TRAFFIC IMPACT ANALYSIS SCOPE AND STUDY AREA

Project Name:	PROJECT NAME	Date: December 1, 2025
Location:	LOCATION	
Owner's Agent:	FIRM NAME	Phone: XXX-XXX-XXXX
	NAME OF ENGINEER	

Scope must be approved and signed by staff prior to submittal of a Traffic Impact Analysis (TIA).

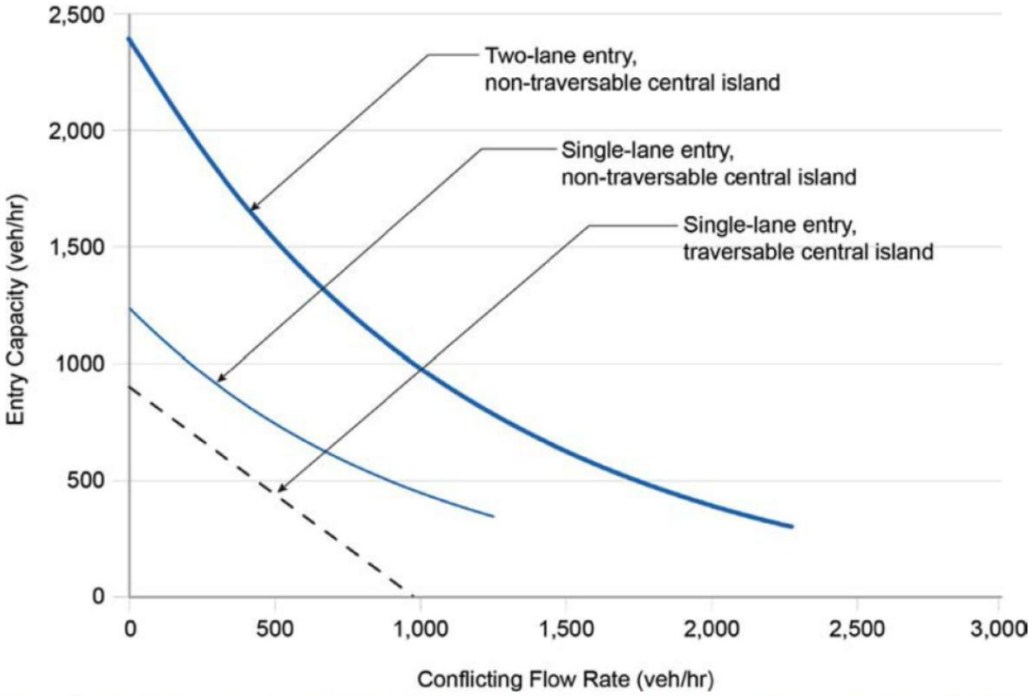
General Requirements

1. The TIA shall be prepared by a professional engineer licensed to practice in Texas and trained and experienced in the application of traffic engineering.
2. A scoping meeting shall be scheduled with Hutto Engineering staff prior to starting the TIA process. Email correspondence with applicable attachments may be acceptable in lieu of a meeting.
3. Any previous traffic study relating to the development that is more than 2 years old may be required to be updated unless the City Engineer determines the conditions have not changed significantly.
4. All TIAs shall incorporate, at minimum, the following traffic counts and associated determinations:
    a. Completion of the initial phase of construction
    b. 5 years after the opening of the initial phase
    c. Completion of the final phase of construction
    d. 5 years after the final phase of construction
5. Additional analyses may be required depending on the project. City Engineer has the authority to modify a-d of the preceding list as the project and city traffic volumes may dictate.
6. TIA shall conform to these requirements, the engineering manual, unified development code, and transportation master plan in effect in Hutto at the time of the scoping.
7. City Engineer may waive the requirement for a TIA in accordance with the Unified Development Code (UDC).
8. Per City of Hutto policy, major intersections, defined as any intersection that includes a collector or higher classification street shall be analyzed using the Intersection Control Evaluation (ICE) procedure required by the Federal Highway Administration (FHWA) and Texas Department of Transportation (TxDOT).
9. Per City of Hutto policy, the City of Hutto will use roundabouts as the preferred option of traffic control where new intersections are planned or an existing intersection that warrants or may warrant a future traffic signal or all-way stop. The following guidelines on intersection control selection are to be applied.

