

Williamson County, Tennessee Traffic Study Guidelines



DISCLAIMER: The official copy of the Williamson County Traffic Study Guidelines is available for inspection at the Williamson County Planning Department office.

Section 1: General

The objective for a traffic study shall be to maintain acceptable levels of capacity and design for travel as new development occurs within the planning jurisdiction of the Williamson County Government (hereinafter the County).

Section 2: Applicability

These guidelines are applicable to any development in the unincorporated Williamson County for which a traffic study is required by Article 19: Road Capacity Adjustment of the Zoning Ordinance, as well as to rezoning requests at the discretion of the County.

Traffic study findings and recommendations shall be consistent with the standards and review procedures that are required by Article 17: Access, Off-Street Parking, and Loading Standards.

Section 3: Level of Service Standards

Within areas where the County Comprehensive Plan provides for new developments, it is the policy of the County that all roadways, intersections, and access points shall be designed so that traffic to and from new developments shall flow at a Level of Service C or better.

Section 4: Design Standards

County roadway design standards call for all County roadways to comply with current American Association of State Highway and Transportation Officials (AASHTO) design standards for 30 mph roadways. Where posted speed limits are higher than 30 mph, the County may require a county roadway to be designed to meet a higher AASHTO design standard. For state highways, for access points to state highways, and for intersections with state highways, design standards are determined by the Tennessee Department of Transportation (TDOT).

Consistent with relevant AASHTO design standards, County roadways generally provide for 11' or 12' travel lanes with 4' or 6' shoulders. Existing and projected levels of traffic determine whether travel lanes will be required to be 11' or 12' wide, and whether shoulders will be required to be 4' or 6' wide. Cross section standards for state highways are determined by the TDOT.

In accordance with Section 19.05 of the Williamson County Zoning Ordinance, no developer implemented roadway modifications within the right-of-way shall occur unless such modifications are approved by the Highway Superintendent, the Williamson County Highway Commission, or the TDOT, as applicable. Written notice of this approval shall be received by the Community Development Department staff prior to consideration of the development proposal by the Planning Commission.

For developer funded roadway modifications, right-of-way acquisition and/or utility relocations shall be the responsibility of the developer, and at the developer's expense.

Section 5: Preparer and Reviewer Qualifications

A traffic study for the County shall be conducted by a traffic engineer or transportation planner with demonstrated experience and expertise in Traffic Impact Analysis. Traffic studies shall be reviewed on behalf of the County by a traffic engineering or transportation planning consultant with similar qualifications. As detailed below, the services of the County's traffic study reviewer are payable by the applicant.

Section 6: Traffic Study Procedures

Prior to the commencement of a traffic study, a pre-study meeting may be scheduled between the applicant and Community Development Department staff, either by teleconference or at the offices of the Community Development Department. The pre-study meeting shall include representatives of the Community Development department staff, the traffic consultant who will review the traffic study on behalf of the County, the applicant, and the applicant's traffic consultant. The purpose of the pre-study meeting will be to review pertinent aspects of the proposed development, to determine the type of traffic study to be conducted, and to finalize the roles, time frames, scope of work, and proposed methodologies for the traffic study. Traffic study methodologies will include, but not be limited to, proposed trip generation rates, adjustments for passby trips and internal trips, trip reduction strategies, and the methodologies to be used for trip distribution and assignment.

The consultant hired by the County shall prepare a cost estimate for the review of the traffic study. Upon the payment of this cost to the County, the County will authorize the applicant to proceed with the traffic study.

Upon the receipt of a traffic study report by the County, the consultant hired by the county shall initiate a sufficiency review. If it is determined that a traffic study has been submitted that is not sufficient in relation to the County's traffic study guidelines as set forth below, then the County may determine the amount of any additional costs payable to the county prior to a further review of the traffic study.

These payments shall be in addition to any other fees or costs that may be required to be paid by the applicant to the County.

In order to expedite a timely review, a traffic study shall be submitted to the County not less than two (2) weeks prior to the agenda deadline for the Planning Commission meeting at which the proposed new development is to be initially considered. A sufficiency determination will be issued to the applicant on or before the agenda deadline. If the traffic study is determined to be insufficient in relation to these traffic study guidelines, then consideration of the proposed new development may be withheld from the Planning Commission agenda.

