



**Lake ~ Sumter
Metropolitan Planning Organization**

**Transportation Concurrency
Management System**

**TRAFFIC IMPACT STUDY
METHODOLOGY GUIDELINES**

**VOLUME 1:
LAKE COUNTY CHECKBOOK TCMS**

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Table of Contents

1. Introduction	1
2. Background	1
3. Requirements for a TIS	3
3.1. When is a TIS required?	3
3.2. Levels of TIS	3
3.2.1. Tier 1 TIS: 0-25 Net New Peak-Hour Trips	3
3.2.2. Tier 2 TIS: 26-100 Net New Peak-Hour Trips	4
3.2.3. Tier 3 TIS: 101+ Net New Peak-Hour Trips	4
3.3. Review Process	5
4. Process Flow Chart	6
5. Request for Exemption and Methodology Letter	7
5.1. Request for Exemption Letter	7
5.2. Methodology Letter	7
6. Report Format	9
7. TIS Report Breakdown	11
7.1. Table of Contents, List of Figures and List of Tables	11
7.2. Introduction	11
7.2.1. Purpose	11
7.2.2. Project Description	11
7.2.3. Site Location and Site Plan	12
7.2.4. Study Area/Area of Influence	12
7.2.5. Planned and Programmed Improvements	13
7.2.6. Committed Development	13
7.3. Existing Roadway and Traffic Conditions	13
7.3.1. Pertinent Existing Roadway Information	14
7.3.2. Existing Segment Geometry	14
7.3.3. Existing Intersection Geometry	14
7.3.4. Existing Traffic Volumes	14
7.3.5. Existing Level of Service	15

7.4. Future Roadway Conditions 15

 7.4.1. Pertinent Future Roadway Information 16

 7.4.2. Future Segment Geometry 16

 7.4.3. Future Intersection Geometry 16

7.5. Future Traffic Conditions 16

 7.5.1. Background Traffic 17

 7.5.2. Trip Generation 17

 7.5.3. Trip Distribution and Assignment..... 18

 7.5.4. Future Traffic Volumes..... 18

7.6. Transportation Assessment..... 19

 7.6.1. Segment Analysis 19

 7.6.2. Intersection Analysis 19

 7.6.3. Turn Lane Analysis 20

 7.6.4. Access Analysis 20

7.7. Mitigation Strategies..... 21

 7.7.1. Recommended Improvements 21

 7.7.2. Proportionate Share Calculation 22

7.8. Summary/Conclusions 23

7.9. Appendix 23

8. Literature Review 24

Appendix A. List of Acronyms..... 26

Appendix B. Total Trip Lengths & New Trip Percentages 27

1. Introduction

The Lake~Sumter Metropolitan Planning Organization (MPO) entered into an interlocal agreement in 2007 with Lake County, Sumter County, all fourteen (14) municipalities in Lake County and the City of Wildwood. This interlocal agreement, effective January 1, 2008, designated the MPO as the administrator of the transportation concurrency management systems (TCMS) for each of these local governments.

The MPO currently monitors the Lake County checkbook TCMS, which covers all of Lake County, incorporated and unincorporated, the Sumter County growth-rate TCMS and the Wildwood growth-rate TCMS. In an effort to standardize the evaluation and mitigation of transportation impacts throughout Lake and Sumter Counties, the MPO embarked on the development of this methodology document.

2. Background

The Lake~Sumter MPO, in coordination with the City of Mount Dora Planning and Development Department, has developed a set of guidelines, presented herein, for the preparation of a Traffic Impact Study (TIS). The intent of this document is to provide a general "best practices" preparation guide for applicants and/or consulting planners/engineers assessing the potential traffic impacts of new developments, updates to previously approved developments, or changes in zoning and/or Comprehensive Plan Amendments. These guidelines establish minimum standards for all TIS reports, in order to provide a clear, orderly and consistent basis on which traffic impacts are to be evaluated.

A TIS is an important tool in the overall development planning process. It provides information which will allow local governments to evaluate the impact of a development, with respect to the need for roadway/intersection capacity, operational and safety improvements. The TIS shall also identify mitigation measures for the impacts identified.

A TIS allows a local government to make more informed decisions. The requirements for the preparation of a TIS are in place to ensure that the local government is able to:

- Identify, in advance, any potential adverse impacts to the existing transportation system, such that appropriate mitigation strategies can be developed.

- Assist public and private sector entities in the early identification of issues related to traffic operations, including, but not limited to, driveway/access locations, traffic signals, and other elements of transportation facilities.
- Support long term planning solutions that foster responsible growth of transportation infrastructure, consistent with the local government's Comprehensive Plan and vision for the community.

A development application will not be deemed complete until a final, approved TIS is received and approved by the local government. In addition, applicants should note that interagency and intergovernmental coordination is necessary for projects that impact transportation facilities maintained by the State (FDOT), County or adjacent/other local governments.

The Lake~Sumter MPO extends a special thanks to the City of Mount Dora and their consultant, Dyer Riddle Mills & Precourt, Inc. (DRMP), for their assistance in developing this methodology document.



3. Requirements for a TIS

3.1. When is a TIS required?

The preparation of a TIS shall be necessary at the time a preliminary development plan application is submitted for all development projects. The level of detail and type of TIS for each project will depend on the number of net new peak-hour trips generated, as detailed in Section 3.2. The amount of net new peak-hour, project traffic/trips generated by the proposed development, which accounts for adjustments for internal capture and pass-by trips, if applicable, shall be based on its proposed land uses and calculated using the trip generation methodologies and guidelines contained herein (refer to Section 7).

A TIS is also required for all aspects of site development and impact assessment within the local government's jurisdiction. This includes, but is not limited to, updates to previously approved developments, the development of the Local Government Comprehensive Plan (LGCP), LGCP amendments (particularly Future Land Use Map (FLUM) changes), as well as participation in Development of Regional Impact (DRIs) and Florida Quality Development (FQDs) review and approval. This also includes zoning, reviews of Planned Unit Developments (PUDs), subdivision ordinances, and related land activities, and Congestion Management Plans (CMPs), including subsequent Campus Development Agreements (CDAs). In addition, a TIS shall be required for all updates or unapproved phases of a project/development.

3.2. Levels of TIS

3.2.1. Tier 1 TIS: 0-25 Net New Peak-Hour Trips

If the traffic impacts of a proposed development can be clearly determined without the submittal of a TIS, and all the parties involved (local government, MPO, Florida Department of Transportation (FDOT), applicant, etc.) are in agreement (including on any necessary mitigation), the submittal of a full TIS may not be necessary. This would likely most often occur with smaller, less intense projects that generate negligible trips. If an applicant believes that their project meets this criterion, the applicant must submit a ***Request for Exemption Letter***.

It should be noted that, ultimately, these trip thresholds are only guidelines and Exemptions are granted **at the discretion of the local government**. The requirements for the *Request for Exemption Letter* are discussed in Sections 5 and 7.

