CECIL COUNTY

DEPARTMENT OF LAND USE AND DEVELOPMENT SERVICES

TRAFFIC IMPACT STUDY GUIDELINES

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FIRST EDITION

TRAFFIC IMPACT STUDY (TIS) GUIDELINES

Definitions and Terms

Level of Service (LOS): Used to describe the quality of vehicle traffic service of any specified intersection and is reported in seconds of delay per vehicle. Longer delays at intersections result in lower levels of service. It commonly ranges from A to F, with F being the longest delays.

Mitigation Efforts: Improvements to surrounding infrastructure and signals made by the developer in order to keep a satisfactory LOS for the intersections within the study area.

Peak Hour: The hour during which the maximum amount of travel occurs. In a TIS, peak hours are identified for the morning and afternoon, and occasionally for Saturday and Sunday.

Traffic Impact Study (TIS): A study performed to provide information regarding the transportation impact of a proposed land use on the roadway network within a designated area. It also contains recommended solutions to mitigate the impact.

Traffic Queue: A group of vehicles waiting to be serviced; where vehicle demand exceeds the ability to service the demand.

Transportation Facilities: roadway, sidewalks, curbs, gutters, traffic control devices, and all other related facilities and improvements.

Trip Distribution: The allocation of the site-generated traffic among all possible approach and departure routes from the site access(es).

Trip Generation: The estimation of the number of vehicles to and from the site.

Purpose

A Traffic Impact Study (TIS) is a study to provide information regarding the transportation impact of a proposed land use on the roadway network within a designated area. It also contains recommended solutions to mitigate the impact.

The purpose of this document is to provide guidelines on the components of the TIS, such as the study area, type of analysis, methodology, and requirements to assess the traffic impacts of land use proposals on the existing and future transportation system.

The specifications outlined in these guidelines are provided to advise applicants as to what will constitute an acceptable TIS for land use proposals in Cecil County (County). Any TIS not meeting the following guidelines shall be considered incomplete. The TIS will not be approved and will be required to be revised or amended unless the Department concurs with the modification or waiver of certain requirements based upon the individual circumstances applicable to a specific project.

Please note that the guidelines are specific to Cecil County. Further requirements from other agencies (such as local municipalities or the Maryland State Highway Administration (SHA)) may be identified during the scoping meeting.

Effective Date

This Policy shall become effective 30 days after its adoption by the Department. Projects that include recorded subdivisions and/or approved major site plans within the last five (5) years that have not been completed are not subject to the Traffic Impact Study Policy unless the Cecil County Road Code has been revised within such time.

Requirements for a Site TIS / Local TIS / Regional TIS

1. If a development would generate[1] between more than 25 external[2] peak hour trips but less than 50, a Site Traffic Impact Study (Site TIS) will be required to be performed.

2. If a development would generate between more than 50 external peak hour trips but less than 300, a Local Traffic Impact Study (Local TIS) will be required to be performed.

3. If a development would generate more than 300 external peak hour trips, a Regional Traffic Impact Study (Regional TIS) will be required to be performed.

Goals of a Site TIS / Local TIS / Regional TIS

1. Site Traffic Impact Study (Site TIS): The Site TIS should focus on ensuring the site access(es) can operate safely and efficiently, while also focusing on the operation of immediate transportation facilities in the vicinity and providing for adequate public and emergency services responses.
2. Local Traffic Impact Study (Local TIS): In addition to the focus on facilities and services listed in Item 1 above, the Local TIS should focus on the traffic operation of all other facilities included in the study area.
3. Regional Traffic Impact Study (Regional TIS): In addition to the focus on facilities and services listed in Items 1 and 2 above, the Regional TIS should focus on the impact on any commuter traffic and/or regional transit services included in the study area.

Determination of TIS

A TIS will be determined at the concept review of major subdivisions and during the first review of site plans. All submissions of the TIS shall be sent to the Planner III in the Division of Planning and Zoning. A digital submission and one hard copy will be required for review.

[1] The latest edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual* shall be used in determining the peak hour trip generation in this section. Whereas the *Trip Generation Manual* does not provide sufficient information in determining peak hour trip generation, engineering judgement shall be used in determining the peak hour trip generation.

[2] External trips refer to trips that access the roadway network and do not include pass-by trips or internal capture trips, as defined in the latest edition of the ITE Trip Generation Handbook.

