
Development Traffic Studies

RULES AND REGULATIONS



THE CITY OF
COLUMBUS
ANDREW J. GINTHER, MAYOR

DEPARTMENT OF
PUBLIC SERVICE

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SECTION 1: INTRODUCTION

1.1 Who We Are

The Department of Public Service delivers essential services that positively impact City of Columbus' residents' lives every day. The Department consists of five divisions: (1) Design and Construction; (2) Infrastructure Management; (3) Mobility & Parking Services; (4) Refuse Collection; and (5) Traffic Management.

Traffic Management is the division responsible for reviewing traffic studies. Specifically, the Division of Traffic Management works with developers to:

- Identify the development's transportation impacts;
- Determine offsite mitigation needs to offset the transportation impacts;
- Identify whether phasing development would be appropriate; and
- Determine the access design to be incorporated into the site plans.

1.2 Purpose of this Guide

The information provided in this guide explains when a property owner is required to conduct a traffic access study or a traffic impact study, how to conduct the study, and how to determine the impact.

Topics addressed in this guide include:

- Circumstances when a traffic impact study or traffic access study is required;
- Qualifications for study preparers and the procedures for study preparation and review;
- Instructions on completing the memorandum of understanding;
- Components required in a traffic impact study or traffic access study;
- Descriptions of maps and charts required in traffic studies;
- Outline of requirements in a traffic study.

1.3 Definitions

The following terms and definitions apply throughout this guide:

- City: Columbus, OH
- Department: Department of Public Service within the City of Columbus
- Development: The construction or alteration of buildings, structures, parking facilities, or roadways within: (1) a parcel or parcels of land; or (2) a parcel of land to be subdivided into multiple parcels of land and public right-of-way.
- Division: Division of Traffic Management within the Department of Public Service
- MOU: Memorandum of Understanding
- ITE: Institute of Transportation Engineers
- TAS: Traffic Access Study
- TIS: Traffic Impact Study

SECTION 2: STUDY PREPARER QUALIFICATIONS

Traffic impact and access studies shall be prepared by an Ohio registered professional engineer with training and experience in traffic engineering—including operations and safety analysis.

The City requires the engineer who prepared the traffic impact or access study to sign and seal the study report.

The preparer shall not be a member of the traffic study review team. Neither shall the preparer be related to a review team member nor hold a financial interest in the project under study.

SECTION 3: TRAFFIC IMPACT STUDY

3.1 When is a Traffic Impact Study Required

A TIS is required for the following if the MOU demonstrates the traffic generated by the following results in 200 or more estimated non-pass-by trip ends at the peak hour of the land use:

- All new Developments;
- The expansion of existing Developments; or
- All Developments requesting:
 - Rezoning;
 - Zoning Variance;
 - Special Permit; or
 - Preliminary subdivision plat approval.

All existing non-pass-by trip ends to not be counted toward the 200 or more estimated trip ends at the peak hour of the land use shall be established by performance of a current traffic count and may not be established with trip generation calculations.

Note, the final estimated non-pass-by trip ends include both primary and diverted trip ends and are determined after subtracting pass-by trips, internal capture trips and multimodal reductions, as approved by the Division.

A TIS may be required for projects predicted to add or alter 100 or more trips at a single, adjacent intersection or based on other factors contained in the current version of the Multimodal Transportation Impact Analysis for Site Development recommended practice report of the ITE.

A revised or new TIS may be required when Development plans described in the MOU change significantly from the time the original TIS is approved. This may include:

- Land use change;
- Access location change;
- Significant land use change close to the site; or
- Any other significant change to the site.

Refer to [Section 6](#) for required components of a TIS.

If a TIS is not required, a TAS may be required as described under [Section 7.1](#).

3.2 Trip Ends Calculations

Trip ends are calculated using the latest edition of the ITE Trip Generation Manual. If a proposed use is not included in the latest edition of the ITE Trip Generation Manual, the Division's Administrator shall have the authority to decide if the proposed use is similar in character and nature to a use included in the ITE Trip Generation Manual. If not, the Division's Administrator shall require a trip generation study to determine whether or not a TAS or TIS is required.

3.3 Waiver of Traffic Impact Study

The Division's Administrator has the authority to waive a TIS if the preparation would result in unnecessary or duplicate analyses—when considering the following factors—including but not limited to:

- Existing roadway infrastructure;
- Planned capital improvement projects;
- Proximity of buildings to right-of-way at potential study intersections that may render additional right-of-way dedication and modification of lane configurations at such potential study intersections infeasible; or
- Previous studies in the vicinity of the site (either privately or publicly funded).

