PM

E. The highest one-hour period in both the AM and PM peak periods, as determined by four consecutive 15-minute count periods should be used in the ICU calculations.

F. Variations in peak-hour volumes can affect LOS calculations because they vary from day-to-day. To minimize these variations, no counts should be taken on Mondays, Fridays, holidays or weekends.

G. If the distance from the edge of the outside through lane is greater than 20 feet and parking is prohibited during the peak period, right turning vehicles may be assumed to utilize this "unofficial" right turn lane. Otherwise, all right turn traffic is assigned to the through lane. If a right turn lane exists, right turn activity is checked for conflicts with other critical movements. It should be assumed that right turn movements are accommodated during non-conflicting left turn phases (e.g., northbound right turns during westbound left turn phase), as well as non-conflicting through flows (e.g., northbound right turn movements and north/south through flows). Right turn movements become critical when conflicting movements (e.g., northbound right turns, southbound left turns, and eastbound through flows) represent a sum of V/C ratios that are greater than the normal through/left turn critical movements.

2. HCM Methodology:

Study area intersections that are stop sign controlled with stop control on the minor street or project driveway only should be analyzed using the unsignalized intersection methodology of the Highway Capacity Manual (HCM 2000). For these intersections, the calculation of level of service is dependent on the occurrence of gaps occurring in the traffic flow of the main street. The level of service should be calculated using data collected describing the intersection configuration and traffic volumes at these locations. The level of service should be determined based on the worst individual movement or movements sharing a single lane. The relationship between the level of service and delay is different than for signalized intersections. The level of service is defined for the various analysis methodologies as follows:

Level of Service	Critical Delay (HCM)	Description
A	0.00 - 10.00	Excellent operation. All approaches to the intersection appear quite open, turning movements are easily made, and nearly all divers find freedom of operation.
B	10.01 - 15.00	Very good operation. An occasional approach phase is fully utilized. Many drivers feel somewhat restricted within platoons of vehicles.
C	15.01 - 25.00	Good operation. Major approach phases fully utilized. Most drivers feel somewhat restricted.
D	25.01 - 35.00	Fair operation. Drivers may have to wait through more than one red signal indication. Queues may develop but dissipate rapidly, without excessive delays.
E	35.01 - 50.00	Poor operation. Volumes at or near capacity. Vehicle may wait through several signal cycles. Long queues form upstream from intersections.
F	>50.01	Forced flow. Represents jammed conditions. Intersection operates below capacity with low volumes. Queues may block upstream intersections.

VIII. Roadway Segment (Link) Analysis

Roadway Segment (Link) Analysis would only be required for a zone change or General Plan Amendment traffic analysis. The assessment of roadway segment would be based upon the following standard ADT (average daily traffic) relationship. Level of service D would be required for roadway segments.

Arterial Highways (Average Daily Traffic Volumes)

Type of Arterial	Lane Configuration	Levels of Service					
		A	B	C	D	E	F
Principal	8 lanes divided	45,200	52,500	60,000	67,500	75,100	-
Major	6 lanes divided	33,900	39,400	45,000	50,600	56,300	-
Primary	4 lanes divided	22,500	26,300	30,000	33,800	37,500	-
Secondary	4 lanes undivided	15,000	17,500	20,000	22,500	25,000	-
Commuter	2 lanes divided	11,300	13,200	15,000	17,000	18,800	-
Commuter	2 lanes undivided	7,500	8,800	10,000	11,300	12,500	-

If the above ADT analysis shows that the projected ADT values exceed Level of Service D, then a peak hour directional analysis should be completed based upon a peak hour

directional capacity of 1,700 vehicles per hour per lane. To ensure adequacy of the roadway segments, directional volume/capacity (V/C) ratio would be calculated to determine if peak hour directional segment volumes would exceed a V/C ratio of 0.90.

IX. Level of Service Standards

The City of Laguna Hills level of service standard for intersections and roadway segments is LOS D. This would be appropriate for both signalized and unsignalized intersections. This level of service indicates an ICU or V/C ratio of 0.90 or less. It should be noted that the City's General Plan Circulation Mobility Element recognizes that not all traffic roads are attributed to land use decisions made by the City, and that specific intersections may have physical or other constraints that create difficulties making sufficient improvements to achieve the acceptable LOS policy. Critical intersections will be identified by the City prior to completing the traffic study specifications and should be identified within the traffic impact study.

X. Significant Impact

A project's significant impact is determined based upon the existing and projected future level of service at an intersection or roadway segment. A significant impact is identified when an intersection or roadway segment is already operating at an ICU or V/C ratio at or below 0.90 and the project causes the level to exceed 0.90 by an impact equal to or greater than 0.01. Furthermore, if an intersection or roadway segment is already operating at a LOS E or F, any ICU or V/C ratio impact equal to or greater than 0.01 would be considered a significant impact by the project.

The project traffic impact study should include a table identifying whether the project has a significant impact at any of the study area intersections or roadway segments. Mitigation would be required to pre-project conditions or the project would need to participate on a "fair-share" basis to the appropriate road fee programs (if any). A project fair share percentage table should be calculated at all study area intersections to show the project's impact to the street network. This percentage would be calculated by taking the project's traffic at a particular intersection and dividing it from the overall growth in traffic during the future conditions.

XI. Site Access and Circulation Review

As part of the traffic impact study, project access and internal circulation should be reviewed based upon the proposed land uses and site plan proposed for the project. Any recommended changes to the circulation system, access or traffic control should be identified in the traffic impact study.