3.2.2. Tier 2 TIS: 26-100 Net New Peak-Hour Trips

A project that generates between twenty-six (26) and one-hundred (100) net new peak-hour project trips shall require the preparation of a TIS unless the applicant believes their project is more in keeping with a Tier 1-type project. In such a case, the applicant may submit a *Request for Exemption Letter*. Approval and granting of this Exemption, however, is strictly at the discretion of the local government.

In addition, as an option, applicants may submit a ***Methodology Letter*** prior to the submittal of the TIS. The requirements for a Tier 2 TIS, *Request for Exemption Letter* and *Methodology Letter* are discussed in Sections 5, 6 and 7. The classification of a project as a Tier 2 TIS is at the discretion of the local government.

As an example, developments of the following size, or larger, typically generate between twenty-six (26) and one-hundred (100), net new peak-hour project trips and would, thus, require a traffic study:

- Retail – 1,000 square feet gross leasable area
- Single Family Residential – 20 dwelling units
- Apartment – 15 dwelling units
- Office Building – 1,000 square feet gross floor area

3.2.3. Tier 3 TIS: 101+ Net New Peak-Hour Trips

A project that generates one-hundred and one (101) or more net new peak-hour project trips shall require the preparation of a more-detailed TIS than would normally be required for a Tier 2 project. This requirement for additional detail will be at the discretion of local government and will be negotiated as part of the methodology review process which involves the submittal and review of a *Methodology Letter*, to be approved by the local government prior to the submittal of the TIS. In general, a project requiring a Tier 3 TIS shall be required to utilize the Lake~Sumter MPO's currently adopted travel demand model, presently the Florida Department of Transportation (FDOT), District 5, Central Florida Regional Planning Model (CFRPM), Version 4.1, to evaluate future traffic conditions. The requirements for a Tier 3 TIS and *Methodology Letter* are discussed in Sections 5, 6 and 7. The classification of a project as requiring a Tier 3 TIS is at the discretion of the local government.

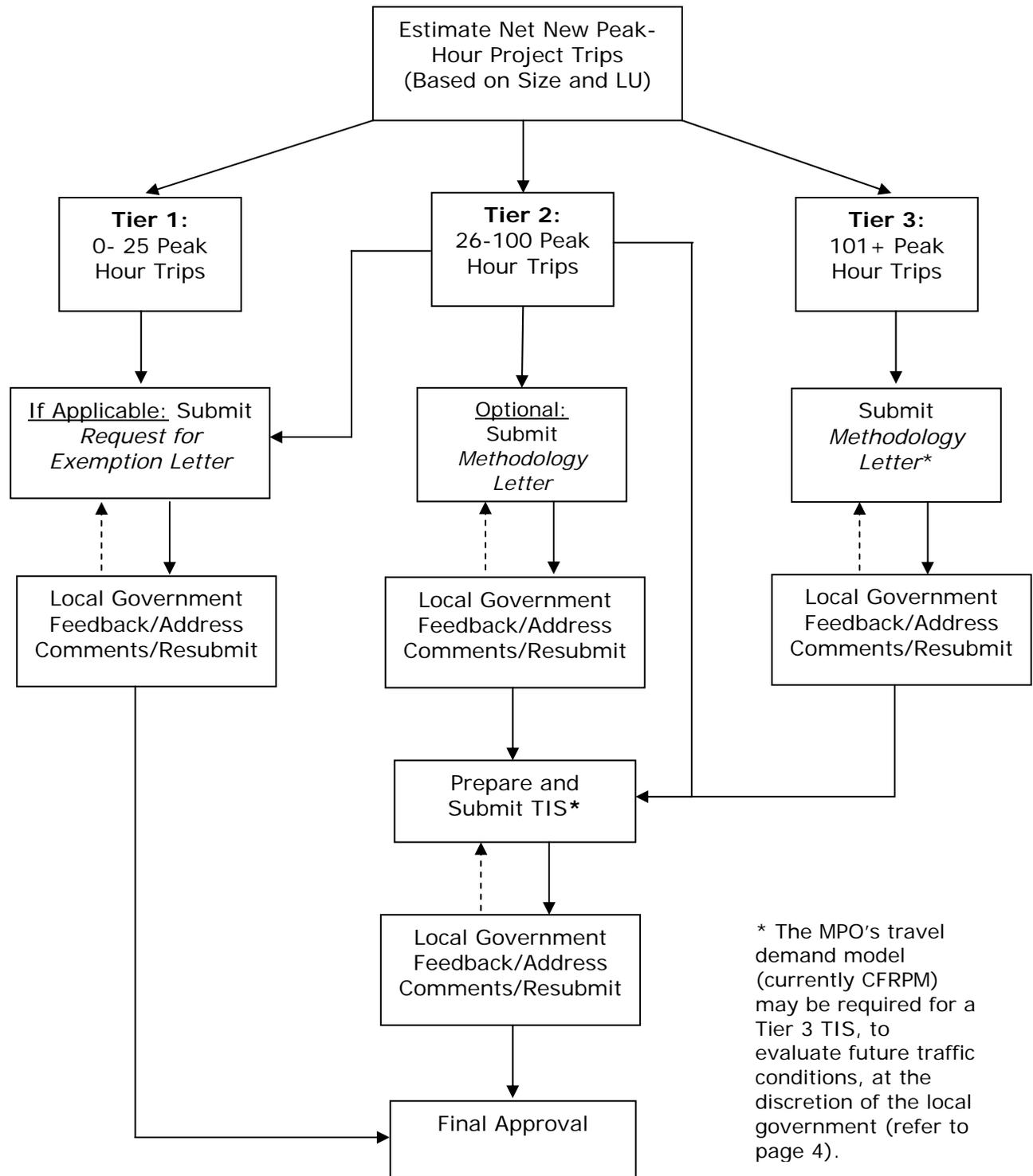
As an example, developments of the following size, or larger, typically generate one-hundred and one (101) or more net new peak-hour project trips and would thus require a traffic study:

- Retail – 7,000 square feet gross leasable area
- Single Family Residential – 100 dwelling units
- Apartment – 160 dwelling units
- Office Building – 30,000 square feet gross floor area

3.3. Review Process

The applicant shall submit three (3) hard copies and one (1) full PDF (electronic) copy of the TIS to the local government's Development Review Coordinator, at the time of application or plan submittal. One copy will be for the local government's file, one for the local government's review and one for the Lake~Sumter MPO's review. If the local government and MPO determine additional agency participation is warranted in the review, additional copies may be requested. These additional agencies may include FDOT or the Florida Turnpike Enterprise, the County, or an impacted adjacent local government. After review, the applicable local government, home to the proposed project, will provide the applicant with a memorandum which contains specific comments from all parties regarding the TIS. These comments must be addressed and necessary mitigation agreed upon prior to final approval being granted.