a. In existing developed areas, a roundabout shall be analyzed where a traffic control upgrade is warranted, capital improvements are being considered, or safety or capacity issues have been identified.
b. When a project includes reconstructing of or constructing of an intersection, a roundabout alternative shall be analyzed to determine if it is a feasible solution based on site constraints, including Right-of-Way (ROW), environmental factors, and other design constraints.
c. When the analysis shows that a roundabout is a feasible alternative, then a roundabout shall be considered as part of the ICE study due to the proven substantial safety benefits and other operational benefits.

10. Roundabouts may not be feasible for these reasons: Site constraints, ROW, environmental factors, existing corridor configuration, etc.; however, the city has the right to require additional review of roundabouts at specific locations where the City Engineer deems it appropriate.

11. Where existing or projected turning movement data are available at the planning level, designers can estimate the required lane configuration of a roundabout. Each approach leg of the roundabout is evaluated individually to determine the number of entering lanes required on the basis of the entering and conflicting flow. The Figure below presents a simplified diagram that evaluates roundabout one entry at a time. It uses the sum of entering flow for a given (y-values) entry plus the conflicting flow passing that same entry (x-values), as a planning guide on the type of roundabout and number of lanes that may be needed for any given entry.



NOTE: Practical capacity is assumed to be 90 percent of maximum capacity. Conclusions not valid at planning level for conflicting flow rates above 1,250 veh/hr for a single-lane circulatory roadway and 2,300 veh/hr for a two-lane circulatory roadway. Values beyond these practical limits may be possible, but further analysis is recommended. SOURCE: Derived from HCM (*1*) and Lochrane et al. (*9*).

Figure 1: Planning-Level Practical Entry Capacity Estimates Using Peak Hour Volumes for a Given Entry (Source: NCHRP 1043, "Roundabout Design Guide", Exhibit 8.5)

12. Rules of lane continuity at any intersection also applies to roundabouts. When two through lanes are required on any entry, there should be two corresponding circulating lanes and two exit lanes. Where exclusive left-turn or right-turn lanes are used, lane continuity rules still apply but alternative lane configurations should also be considered.

Report contents

1. An executive summary covering
   a. The proposed site development
   b. Methodology
   c. Data used
   d. Major findings of the analysis
   e. Recommended mitigation measures proposed, if necessary.

2. A vicinity map showing the location of the proposed development in relation to the transportation system or the area and location maps with turn counts broken down with AM and PM peaks. A complete description of the proposed development including:
   a. A site plan
   b. The total size and nature of the entire proposed development
   c. The proposed location and traffic control of all proposed access points.
   d. Intersection Control Evaluation (ICE) and justification where modifications to an existing intersection are determined to be necessary or a new intersection is proposed. See Appendix A for more information on ICE.

3. A brief description of the current (and proposed, if applicable) land users adjacent to the site.

4. A description of the study area for the TIA as defined by all proposed site access points and shall include:
   a. Roadway names, locations and functional classifications
   b. Intersection type, lane configurations and traffic control
   c. Pedestrian, bicycle, and transit facilities

5. Discussion of Assumptions and Methodology:
   a. Distributions. Default value is to assume site distribution will be the same split as existing conditions. Call out any exceptions to this.
   b. Cap on total combined trip reduction (pass-by and internal capture)
   c. Growth factors – provide analysis of both 0% growth rate and estimated growth rate.

6. Existing traffic volumes (measured within the previous six (6) months and adjusted to reflect current conditions) and operational analysis for all study intersection including:
   a. Average intersection delay
   b. Level of Service
   c. Volumes/capacity ratios
   d. Queue length analysis

7. If a recent traffic count for an affected street is not available, the City Engineer may require the applicant to conduct a traffic count.