Traffic studies for developments proposed to be located within municipal growth areas shall be submitted by the County to affected municipal or regional Planning Commissions for their review and comment, in accordance with established procedures for intergovernmental planning commission review. Prior to taking any formal action regarding these studies, the County will review pertinent comments that are received under these procedures.

If a traffic study includes recommendations for new or modified access points to state highways, significant modifications to existing state highways, or new state highway or transportation facilities, the applicant shall demonstrate that the TDOT has reviewed these recommendations and is in agreement with them.

A traffic study shall closely correspond with the site plan that is submitted for the approval of the proposed new development.

Section 7: Thresholds for County Traffic Studies

(A) INTRODUCTION

- (1) The applicant shall review the County’s Official Traffic Shed Map; Table 19.05-2: Arterial Traffic Shed Capacities; Table 19.05-3: Collector Traffic Shed Capacities; and Table 19.05-4 Trip Generation Table; in order to determine:
 - a) the number of trips likely to be generated by the proposed development in the p.m. peak hour; and
 - b) the capacity classifications and corresponding LOS C service volumes for the designated arterial and collector roadways that will provide access to the proposed development.
- (2) No traffic study or highway capacity adjustment shall be required if it is determined that the number of trips likely to be generated by a proposed new development would not add more than one percent of the LOS C service volume of any of the designated arterial and collector roadway(s) that will provide access to the proposed development.
 - a) A Traffic Access Analysis (TAA) shall be prepared for developments that are within municipal growth areas (MGA-H) or Suburban Infill and Conversation (SIC) areas, and that would potentially generate fewer than 50 p.m. peak hour trips.
 - b) A Traffic Shed Analysis (TSA) shall be prepared for developments that are not within MGA, MGA-H or SIC areas and that would potentially generate fewer than 50 p.m. peak hour trips, in accordance with Article 19: Road Capacity Adjustment of the Williamson County Zoning Ordinance.
 - c) A Traffic Impact Analysis (TIA) shall be prepared for developments that would potentially generate between 50 and 400 p.m. peak hour trips, either within or not within MGA, MCA-H or SIC areas.
 - d) A Traffic Impact Study (TIS) shall be prepared for all developments that would potentially generate 400 or more p.m. peak hour trips, either within or not within MGA, MGA-H or SIC areas. The county also has the option to allow or require a Traffic Impact Study to be prepared for a proposed new development that would potentially generate fewer than 400 p.m. peak hour trips.
 - e) A Rezoning Analysis (RA) shall be prepared at the discretion of the County, without regard to the number of potential p.m. peak hour trips that may be generated by a proposed new development.

(B) TABLE 1: TRAFFIC STUDY THRESHOLDS

Table 1: Traffic Study Thresholds shows the thresholds for the traffic study types that are described above.

TABLE 1: TRAFFIC STUDY THRESHOLDS		
Threshold, in p.m. peak hour trips	Traffic Study Type	
	Within a Municipal Growth Area or Suburban Infill and Conservation Area?	
	Yes	No
<50	Traffic Access Analysis (TAA)	Traffic Shed Analysis (TSA)
50 – 400	Traffic Impact Analysis (TIA)	
>400, OR*	Traffic Impact Study (TIS)	
*	Rezoning Analysis (RA)	
* at the discretion of the County		

Section 8: Traffic Study Elements

(A) INTRODUCTION

All traffic studies shall include a general description of the proposed new development, including a vicinity map and a site map, as well as a brief narrative, to show:

- (1) the location of the proposed development;
- (2) the number and location(s) of proposed access point(s);
- (3) the traffic shed(s) where the development would be located;
- (4) whether or not the development is within a municipal growth area;
- (5) the existing use of the land proposed for development;
- (6) existing land uses and development trends in the area;
- (7) transportation facilities that will provide access to the development, noting the official route numbers of any state highways;
- (8) existing traffic levels; and
- (9) factors affecting future traffic.