4. Process Flow Chart



5. Request for Exemption and Methodology Letter

5.1. Request for Exemption Letter

A *Request for Exemption Letter* is sometimes applicable, as discussed in Section 3.2. At a minimum, the *Request for Exemption Letter*, based on the guidelines stated herein, shall provide the following information:

- Purpose (also include grounds for exemption)
- Project Description
- Site Location/Site Plan
- Area of Influence/Study Area
- Trip Generation – Based on Guidelines Set Forth in Section 7
- Trip Distribution/Assignment – Required to determine availability of capacity, and, for Lake County projects, to update the Lake County Checkbook TCMS

Details regarding the requirements for each bulleted item listed above are provided in Section 7.

Sample Request for Exemption Letter(s) may be added to the appendix of this document, or to the MPO and/or local government websites, at a later time, for reference.

5.2. Methodology Letter

A *Methodology Letter*, applicable as discussed in Section 3.2, shall be submitted to the local government, prior to submittal of the TIS, for any project that generates one-hundred and one (101) or more net new peak-hour project trips. The *Methodology Letter*, also optional prior to submittal of a Tier 2 TIS, is required to:

- Identify whether the project will require a Tier 2 or Tier 3 TIS.
- Identify any critical issues such as, but not limited to, trip generation, trip distribution, the extent of the study, the area of influence, the horizon years, specific time periods to be analyzed, and data sources.
- Ensure that all relevant issues are adequately addressed in the TIS and that no extraneous elements are included in the study.
- Help the applicant understand the local government's expectations should further studies be required.

At a minimum the *Methodology Letter*, based on the guidelines stated herein, shall provide the following information:

- Purpose
- Project Description
- Site Location/Site Plan
- Area of Influence/Study Area *
- TCMS Data for Study Area Roadways *
- Intersections to be Analyzed
- Planned and Programmed Improvements
- Trip Generation
- Trip Distribution
- Trip Assignment
- Future Traffic Volumes
- Future Intersection Volumes

* Prior to submitting the Methodology Letter, the applicant should request the local government/MPO provide a study area report, generated by the Lake County TCMS software, based on location, and proposed land uses. This shall include a study area map and current TCMS data spreadsheet, including existing volumes, existing Level of Service (LOS), LOS standards, service volumes, and committed/reserved trips (background).

Details regarding the requirements for each bulleted item listed above are provided in Section 7.

Sample Methodology Letter(s) may be added to the appendix of this document, at a later time, for reference.

6. Report Format

In order to provide consistency and facilitate review of the TIS, the following outline shall be followed to the extent possible:

Table of Contents

List of Figures

List of Tables

1. Introduction

- Purpose
- Project Description
- Site Location and Site Plan
- Study Area/Area of Influence *
- Planned and Programmed Improvements
- Committed Development

2. Existing Roadway and Traffic Conditions

- Pertinent Existing Roadway Information *
- Existing Segment Geometry
- Existing Intersection Geometry
- Existing Traffic Volumes *
- Existing Level of Service *

3. Future Roadway Conditions

- Pertinent Future Roadway Information
- Future Segment Geometry
- Future Intersection Geometry

4. Future Traffic Conditions

- Background Traffic *
- Trip Generation
- Trip Distribution and Assignment
- Future Traffic Volumes

5. Transportation Assessment

- Segment Analysis
- Intersection Analysis
- Turn Lane Analysis
- Access Analysis

6. Mitigation Strategies

- Recommended Improvements
- Proportionate Share calculation (if applicable)

7. Summary/Conclusions

- A brief discussion (one or two paragraphs) shall be provided to highlight the TIS Tier classification (Tier 1, Tier 2 or Tier 3), methodology followed and general results.
- Action requested (e.g., approval of mitigation strategy) of local government shall be specified.

8. Appendix

- a. Traffic Count Data
 - i. Average Daily 24-Hour or Peak-Hour Traffic Counts (collected, as necessary)
 - ii. Peak-Hour Turning Movement Counts (A.M., P.M., Mid-day, Weekend (collected, as necessary)
- b. Capacity Analysis Summary Sheets
 - i. Existing Conditions
 - ii. Future Conditions (per phase, if required)
 - iii. Future Mitigated Condition (per phase, if required)
- c. Lake County TCMS Spreadsheet
- d. Trip Distribution plot from the MPO Travel Demand Model (Tier 2, if necessary, and Tier 3 TIS)

- * Prior to submitting the Methodology Letter, the applicant should request the local government/MPO provide a study area report, generated by the Lake County TCMS software, based on location, and proposed land uses. This shall include a study area map and current TCMS data spreadsheet, including existing volumes, existing LOS, LOS standards, service volumes, and committed/reserved trips (background).

7. TIS Report Breakdown

The following section describes the minimum content/information that shall be included in each chapter or section of the TIS based on the outline provided in Section 6.

7.1. Table of Contents, List of Figures and List of Tables

A Table of Contents, List of Figures and List of Tables shall be provided as part of the TIS report.

7.2. Introduction

This chapter, or section, shall contain pertinent information about the proposed project. The information that shall be provided is discussed below.

7.2.1. Purpose

The tier (1, 2 or 3) of TIS and reason for the submittal of the TIS shall be stated. For example, it shall be stated if the TIS is being submitted for a development plan approval, zoning change, etc. Another example would be if the TIS is being submitted as an update to a previously approved development/phase.

7.2.2. Project Description

A brief description of the proposed project shall be provided. The following information shall be provided and can be presented as a bulleted list or table:

- Area Type (Rural, Transitional, Urban)
- Type of Development (e.g., Residential, Retail, etc.)
- Institute of Transportation Engineers (ITE) Land Use Code(s)
- Size of development in standard ITE units (e.g., dwelling units for residential)
- Location/Description of the proposed development site access
- Anticipated opening/buildout year (by phase, if necessary)
- Analysis years (by phase, if necessary)
- Analysis periods (e.g., AM, PM, Mid-day, etc)
- Source of adopted roadway Level of Service (refer to TCMS spreadsheet)

7.2.3. Site Location and Site Plan

An area figure/map shall be provided to show the location of the project in relation to the surrounding region. This figure shall show the area of influence of the project, as discussed in the following section. In addition, a site plan shall be included in this section to provide an overview of the project site and site access.

7.2.4. Study Area/Area of Influence

The study area to be addressed by the applicant shall be regional in nature and shall include all roadways and major intersections affected by the proposed development. For those projects requiring a Methodology Letter, the study area will be defined prior to submittal of the TIS. The applicant should request the local government/MPO provide the study area based on location and proposed land use (provided by applicant).

