

# Transportation Impact Analysis Guidelines

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# TRANSPORTATION IMPACT ANALYSIS GUIDELINES

## SECTION 1 – PURPOSE FOR SUBMISSION OF TRANSPORTATION IMPACT ANALYSES

These transportation impact analysis guidelines and procedures define when applications for developments warrant a detailed transportation analysis and what information should be included in it. “Transportation” is viewed from a multimodal perspective to evaluate all transportation modes to include vehicular, pedestrian, bicycle, and transit.

All applicants will be required to follow the Knoxville-Knox County Planning Commission guidelines and will be treated equally under the same or similar circumstances. The purpose of performing a transportation impact analysis is to:

1. Provide guidance for short and long-range planning of site access;
2. Provide guidance for on-site circulation and the interface between on-site circulation and off-site transportation;
3. Provide guidance for off-site improvements needed to permit the roadway system to function satisfactorily so as to accommodate site and non-site transportation;
4. Assist developers and landowners in making land use site planning decisions regarding transportation;
5. Identify the contribution a particular development makes to roadway system traffic or motor vehicle volumes;
6. Provide a basis for estimating improvement requirements attributable to a particular project;
7. Assess the compatibility with local transportation plans;
8. Enable staff to better evaluate the impact from zoning changes and development plans;
9. Allow appointed and elected officials to know implications of their voting decisions.
10. Identify measures to be taken to improve accessibility and safety for all modes of travel, particularly for alternatives to the car such as walking, cycling, and public transit.

## SECTION 2 – APPLICABILITY

- A. All applications are subject to review to determine if a transportation impact analysis will be required. The requirement for a transportation impact analysis is primarily driven by the expected number of motor-vehicle trips, i.e. “traffic”, that will be generated by a proposed development in a 24-hour period with a specific minimum threshold of 750 generated trips. There may be other special circumstances related to factors including, but not limited to, the location of the development, current traffic patterns, safety-related issues or previous development on the property that warrant an analysis of transportation impacts. The volume of expected traffic also affects the level of analysis that is required, with higher volumes of traffic necessitating greater study scopes and detail. For more information on the thresholds and levels of a transportation impact analysis, go to Section 3 – Types and Levels of Transportation Analysis.
- B. A requirement for a transportation impact analysis applies to not only applications involving entirely new standalone developments, but also to the following:
1. All proposed redevelopment (i.e. proposed modifications to existing developments or completion of previously approved development) that meet minimum trip generation thresholds for the whole development as defined by Table 1.
  2. All proposed older developments (greater than 5 years since the original concept or Use on Review approval) may require a transportation impact analysis if the overall development is over the 750 trips threshold or if significant changes in the area have occurred. The overall development is defined as including all interconnected access points, and significant changes to an area are defined as, but not limited to, increase in new development or redevelopment within a half mile radius or an increase in ADT vehicular traffic by 5% or more to adjacent streets.
  3. All proposed phased development (or adding onto existing development).
    - a. For developments with a previous transportation impact analysis completed early in the development stage process, it may need to be updated with a level of analysis approved by Knoxville-Knox County Planning Staff to include more detail of the land uses as the site plans become specific. Even if the number of estimated trips generated in an original

study is not exceeded in the later proposal, Planning staff may require some level of analysis to be performed for the development.

- b. For developments without a previous transportation impact analysis, any outparcels or future development area created and not included in the original project scope may require an analysis for the overall development, especially if evaluation of the additional development indicates the entire site exceeds the daily trip threshold.
- C. If an applicant submits a development plan that is under the daily trip threshold for the requirement of a transportation impact analysis and the applicant has ownership or control of additional property that is zoned to allow a larger development project that would meet the threshold, the Executive Director can require a transportation impact analysis. An applicant of a proposed development shall not avoid the intent of these requirements by submitting piecemeal/phased applications for development (separate applications for a larger development that do not necessarily meet the daily trip threshold individually).
- D. If a development has direct access to a State Highway then the Tennessee Department of Transportation (TDOT) Region 1 Traffic Office staff must be consulted. TDOT Traffic Office staff will determine whether the TDOT “Traffic Impact Studies” regulations apply in addition to or separate from what is required in these guidelines. Refer to TDOT Traffic Design Manual, Chapter 2 - Traffic Impact Studies (latest approved).
- E. Upon being provided proof by the applicant’s transportation engineer that a transportation impact analysis is not warranted due to insignificant impact of the proposed development, the Executive Director of Knoxville-Knox County Planning may either reduce the level of analysis required or waive the requirement. Any waiver requests shall be made in writing and shall include the data and analysis necessary to support the request.
- F. The Executive Director of Knoxville-Knox County Planning has the authority to require a transportation impact analysis regardless of the proposed development’s projected trip generation if conditions are determined necessary to warrant it. This will all be in coordination with the Director of Engineering for Knox County and/or the City of Knoxville. Documentation of the specific warranting conditions will be prepared and provided to the applicant.