8. Accident data summary and analysis within the study area for the most recent available three-year period.

9. Complete trip generation estimates for all phases and land uses of the proposed development should be calculated with the following requirements:

a. The most recent edition of the ITE publication "Trip Generation Manual" should be used.

b. The specific trip generation figures that are used for calculations should be noted in the report.

c. If the ITE manual does not contain adequate data or the proposed land use is unique, a trip generation study shall be conducted.

i. Trip generation shall be based upon the proposed land use and density. AM peak, PM peak and total daily site-generated traffic must be calculated using an independent variable or determinant which has been confirmed by the city before the TIA is prepared. The applicant must identify and justify the applicability of the trip rates used. Gross square footage is the usually accepted determinant for retail project. The number of dwelling units is the most often accepted determinant for residential uses. A table of proposed land uses must also be included in each TIA report for review.

ii. Trip generation rates shall be adopted from the Trip Generation: An Informational Report, most recent edition, Institute of Transportation Engineers, 1099 14th St., NW, Suite 300 W, Washington, DC 20005.

iii. Average weekday trips shall be used in estimating total daily trips generated unless otherwise indicated by staff in defining the scope of study. Weekend or other trip rates shall also be required if the peak hour does not occur on an average weekday. The average trip rate for peak hour of adjacent street traffic shall be used to estimate AM/PM peak hour traffic entering and exiting the site. Guidelines in the Trip Generation manual shall be used for determining whether to use average trip rates or equations.

iv. If the TIA is filed for a specific site plan, trip generation shall be based upon the uses and intensities identified on the site plan. If a site plan is not available, trip generation shall be based upon the maximum allowable density for the most intensive use permitted by zoning.

v. Reductions for internal capture, pass-by and transit usage should be discussed with the staff in defining the scope of study and must be supported by adequate documentation. No reductions in trip rates may be made for driveway turning movements unless it can be documented that certain trips will not sure the driveway. Guidelines contained in the Trip Generation manual or other approved sources shall be used to document internal capture and pass-by trips.

10. Trip distribution of the trip generation information should be performed using directional trip distribution patterns based on historical data. Provide maps in both Excel file and PDF file (aerial view) showing Project trips distribution and percentages (inbound/outbound for both AM/PM peak hours) at the project driveways, study intersections, and freeways as an attachment(s).

a. Percentages for directional distribution of the site generated traffic must be well referenced. The basis for directional attraction shall largely rely on the following information:

i. Marketing study

ii. Subarea Transportation Study
iii. City or State Travel Demand Estimation

b. If the above information is not available, a traffic study for determining direction attraction is required to address the area that is surrounded by the nearest arterial streets. The traffic study must be consistent with the procedures established for calculating trip distribution in "Quick-Response Urban Travel Estimation Techniques and Transferable Parameters", NCHRIP 186, Transportation Research Board.

11. Study Intersections selection: To select the study intersections for analysis, the below guidelines should be followed to determine which existing and future intersections are to be analyzed. Documentation of this process should be submitted with the scope for review.

a. All driveways or access points to a proposed development shall be included, regardless of the number of peak-hour trips.
b. All intersections within ¼ mile of the site boundary should be included
c. For intersections within one-half (½) mile of a proposed development generating 2,000 daily trips, or with known operational or safety concerns, the TIA requirement and scope shall be at the discretion of the City Engineer.

12. Access Management Analysis shall be conducted to ensure safe and effective access for the site's operations. For certain uses where on-site queuing is probable, such as drive-thru restaurants or schools, a Queueing Analysis may be required. A Queueing Analysis should identify the project's queues and ensure that on-site storage can contain the queue generated by the development.

13. Forecast traffic volumes and conduct intersection performance evaluations (including average delay, level of service, and volume-to-capacity ratios) for all study intersections under the following conditions:

a. Opening Year (No-Build) – five years from the date of analysis without the proposed development;
b. Opening Year (Build) – with the proposed development in place; and
c. Horizon Year (Build-Out + 5 Years) – five years beyond full build-out of the proposed development.

14. For study assumptions list the sources of annual traffic growth rate and related background Projects For instance:

Project Name	Build out year

15. Safety analysis of the proposed site accesses, including sight distance (both stopping sight distance and intersection sight triangle) and operational characteristics.

16. Analysis of the right-and-left turn-lane warrants, queue lengths, acceleration lanes, throat lengths, channelization, and other characteristics of the site-access driveways as appropriate.