The extent of the study impact area shall be determined by the area of influence of the project. The area of influence shall be established as one-half (1/2) the total trip length associated with the land use of the proposed development, based upon the Lake County Transportation Impact Fee Update Study Final Report (see table in Appendix A, column "E"). The area of influence shall be based on the "as the car drives" distance as opposed to the "as the bird flies" distance. The roadway segments and intersections within the area of influence shall be considered for further study. In cases where the proposed project involves multiple land uses, the study area shall be defined as one-half the total trip length associated with the land use having the longest total trip length.

It should be noted that once the study area has been established based on the previously described methodology, there is the potential that not all intersections and segments within the study area will require full analysis. The intersections requiring full data collection and analysis will be determined by the anticipated effect of the proposed development at each location. The principal factors in this determination include the project trip distribution on the study area network and existing LOS and operations on the study area roadways and at the subject intersections. As the affect of the project traffic on more distant segments and intersections diminishes, specific locations may be removed from further consideration. Additionally, factors that could also influence the area of influence are the existing and future land uses in the area, and the existing and future transportation network.

The study area roadways and intersections may be discussed during the methodology review process, but ultimately, it is at the discretion of the local government to reduce or expand the study area, as deemed necessary.

7.2.5. Planned and Programmed Improvements

This section shall identify and discuss all planned and programmed roadway improvements relevant to the study area. This includes all local, state and federal projects that have been planned or funded. The section shall include a list of planned or programmed improvements, location/limits, programmed phases with years, and the name of the agency responsible for implementing the project. Only those programmed improvements contained in the first three (3) years of the relevant work program, and funded for construction, shall be considered as capacity "in-place." If no programmed or planned improvements are relevant to the study area, the applicant shall indicate that there are no planned or programmed improvements within the project study area within the next three years. In general, the Lake County TCMS will be kept up to date with planned and programmed improvements from the first three years of the work program.

7.2.6. Committed Development

This section shall include discussion and figures pertaining to Approved/Committed Development. In general, the Lake County TCMS will be kept updated with committed/reserved trips relevant to the study area. If no information is available then an appropriate growth rate, as approved by the local government, shall be used.

7.3. Existing Roadway and Traffic Conditions

The applicant is responsible for collecting or obtaining the existing conditions data required to effectively produce a TIS that meets the local government's requirements. The existing conditions data will include information on existing roadway geometry, existing traffic control, existing traffic volumes and existing LOS. This information shall be from field observations and the Lake County TCMS spreadsheet and may be presented collectively using tables and/or figures.

7.3.1. Pertinent Existing Roadway Information

Any information that does not fall strictly into the existing segment and intersection categories shall be documented. This may include discussion and figures pertaining to Access Management (e.g., restricted, unrestricted), Functional Classification (e.g., arterial, collector, local road), Area Type (e.g., urban, urban transitioning, or rural/undeveloped), etc.

7.3.2. Existing Segment Geometry

Information shall be provided about the existing geometry or laneage of the study segments. Typically this information is depicted in a figure or listed in a table.

7.3.3. Existing Intersection Geometry

Information shall be provided about the existing geometry or laneage of the study intersections. Typically this information is depicted in a figure or listed in a table.

7.3.4. Existing Traffic Volumes

A discussion and appropriate tables/figures shall be provided to present existing year Average Daily Traffic (ADT) and peak-hour directional volumes on study area roadway segments, and existing year peak-hour turning movement counts (TMCs) at the study area intersections.

P.M. peak-hour directional volumes are provided in the Lake County TCMS spreadsheet, provided at or before methodology. In cases where no information exists in the TCMS for a particular segment (zeroes in the TCMS), manual/tube counts shall be required. For such a situation, count data from the most recent FDOT Traffic Information DVD and/or the Lake County Annual Traffic Counts program may also be utilized to obtain segment volumes. Historical TMC data collected by others that is less than one (1) year old may also be utilized, with prior local government approval, provided that the counts are grown to present day volumes using an accepted growth rate.

7.3.5. Existing Level of Service

Existing LOS analyses shall be conducted for segments and intersections based on currently accepted traffic engineering principles. Methods that incorporate and apply appropriate techniques from the latest edition of the Highway Capacity Manual (HCM) are acceptable. These methods may include the use of the latest available versions of the Highway Capacity Software (HCS), Synchro, LOSPLAN and the FDOT Generalized Service tables.

The existing LOS shall be compared to the adopted LOS standards used for concurrency determination and shall be consistent with the Transportation Element of the local government's Comprehensive Plan. The LOS standards for an intersection analysis shall be the conservative adopted roadway LOS standard of the intersecting roadways. For the majority of facilities, the Lake County TCMS will be kept up to date with the adopted LOS standards, area type, facility type, maximum service volume, etc. as they apply to the transportation network.

When an applicant is utilizing the FDOT Generalized Service tables, particular attention shall be given to the appropriate selection of criteria based on Access Management (e.g., restricted, unrestricted), Functional Classification (e.g., arterial, collector, local road), Area Type (e.g., urban, urban transitioning, or rural/undeveloped), etc.

Before conducting an analysis utilizing LOSPLAN, the applicant shall verify with the Lake County TCMS that an analysis on the affected segments has not already been developed, and is being applied in the TCMS, within the past year. If an approved LOSPLAN analysis, less than one (1) year old, exists within the Lake County TCMS, the applicant shall utilize these results for the applicable segments of the system within the study area.

7.4. Future Roadway Conditions

This section shall contain information pertaining to the future (build-out year) roadway conditions. Generally, if the future roadway conditions are not substantially different from the existing year (as would be the case when there are no pertinent planned and programmed improvements) then this section may not be necessary and a brief statement to that effect shall be provided.

7.4.1. Pertinent Future Roadway Information

Any information that does not fall strictly into the existing segment and intersection categories shall be documented. This may include discussion and figures pertaining to Access Management (e.g., restricted, unrestricted), Functional Classification (e.g., arterial, collector, local road), Area Type (e.g., urban, urban transitioning, or rural/undeveloped), etc. If the pertinent roadway information does not differ from that of the then this may be stated in lieu of tables or figures.

7.4.2. Future Segment Geometry

This section shall include information about the future geometry or laneage of the study segments. Typically this information can be depicted in a figure or listed in a table. If the future segment geometry does not differ from the existing segment geometry, then this may be stated in lieu of tables or figures.

7.4.3. Future Intersection Geometry

This section shall include information about the future geometry or laneage of the study intersections. Typically this information can be depicted in a figure or listed in a table. If the future intersection geometry does not differ from the existing intersection geometry, then this information may be stated in lieu of any tables or figures.

7.5. Future Traffic Conditions

The applicant shall provide a graphical summary or table of the future year background traffic, plus the proposed development traffic for the A.M. peak-hour, P.M. peak-hour, Mid-day peak-hour or weekend peak-hour (whichever is applicable). These volumes shall include both segment and turning movements within the study area.

Note that de minimis impacts are defined by Florida Statute as project impacts equating to less than 1% of the maximum service volume for the impacted roadway segment. Cumulative de minimis impacts may not exceed 110% of the maximum service volume for non-hurricane evacuation routes or 100% of the maximum service volume for designated hurricane evacuation routes.