(B) ELEMENTS OF A TRAFFIC ACCESS ANALYSIS (TAA)

- (1) When a proposed new development within a municipal growth area or suburban infill and conservation area would potentially generate up to 50 p.m. peak hour trips, a Traffic Access Analysis shall be conducted.
- (2) For a Traffic Access Analysis, the study area shall be limited to the roadway segments that provide direct access to the proposed new development.
- (3) Depending on the scale and location of the proposed new development, and subject to county approval, existing available traffic counts may be utilized in lieu of new traffic counts.
- (4) Trip generation forecasts, determination of the buildout year, and the determinations of background traffic, shall generally follow the relevant procedures that are to be used in preparing a Traffic Impact Study, as shown below.
- (5) The Traffic Access Analysis shall address the proposed number and type of dwelling units, and/or if applicable, the land use and square footage for each proposed nonresidential use within the new development.
- (6) For the a.m. and p.m. peak hours, directional assignments of inbound and outbound site generated traffic shall be determined for each proposed access point.
- (7) For roadway segments within the study area that are shown on the Official Traffic Shed Map, refer to Table 19.05-1: Vehicular Traffic Service Volumes (Two-Way Peak Hour Trips) of the Williamson County Zoning Ordinance, to determine the levels of service for existing, background, and combined background and site generated traffic in the a.m. peak hour and the p.m. peak hour.
- (8) For roadway segments within the study area that are not shown on the Official Traffic Shed Map, a roadway level of service analysis shall be conducted, utilizing the appropriate methodology(ies) that are documented in the latest edition of the Highway Capacity Manual (HCM). For capacity analyses of two lane roadways within the study area, the preferred methodology shall be the "Two Lane Highways" methodology documented in the HCM.
- (9) For existing, background, or combined background and site generated traffic, the study shall note any roadways in the study area where levels of service may be deficient in relation to the Level of Service standards that are noted above.
- (10) If there is a potential for the correction of any identified level of service deficiencies, then recommendation(s) for appropriate mitigation measures may be included in the Traffic Access Analysis Report.
- (11) For Traffic Access Analyses, mitigation recommendations shall be follow the procedures described below for Traffic Impact Studies.
- (12) Recommendations for mitigation measures shall conform with Section 19:05: Roadway Capacity Modification Options of the County zoning ordinance.

- (13) If a recommended mitigation measure involves a state highway, then the design for the recommended modification shall be subject to the review and approval of the Tennessee Department of Transportation (TDOT).
- (14) The Traffic Access Analysis report shall include maps and tables that show the location of the proposed new development; traffic shed boundaries in the vicinity; trip generation by land use type; and existing, background, and combined background and site generated traffic at access points and on roadways within the study area.
- (15) The Traffic Access Analysis report shall also include relevant analysis worksheets, and may also include buildout year documentation and copies of cost estimates for comparable roadway modification projects.
- (16) The recommended elements for a typical Traffic Access Analysis are generally noted in Table 2: Traffic Study Elements (see Page 12).

(C) ELEMENTS OF A TRAFFIC IMPACT ANALYSIS (TIA)

When a proposed new development would potentially generate between 50 and 400 p.m. peak hour trips, a Traffic Impact Analysis shall be conducted.

(1) Study Area

- a) For proposed developments that would potentially generate between 50 and 400 p.m. peak hour trips and that are located wholly or partly within a MGA, MGA-H or Suburban Infill and Conservation (SIC) area, the study area for a Traffic Impact Analysis shall include proposed access points, the major intersections that are closest to each proposed access point, and the roadway segments that are located between each access point and the major intersections that have been identified.
- b) For other proposed developments that would potentially generate between 50 and 400 p.m. peak hour trips, the study area shall include the traffic shed(s) where the proposed development would be located.

(2) Study Elements

For proposed developments that would potentially generate between 50 and 400 p.m. peak hour trips and that are located wholly or partly within an MGA, MGA-H or SIC area, a Traffic Impact Analysis shall include:

- a) Determination of the buildout year and background traffic estimates;
- b) Trip generation forecasts;
- c) A.M. and P.M. peak hour turning movement counts at proposed access points and at major intersections within the study area;
- d) Distribution and assignment of site generated traffic;
- e) A.M. and P.M. peak hour intersection capacity analyses - of background traffic and of background and site generated traffic - for each proposed access point and for major intersections within the study area;
- f) At access points and at major intersections within the study area, the identification of potential A.M. and P.M. peak hour level of service deficiencies;
- g) A review of existing sight distances, roadway alignments and roadway cross sections within the study area;
- h) The identification of potential intersection or roadway design deficiencies; and
- i) Recommendations for the mitigation of intersection capacity deficiencies and intersection and roadway design deficiencies.

Each of the above steps shall follow a methodology that is generally consistent with the corresponding methodology shown below for Traffic Impact Studies.