Scoping Meeting

A scoping meeting is required prior to preparation of the study. Required attendees include the applicant (and/or his/her representative) and the Cecil County Department of Land Use and Development Services. The Maryland State Highway Administration (SHA) and any pertinent local municipality may attend the scoping meeting as needed. The meeting shall include a review and consent of the following:

a) A general overview of the land use proposal and any concept / site plans;

b) Peak hours to be studied;

c) Scenarios to be studied;

d) Determination of the study area;

e) Collection of traffic data & crash data;

f) Trip Generation / Land Uses Codes;

g) Analysis methodology to be used;

h) Trip Distribution to be used;

i) Projects within the study area that will be included for estimation of background traffic including all active projects within the past two (2) years and all recorded subdivisions in the area;

j) Determination of Road Code Design Guidance requirements (Road Condition Survey);

k) Future County or SHA capital roadway construction / improvement projects in the area that may impact the subject site;

l) Clarification, justification, and agreement on all assumptions used in the report.

These items are described in further detail below:

a) General overview of land use proposal: A general overview of the development will be discussed, such as description of the land use, proposed access locations, potential design concerns, etc.

b) Peak hours to be studied: Days (weekday and / or Saturday) and peak hours (weekday AM, weekday PM, Saturday mid-day, etc.) that will be analyzed in the study will be determined.

c) Scenarios to be studied: Years (Existing, future, phased interim) and conditions (no-build, build, phased) that will be analyzed in the study will be determined.

d) Determination of the study area: The study area will be determined in the following manner:

- Site TIS – the site access(es) and any immediate transportation facilities in the vicinity of the site access(es) will be included.

- Local TIS – In addition to the items included for the Site TIS study area, the following will be included:

    - If the development is located within a growth area as per the County Comprehensive Plan, the study shall include all existing County and State roads in all directions from each of the site access(es) to the first intersection of a major collector or higher functional classification road.

    - If the development is located within a rural area as per the County Comprehensive Plan, the study shall include all existing County and State roads in all directions from each of the site access(es) to the first intersection of a major collector or higher functional classification road within a two (2) mile radius of location of the site access(es).

    - If the development is located outside of the growth and rural areas as per the County Comprehensive Plan, Department of Land Use & Development Services (DLUDS) judgment shall be used in determining the appropriate study area.

- Regional TIS – In addition to the items included for the Site and Local TIS study areas, engineering judgement should be used to determine if the addition of traffic from the development would significantly impact any other facilities not previously mentioned.

In addition to the requirements listed for the Site TIS, Local TIS, and Regional TIS above, there are certain areas and roadways within the County that have specific goals identified in the Comprehensive Plan. These include, among others:

- Interstate Route 95;
- US Route 40;
- Roadway connections between I-95 and US Route 40;
- Bridge locations.

In determining the study area for a traffic study, special consideration should be given to these and related facilities to ensure that the traffic added to the roadway network by a development does not adversely affect the County's goals for these areas.

e) Collection of traffic data: Collection of traffic data for the traffic study shall be conducted within a 12-month period prior to submitting the report. Traffic data collected shall include the following:

- Turning movement counts, in 15-minute intervals;
- Pedestrian counts;
- Bicycle counts;
- Right-turn-on-red vehicular movement counts;
- Heavy vehicle counts (such as trucks and buses).

Weekday traffic counts should be taken on Tuesdays, Wednesdays, or Thursdays when Cecil County Public Schools are open with students and staff on-site and operating on a normal schedule after Labor Day and before Memorial Day; not prior to or following a holiday; and not during the last two weeks of December, unless otherwise requested. Turning movement counts shall be collected from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM, unless otherwise requested.

Saturday mid-day traffic counts shall be collected from 10:00 AM to 2:00 PM, unless otherwise requested.

Specific traffic data collection instructions (such as if the development is for a school or church, an intersection is heavily affected by seasonal traffic, etc.) shall be determined by engineering judgement and discussed during the scoping meeting.

Additionally, for the intersections in the study, crash data from Maryland's Open Data Statewide Vehicle Crashes database from the last three (3) calendar years should be included in the report.

The County will confirm the exact data to be collected at the scoping meeting.

f) Trip Generation / Land Use Codes: Trip Generation for the proposed land use shall be conducted using the current practices and procedures outlined in the latest editions of the Institute of Transportation Engineers *Trip Generation Manual* and the ITE Trip Generation Handbook. Whereas the ITE Trip Generation Manual does not provide sufficient information for use in determining the trip generation, engineering judgement shall be used in determining the trip generation. Use of the appropriate ITE land use codes or alternate methods of trip generation shall be confirmed by the County at the scoping meeting.

g) Analysis methodology to be used: Capacity analysis shall be performed for all intersections, roadways, ramps, weaving sections, internal circulation and access points included in the study. The analysis shall be in accordance with the methodologies contained in the most current edition of the *Highway Capacity Manual* (HCM). The most current version of the Synchro (using the HCM module within the program) or Highway Capacity Software (HCS) shall be utilized for the analysis, and any deviation from the default values in either program must be proposed, documented and agreed to by the County and SHA.

