SECTION 336. TRAFFIC IMPACT STUDIES

A. Intent.

Lenox Township recognizes the direct correlation between land use decisions and traffic operations. Traffic impact studies assist in coordinating land use and transportation planning by forecasting the potential generation of new vehicular traffic; evaluating proposed access plans and identifying driveway-related road improvements at the site plan review stage; and identifying off- site road improvements needed to accommodate future traffic patterns. The intent of this section is to establish warrants for determining when traffic impact studies should be done, as well as minimum standards for the conduct and reporting of such studies.

B. Required Study by Type.

Traffic impact studies generally consist of three types, a Rezoning Traffic Study (RTS), Traffic Impact Assessment (TIA), or Traffic Impact Statement (TIS). The content of each study type is broadly described below, along with the warranting conditions.

1. **Rezoning Traffic Study.** An RTS describes relevant existing traffic conditions and compares the potential trip generation of a site's use under existing and proposed zoning classifications. An RTS is required for any proposed change to the zoning map that is either (1) inconsistent with the Township's Master Plan, or (2) involves other than residential down-zoning.

2. **Traffic Impact Assessment.** A TIA describes existing and likely future traffic conditions both with and without a site developed in specific proposed manner. The evaluation of traffic impacts is limited to overall trip generation and the operation of the proposed site access drive(s). A TIA is required if the proposed use(s) would generate (1) 500-749 driveway trips per day or (2) 50-99 peak- hour, peak-direction driveway trips.

3. **Traffic Impact Statement.** A TIS is similar to a TIA but includes off-site intersections and other critical road features more impacted due to a proposed use's greater amount of trip generation. It may also be appropriate to evaluate impacts at an off- site location due to ongoing congestion or safety problems, or because a road redesign is pending and should account for potential land use changes in the area. A TIS is required if the proposed use(s) would generate (1) 750 or more driveway trips per day or (2) 100 or more peak-hour, peak- direction driveway trips.

4. **Determination of Need.** The Township's Traffic Engineering Consultant will certify the type of traffic impact study required (if any), by signing a Determination of Need form completed by the Applicant or

Applicant's traffic consultant. The form to be used for this purpose will be approved by the Township Board and may be obtained from the office of the Township Clerk.

C. Preparation and Submittal: All traffic impact studies must be planned and conducted in close cooperation with Township staff and/or designated Township consultants.

1. Qualifications of Preparer and Reviewer. The person responsible for preparing a traffic impact study shall (1) have at least three years of recent experience preparing such studies, where that work has comprised a major portion of the Preparer's professional experience; (2) be an Associate (or higher) member of the Institute of Transportation Engineers; and (3) be a registered Professional Engineer (P.E.) in Michigan, certified Professional Traffic Operations Engineer (PTOE), and/or certified community planner (AICP or PCP). The person designated by the Township to review a submitted study shall have the same qualifications.

2. **Approval of Scope.** Using a form approved by the Township Board, the Preparer shall complete and submit to the Traffic Engineering Consultant a Traffic Impact Study Worksheet. This worksheet will (1) detail the trip generation forecast used to determine the need for the study; (2) identify candidate off-site intersections (if any) based, in part, on projected site traffic constituting 5% or more of existing traffic; (3) propose specific growth rates and other developments to be considered in forecasting future background traffic (if any); (4) describe the method to be used in distributing site-generated traffic; and (5) confirm an awareness of other study methodology requirements. The Preparer should verify that the completed worksheet is satisfactory prior to continuing work on the study. Studies submitted without such verification will not be reviewed in detail or approved.