7.5.1. Background Traffic

Background (committed/reserved) traffic from approved developments in the area shall be tracked and is maintained within the Lake County TCMS. As such, in most cases, a separate determination of background traffic will not be required.

7.5.2. Trip Generation

Trip generation involves estimating the number of trips that will be produced from or attracted to the proposed development. The latest edition of the ITE Trip Generation manual (currently the 7th Edition, as of the writing of this document) shall be used to determine proposed project trip estimates. The estimates obtained from this source must be used with good judgment as they are based on national data and may not take into account any special features that the local subject site might have.

Opportunities are available for reducing the estimated trips to derive net, new, external trips and include:

- **INTERNAL CAPTURE** – Internal capture refers to the percentage of trips generated by a multiple land use development (e.g., having a combination of retail, office and/or residential uses) that take place entirely within that development. Deductions may be made to the total site-generated trip estimates of a multi-use development by estimating the amount of internal capture for individual land uses. The ITE Trip Generation Handbook contains the recommended procedure for estimating internal capture deductions.
- **PASS-BY TRIPS** – Retail land uses experience pass-by trip "capture" from the adjacent traffic stream. Pass-by trips are those already on the network making intermediate stops en-route between an origin and a primary trip destination, without route diversion. These trips shall not be included in the new trip estimates. In general, pass-by trips should not exceed 10% of the background traffic on the adjacent roadway, nor 25% of total trip generation. **However, fast-food restaurants, gas stations/convenience stores, pharmacies/drug stores and drive-in banks, due to their high pass-by nature, may exceed 25% of the total, with permission from the local government.** New trip percentages, by land use, are provided in the Lake County Transportation Impact Fee Update Study Final Report (see table in Appendix A, column "F").

The use of internal capture and pass-by rates shall be approved at the discretion of the local government.

7.5.3. Trip Distribution and Assignment

Trip distribution is a process by which the trips generated in one traffic analysis zone (TAZ), or by one land use, are allocated to other TAZs, or other land uses, in the study area. Trip assignment is the process of numerically assigning the distributed trips to specific transportation facilities. The term "trip distribution" is sometimes used to define both procedures of trip distribution and assignment.

Trip distribution and assignment may be based on the Lake~Sumter MPO's currently adopted travel demand model (presently CFRPM), market analysis, existing traffic flows, applied census data, or professional judgment (manually distributed). In general, this section shall present the forecasted trip assignment based on the development's trip generation and distribution estimates. This typically takes the form of figures providing the percentage of total proposed project trips on the individual roadways in the transportation study network. The procedures and logic for estimating the trip distributions must be well documented. The trip distribution and assignment patterns shall be presented for each phase of the development or as requested by the local government. Unless otherwise agreed at Methodology, proposed projects which are projected to generate one-hundred and one (101) or more net new peak-hour project trips (Tier 3 TIS) should utilize the Lake~Sumter MPO's currently adopted travel demand model (presently CFRPM) to derive trip assignment percentages.

7.5.4. Future Traffic Volumes

This section shall include discussion and figures presenting future year ADT on study roadway segments and future year peak-hour TMCs at the study intersections. Typically, this information can be depicted in a figure or listed in a table. This estimate of future year traffic volumes on the study area transportation network would result from the summation of the proposed project volumes, determined after the processes of trip generation (including adjustment for internal capture and pass-by trips), trip distribution and assignment, committed/reserved trips from the Lake County TCMS, and existing traffic volumes.

$$\boxed{\text{Future Traffic Volumes}} = \boxed{\text{Existing Traffic Volumes}} + \boxed{\text{Committed/Reserved Trips from TCMS}} + \boxed{\text{Project Traffic}}$$

7.6. Transportation Assessment

LOS analyses shall be conducted and utilize the future and projected traffic volumes, as obtained following the guidance provided in Section 7.5. The analysis shall be based on currently accepted traffic engineering principles. Methods that incorporate and apply appropriate techniques from the latest edition of the Highway Capacity Manual are acceptable. These methods may include the use of HCS, Synchro 6 and higher, LOSPLAN and FDOT Generalized Service tables.

The LOS standards used for concurrency determination shall be consistent with the Transportation Element of the local government's Comprehensive Plan. The LOS standards for an intersection shall be the most conservative adopted roadway LOS standard of the intersecting roadways. For the majority of facilities, the Lake County TCMS will be kept up to date with the adopted LOS standards, area types, facility types, maximum service volumes, etc., as they apply to the transportation network.

7.6.1. Segment Analysis

A roadway segment analysis shall be performed on each of the study segments. If the analysis indicates that the future segment LOS will be below the adopted LOS standard, potential mitigation measures shall be developed, as well as a fair share calculation for these measures. The latest version of LOSPLAN can also be used to develop an alternative capacity/service volume based on corridor-specific data. The LOSPLAN analyses must be approved by the local government and shall be applied in the TCMS as the new capacity.

7.6.2. Intersection Analysis

A signalized or unsignalized intersection analysis shall be performed on each of the study intersections. The procedure shall utilize Highway Capacity Manual techniques, as previously mentioned in Section 7.6. The existing LOS shall be compared to the adopted LOS standards, used for concurrency determination, and shall be consistent with the Transportation Element of the local government's Comprehensive Plan. The LOS standards for an intersection shall be the most conservative adopted roadway LOS standard of the intersecting roadways.

A summary of the analysis results shall be tabulated with the software output included in the Appendix section. If the analysis determines that the future intersection LOS will be below the adopted LOS standard, potential mitigation measures shall be developed as well as fair share calculation for these measures.

7.6.3. Turn Lane Analysis

For intersections with failing turning movements, the need for additional turn lanes and an analysis of turn lane storage length adequacy shall be conducted. Information regarding the methodologies to conduct this analysis is available in References 21, 22 and 23.

7.6.4. Access Analysis

The TIS shall include an assessment of on-site and off-site turn lane adequacy, required storage, potential for signalization, sight distance and other intersection safety aspects, and on-site circulation as it may affect access. Use of joint access driveways is encouraged to reduce the total number of connections to the roadway network.

The following points should be considered in determining the need for turn lanes:

- The total traffic generated by the anticipated traffic distribution, the number of access points and the projected turning movement volumes.
- A traffic analysis indicates that turn lanes would be necessary to maintain capacity on fronting roads and/or at adjacent or nearby intersections.
- Entrances are proposed at locations where grade, topography, site distance, traffic, or other unusual conditions indicate that turn lanes would be needed to improve safety.

Land development regulations will govern when access to the County Road network is involved. Lake County typically requires turn lanes projects generating 50+ peak hour trips. For access to the State Highway System, normal procedures with FDOT apply.