17. Comparison of the location and spacing of the proposed site-access driveways with City of Hutto standards and the standards of the Texas Department of Transportation, if necessary.

18. Analysis of the parking needs of the proposed development, the adequacy of the proposed facilities to meet those needs as appropriate, and the conformance of the proposed parking facilities to applicable standards.
19. Description and analysis of mitigation measures necessary to bring identified intersections and locations into compliance with the applicable standards, including signal, turn lane, or other warrant analysis as appropriate. Provide figures of: existing peak hour volumes, site generated peak hour volumes, future peak hour volumes, trip distribution.
20. Intersection Control Evaluation (ICE) consisting of a quantitative comparison of the intersection modification costs, safety performance and operational performance. Additional qualitative comparison of intersection modification alternatives shall include: pedestrian and bicycle accommodation, impacts to nearby access or parking, environmental factors, space for large trucks and aesthetic benefits.
21. An appendix which includes:
    a. Copies of raw traffic count data used in the analysis
    b. Calculation sheets and/or computer software output for Levels of Service, delay and volume to capacity ratio calculations in analysis
    c. Warrant worksheets for signals, turn lanes, signal phasing, all-way stops, and other proposed measures as appropriate.
    d. Intersection alternative comparison and supporting analyses.
22. Appendix reports and raw data files of printouts, warrant studies, count data shall be submitted in digital format and not by paper submittal. So shall models within HCS or Synchro.

Standard accepted Guidelines

1. Use the most recent version of HCM for the capacity analysis of roundabouts. All roundabout intersections shall operate at a Level of Service "C" or better at build plus five years, with a volume/capacity ration of 0.85 or less. The roundabout operational analysis shall account for possible phasing of capacity expansion, whereby an interim scheme may be established if the analysis reveals that single lane entries are adequate for a period of up to ten years. Traffic analysis results shall be submitted with the concept design including opening year, opening plus 10 years, and design year volumes, percent of trucks and turning movements on all approaches by movement. Overbuilding roundabout capacity has been shown to contribute to higher crash incidence.
2. All signalized and all-way stop controlled intersections shall operate at a Level of Service "C" or better with a volume/capacity ratio of 0.85 or less at the design year traffic demands. Other un-signalized intersections (including un-signalized private accesses) shall operate at Level of Service "D" or better for major street left turns on side street approaches. Although lower Level of Service may be acceptable if the movement has a low volume/capacity ratio and there are no known safety problems at the intersection.
3. Acceptable analysis methods shall only be the latest version of Highway Capacity Manual or Synchro.
4. Signal timing used in capacity or progression analysis shall use the same cycle length as is currently in use at the intersection. Unless specifically noted otherwise, and shall not exceed 120 seconds. Signal timing shall provide adequate green time for pedestrian crossings.

5. At driveways on arterials or collector roadways, deceleration/turn lanes may be required. Additional right of way may also be required to accommodate the deceleration/turn lanes. Right turn deceleration lanes shall be provided for all driveways with projected peak hour right turn volumes at least 50 or greater vehicles per hour during any peak hour period. Right turn storage lengths shall be sized to the number of vehicles expected to queue in the lane during an average peak period. Required right turn storage and transition lengths are found in the Engineering Manual. On TxDOT roadways refer to the TxDOT Roadway Design Manual and Access Management Manual for right turn lane requirements.
6. Peak Hour factors less than 0.75 or greater than 0.90 shall not be used unless justified by specific counts at that location.
7. All tube counts shall be a minimum of 48 hours.
8. The traffic impact analysis shall take into account the city's Transportation Master Plan.