## SECTION 3 – TYPES AND LEVELS OF TRANSPORTATION ANALYSIS

Two types of transportation impact analysis have been identified depending upon the particular situation and conditions involved – a “Transportation Impact Letter” (TIL) and a “Transportation Impact Study” (TIS). The required type of transportation impact analysis will be determined by Planning staff in consultation with the staffs from the other affected jurisdictions based on the location of the proposed development and its points of access. The particular aspects and levels of analysis involved with a TIL and TIS are outlined in the remainder of this Section.

**A. Transportation Impact Letter (TIL)** – A TIL involves a broader-level review of transportation impacts from the proposed development that can be submitted in a less formal, letter-type format. A TIL does not have an associated trip generation threshold requirement as its trigger, but is rather based on specific circumstances that warrant a different type of transportation analysis that is often less detailed than a standard TIS. There are differing types of a TIL depending upon the specific situation involved with the development application. Following are specific examples of situations that may result in a TIL request for an application, with other possible situations also warranting a TIL as determined by Planning staff in consultation with affected stakeholder jurisdictions.

1. Rural Area Traffic Assessment – Rural Retreat Use on Review proposals (on a local classified roadway) and Rural Area (as defined by the “Growth Policy Plan”) residential density increase proposals. This type of TIL is used to provide an overall assessment of a roadway’s sufficiency to accommodate increased densities and development in rural portions of Knox County and specifically to address the requirements from:

- The Knoxville Farragut Knox County Growth Policy Plan, Section 1: Policies, 3.5 (d) or as amended.
- Knox County Code of Ordinances, Appendix A, Section 4.104.02: Standards for the Use on Review approval of Rural Retreats.

2. Update of Previous TIL/TIS – A TIL may be allowed/required in cases when a development approval with a TIL/TIS has expired and a new application is being submitted. The TIL would be used to determine whether any conditions have changed that may warrant revised recommendations and document any other updated information.

3. Change in Land Use from Previous Development Plan – A TIL may be allowed/required in cases where an overall development plan is modified from the original application. An example of this situation is when an overall Concept Plan and TIS is submitted for a large commercial subdivision that assumes various land uses for each parcel and a differing land use is ultimately submitted for a subsequent development application. The TIL would be used to document the difference in projected trip generation and determine any associated change in recommendations needed from the original TIS.

4. Minor Additions to Previous Development Plans – A TIL may be allowed/required in cases where a minor addition to a development is being proposed, i.e. new outparcels or new residential units to a subdivision. In general a “minor change” means when the number of units or square footage increases less than 20% (< 20%) of the original number.

5. Other Situations Requiring Less Analysis than a TIS – A TIL may be allowed/required in cases where the daily trip threshold is exceeded but less analysis has been determined to be needed to evaluate the transportation impact of the proposed development. The specific required scope of the TIL in this situation will be provided to the applicant as determined by Planning staff in consultation with the other affected reviewing jurisdictions.

Section 6 of these guidelines provides additional information on the required content and format of a TIL report document.

**B. Transportation Impact Study (TIS)** – A TIS involves a detailed documentation of transportation impacts from the proposed development and is compiled into a formal report format for review. There are three levels of a TIS that define the required study area parameters based upon the projected 24-hour trip generation of the proposed development as indicated by the threshold values in Table 1 below.