For other proposed developments that would potentially generate between 50 and 400 p.m. peak hour trips, a traffic shed analysis shall be conducted in accordance with Article 19: Road Capacity

Adjustment of the County Zoning Ordinance. Significant findings from the traffic shed analysis shall be included in the Traffic Impact Analysis report.

(3) Warrant Analyses

- a) For all proposed developments that would potentially generate between 50 and 400 p.m. peak hour trips, warrant analyses shall be conducted in accordance with the procedures described below for Traffic Impact Studies.

(4) Mitigation and Phasing

- a) Procedures for the analysis of mitigation and phasing shall be in accordance with the applicable procedures described below for Traffic Impact Studies.
- b) Recommendations for modifications to access points, intersections, or roadways, shall be in accordance with Section 19:05: Roadway Capacity Modification Options of the County zoning ordinance; and
- c) If any recommended modification involves a state highway, then the design for recommended modification shall be subject to the review and approval of the TDOT.

(D) TRAFFIC IMPACT ANALYSIS REPORT

- (1) The Traffic Impact Analysis report shall include a site plan and a location map for the proposed development, as well as tables showing trip generation by land use type.
- (2) For proposed developments that would potentially generate between 50 and 400 p.m. peak hour trips and that are located wholly or partly within a MGA, MGA-H or Suburban Infill and Conservation (SIC) area, the Traffic Impact Analysis report shall also include:
 - a) Schematic diagrams showing existing, background, site traffic distribution and assignment, and combined traffic, for all major intersections and roadways within the study area; and
 - b) The results of all capacity, warrant, and design analyses.
- (3) For other proposed developments that would potentially generate between 50 and 400 p.m. peak hour trips, the Traffic Impact Analysis shall include significant findings and recommendations from the Traffic Shed Analysis conducted pursuant to Article 19: Road Capacity Adjustment.
- (4) For all proposed developments that would potentially generate between 50 and 400 p.m. peak hour trips, the Traffic Impact Analysis report shall also include:
 - a) Significant findings from the Traffic Impact Analysis;
 - b) Recommendations with respect to mitigation, phasing, and right of way analyses; and
 - c) A determination that recommended transportation modifications are consistent with relevant adopted local major thoroughfare plans or regional long range transportation plans.
- (5) For any recommended modifications that involve state highways, the Traffic Impact Analysis Report shall also include documentation of coordination activities with appropriate representatives of the TDOT, as well as any findings or recommendations by TDOT officials regarding recommended roadway modifications.
- (6) An appendix to the Traffic Impact Analysis report shall include relevant analysis worksheets. As determined at the pre-study meeting, the appendix may also include buildout year documentation and copies of cost estimates for comparable projects.
- (7) The recommended elements for a typical Traffic Impact Analysis are generally noted in Table 2 below.

(E) ELEMENTS OF A TRAFFIC IMPACT STUDY (TIS)

As provided in *Article 19: Road Capacity Adjustment*, a Traffic Impact Study shall be conducted when a proposed new development would potentially generate 400 or more p.m. peak hour trips. As also further provided in *Article 19*, the County also has the option to allow or require a Traffic Impact Study to be conducted for a proposed new development that would potentially generate fewer than 400 p.m. peak hour trips.

A Traffic Impact Study shall be conducted in accordance with the procedures documented in Article 19 C of the County Zoning Ordinance.

In addition to determining whether or not sufficient traffic capacity is either available or can be provided cost effectively, a Traffic Impact Study shall also address the design of the local roadway network in relation to the scale of a proposed new development.

(1) Study Area

a) The study area for a Traffic Impact Study shall be determined at the pre-study meeting. At a minimum, the study area for a Traffic Impact Study shall include all of the major intersections and arterial and collector roadways whose levels of service may change due to traffic to or from the proposed new development; as well as the major intersections and arterial and collector roadways that are located between the proposed new development and the nearest major freeway interchange; whichever is more inclusive.

(2) Existing Traffic Counts

- a)** To determine existing traffic, hourly turning movement counts shall be conducted at each of the major intersections that have been identified within the study area at the pre-study meeting. The specific hours for turning movement traffic counts will be determined at the pre-study meeting;
- b)** In addition, 24-hour automatic traffic counts shall be conducted at critical locations along arterial and collector roadways within the study area. The specific days and locations for automatic traffic counts will be determined at the pre-study meeting; and
- c)** Within the study area, a Traffic Impact Study shall also document existing available TDOT traffic counts, along with any existing available municipal traffic counts.