Approval Process

1. The following standards have been set to ensure that traffic impact studies are reviewed quickly. The city's goal is to complete 90 percent of all studies at or before the review times shown.
2. After staff has completed their review and all issues related to the report have been addressed, an approval letter/e-mail from city staff will be provided to the applicant. This letter/e-mail will outline any conditions, stipulations or mitigation related to the approval of the project. Upon approval of the TIA or TIS report, a signed and sealed copy of the finalized report shall be submitted with all pertinent files.
3. Improvements should be identified to mitigate the site's impact on the surrounding transportation network shall be clearly identified and described within the report narrative. All proposed improvements must also be summarized in a tabular format for clarity and ease of review. Either planning-level or itemized cost estimates shall be provided for each improvement, accompanied by applicable supporting documentation. These estimates must account for all costs reasonably expected to design, permit, and construct the improvement.
4. For projects with proportionate share mitigation improvements or requiring additional hearings or agreements, additional work and coordination may be necessary prior to staff's final determination of "sufficiency".
5. If traffic-related issues are not addressed, or there are continued disagreements between applicant and review staff which would not allow the project to be approved, the project may be denied until issues are resolved.
    a. Based on the results of the TIA and recommendations/actions by city staff, the city as appropriate, may determine that the TIA is adequate to support one or more of the following actions:
    b. Approve the development request, if the project has been determined to have no significant impact or where the impacts can be adequately mitigated;
    c. Approve the development request, subject to a phasing plan;
    d. Recommend study of the Transportation Master Plan to determine amendments required to increase capacity;

e. Recommend amendment of the City's Capital Improvement Program relative to the construction of needed improvements; or
f. Deny the development request, where the impacts cannot be adequately mitigated.

Submittal Requirements

A complete TIA submittal shall be provided through the GovWell portal and must include the following items. Individual files may be combined and submitted as ZIP archives (e.g., all Synchro files may be submitted as one ZIP file) in lieu of separate uploads.

a. An electronic (PDF) copy of the complete Full Traffic Impact Analysis (TIA) report.
b. Synchro files representing a connected roadway network for all scenarios analyzed (existing, background, no-build, and build-out conditions).
c. Excel spreadsheets containing trip generation calculations, pass-by and internal capture analyses, site traffic distribution and assignment, and driveway-level traffic summaries for each analysis scenario.

Please note that incomplete submittals will not be accepted for review**.**

City of Hutto: Electronic, Attention Engineering
TxDOT: Electronic, Attention Scott Cunningham

This scope and study is based upon the assumed development uses and intensities in the TIA Determination sheet in **Attachment B**. Any change in these assumptions may require a change in the scope. Preparation of the TIA shall follow City of Hutto Unified Development Code Chapter 10.515.4 requirements unless otherwise specified in this document.

Approved by (City of Hutto): Date: _____

Include TxDOT if project is altering or adding access to a TxDOT facility.
Approved by (TxDOT): Date: _____

Include Williamson County if project is in the ETJ.
Approved by (Williamson County): Date: _____

Appendix A

The purpose of an ICE study is to provide a holistic approach to evaluating several different methods of intersection control at a given location, and in this case, to provide a transparent recommendation that can be relied upon by City staff and elected officials.

It is anticipated that multiple geometric alternatives will be studied for each method of intersection control. The evaluation of each alternative will be based on quantitative and qualitative measures of performance. The broad categories are safety, capacity, and cost for quantitative measures, while the

qualitative measures include aesthetics, pedestrian and bicycle accommodations, and practical feasibility.

Consistent with the TxDOT TSAP Manual, the content of the ICE study is as follows, including a comparison of alternatives chart that will summarize the findings of the report.

Stage 1 – Practical Scoping and Screening of Alternatives

The outcome of Stage 1 is to identify concepts meriting further consideration based on their practical feasibility. This assessment should produce a concept level understanding of the intersection control strategies that meet the following screening objectives:

- Meets the transportation purpose and need consistent with system performance criteria (safety and level of service)
- Meets the financial constraints, the needs and the values of the directly affected stakeholders.

The evaluation normally requires a planning level capacity analysis to identify preliminary footprint of the intersection. The concept level footprint of the intersection determines if a specific strategy is context appropriate and practical to implement.

The Stage 1 practical evaluation should rely on the following:

- Consultation with the project sponsor to ensure that purpose and need is met.
- General planning level traffic analysis, intersection control warrant studies, including use of CAP-Z to confirm feasible options in terms of capacity.
- Safety screening using SPICE to confirm the safety-beneficial alternatives.
- Engineering judgement.