XII. Parking Requirements

The parking provided by the project should be adequate to meet the anticipated use of the site. Typically, the City's parking code should be utilized to determine the adequacy of the parking. In some cases where there are mixed use projects, shared parking is appropriate. In cases of shared parking conditions, an Urban Land Institute (ULI) shared parking analysis should be provided for the proposed project. This study should analyze peak parking demand for each individual use and the times of the day that those uses are in greatest demand. The ULI shared parking analysis should use parking demand rates based upon the City's parking code.

In some cases, specialized uses may require parking rates not identified in the City's parking code, and as such, special parking demand studies should be provided to assess the adequacy of parking. The need for these types of studies would be identified in the scoping agreement. Data from at least three (3) similar sites should be included in any specialized studies.

XIII. Queuing Analysis

A queuing analysis may be required for certain projects (i.e. private gated communities, restaurants or pharmacies with drive-thru lanes, etc.) to ensure that adequate vehicle stacking is available in the proposed site plan. Various methodologies are available to assess project queuing including the "Crommelin Methodology" and other queuing methodologies included in the ITE Land Development Traffic Manual. As an alternative, on-site queuing studies of similar uses may be utilized to assess the queuing for a project.

XIV. Special Issues (if any)

In some cases there may be special issues that may be addressed as part of the traffic or parking assessment. Special issues may depend on the specific type of land use being proposed and these will be identified in the traffic study specifications.

XV. Recommendations

The traffic study should include a list of recommendations to be incorporated as part of the project conditions. These recommendations should be included in both written and graphic form within the traffic study.

XVI. Conclusion

A summary and conclusion section should be included to summarize the findings of the traffic study. The conclusion section would identify the impact of the proposed project and refer to the recommendations included in the traffic study report to mitigate the impacts.

XVII. Exhibits

Exhibits should be provided to adequately describe the proposed project in graphic format. This would include a location map, site plan, existing roadway conditions and lane configuration, existing traffic volumes, project trip distribution maps, project buildout without and with the project traffic volumes, cumulative projects location map, cumulative projects trip distribution maps, cumulative projects traffic volumes, general plan buildout traffic volumes without and with the project (when applicable), and an exhibit showing the graphic representation of proposed project recommendations and improvements.

XVIII. Tables

The traffic impact study should obtain sufficient tables to identify project impacts. This would include table summaries of existing levels of service, project trip generation rates, project trip generation, existing plus project level of service, project buildout without and with the project levels of service, general plan Buildout without and with the project levels of service, a summary table of all traffic levels of service considered in the traffic study, a parking requirement table, a queuing analysis table (when applicable) and a table summarizing study recommendations.

XIX. Appendices

Appendices should include traffic counts level of service worksheets for all study scenario conditions, any parking related material utilized in the analysis and any relevant references utilized to complete the study.

Exhibit A

TRAFFIC STUDY SPECIFICATIONS

This letter acknowledges the City of Laguna Hills requirements for traffic impact analysis of the following project. The analysis must follow the City of Laguna Hills Traffic Impact Study Guidelines.

The Traffic Study pertains to which of the following:

- ☐ Access / Internal Circulation / Parking Review (less than 50 peak hour trips or 500 ADT)
- ☐ Project Buildout Traffic Impact Study (50 or more peak hour trips or 500 ADT)
- ☐ Zone Change / General Plan Amendment Traffic Impact Study (more trips than existing zoning / General Plan)
- ☐ Parking Study Only
- ☐ Other: _____

Case Numbers: _____
Project Name: _____
Project Address: _____
Project Description: _____

Consultant	Developer
Name: _____	Name: _____
Address: _____	Address: _____
_____	_____
Telephone: _____	Telephone: _____

A. Trip Generation Source: (ITE 8th Edition or other approved source) _____

Current GP Land Use _____ Proposed Land Use _____
Current Zoning _____ Proposed Zoning _____

	Current Trip Generation to be Credited:			Project Trip Generation:			Net Trip Generation:		
	In	Out	Total	In	Out	Total	In	Out	Total
AM Trips	_____	_____	_____	_____	_____	_____	_____	_____	_____
PM Trips	_____	_____	_____	_____	_____	_____	_____	_____	_____

Internal Trip Allowance ☐ Yes ☐ No _____ % Trip Discount
Pass-By Trip Allowance ☐ Yes ☐ No _____ % Trip Discount

The full project trips should be applied to the trips at adjacent study area intersections and project driveways and shall be indicated on a report figure.

B. Trip Geographic Distribution (%): North = _____ % South = _____ % East = _____ % West = _____ %
(attached exhibit for detailed assignment)

C. Background Traffic

Project Build-out Year _____ Annual Ambient Growth Rate: _____ %
Phase Year(s) _____
Other area projects to be analyzed: To be provided by the City of Laguna Hills.
Model/Forecast methodology _____

Exhibit A - Traffic Study Specifications - Page 2

D. Study Intersections: (NOTE: Subject to revision after other projects, trip generation and distribution are determined, or comments from other agencies.)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____

E. Other Jurisdictional Impacts:

Is this project within a City's Sphere of Influence or one-mile radius of City boundaries? ☐ Yes ☐ NO

If so, name of adjacent City Jurisdiction: _____

F. Site Plan (please attach reduced copy)

G. Specific issues to be addressed in the Study (To be filled out by the City of Laguna Hills)

_____

H. Existing Conditions
Traffic count data must be new or recent. Provide traffic count dates if using other than new counts.
Date of counts: _____

I. Level of Service (LOS)

Acceptable intersection LOS for this study: D or Better

Recommended by:

_____ _____
Consultant's Representative Date

Approved Traffic Study Specifications:

_____ _____
City of Laguna Hills Date