(3) Buildout Year Determination

a) Determination of the buildout year shall be based on documented market absorption rates in the area of the proposed new development.

(4) Background Traffic Estimates

- a)** Existing traffic counts shall be converted into background traffic estimates in two steps:
Step 1-Growth rates applied to existing traffic counts shall be consistent with growth rates at TDOT traffic count stations located within the study area, OR growth rates shall be based on an interpolation of existing traffic counts and available traffic forecasts documented in either an existing adopted major thoroughfare plan or the current Nashville Area Metropolitan Planning Organization (NAMPO) long range transportation plan.
Step 2-If there are any approved developments that have not been completely built out and that would potentially add a significant amount of traffic to any intersections or roadways within the study area, traffic to and from these developments shall be included in the background traffic estimates that are to be used for a Traffic Impact Study.

At the pre-study meeting, specific procedures will be determined for converting existing traffic counts into background traffic estimates.

(5) Trip Generation

Typically, trip generation forecasts shall be developed for both the a.m. peak hour and the p.m. peak hour. The specific peak hours for analysis will be reviewed at the pre-study meeting. Preferably, these forecasts shall be derived from the trip generation rates or equations that are documented in the latest (8th or later) edition of the ITE Trip Generation Report. The Traffic Impact Study report shall document the specific rates or equations used in the study. If alternative

rates or equations are used, their use shall be reviewed at the pre-study meeting, and shall also be documented in the Traffic Impact Study report. If an alternative trip generation rate or equation is used, then the Traffic Impact Study report shall include any resulting differences in trip generation forecasts.

(6) Adjustments for Passby Trips, Internally Captured Trips, and Proposed Trip Reduction Strategies

- a)** Subject to authorization on behalf of the County at the pre-study meeting, trip generation forecasts may be adjusted to account for:
 - i)** Passby trips, i.e. trips to or from a proposed new development that may be drawn from the stream of existing or background traffic; as well as
 - ii)** Internally captured trips, i.e. trips that may begin and end within the boundaries of a proposed new development; and
 - iii)** Proposed trip reduction strategies.
- b)** Adjustments to reflect passby trips, internally captured trips, and/or trip reduction strategies shall be derived from methodologies published by the Institute of Transportation Engineers (ITE), or by another authority recognized by the County, e.g. a state department of transportation or Tennessee Division of Air Pollution Control. If traffic study findings are based on the successful outcome of one or more operational trip reduction strategies, e.g. carsharing, then the study shall also include a management and operations plan that demonstrates the feasibility and effectiveness of the proposed operational trip reduction strategy(ies).

(7) Trip Distribution and Assignment

Trips to and from a proposed new development shall be assigned to the access points, intersections, and arterial and collector roadways that are included in the study area that has been identified. These assignments shall be derived from an approved systems planning model and network (such as the model and network maintained by the Nashville Area MPO), or from observed traffic patterns within the study area. The methodology to be used for trip distribution and assignment will be addressed at the pre-study meeting.

(8) Capacity Analyses

- a)** For a background traffic scenario and for a scenario that includes both background and site generated traffic, peak hour capacity analyses shall be conducted for access points, major intersections, and roadways. The capacity analysis methodologies used in the Traffic Impact Study shall be consistent with the methodologies documented in the latest edition of the Highway Capacity Manual (HCM). For capacity analyses of two lane roadways within the study area, the preferred methodology shall be the “Two Lane Highways” methodology documented in the HCM;
- b)** If it is determined at the pre-study meeting that provisions for non-highway modes of travel are likely to significantly affect the impact of the proposed development upon access points, intersections, or major roadways within the study area, then, subject to county approval at the pre-study meeting, an alternative methodology may be utilized that would provide for the determination of multimodal levels of service;
- c)** The capacity analyses shall address existing or proposed stacking distances in relation to the lengths of existing or proposed turn lanes;
- d)** Capacity analyses may reflect committed projects that would affect any of the intersections or roadways in the study area, provided that these projects are likely to be completed prior to the buildout year for the proposed new development. In determining the current status of any funding commitments, the Traffic Impact Study findings shall be based on the most current information that is publicly available; and

- e) The Traffic Impact Study report shall include recommendations for any modifications that will be necessary in order to achieve or maintain acceptable levels of service within the Traffic Impact Study area.