**Table 1 – Transportation Impact Study Level Trip Generation Thresholds**

<b>24-Hour Trip Generation</b>	<b>Transportation Impact Study (TIS) Thresholds</b>
750 – 2,999 ADT	Level 1 TIS
3,000 – 5,999 ADT	Level 2 TIS
>6,000 ADT	Level 3 TIS

*Trip generation values are to be determined based on the procedures and rates documented in the Institute of Transportation Engineer’s (ITE) Trip Generation Manual, latest edition or from an approved local study unless otherwise requested and approved by Planning staff.*

1. Level 1 studies require analysis of each access that the development has to an existing roadway at the minimum. Access points to be analyzed include public roads, private rights-of-way, and private driveways. This level of study is commonly required for residential subdivisions, office developments, and smaller commercial developments. Planning staff, in consultation with the review team, reserve the right to require additional intersection(s) or substitute intersections for access points to be evaluated due to known geometric or safety-related issues.
2. Level 2 studies require analysis of each access that the development has to an existing roadway and to the first control point beyond those access points at the minimum. A control point is an intersection controlled by a traffic signal or stop sign on the existing roadway onto which the development has access. For cases where a traffic control device does not exist, Planning staff will determine the extent of the study. If a freeway interchange is near the property to be developed and is not signalized, Planning staff will determine if the ramps need to be included in the study. This level of study is commonly required for moderately sized commercial developments and larger office complexes. Planning staff, in consultation with the review team, reserve the right to require additional intersection(s) or substitute other intersections for an access or first control point to be evaluated due to known geometric or safety-related issues.
3. Level 3 studies require a complete Transportation Impact Study addressing each access point, the first control point beyond each access point, and the nearest collector/collector



intersection(s) or street(s) of higher classification as determined by Planning staff and in consultation with the review team. The exact area to be studied will be determined by Planning staff and the review team with input from the study preparer. Level 3 studies are uncommon, as they are usually warranted only with very large mixed-use and commercial developments.

Section 7 of these guidelines provides detailed information on the required content and format of a TIS report document.

## **SECTION 4 – PRE-SUBMITTAL AND SUBMISSION PROCEDURES**

A pre-submittal consultation with Planning staff to determine the need (requirement) for and scope of transportation impact analysis associated with an application is strongly encouraged in order to avoid delays and postponements in the review process. If required, a completed transportation impact analysis must be submitted at the same time as the application for a development. Therefore, a preliminary assessment of the development's transportation impact should be conducted well in advance of the actual submission of plans or application to Planning staff to allow time for the required level of transportation analysis to be completed by the applicant's transportation engineer.

The following is a typical listing of steps conducted to determine the need for and scope of a transportation impact analysis.

1. The applicant shall fill out the "Pre-submittal TIS Checklist" form and submit to Planning staff for review. This form will be used to calculate a development's projected trip generation, review other conditions in the area that may warrant a specific transportation analysis and determine if previous transportation studies have been performed for the site.
2. Planning staff will coordinate review of the completed form submitted by the applicant with City of Knoxville Engineering, Knox County Engineering and/or TDOT, and inform the applicant if an analysis is required and the type of analysis under the categories of TIS or TIL. If a transportation analysis is determined to be required, the applicant will be provided a written statement of the minimum required scope in terms of study area intersections and other major parameters to be addressed by the analysis. If three (3) or more agencies are involved in the review, then more time may be required to complete

review. At any time, Planning staff may require a Pre-Study Scoping Determination Conference to determine if further analysis needs to be included in the TIL or TIS.

3. Once a TIL or TIS is determined to be required by Planning staff, the applicant must select a transportation engineer meeting the qualifications of Section 5. The transportation engineer may need to consult with Planning staff periodically to review the collected data and any assumptions made for a draft report.
4. For each TIL or TIS reviewed by Planning staff, the formal submission by the applicant or their consultant shall include the following:
  - a. An electronic copy of the full letter or study, including data analysis files that match the analysis presented in the TIL or TIS.
  - b. A minimum of four (4) signed and sealed printed hard-copies. Confer with Planning staff on the number of printed copies required prior to submittal since multiple agencies may be involved.
5. Draft reports are due at the time development applications are submitted.
6. Planning staff, along with local and state government, shall review the draft TIL/TIS in conjunction with the other elements of the development application. If the draft transportation analysis is not of the proper scope or is executed improperly, the applicant shall be notified of the deficiencies and be required to submit corrections on the same schedule that applies to the other elements of the development application. Failure to submit corrections in a timely fashion will lead to delays or postponement of the application.
7. Any changes or corrections requested by the review team must be submitted as a complete revised TIL/TIS unless otherwise noted. Revised studies that are submitted without the minimum information below may be subject to significantly longer review periods, or may be sent back without being reviewed.