3. **Submittal of Report.** Unless waived by the Planning Commission, traffic impact studies must be submitted to the Township at least 30 days prior to the associated rezoning or development proposal appearing on the agenda for a Site Plan Committee or public meeting. This lead time is needed to ensure the distribution of the report to the Reviewer; study review and the preparation of review comments; and the distribution of the review comments to appropriate Township officials. The Planning Commission will inform the Applicant when the traffic impact study has been approved, at which time the Applicant or Applicant's traffic consultant shall also submit the approved study to the Road Commission of Macomb County and/or Michigan Department of Transportation (MDOT), as appropriate (based on agency jurisdiction over the road(s) abutting the subject site). If revisions or additions to the initial report are required, they shall be made and approved before the report is accepted by the Township and forwarded to the responsible road agency(ies).

D. **Traffic Impact Study Contents:** All studies should be consistent with the state of the practice, as outlined in such publications as *Evaluating Traffic Impact Studies - A Recommended Practice for Michigan Communities* (*ETIS*, sponsored by MDOT, et al.). Required content by study type is indicated in the table below. The composition of individual content items is detailed in paragraphs a through n.

1. **Describe Requested Rezoning or Proposed Use(s).** When rezoning is requested, the study shall identify a range of feasible permitted uses under existing zoning as well as a range of feasible permitted uses under the proposed new zoning; justify the use sizes assumed within each range; and ensure that the sized uses represent a reasonably robust range of potential trip generation. When a site plan

or plat is proposed as opposed to a rezoning, the study shall include (where feasible) the conceptual site plan or plat assumed as the basis for the study, along with the anticipated phasing and build-out year(s) for the development.

2. **Describe Site, Surroundings, and Study Area.** At a minimum, existing abutting land use(s) and roadway conditions shall be described. If off-site intersections have been identified and approved via the TIS Worksheet (Sec.332.3.b), the study area inferred by those intersection locations shall be similarly described. Special attention should be paid to features potentially affecting the required provision of safe and efficient site access, such as road alignment and sight distance limitations; speed limits; surface type; lane configuration and traffic control devices; existing or approved intersections and driveways within 300 ft of the proposed site access points (on both sides of abutting road(s)); and compliance or non-compliance with established access- management standards.

CONTENT REQUIREMENTS BY TRAFFIC STUDY TYPE

CONTENT ITEM	**Required for**		
	Rezoning Traffic Study	Traffic Impact Assessment	Traffic Impact Statement
Describe Requested Rezoning or Proposed Use(s)	x	x	x
Describe Site, Surroundings, and Study Area	x	x	x
Obtain and Evaluate Current Traffic Data: Daily Traffic Volumes (latest available) Hourly Traffic Volumes (generally new counts) Other Data if Indicated in Letter to Applicant	x	x	x
Describe Anticipated Future Changes to Area Land Uses and Roads	x	x	x
Forecast Future Background Traffic Volumes		x	x
Forecast Driveway Trip Generation in Manner Recommended by Institute of Transportation Engineers	x	x	x
Discount Driveway Trips as Appropriate	x	x	x
Forecast and Compare Trip Generation by Uses Permitted within Existing and Proposed Zoning Districts	x		
Develop Reasonable Trip Distribution Model(s)		x	x
Assign Generated Trips and Forecast Future Total Traffic		x	x
Determine Minimum Warranted Access Improvements		x	x
Evaluate Peak-Hour Traffic Impacts		x	x

Identify and Evaluate Any Needed Capacity Mitigation		x	x
Recommend Road Improvements At Access Point(s) (including Driveway Lanes) At Off-Site Intersection(s) (as required)		x	x

3. **Obtain and Evaluate Current Traffic Data.** For all three traffic study types, the Preparer shall obtain the latest available daily traffic counts for area roads, and determine (where possible) the proportion of traffic within the AM and PM peak hours (the *K-factor*). For Impact Assessments and Impact Statements, new peak- period manual counts shall be made at all selected off-site intersections, including those opposite proposed site access points, unless waived by the Traffic Engineering Consultant. Any new counts shall be made on a Tuesday, Wednesday, or Thursday of a non-holiday week unless the nature of the proposed use requires otherwise (such as Saturday for a major shopping center). To the extent feasible, counts should be made during average or higher-than-average volume conditions. In rare situations, seasonal adjustments may be permitted to ensure that an adequately representative volume condition is addressed. The locations, days, and time periods selected for the manual volume counts will be predetermined and documented on the TIS Worksheet. If any special counts (e.g., of trucks, gaps, speeds, crashes, etc.) are proposed or required, such will be indicated in a separate letter.