7.7. Mitigation Strategies

If the transportation assessment reveals that the potential project will not result in a deficiency in the existing roadway network then no project-related improvements are required. However, mitigation strategies must be developed if the transportation assessment determines that the proposed project will potentially result in a deficiency in the LOS of transportation facilities. This process involves addressing the extent of the mitigation strategies/solutions as well as calculation of fair share cost.

7.7.1. Recommended Improvements

Mitigation strategies must be developed if the transportation assessment determines that the proposed project will potentially result in a deficiency in the Level of Service of transportation facilities. Mitigation measures for segments, intersections, turn lanes and site access shall be developed to allow the build condition to operate above the local government's acceptable Level of Service standards. These measures may include, but are not necessarily limited to:

- Revised striping
- Addition of turn lanes
- Addition of travel lanes
- Addition of storage lanes
- Lengthening of storage lanes
- Installation of traffic signals
- Installation of traffic control signs
- Restriction of turning movements
- Adjustment of cycle lengths
- Introduction of additional signal phases

Improvements must be concurrent with the impacts of development. Concurrency is a state requirement that development is not to proceed unless infrastructure capacity and specific urban services are in place to service the new development.

If reasonable mitigation measures cannot be implemented to assure that traffic will operate in an efficient way, a more detailed evaluation of project size, land use types, and development phasing may be required. If viable transportation improvements cannot be recommended, then steps must be taken to reduce the project's impact on the adjacent roadway network to acceptable levels.

7.7.2. Proportionate Share Calculation

The intent of the proportionate share option is to provide applicants an opportunity to proceed under certain conditions, notwithstanding the failure of transportation concurrency, by contributing their share of the cost of improving the impacted transportation facility. However, the ability of local governments to fund improvements is subject to budget constraints.

Consequently, it should be noted that the determination of a project's proportionate share cost and the applicant's ability to pay that cost is not a guarantee the project will be approved. In addition, there is no guarantee of a funding match by the local government to facilitate implementation of the proposed mitigation strategy unless it is formalized in an agreement.

The estimated cost of the needed intersection and roadway improvements shall be calculated for the stage or phase of the project under review using guidance provided in FS 163.3180 (16) and FAC 9J-2.045. The formula below is provided as guidance:

$$\boxed{\text{Proportionate Share Cost}} = \boxed{\text{Cost of Improvement}} * \boxed{\text{Project Trips}} \div \boxed{\text{Increase in Service Volume}}$$

where,

- ***Increase in Service Volume*** is the change in peak-hour maximum service volume of the roadway that would result from the construction of the improvement necessary to maintain the adopted LOS.
- ***Cost of Improvement*** is the cost of construction, at the time of developer payment, of an improvement necessary to maintain the adopted level of service. Construction cost includes all improvement associated costs, including engineering design, right-of-way acquisition, planning, engineering, inspection, and other associated physical development costs directly required and associated with the construction of the improvement, as determined by the governmental agency having maintenance authority over the roadway.
- ***Project Trips*** are the trips from the stage or phase of the project under review that are assigned to a roadway segment and have triggered a deficiency based upon comparison to the adopted LOS.

7.8. Summary/Conclusions

A brief discussion (one or two paragraphs) shall be provided to highlight the TIS Tier classification (Tier 1, Tier 2 or Tier 3), methodology followed and general results. In addition the action requested (e.g., approval of mitigation strategy) of local government shall be specified.

7.9. Appendix

A. Traffic Count Data

- i. Average Daily 24-Hour Traffic Volumes (as necessary)
- ii. Peak-hour Turning Movement Volumes (A.M./P.M./Mid-day, as necessary)

B. Capacity Analysis Summary Sheets

- i. Existing Conditions
- ii. Future Conditions (per phase if required)
- iii. Future Mitigated Condition (per phase if required)

C. Lake County TCMS spreadsheet (relevant sections)

8. Literature Review

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27. Florida Dept. of Transportation. (2007). *2007 LOS Issue Papers*.

Appendix A. List of Acronyms

ADT	Average Daily Traffic
CDA	Campus Development Agreement
CFRPM	Central Florida Regional Planning Model
CMP	Congestion Management System
DRI	Development of Regional Impact
FDOT	Florida Department of Transportation
FLUM	Future Land Use Map
FQD	Florida Quality Development
HCM	Highway Capacity Manual
HCS	Highway Capacity Software
ITE	Institute of Transportation Engineers
LGCP	Local Government Comprehensive Plan
LOS	Level of Service
MPO	Metropolitan Planning Organization
PDF	Portable Document Format
PUD	Planned Unit Development
TAZ	Traffic Analysis Zone
TCMS	Transportation Concurrency Management System
TIS	Traffic Impact Study
TMC	Turning Movement Count

Appendix B. Total Trip Lengths & New Trip Percentages

*Source: Lake County Transportation Impact Fee Update Study
Final Report – Table 9.1*

**Table 9-1
Lake County Transportation Impact Fee Schedule (100.0 Percent of Cost) including Sales Tax Credit
as of 12-21-01**

Fee Schedule Assumptions:

Gasoline Tax		Unit Construction Cost: \$1,702,843	Local Trip Length: 0.5
\$ per gallon to capital:	\$0.191	Capacity per lane: 8,487	Interstate Mileage %: 20.5%
Facility life (years):	25	Fuel efficiency: 16.0	Across-the-Board Adjustment: 0.0%
Interest rate:	5.0%	Effective days per year: 365	