Please note that the comment response document must be:

- A. Included as part of the information in the sealed, signed, and dated TIL/TIS submittal, and must be bound at the back of the of the document, or

B. Sealed, signed, and dated by the engineer if the comment response document is the only location where information is provided to address review comments.

The comment response document should state the reviewer's comment then provide a response to the comment. The response must include information on how the comment was addressed, where it was addressed, and, if applicable, provide a page number for where the revision was made. Simply stating the comment was addressed is not acceptable and will prevent the revised TIL/TIS from being reviewed.

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**Note:** *Since a completed transportation impact letter or study must be submitted at the same time as the application for a development, it is critical that the applicant conduct steps 1 –4 early in their planning of a proposed development. Failure to submit a TIL/TIS or submission of an inadequate TIL/TIS will slow the review process and lead to delays or postponements.*

## **SECTION 5 – REQUIRED QUALIFICATIONS FOR PREPARERS**

Transportation impact letters (TIL) or studies (TIS) shall be prepared under the supervision of a qualified engineer who has specific training in traffic and transportation engineering and several years of experience related to preparing transportation studies for existing or proposed developments. The study shall be signed and sealed by a professional engineer. The ability to forecast and analyze transportation needs for both developments and roadway systems is essential. All transportation operations and design work shall be completed under the supervision of a registered professional engineer.

## **SECTION 6 – SCOPE AND REPORT REQUIREMENTS – TRANSPORTATION IMPACT LETTER (TIL)**

The specific contents of a TIL will vary depending on the type of analysis being performed as outlined in Section 3.A.

In general, the amount of documentation should be brief, with a technical emphasis, and should usually be limited to no more than 10 pages plus any supporting data/analyses included in an appendix. The following are the major types of TILs and their associated required content:

A. TIL for Rural Area Traffic Assessments. This type of TIL is only for areas within the unincorporated areas of Knox County.

1. Project description:
  - A. Rural Retreat
    - i. General description of the type of proposed land use and activities that will be hosted, i.e. concerts, lodging, weddings, etc.
    - ii. Typical hours of operation
    - iii. Number of expected events per month/year with their average duration and typical day of the week
    - iv. Number of expected attendees per event
  - B. Growth Policy Plan
    - i. General description of the type of proposed land use and density
2. Existing Conditions Assessment (to be provided for the entire length of route(s) between development access and nearest collector/arterial roadway, specific routes required to be studied will be determined by Knoxville-Knox County Planning and Knox County Engineering staff if multiple routes to site exist)
  - A. Distance from nearest collector/arterial roadway to site access
  - B. Pavement width
  - C. Pavement markings and signs
  - D. Horizontal and vertical geometry along route (grades, curvature, sight distance, number of access points, etc.)
  - E. Average daily traffic
  - F. Intersection sight distance at the access route intersection with the collector/arterial
  - G. Intersection sight distance at the proposed development driveway and the access route
  - H. Crash history (3 - 5 years) and notable patterns/locations along route
3. Trip Generation based upon ITE Trip Generation Manual (latest edition); if land use is not available within the manual, then an alternative methodology will need to be reviewed and approved by Knoxville-Knox County Planning, Knox County Engineering staff, or City of Knoxville Engineering staff.
4. Other (Knoxville-Knox County Planning, Knox County Engineering staff, and/or study preparer may be aware of other issues that should be addressed)
5. Study Conclusions and Recommendations including:

- A. Provide recommendations for any road improvements needed to mitigate issues identified from the existing conditions assessment
- B. Statement of route's overall sufficiency in providing acceptable (meeting traffic engineering standards) access to the site based on the assessment of existing conditions with the addition of new trips from the proposed development.

6. Supporting documentation

B. TIL for Updates, Changes and Additions to Previous Development Applications – This section generally addresses the situation when a TIL is requested for a project application that is for a site that has had a previous review or is an ongoing development that may be undergoing changes from the original proposed plan that need to be accounted for to ensure previous recommendations are still valid.