4. **Describe Anticipated Future Changes to Area Land Uses and Roads.** All traffic studies shall document pending changes, other than the proposed site development, that might influence future traffic conditions. These changes should include but not necessarily be limited to (1) other developments that could increase traffic at the selected off-site intersections by 5% or more, and (2) planned road improvements in the study area, with those actually approved and funded clearly distinguished from other improvements merely discussed or recommended.

5. **Forecast Future Background Traffic Volumes.** To provide an appropriate basis for expressing the traffic impacts of a proposed development, current traffic volumes shall always be projected to the earliest subsequent year in which it would be reasonable to expect full occupancy of the development. This creates a so- called background traffic scenario, wherein recent traffic trends have continued or new expected trends have evolved, but the subject site hypothetically remains undeveloped. The TIS Worksheet must be used to predetermine and document the general growth rate and specific background developments to be considered in established the background traffic scenario.

6. **Forecast Driveway Trip Generation.** Unless waived by the Review Consultant, forecasts of driveway trip generation must be based on data and methodology found in the latest editions of the following two ITE publications: *Trip Generation* (rate data) and *Trip Generation Handbook - An ITE Recommended Practice* (methodology and pass-by percentages; hereafter referred to as the *Handbook*). The *Handbook's* recommended procedure for choosing between *Trip Generation's* average rates and regression equations should be followed, with the exception that no regression with a correlation coefficient (R2) of less than 0.75 shall be used, regardless of sample size. Regardless of which statistical approach is taken (average rates or equations), it is critical that (1) the size of the development under analysis be within the range of ITE's sample data (especially important when the illustrated regression equation is non-linear); (2) the line representing the weighted average rate or regression equation lie within the cluster of data points near the size of the development site; and (3) a regression equation with a non-zero intercept not be applied for small developments (to avoid illogical results). The Preparer should contact the Traffic Engineering Consultant if questions arise regarding the best forecasting method or what to do when ITE data appear unsuitable.

7. **Discount Driveway Trips as Appropriate.** For some land uses, such as those involving shopping or dining, it may be appropriate to reduce (1) the above- predicted number of trips at site access points, due to transit usage or so-called "internal or downtown capture" (i.e., walking trips), or (2) the number of new driveway trips assumed to pass through off-site intersections, due to "pass-by or diverted" traffic (drivers already using area roads en route to primary destinations elsewhere). Driveway trips less pass-by and diverted trips are known as "new" or "primary" trips. The percentages of total driveway trips assumed in each of the above categories (if any) will be predetermined and documented via the TIS Worksheet. To be conservative, the pass-by percentages recommended in *ETIS* should be used as applicable; in no cases shall percentages larger than the averages found in the *Handbook* be used.

8. **Forecast and Compare Trip Generation by Uses Permitted within Existing and Proposed Zoning Districts.** This item is to be completed only for Rezoning Traffic Studies. Where site development under *existing* zoning could involve more than a single density or development size, at least two uses representing a range of potential trip generation must be identified and evaluated. For the proposed *new* zoning, at least one assumed development must be forecasted to generate a quantity of trips near the higher end of what might be generated by all feasible uses permitted under that new zoning (the

use envisioned by the rezoning Applicant may or may not meet this requirement). The report must explain in some detail the planning and traffic engineering bases of the assumed development scenarios. The trip generation comparison must address the total number of driveway trips generated by the site, and if applicable, the number of new (or primary) trips passing through all off-site intersections (if less than total driveway trips).