The practical alternatives that pass this screening process are carried into a more detailed Stage 2 – Engineering Analysis. Other options not found to meet the purpose and need in a practical way are discarded from further consideration and needless comparison with viable and practical alternatives.

Stage 2 – Engineering Analysis

The evaluation of intersection control alternatives continues with a quantitative assessment accounting for the following:

- Prediction of vehicle delay and queuing for the intersection, both as a roundabout and as a traffic signal, e.g., Arcady, Sidra, and Synchro capacity analysis software packages. Compare performance under existing and horizon year peak hour traffic volumes.
- Assess collision history and local crash data to establish how successful the type of intersection control would be compared to the existing conditions and other alternatives.
- Estimate safety after conversion to signalized intersection and estimate safety after conversion to roundabout. Crash modification factors (CMFs) local or published (i.e., the Highway Safety Manual) can be sourced for this exercise.

- Construction cost plus cost of property acquisition. An economic analysis could include life-cycle cost considerations and a cost to benefit ratio comparison for viable alternatives.
- Use TxDOT's SII ((Safety Improvement Index) tool to rank alternatives and associate a Benefit to Cost ratio to rank alternatives.
- Develop alternative intersection design concept and cost estimates following best practices as established by TxDOT. Design refinement should be identified to maximize the operational and safety performance of the alternative intersections while considering project specific constraints.
- Design performance checks of the roundabout alternative to confirm its functionality.

Identifying and comparing qualitative measures of various control alternatives are often subjective in these studies but useful for public meeting presentations:

- Environmental – identify significant environmental impacts
- Pedestrian and Bicycles – consider nearby pedestrian generators, routes and ADA impacts. Present viable options to safely accommodate pedestrian traffic at the intersections.
- Aesthetics – the ability to beautify the intersection and integrate it with surrounding land uses and roadside conditions.
- Construction staging
- Vehicle noise, fuel consumption, and emissions
- Pedestrians and persons with disabilities
- Bicyclists
- Maintenance and emergency services
- Speed control
- Goods Movement

An ICE report will be prepared including the documentation of predicted operations, costs and the illustration of alternative roundabouts explored to determine the preferred roundabout configuration. A typical comparison of alternatives can be prepared for internal discussion and external use at public meetings.

Attachment A

INSERT EXHIBIT WITH SITE LOCATION AND STUDY INTERSECTIONS MATCHING LABELS BELOW HERE

Existing Intersections

A. LIST ALL STUDY INTERSECTIONS

Future Intersections:

A. LIST PROPOSED SITE DRIVEWAYS AND NEW INTERSECTIONS CREATED BY SITE ACCESS

Attachment B

CITY OF HUTTO
TRAFFIC IMPACT ANALYSIS (TIA) DETERMINATION WORKSHEET
APPLICANT MUST FILL IN WORKSHEET PRIOR TO SUBMITTING FOR TIA DETERMINATION

PROJECT NAME: PROJECT NAME
LOCATION: PROJECT LOCATION
APPLICANT'S AGENT: FIRM NAME (ENGINEER NAME) TELEPHONE NO.: XXX-XXX-XXXX
APPLICATION STATUS: DEVELOPMENT ASSESSMENT:___ ZONING__SITE PLAN: ____

EXISTING:

PARCEL NUMBER	BLDG SQ.FT.	LAND USE	**ITE CODE**	**DAILY TRIP RATE/EQ**	**DAILY TRIPS**

PROPOSED

TRACT NUMBER	BLDG SQ.FT.	LAND USE	**ITE CODE**	**DAILY TRIP RATE/EQ**	**DAILY TRIPS**	**AM / PM TRIP RATE/EQ**	**AM TRIPS**	**PM TRIPS**
1 (Phase)								
2 (Phase)								
				Total			**1,746**	

ABUTTING ROADWAYS

STREET NAME	PROPOSED ACCESS?	PAVEMENT WIDTH	CLASSIFICATION*

*Classification reflects Mobility Master Plan, 2024

NOTE: A TIA determination must be made prior to submittal of any zoning or site plan application. Therefore, this completed and reviewed form MUST ACCOMPANY any subsequent application for the IDENTICAL project. CHANGES to the proposed project will REQUIRE a new TIA determination to be made.