- 1. Project Description and Overview of Changes from Original Plan (if applicable)
- 2. Comparison of Trip Generation between Original and Proposed Uses (if applicable)
  - A. If the Shopping Center land use is used then the net difference between the Shopping Center and other specific land uses needs to be discussed.
- 3. Evaluation of Surrounding Area Transportation Network Conditions and Changes
- 4. Status of Previous Transportation Analysis Recommendations
- 5. Evaluation of Need for Additional or New Recommendations

C. TIL for Other Situations Requiring Less Analysis than a TIS – The scope and format for this type of TIL will be determined on a case-by-case basis by Planning staff in consultation with other affected jurisdictions. An example of one situation where a TIL may be substituted for a full TIS is in the case where sufficient existing data (such as a recent traffic count) is available to conduct a type of “worst-case analysis” that shows no mitigation measures would be warranted based on the projected trip generation at full build-out of the development. There are other situations where a TIL may be justified that includes only a subset of the report requirements outlined in Section 7 for a Level 1, 2 or 3 TIS. This type of TIL should still include documentation of a basic site access evaluation such as sight distance verification and any recommended essential access design/site circulation principles to be implemented to safely accommodate all modes of transportation.

## **SECTION 7 – SCOPE AND REPORT REQUIREMENTS – LEVEL 1, 2, AND 3 TRANSPORTATION IMPACT STUDIES**

### **A. Executive Summary**

1. Purpose & objectives of the study
2. Site location & study area map
3. Description of the proposed development, to include all project accesses, roads, and driveways
4. Principal findings
5. Conclusions/Recommendations

### **B. Existing Conditions**

1. Description of site including a location map
2. Type of project
  - a. If residential, number and type of dwelling units
  - b. If commercial or industrial, square footage and type of development
  - c. Key characteristics of existing roadways
3. Other planning data which may be pertinent
4. Site Plan with proposed access points shown
5. Directional and/or turning movement traffic counts on roads/intersections adjacent to property with access to development
  - a. Traffic count data – Traffic counts should be no more than two years old. If there have been significant changes in traffic patterns or changes in ADT by more than 5% within those two years, then a new traffic count may be required. If there is a request to not complete a new traffic count, supporting data must be provided.
  - b. Traffic counts during school closures – If a traffic count is done when one or more area schools are out of session, a new traffic count may be required after area schools have been re-opened for a minimum of 2 weeks following summer break or following 1 week

after other breaks, e.g. Spring Break. This revised evaluation with school traffic counts should verify any analyses and recommendations already completed for the TIL or TIS.

6. Level of service of intersection(s) (if applicable)
  - a. Recommended software programs for analysis are the latest versions of Highway Capacity Software (HCS) or Synchro
  - b. Other nationally recognized software can be used, subject to approval by review staff
- C. Background Conditions
  1. Identification of historical ADT (average daily traffic) count locations close to development
  2. Evaluation of traffic growth and annual growth rate
  3. Application of the growth rate to the expected build-out year of the project on figure(s)
  4. Level of Service (LOS) of intersections at future year(s) without development
  5. Include any other large previously approved projects that directly affect main intersections
- D. Trip Generation
  1. This section of the report is used to document the estimated number of daily and peak-hour motor vehicle trips that will be generated by the proposed project. Generally, the “peak-hour” analysis will include both peak periods occurring in the morning (7:00 to 9:00 a.m.) and afternoon (4:00 to 6:00 p.m.), but this can vary based on the particular circumstances and land uses that are involved. The specific analysis periods will be established during pre-study scoping consultation.
  2. Trip generation for the project shall be estimated for each required time period using the methods and rates contained in the ITE *Trip Generation Manual* (latest edition) with the exception of multi-family land uses. Procedures for special circumstances such as trip generation of multi-family uses and other situations are provided below.
    - a. A local study of trip generation rates at several apartment complexes in Knox County was conducted and used to formulate specific “Local Apartment” trip generation rates. Documentation of the study process and resulting rates is available from Knoxville-Knox County Planning. These rates shall be used for all land uses considered to be a multi-family development including apartments, condos, townhomes, or other attached housing, but

excluding developments whose primary market are college students that are typically leased by individual bedrooms. If the multi-family development is located in the downtown district, Planning staff may consider the use of Dense Multi-Use Urban or Center City Core (defined in the ITE Trip Generation Manual) as the location or setting instead of the Local Apartment rate.

- b. Trip generation for multiple retail land uses within the same proposed development will generally need to be calculated for each standalone business unless it can be demonstrated that the overall development meets the definition of the Shopping Center land use (ITE Land Use Code 820). These will be reviewed on a case-by-case basis in the pre-submittal consultation stage and use of the Shopping Center rates are subject to approval by Planning staff prior to the preparation of the transportation impact analysis. If specific retail types are not known at the time of submittal a land use must be assumed and approved by Planning staff that would be typical of a strip commercial development. The applicable trip generation rates for any out-parcels either included within the original development or added to a previously established shopping center will also need to be determined as part of the pre-submittal consultation process.
  - c. If the type of proposed development is not addressed in the ITE manual, then the study preparer can provide alternate trip generation rates for review and approval by Planning staff prior to beginning the study.
3. Calculation and documentation of trip ends shall be provided in tabular format broken out by individual land use and analysis period along with totals for each. If the development is planned to occur in phases then trip generation for each phase shall be documented separately along with the totals for complete build-out.