(9) Warrant Analyses

- a) If any new signal installation is needed in order to provide sufficient capacity at any intersection or site access point, then a signal warrant analysis shall be conducted;
- b) A left turn warrant analysis shall be conducted, following the procedures that are documented in NCHRP Report 457: Engineering Study Guide for Evaluating Intersection Improvements;
- c) A survey shall determine either the presence of a paved shoulder that would be sufficient to provide a paved surface for a right turn deceleration lane at the entrance(s) to the proposed development, in accordance with relevant design standards for width, length, and taper;
- d) If a left turn lane is found to be warranted or if a paved shoulder is not sufficient for the provision of a right turn lane deceleration lane at each proposed site entrance as described above then the Traffic Impact Study shall include recommendation(s) for the provision of additional left turn and/or right turn lanes;
- e) Recommendations for turn lanes shall conform to Section 19:05: Roadway Capacity Modification Options of the County Zoning Ordinance; and
- f) If a proposed site entrance is located on a state highway, then the design for proposed turn lanes at site entrances shall be subject to the review and approval of the Tennessee Department of Transportation (TDOT).

(10) Design Analysis

- a) In addition to modifications that are intended to provide sufficient capacity on roadways and at access points and intersections within the study area, additional modifications may be needed in order to provide for acceptable sight distances or to mitigate other intersection or roadway design deficiencies;
- b) The design analysis shall include an assessment of sight distances on roadways and at access points and intersections, noting locations within the study area where applicable AASHTO, state, or county sight distance standards are not met under existing or background conditions;
- c) A similar analysis shall be undertaken in order to identify locations within the study area where applicable alignment or cross section standards are not met. At these locations, existing alignments and roadway cross sections, including lane and shoulder widths, shall be documented in the Traffic Impact Study report. Where potential design deficiencies are identified, the Traffic Impact Study report shall include recommendations for appropriate mitigation; and
- d) The design analysis may reflect ongoing or committed modifications to roadways or intersections within the study area, provided that sufficient funds have been programmed or otherwise committed for the completion of these modifications prior to the buildout year. In determining the current status of any funding commitments, the Traffic Impact Study findings shall be based on the most current information that is publicly available.

(11) Right of Way Evaluation

The Traffic Impact Study shall note locations where additional rights of way may need to be acquired in order to correct any identified capacity or design deficiencies. This shall be determined through a review of existing available right of way information pertaining to state and county roadways within the study area.

(12) Mitigation

- a)** For any capacity deficiencies, recommended new turn lanes, or existing sight distance or other design deficiencies that may be identified, the Traffic Impact Study report shall document mitigation recommendations, including a notation of whether or not additional right of way may need to be acquired in order to implement any of these recommendations;
- b)** If any recommended modifications are to be funded by a city, the County, the state, or another private entity, then the study shall address the status of the commitment to fund these modifications. For example, a project may be included in an adopted state budget, or it may be already underway. The study report shall also identify the share of the improvement costs that are proposed to be provided by the developer, either in-kind or through a financial contribution. In determining the current status of any funding commitments, the Traffic Impact Study findings shall be based on the most current information that is publicly available; and
- c)** Cost estimates shall be consistent with recent bids for comparable projects in the county, the region, or the state. Documentation of comparable cost estimates shall be submitted in order to demonstrate this consistency. As an alternative, cost estimates may be provided for a comparable project that is included in a currently approved and valid MPO Transportation Improvement Program. Developer-implemented modifications shall be constructed in accordance with the phasing recommendations included in the approved Traffic Impact Study.

(13) Phasing

If a Traffic Impact Study report notes that the implementation of a mitigation measure may not be completed at the time of the initial use and occupancy of a proposed new development, then the study report shall include an analysis and recommendation for the phasing of the proposed new development. The Traffic Impact Study report shall demonstrate that the recommended phasing will allow the county's level of service and roadway design standards to be maintained while the proposed new development is underway.