Adequate standards for level of service (LOS) are described in Section 5.2.5 of the County Comprehensive Plan. LOS is as set forth in the current edition of the HCM.

Signalized intersections shall be analyzed using the most current signal plan and signal timings available from the SHA (for state-maintained signals) or the County (for County-maintained signals). Any intersections for which a signal is proposed shall have a signal warrant analysis prepared and included with the TIS. The signal warrant analysis shall be prepared under the latest methodologies listed in the most current version of the *Manual of Uniform Traffic Control Devices* (MUTCD).

Acceptable traffic signal cycle lengths have been established using SHA guidelines, which are based on the critical lane analysis. The SHA recommended cycle lengths are as follows:

LOS	TWO (2) CONFLICTING MOVEMENTS	THREE (3) CONFLICTING MOVEMENTS	FOUR (4) CONFLICTING MOVEMENTS
	2 PHASES	3-5 PHASES	6-8 PHASES
A	90	100	120
B	90	100	120
C	100	120	135
D	120	135	150
E	135	150	165
F	150	165	180

Unsignalized intersections not meeting the LOS standards may be required to complete a signal warrant analysis and / or a roundabout analysis. Unsignalized intersections will be evaluated based on the LOS of the major street left-turn(s) and minor street approach(es).

Critical Lane Analysis, in addition to HCM analysis may be required per the County and/or SHA.

Progression analysis may be required for impacted arterials containing two or more traffic signals within a mile, for closely spaced intersections (i.e., when the distance between intersections is less than 1000-feet or when estimated 95-percent queue lengths exceed the distance between intersections), or for corridors with interconnected signals. Programs such as Synchro or VISSIM shall be utilized for the purpose of progression analysis. A minimum of 5 simulation runs shall be used.

On-site traffic circulation analysis may be included in the TIS. The analysis shall include, but not be limited to, all major internal intersections as per the concept or site plan for the development.

All required analysis shall be confirmed by the County and / or SHA during the scoping meeting.

h) Trip Distribution to be used: The site-generated trips must be distributed across particular roadways and intersections in a path that reasonably connects the origin and destination of the vehicular trips. Any of the following methodologies shall be acceptable for the purpose of trip distribution only after discussing with the County at the scoping meeting:

1) Cordon-based method;

2) Gravity model (through utilization of demographic data);

3) Computer-based model (using software such as CUBE);

4) Current directional distribution (acceptable only if there are no land use changes or roadway network changes before the build-out year of the development that will cause the directional distribution to change).

If there are multiple land uses proposed, a different distribution for each land use may be appropriate. This should be discussed with the County at the scoping meeting.

Distribution and assignment of pass-by trips, if applicable per the proposed land use, shall also be discussed with the County at the scoping meeting.

Justifications will be noted at the scoping meeting and the County's agreement with the suggested traffic distribution(s) must be achieved before preparing the TIS.

i) Approved or preliminary site plans within the study area that will be included for estimation of background traffic: Traffic that will be generated by any approved or preliminary site plans within the study area will be included in all future (no build and build) scenarios to be studied. The County will provide a list of these developments at the scoping meeting.

Should any of the developments have identified mitigation for facilities within the study area, those mitigation efforts should be included as part of the analysis of the future scenarios.

j) Determination of Road Code Design Guidance requirements (Road Condition Survey): The County is charged with design & construction oversight as well as maintenance of all County public streets and associated storm drainage systems. The Road Code and Standard Specifications provide direction for most design and construction matters. The Road Code applies to all County maintained streets, those streets intended for dedication to the County, and proposed private roads outside of the incorporated towns.

Additionally, the County recognizes that a Road Condition Survey (RCS) is an integral and necessary part to the initial Road Improvements Proposal. Except where waived by the Department of Public Works, a RCS shall be submitted with (and part to) the initial Road Improvements Report and prior to the applicant's submittal for preliminary plat review by the Cecil County Planning Commission.

k) Future capital roadway construction / improvement projects in the area that may impact the subject site: The County and/or SHA shall identify all pertinent future capital roadway construction or improvement projects that will affect any facilities within the study area during the scoping meeting. Upon discussion at the scoping meeting, the impact of these projects may need to be considered in the analysis for the future scenarios.

l) Clarification, justification, and agreement on all assumptions used in the report: Any items not included in the sections above that are pertinent to the traffic study will be discussed at the scoping meeting and documented prior to beginning the study.