9. **Develop Reasonable Trip Distribution Model(s).** The method(s) used to distribute site- generated traffic among specific movements at the site drives and various off-site intersections evaluated should be explained in some detail. For instance, it is insufficient to simply state that the trip distribution modeling is "based on existing traffic patterns"; the superficial application of this concept may result in all trips being modeled as if they were pass-by trips. Generally, new (primary) trips should be modeled *separately* from pass-by trips, since the former return to their origin (by definition), as opposed to exiting in the direction they were traveling prior to entering. Refer to the *Handbook* chapter entitled "Pass-by, Primary, and Diverted Linked Trips" for more explanation. Finally, the traffic impact study should illustrate the assumed trip percentages throughout the study area (including at site drives, to facilitate a reasonableness review).

10. **Assign Site-Generated Trips and Forecast Future Total Traffic.** Assign the total site- generated peak-hour trips forecasted in items 4f and 4g according to the model(s) developed in item 4i. Add the resulting site traffic to the future background traffic (forecasted in item 4e) to forecast future total *peak-hour* traffic. The future *daily* traffic on the abutting road(s) must also be forecasted for the site's anticipated build-out year, generally by dividing the projected future total peak-hour traffic volume by a K-factor (either the value(s) determined in item 4c, or by value(s) based on professional experience and judgment). Any deviation from this approach must be approved in advance by the Traffic Engineering Consultant.

11. **Determine Minimum Warranted Access Improvements.** Prior to evaluating future levels of service at site access points and off-site intersections (as applicable), the safety- based need for left- and right-turn lanes at the proposed access points must be determined. Warrants published by the Michigan Department of Transportation shall be evaluated and used as the basis for road improvement recommendations, on multi-lane as well as two-lane roads. The evaluation of these warrants will examine both peak-hour and daily volumes at site build-out, as applicable.

12. **Evaluate Peak-Hour Traffic Impacts.** The study must evaluate peak-hour levels of service at all off-site intersections under current, future background, and future total (background-plus-site) traffic conditions, as well as at all site access points under future total traffic conditions. Unless waived by the Traffic Engineering Consultant, all locations and hours counted (per item 4c) must be evaluated using methodology consistent with latest edition of the *Highway Capacity Manual*, published by the Transportation Research Board. Capacity analyses must evaluate future background and future total traffic *without as well as with* any recommended mitigation, unless funding of timely mitigation is assured

or this requirement is waived by the Traffic Engineering Consultant. Finally, the study must (1) indicate the peak-hour factors used in the capacity analyses; (2) summarize in the body of the report (at a minimum) the level of service for any movements rated E or F as well as the level of service by intersection approach (as applicable); and (3) comment on the average delay per vehicle for any intersections, approaches, or movements rated F.

13. **Identify and Evaluate Any Needed Capacity Mitigation.** Unless waived by the Traffic Engineering Consultant, the traffic impact study must determine what (if anything) would have to be done to ensure a future background and/or future total level of service of at least D overall at every signalized intersection evaluated. A reasonable effort should also be made to identify mitigation for any approaches or movements expected to experience a level of service of E or F, whether at signalized or unsignalized intersections (including driveway approaches to major roads). Level of service analyses must be done and fully documented for all identified capacity mitigation.

14. **Recommend Appropriate Access Design and Off-Site Road Improvements.** Based on the study's findings and conclusions, the final report shall recommend, at a minimum: (1) an appropriate lane configuration at each proposed access point, including turn lane lengths based on storage and/or deceleration requirements; (2) specific clear-vision triangles commensurate with prevailing standards and speeds; and (3) needed capacity mitigation at the off-site intersections evaluated. Off-site mitigation to accommodate new traffic generated by the proposed development shall be clearly distinguished from the mitigation needed to accommodate future background traffic growth unrelated to the development.

15. **Possible Waiver of Study Requirement:** The requirement for submittal of a traffic impact study may be waived by the Planning Commission in certain cases where recent studies of a similar nature have been completed and no further benefit would be achieved by completing an additional study. Requests to waive traffic study requirements will be evaluated on a case-by-case basis.