The specific methodologies used in the trip generation calculations shall be clearly documented including the independent variable that was used and whether the “Weighted Average Trip Rate” or “Regression Equation” was applied. The process documented in the *ITE Trip Generation Handbook* for selecting between using the regression equation or weighted average rates shall be used to determine the appropriate method.

Any adjustments to the calculated trip generation amounts to account for potential pass-by trips, internal trips or transit trip reduction, if applicable – must be documented according to the procedures identified in the *ITE Trip Generation Handbook* and approved by Planning



staff. Table 2 provides the maximum allowed pass-by percentages for selected land uses that have been previously accepted for use in Knox County and will serve as default percentages.

**Table 2 – Maximum Pass-by Percentages for Selected Land Uses in Knox County**

Land Use	LUC	Maximum Pass-by %
Fast-food Restaurant	934	40
Supermarket	850	
<25,000 SF		55
25,000 – 50,000 SF		35
>50,000 SF		10
Convenience Market	945	
<10,000 ADT		60
10,000 – 20,000 ADT		65
20,000 – 30,000 ADT		70
30,000 – 40,000 ADT		75
>40,000 ADT		80
Shopping Center	820	30

*Source: March 10, 1997 Memorandum to MPC Traffic Impact Study Reviewers and Preparers Group*

**A. Trip Distribution & Assignment**

1. Assumptions with figures as to the directional distribution of traffic to and from the development
2. Assumptions with figures as to the peak hour percentages and directional splits (this may need consultation with Planning staff prior to initiation of TIL/TIS). Each land use may justify a separate trip distribution, if the project is a mixed-use or shopping center development.

**B. Analysis**

1. Level of Service (LOS) and capacity analysis for peak periods

- a. Compute the projected LOS and capacity analysis for each access point to the adjacent road system based on the development by phase
    - 1). Highway Capacity Software is recommended
    - 2). Other nationally recognized software can be used
  - b. Compare LOS before development to LOS after development, if applicable
  - c. HCM Link Analysis, if applicable
  - d. 95th percentile queuing length analysis for all unsignalized and signalized intersections (any reduction from the 95% percentile queue model percentage shall require prior approval from review staff)
2. Intersection and roadway geometry – existing and proposed
    - a. Distances from existing streets, driveways, and/or median cut
    - b. Alignment with existing streets, driveways, and/or median cuts
    - c. Intersection layout
    - d. Sight distance analysis (including field measurements at proposed access points)
    - e. Right-of-way width
    - f. Lane width(s)
    - g. Turn-Lane Warrant analysis, per design criteria for City of Knoxville, Knox County or TDOT
    - h. Intersection warrant analysis (signal or roundabout, if needed)
    - i. Spot Speed Study (if requested by review staff)
    - j. Crash history (if requested by review staff)
  3. Site Circulation (analysis pertaining to compliance to access policy of the given jurisdiction)
  4. Multimodal facilities
    - a. Sidewalks
    - b. Transit stop(s)
    - c. School bus stops

- d. Bicycle lanes/routes

### C. Recommendations

1. Site access – including documentation of the controlling jurisdiction’s driveway/access policy and confirmation that site access meets the minimum requirements, i.e. access spacing, lane width, turning radii, etc....
2. Intersection improvements
  - a. Traffic control device(s) – modify existing or need for new
  - b. Left and/or right turn lanes
  - c. Acceleration and/or deceleration lanes
  - d. Length of storage bays
  - e. Sight Distance improvements
3. Off-site improvements
  - a. Modification to existing traffic control device(s)
  - b. Additional traffic control device(s)
  - c. Additional lanes at major intersections
  - d. Additional roads
4. Improvements by phasing (if applicable)

### D. Appendix

1. Raw traffic count data
2. Trip Generation worksheets
3. Historical and Background growth data
4. Bicycle, Pedestrian, & Transit data
5. Documentation of analysis (e.g. capacity analysis, right- & left-turn lane warrants, signal warrants, etc.)