Documentation of the Scoping Meeting

After the scoping meeting, the applicant will provide minutes of the scoping meeting to DLUD and all other attendees; those minutes will provide detail on all of the items discussed at the scoping meeting, and will serve as a scope of work for the Traffic Impact Study. The County will then review the minutes, and provide comments as to any changes that need to be made. An edited copy of the minutes will then be provided by the applicant for confirmation by the County. Once confirmed, the applicant may begin the study.

Submission / Review Process

Prior to submitting a TIS, the raw traffic data, in the form of the 15-minute interval count sheets, will be submitted to DLUD for review. The peak-hour data will be represented graphically on stick-figures.

After review, the County will issue acceptance of the data or request changes to be made. After acceptance, the County will issue a letter to that effect and will include any growth factors for the roads in the study area.

Following the review of the raw traffic data, the TIS shall be submitted in the following manner:

- Table of Contents
- Introduction
    - Explanation of project / purpose of report
    - Concept subdivision / site plan of proposed development
    - Area map showing site location and study area
- Existing Conditions
    - Traffic counts
    - Existing lane configuration diagrams
    - Analysis (as per the scope of work) of existing conditions
- No-Build Conditions
    - Background volumes (existing counts with growth factors applied)
    - Area map showing the locations of the approved developments
    - Traffic generated by other approved developments
    - Trip distribution for other approved developments
    - Total no-build traffic volumes
    - Analysis (as per the scope of work) of no-build conditions
    - Analysis (as per the scope of work) of no-build conditions with future capital / improvement projects

- Build Conditions
    - Traffic generated by the proposed development
    - Trip distribution by proposed development
    - Total build traffic volumes
    - Analysis (as per the scope of work) of build conditions
    - Analysis (as per the scope of work) of build conditions with future capital / improvement projects
- Conclusions / Recommendations
    - Explanation of results of analysis
    - Recommended improvements to mitigate the site traffic impacts
- Appendix
    - All pertinent correspondence
    - All traffic count sheets (15-minute interval sheets)
    - Printouts of traffic analysis

Please note that the content of a TIS is subject to applicability due to the scope of the project. All submissions in the TIS process will require that a digital copy be sent to the Department in the form of a flash drive or e-mail.

Recommendations

The TIS report shall include, but not be limited to, the following recommendations to mitigate the applicable traffic impact on the roadway network:

a) Design of proposed access(es) (including needed right-of-way);

b) Incorporation of site-generated traffic into a proposed capital project;

c) Incorporation of site-generated traffic into a planned non-capital mitigation project;

d) Widening of roadways (including needed right-of-way);

e) The addition of lanes at intersections (including needed right-of-way);

f) Modification to existing traffic signals (either phasing and / or signal timings);

g) Installation of new traffic signals (including needed right-of-way);

h) Installation of alternate traffic control (such as roundabouts or all-way stops) (including needed right-of-way);

i) Improvements to, or the addition of, pedestrian and bicycle facilities;

j) Improvements to, or the addition of, transit facilities;

k) Service and delivery vehicle access;

l) Internal / drive-through circulation;

m) Parking design.

The Cecil County Road Code, MDOT / SHA Standards and AASHTO sources shall be utilized for the design of the recommended improvements. A TIS without specific recommendations to mitigate negative impacts to the roadway network shall not be considered complete.

PARAMETERS FOR TRAFFIC ANALYSIS

Version of Synchro / HCS:	Latest available version Use defaults unless otherwise specified
TRAFFIC CHARACTERISTICS	
Peak Hour Factor (PHF):	As determined from the turning movement count; Use 0.92 otherwise.
Heavy Vehicles:	As determined from the turning movement count; Use 2% otherwise.
Ideal Saturation Flow:	1,750 vphgpl (vehicles per hour of green time per lane) for rural areas; 1,900 vphgpl (vehicles per hour of green time per lane) for urban areas.
SIGNAL CHARACTERISTICS	
Signal Type:	Fully actuated if it is not within the closed loop system; Actuated with coordination if it is within a closed loop system.
Arrival Type:	Fully actuated: For HCS, Arrival Type 3 must be used on each movement Actuated with coordination: For HCS, Arrival Type 3-4 as appropriate must be used on the coordinated lane groups. Arrival Type 3 must be used on the non-coordinated lane groups
Right-turn on Red:	0 if it is not permitted; from traffic counts if it is permitted
Cycle Length:	Existing cycle length. Signals within a coordinated system shall use the system cycle length
Yellow / All Red:	As determined by the current timing plan
Extension of Effective Green:	4 seconds per phase
Queue Length Percentile:	95^{th}