(14) Traffic Impact Study Report

- a)** The Traffic Impact Study report shall include a site plan and a location map for the proposed development, schematic diagrams showing existing, background, site traffic distribution and assignment, and combined traffic, for all major intersections and roadways within the study area;
- b)** Trip generation forecasts shall be tabulated in the Traffic Impact Study report by land use type as well as by phase, as applicable;
- c)** The results of all capacity, warrant, and design analyses shall be documented and included in the Traffic Impact Study Report. The report shall also include significant findings and recommendations with respect to right of way evaluation, mitigation, and phasing;
- d)** The Traffic Impact Study report shall also note whether or not recommended transportation modifications are consistent with relevant adopted local major thoroughfare plans or regional long range transportation plans;
- e)** For recommended mitigation measures that involve multimodal options or trip reduction strategies, the Traffic Impact Study report shall include a management and operations plan that demonstrates their feasibility and effectiveness;

- f)** For any recommended modifications that involve state facilities, the Traffic Impact Study report shall include documentation of coordination activities with appropriate representatives of the TDOT, as well as any findings or recommendations by TDOT officials regarding these recommended modifications;
- g)** The appendix to the Traffic Impact Study report shall include capacity and warrant analysis worksheets. As determined at the pre-study meeting, the appendix may also include buildout year documentation and copies of cost estimates for comparable projects; and
- h)** The recommended elements for a typical Traffic Impact Study are generally noted in Table 2 below.

(F) ELEMENTS OF A REZONING ANALYSIS (RA)

- a)** When a development is proposed that would involve a zoning amendment, the county may require a rezoning analysis to be prepared and submitted under these guidelines. The purpose of a rezoning analysis will be to determine the potential overall traffic impact of the proposed rezoning, including but not limited to the traffic impact of an individual proposed new development;
- b)** The study area for a rezoning analysis shall include the entire area that appears likely to be rezoned, including but not limited to the site of the proposed development. The analysis shall address the potential traffic impacts that may result from the rezoning of this entire area, including but not limited to the potential impacts of the proposed development itself;
- c)** Depending on the size of the study area in relation to the size of the proposed development itself, then the applicant's share of the total study cost may be determined to be an amount below the total cost of the rezoning analysis; and
- d)** The recommended elements for a typical Rezoning Analysis are generally noted in Table 2: Traffic Study Elements in (G) below.

(G) TABLE 2: TRAFFIC STUDY ELEMENTS

TABLE 2: TRAFFIC STUDY ELEMENTS					
TASK	TRAFFIC ACCESS ANALYSIS	TRAFFIC SHED ANALYSIS	TRAFFIC IMPACT ANALYSIS	TRAFFIC IMPACT STUDY	REZONING ANALYSIS
Pre-Study Meeting	X	Refer to Article 19: Road Capacity Adjustment Williamson County Zoning Ordinance	X	X	X
Review Thresholds	X		X	X	
Introduction	X		X	X	X
Study Area Determination	X		X	X	X
Traffic Counts	#		X	X	X
Turning Movement Counts			#	X	
Buildout Year Determination	X		#	X	X
Background Traffic Forecast	X		#	X	X
Trip Generation Forecast	X		#	X	X
Adjustments for Passby and Internal Trips			#	#	
Adjustments for Trip Reduction Strategies			#	#	
Forecast of Background and Site Generated Traffic	X		#	#	
Trip Distribution and Assignment	X		#	X	X
Roadway Capacity Analysis	X		#	X	X
Intersection Capacity Analysis			#	X	
Warrant Analysis			#	X	
Design Analysis				X	
Recommendations for Mitigation and Phasing	#		#	X	
Report	X		X	X	
Appendix			#	X	
X	Required				
#	Refer to text for additional information				

Section 9: References

A Policy on Geometric Design of Highways and Streets, Fifth Edition American Association of State Highway and Transportation Officials, Washington DC: 2004

Article 17: Access, Off-Street Parking, and Loading Standards, Williamson County Government: Franklin TN: 2011

Article 19: Road Capacity Adjustment, Williamson County Zoning Ordinance, Williamson County Government: Franklin TN: 2011

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Highway Capacity Manual, Transportation Research Board, Washington DC: 2010

NCHRP Report 365 Travel Estimation Techniques for Urban Planning, Transportation Research Board, Washington DC: 1998

NCHRP Report 457: Engineering Study Guide for Evaluating Intersection Improvements, Transportation Research Board, Washington DC: 2001

Transit Capacity and Quality of Service Manual, Transportation Research Board, Washington DC: 2003

Transportation Impact Handbook, State of Florida Department of Transportation: 2010

Transportation Impact Analyses for Site Development: An ITE Proposed Recommended Practice, Institute of Transportation Engineers, Washington DC: 2010

Trip Generation, 8th Edition, Institute of Transportation Engineers, Washington DC: 2008

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