## Report Requirements – Level 3 Studies

In addition to the preceding information required for Level 1 and 2 studies, the following information on Trip Assignment shall be provided in the report prior to the Analysis and Recommendation sections:

E. Trip Assignment

1. Discuss the effects of phasing of the proposed project
2. Other analysis requirements of the network may be required by Planning staff

**ADDITIONAL RESOURCES ATTACHED (ATTACHMENTS A – C)**

Task	Rural Retreat Traffic Letter	Letter	Level 1	Level 2	Level 3
<b>Pre-Study Meeting</b>	C	C	R	R	R
<b>Impact analysis:</b>					
Project description & overview to include planned land uses, internal circulation for all modes, site access, etc.	R	R	R	R	R
Road geometry summary	R	R	R	R	R
Site Plan that includes driveways and roadways (existing and dedicated)	R	R	R	R	R
Details of other large projects (both approved and permitted) in the study area	C	C	R	R	R
Existing conditions analysis (LoS) <sup>(1)</sup> at site with traffic counts	C	C	R	R	R
Existing conditions at nearby intersections	C	C	C	R	R
Background traffic growth with historical count evaluation & future projected traffic w/o project (LoS) <sup>(1)</sup>	C	C	R	R	R
Trip Generation for specific site land uses or comparison between original vs proposed uses	R	R	R	R	R
Trip Distribution & Assignment analysis	C	C	R	R	R
Future + project conditions analysis at site or nearby intersections (LoS) <sup>(1)</sup>	C	C	R	R	R
Mitigation identification and evaluation	C	C	C	C	C
Sight distance evaluation	R	R	R	R	R
Opposing driveway locations & proximity evaluations	R	C	R	R	R

<b>Site Issues:</b>					
Evaluate number, location & spacing of access point(s)	R	R	R	R	R
Evaluate first control point beyond access point(s)			C	R	R
Evaluate nearest intersection with a collector or higher classification street				C	R
Access design, queue lengths, etc.	R	R	R	R	R
<b>Other Analyses:</b>					
Update on previous study recommendations	R	R	R	R	R
Signal coordination analysis			C	C	R
Signal warrant analysis			C	C	R
Turn lane warrant analysis		C	R	R	R
95 <sup>th</sup> percentile queuing length analysis			R	R	R
Multi-modal facilities	C	C	R	R	R
Crash History/Spot Speed Study	C		C	C	R
Segment/Link Analysis				C	C
<b>KEY</b>					
<b>R = required</b>					
<b>C = may be appropriate on a case-by-case basis</b>					

Notes: 1. LoS = Level of Service as determined by techniques outlined in the Highway Capacity Manual.

ATTACHMENT B:  
**Pre-Submittal Transportation  
Impact Analysis (TIA) Scope  
Determination Form**

**DEVELOPMENT INFORMATION**

Project name:	
Project Description:	
Project Location	
Existing Zoning:	
Development Name:	
Developer name & address:	
Telephone number:	
Email:	
Tax Map & Parcel #:	

**CHECKLIST (All items should be available at the time of discussion)**

Complete description of the development that includes:

	<b>Site Map details (this should be <u>attached</u>):</b>	
<input type="checkbox"/>	Building footprints	
<input type="checkbox"/>	Number of units/unit size	
<input type="checkbox"/>	Access points	
<input type="checkbox"/>	Internal roadways (if any)	
<input type="checkbox"/>	Adjacent streets	
<input type="checkbox"/>	Proposed sidewalks and bicycle facilities, and	
<input type="checkbox"/>	Location and number of proposed parking spaces (if applicable)	
	<b>Phasing plan (if applicable) that includes:</b>	
<input type="checkbox"/>	Phase size, location, & timing	

BELOW TO BE FILLED OUT BY KNOXVILLE-KNOX COUNTY PLANNING STAFF

- Pre-study scope meeting **needed**
- Pre-study scope meeting **not needed**

**Intersection(s) to study:**

**Level of Analysis:**

**Notes:**

Signature	Date



# ATTACHMENT C: Transportation Impact Analysis (TIA) Review Process

\*Planning staff reviews all submitted development applications for transportation analysis triggers. Please allow ample time for this review process prior to submitting the development application to prevent delays or postponements.

**Transportation Impact Letter (TIL)**  
**Transportation Impact Study (TIS)**