ITE Code	Land Use (A)	Unit (B)	Trip Rate (C)	Trip Length (D)	Total Trip Length (E)	Percent New Trips (F)	Total Impact Cost (G)	Annual Gas Tax (H)	Gas Tax Credit (I)	Across the Board Adjustment (J)	Net Impact Fee (K)	Current Fee (L)	Percent Difference (M)
Residential:													
210	Single Family / Mobile Home (On Single Family Lot) - Less than 1500 sf	du	6.38	8.60	9.10	100%	\$4,373	\$127	\$1,783	\$0	\$2,589	\$1,083	139%
210	Single Family / Mobile Home (On Single Family Lot) - 1,501 sf to 2,500 sf	du	8.50	8.60	9.10	100%	\$5,830	\$169	\$2,378	\$0	\$3,453	\$1,343	157%
210	Single Family / Mobile Home (On Single Family Lot) - Greater than 2,500 sf	du	10.03	8.60	9.10	100%	\$6,880	\$199	\$2,805	\$0	\$4,074	\$2,157	89%
N/A	Active Adult (Deed Restricted)	du	3.91	9.80	10.30	100%	\$3,056	\$88	\$1,238	\$0	\$1,818	\$1,104	65%
221	Multi-Family (1 or 2 Stories)	du	6.59	7.19	7.69	100%	\$3,779	\$111	\$1,558	\$0	\$2,221	\$1,142	95%
222	Multi-Family (3 & more Stories)	du	4.20	7.19	7.69	100%	\$2,408	\$70	\$993	\$0	\$1,416	\$728	94%
240	Mobile Home Park (Mobile Homes clustered in a Park)	du	4.81	6.06	6.56	100%	\$2,325	\$69	\$970	\$0	\$1,355	(1)	
252	ACLF	du	3.40	4.37	4.87	72%	\$853	\$26	\$366	\$0	\$487	\$572	-15%
Lodging:													
310	Hotel	room	8.23	8.88	9.38	66%	\$3,847	\$111	\$1,566	\$0	\$2,281	\$1,236	85%
320	Motel / Bed and Breakfast	room	5.63	6.06	6.56	77%	\$2,095	\$62	\$874	\$0	\$1,221	\$1,236	-1%
416	Campground / RV Park	space	3.90	6.06	6.56	77%	\$1,451	\$43	\$606	\$0	\$846	\$806	5%
Recreational:													
412	General Recreation / County Park	acres	2.28	6.40	6.90	90%	\$1,047	\$31	\$435	\$0	\$612	\$727	-16%
420	Marina	slip	2.96	8.04	8.54	94%	\$1,784	\$52	\$730	\$0	\$1,054	\$719	47%
430	Golf Course	holes	35.74	6.91	7.41	90%	\$17,727	\$520	\$7,326	\$0	\$10,401	(2)	
473	Amusement & Recreation Services	1,000 sf	134.30	6.91	7.41	94%	\$69,573	\$2,040	\$28,753	\$0	\$40,820	(2)	
492	Racquet Club/Health Spa	1,000 sf	17.14	6.91	7.41	94%	\$8,879	\$260	\$3,670	\$0	\$5,210	\$4,166	25%
494	Bowling Center	1,000 sf	33.33	6.91	7.41	92%	\$16,899	\$496	\$6,984	\$0	\$9,915	(2)	
N/A	Dance Studio	1,000 sf	17.14	6.91	7.41	94%	\$8,879	\$260	\$3,670	\$0	\$5,210	(2)	
N/A	Horse Training	acres	5.00	6.91	7.41	94%	\$2,590	\$76	\$1,070	\$0	\$1,520	(2)	
Institutional:													
520	School (Elementary)	student	1.02	7.40	7.90	80%	\$482	\$14	\$198	\$0	\$283	\$138	105%
522	Middle School	student	1.45	7.40	7.90	90%	\$770	\$22	\$317	\$0	\$453	\$138	228%
530	School (High)	student	1.79	7.40	7.90	90%	\$951	\$28	\$391	\$0	\$560	\$175	220%
550	School (College)	student	2.38	8.60	9.10	90%	\$1,469	\$43	\$599	\$0	\$870	\$225	287%
540	Junior College	student	1.54	8.60	9.10	90%	\$951	\$28	\$388	\$0	\$563	\$1,221	-54%
560	Church / Religious Organization	1,000 sf	9.11	5.50	6.00	90%	\$3,597	\$107	\$1,512	\$0	\$2,084	\$808	158%
565	Day Care Center	1,000 sf	79.26	2.82	3.32	73%	\$13,013	\$419	\$5,904	\$0	\$7,109	\$9,019	-21%
566	Cemetery	acres	4.73	8.00	8.50	95%	\$2,867	\$83	\$1,174	\$0	\$1,693	\$820	106%
590	Library	1,000 sf	54.00	4.60	5.10	85%	\$16,839	\$511	\$7,195	\$0	\$9,644	\$4,315	124%
610	Hospital	1,000 sf	16.78	6.40	6.90	77%	\$6,595	\$194	\$2,740	\$0	\$3,855	(2)	
620	Nursing Home	bed	2.61	3.67	4.17	89%	\$680	\$21	\$298	\$0	\$382	\$450	-15%
730	Government Office Building	1,000 sf	68.93	7.19	7.69	92%	\$36,365	\$1,064	\$14,989	\$0	\$21,375	\$523	3987%

**Table 9-1
Lake County Transportation Impact Fee Schedule (100.0 Percent of Cost) including Sales Tax Credit
as of 12-21-01**

Fee Schedule Assumptions:

Gasoline Tax		Unit Construction Cost: \$1,702,843	Local Trip Length: 0.5
\$ per gallon to capital:	\$0.191	Capacity per lane: 8,487	Interstate Mileage %: 20.5%
Facility life (years):	25	Fuel efficiency: 16.0	Across-the-Board Adjustment: 0.0%
Interest rate:	5.0%	Effective days per year: 365	

ITE Code	Land Use (A)	Unit (B)	Trip Rate (C)	Trip Length (D)	Total Trip Length (E)	Percent New Trips (F)	Total Impact Cost (G)	Annual Gas Tax (H)	Gas Tax Credit (I)	Across the Board Adjustment (J)	Net Impact Fee (K)	Current Fee (L)	Percent Difference (M)
Office:													
710	Office under 10,000GSF	1,000 sf	22.64	7.19	7.69	92%	\$11,945	\$349	\$4,924	\$0	\$7,021	\$4,037	74%
710	Office 10,001 GSF to 30,000 GSF	1,000 sf	19.28	7.19	7.69	92%	\$10,171	\$297	\$4,192	\$0	\$5,978	\$4,037	48%
710	Office 30,001 GSF to 100,000 GSF	1,000 sf	14.67	7.19	7.69	92%	\$7,737	\$226	\$3,189	\$0	\$4,548	\$2,727	67%
710	Office 100,001 GSF to 400,000 GSF	1,000 sf	10.73	7.19	7.69	92%	\$5,661	\$166	\$2,333	\$0	\$3,327	\$1,945	71%
710	Office greater than 400,000 GSF	1,000 sf	8.76	7.19	7.69	92%	\$4,620	\$135	\$1,904	\$0	\$2,716	\$1,945	40%
715	Single Tenant Office Building	1,000 sf	11.57	7.19	7.69	92%	\$6,104	\$179	\$2,516	\$0	\$3,588	\$2,300	56%
720	Medical Office	1,000 sf	36.13	7.19	7.69	87%	\$18,025	\$527	\$7,430	\$0	\$10,595	\$7,011	51%
750	Office Park	1,000 sf	11.42	7.61	8.11	82%	\$5,684	\$166	\$2,334	\$0	\$3,349	\$2,344	43%
760	Research Center	1,000 sf	8.11	7.61	8.11	82%	\$4,036	\$118	\$1,658	\$0	\$2,378	\$1,580	51%
770	Business Park	1,000 sf	12.76	7.61	8.11	82%	\$6,350	\$185	\$2,608	\$0	\$3,742	\$2,949	27%
General Commercial:													
820	Under 50,000 GSF	1,000 sf	111.82	2.40	2.90	54%	\$9,824	\$382	\$5,382	\$0	\$4,442	\$941	372%
820	50,000 to 200,000 GSF	1,000 sf	62.95	2.68	3.18	65%	\$7,434	\$284	\$3,999	\$0	\$3,434	\$604	469%
820	200,001 to 600,000 GSF	1,000 sf	41.56	3.38	3.88	75%	\$7,142	\$264	\$3,717	\$0	\$3,425	\$915	274%
820	Greater than 600,000 GSF	1,000 sf	32.45	4.23	4.73	82%	\$7,630	\$274	\$3,868	\$0	\$3,761	\$2,519	49%
Retail / Services:													
444	Movie Theater w/ Matinee	screen	153.33	3.10	3.60	87%	\$32,981	\$1,047	\$14,761	\$0	\$18,220	\$27,952	-35%
812	Bulding Materials and Lumber Store	1,000 sf	30.60	8.74	9.24	74%	\$15,784	\$456	\$6,431	\$0	\$9,353	\$800	1069%
813	Discount Superstore (greater than 120,000 sf)	1,000 sf	46.96	3.10	3.60	73%	\$8,476	\$269	\$3,793	\$0	\$4,682	\$1,229	281%
814	Speciality Retail	1,000 sf	40.67	4.79	5.29	85%	\$11,225	\$399	\$5,621	\$0	\$5,605	\$1,064	427%
815	Discount Superstore (less or equal to 120,000 sf)	1,000 sf	56.63	3.10	3.60	73%	\$10,221	\$325	\$4,574	\$0	\$5,646	\$1,834	208%
816	Hardware / Paint Store	1,000 sf	51.29	8.74	9.24	74%	\$26,457	\$765	\$10,780	\$0	\$15,677	\$1,341	1069%
818	Wholesale Nursery	Acres	4.50	8.60	9.10	74%	\$2,284	\$66	\$931	\$0	\$1,353	\$10,670	-87%
831	Quality Restaurant	1,000 sf	89.95	4.37	4.87	77%	\$24,140	\$736	\$10,368	\$0	\$13,772	\$5,049	173%
832	High Turnover Restaurant	1,000 sf	130.34	4.23	4.73	72%	\$31,660	\$968	\$13,644	\$0	\$18,016	\$3,760	379%
834	Fast Food Restaurant/W drive Thru	1,000 sf	496.12	2.26	2.76	59%	\$52,760	\$1,762	\$24,832	\$0	\$27,928	\$1,827	1429%
836	Bar / Lounge / Drinking Place	1,000 sf	130.34	4.23	4.73	72%	\$31,660	\$968	\$13,644	\$0	\$18,016	\$284	6244%
837	Quick Lube	bays	40.00	4.65	5.15	72%	\$10,688	\$324	\$4,562	\$0	\$6,126	(3)	
840	Auto Repair	1,000 sf	37.60	5.08	5.58	72%	\$10,968	\$329	\$4,643	\$0	\$6,325	(3)	
841	New and Used Auto Sales	1,000 sf	37.50	6.63	7.13	78%	\$15,467	\$455	\$6,410	\$0	\$9,056	\$6,554	38%
844	Service Station	Fuel Position	168.56	2.04	2.54	23%	\$6,308	\$215	\$3,027	\$0	\$3,281	\$870	277%
847	Car Wash	1,000 sf	108.00	2.82	3.32	71%	\$17,246	\$555	\$7,825	\$0	\$9,421	(3)	
850	Supermarket	1,000 sf	111.51	2.96	3.46	54%	\$14,215	\$454	\$6,404	\$0	\$7,811	\$2,067	278%
853	Convenience Market w/gas	1,000 sf	845.60	2.26	2.76	29%	\$44,201	\$1,476	\$20,803	\$0	\$23,397	\$4,021	482%
881	Pharmacy/Drugstore	1,000 sf	88.16	2.96	3.46	54%	\$11,239	\$359	\$5,063	\$0	\$6,176	(3)	
890	Furniture Store	1,000 sf	5.06	8.60	9.10	54%	\$1,874	\$54	\$764	\$0	\$1,110	\$114	874%
911	Bank	1,000 sf	156.48	3.38	3.88	55%	\$23,200	\$728	\$10,264	\$0	\$12,936	\$8,636	50%
912	Bank w/Drive-Thru	1,000 sf	232.90	3.38	3.88	55%	\$34,531	\$1,084	\$15,277	\$0	\$19,254	\$8,636	123%
N/A	Convenience Mkt. w/gas, fast food and car wash	1,000 sf	984.60	3.67	4.17	32%	\$92,222	\$2,865	\$40,384	\$0	\$51,838	(3)	
N/A	Veterinary Clinic	1,000 sf	32.80	2.82	3.32	70%	\$5,164	\$166	\$2,343	\$0	\$2,821	(3)	

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Industrial:													
110	General Light Industrial	1,000 sf	6.97	11.14	11.64	92%	\$5,697	\$163	\$2,294	\$0	\$3,403	\$1,907	78%
120	General Heavy Industrial	1,000 sf	1.50	11.14	11.64	92%	\$1,226	\$35	\$494	\$0	\$732	\$410	79%
130	Industrial Park	1,000 sf	6.96	11.14	11.64	89%	\$5,504	\$157	\$2,216	\$0	\$3,287	\$1,430	130%
140	Manufacturing	1,000 sf	3.82	11.14	11.64	92%	\$3,122	\$89	\$1,257	\$0	\$1,865	\$1,054	77%
150	Warehouse	1,000 sf	4.96	11.14	11.64	92%	\$4,054	\$116	\$1,633	\$0	\$2,422	\$1,335	81%
151	Mini-Warehouse	1,000 sf	2.50	4.37	4.87	92%	\$802	\$24	\$344	\$0	\$457	\$713	-36%
152	High Cube Warehouse (4)	1,000 sf	1.20	15.90	16.40	92%	\$1,400	\$39	\$557	\$0	\$843	(3)	
N/A	Airport Hanger	1,000 sf	4.96	11.14	11.64	92%	\$4,054	\$116	\$1,633	\$0	\$2,422	(3)	
170	Utilities Building	1,000 sf	5.44	11.14	11.64	92%	\$4,447	\$127	\$1,791	\$0	\$2,656	\$216	1130%

Notes:

N/A - Does not have an ITE Land Use Code
(1) Mobile Homes on a single lot of record are included in the single family home categories; the Mobile Home Park is a new category for mobile homes clustered together where the land is typically rented to the mobile home owner.
(2) Different Unit of measurement between Current Impact Fee schedule and Revised Impact Fee Schedule
(3) New land use category, does not exist in Current Impact Fee Schedule
(4) Source: The Goodyear Tire & Rubber Co. Independent Impact Fee Study Supplemental Analysis, Griffey Engineering, Inc. 2001

Source: Tindale-Oliver and Associates, Inc. 2001

C:\Documents and Settings\lgwelstead\Desktop\Road Impact Fee[table9-1.xls]Detail Fee Schedule