SECTION 4: TRAFFIC IMPACT STUDY REVIEW PROCESS

The intent of the TIS review process is to assist preparers in developing concise reports.

The review consists of the following:

4.1 Determine if a Traffic Impact Study is Required

Review [Section 3.1](#) and [Section 7.1](#) to determine whether a TIS or a TAS is required. The Division will make a final determination.

4.2 Approval of Memorandum of Understanding

4.2.1 MOU submission requirements:

- Approved Form. The MOU must be submitted on the most current MOU form provided by the Department of Public Service. This form can be found on the Department's website. Any and all other MOU forms will be rejected.

NOTE: The approved MOU form **SHALL NOT BE MODIFIED**, including, but not limited to, supplying additional information or changing the format.

- MOU Preparer Meets Qualifications. [Section 2](#) applies to the preparer of the MOU.
- Completed MOU Sent to Correct Email Address. Refer to [Section 5](#) for instructions on completing the MOU form. The MOU must be emailed to DPSDevelopmenttrafficstudies@columbus.gov.

4.2.2 MOU review process:

Upon receipt of the MOU, the Division will respond within 10 business days with an approval or with significant comments. An MOU may be approved with minor comments on the condition that the minor comments are incorporated within the traffic study. When the Division receives an MOU it will track all subsequent submittals and time frames for review.

The MOU must be approved by the Division before any traffic study submissions will be reviewed.

4.3 Submission of the Traffic Impact Study

4.3.1 Traffic Impact Study submission requirements:

- Study Contains All Required Components. The TIS must contain all the required components listed under [Section 6](#).
- Study Preparer Meets Qualifications. [Section 2](#) applies to the preparer of the study.
- Completed Study Sent to Correct Email Address. The study must be emailed to DPSDevelopmenttrafficstudies@columbus.gov.

4.3.2 Traffic Impact Study review process:

Studies that the Division deems complete will be reviewed within 30 calendar days. Staff will respond with comments or an approval letter. If there are substantial comments, the Division will prepare a response and will offer to schedule a meeting with the applicant to discuss the comments.

If studies are found to be incomplete and do not contain all components required under [Section 6](#), the Division may return the study to the preparer without reviewing it. This is to allow staff the adequate time to review those studies that are prepared in compliance with [Section 6](#).

The recommendations from an approved traffic study are a significant component of the Division's recommendation to the Department of Building and Zoning Services for rezoning and variance applications. The Division provides an approval recommendation to the Department of Building and Zoning Services once the following conditions have been met:

- Incorporation of commitments for mitigating transportation impacts within the respective rezoning or variance application; and
- Resolution of all Division comments on a rezoning or variance application.

However, if necessary improvements or commitments are not agreed upon within a rezoning or variance application, this could require the Division's recommendation on a rezoning or variance application to revert to a disapproval.

The Department of Building and Zoning Services makes the final determination regarding the overall recommendation on behalf of City Departments.

4.3.3 Resubmittal of Traffic Impact Study:

Incomplete or inadequate studies will be revised and modified by the preparer as requested by the Division.

- Studies with minor comments. A resubmittal is eligible for a review within 10 business days when it only has to address minor comments. The Division will inform the applicant that the comments are minor. Upon verification that the applicant has adequately addressed the outstanding comments, an approval letter will be provided.
- Studies with major comments: A resubmittal is eligible for a review within 30 calendar days when it has to address major comments. After this review, if there are still major concerns the Division will schedule a meeting with the consultant, developer, and any other party at the City's discretion, to discuss the requirements of satisfying those concerns. The goal of this meeting is to have the study approved with the next submittal. An approval letter is provided when the applicant adequately addresses the outstanding comments.

4.3.4 New Study Required:

If a project changes substantially during the study, it will be deemed a new project and the traffic study review process will restart. New projects require a new MOU submittal/approval and a new TIS submittal/approval. A project changes substantially when one of the following occurs:

- Modification of the proposed land use within a site;
- Significant increase in the density or unit count within a site;
- Significant changes to the location or configuration of access points for a site; or
- Significant changes to the site configuration that affect trip distributions and assignments.

4.3.5 Escalation Procedures:

When the Division and applicant are unable to reach an agreement after two reviews, a meeting may be held with the Division's Administrator and the applicant. The purpose of this meeting is to discuss outstanding issues and to create a timeline to resolve said issues.

4.3.6 Multijurisdictional Studies:

Review times for the MOU and the study submissions may vary based on the requirements of other reviewing agencies. Expectations will be set prior to study submission.

SECTION 5: MOU COMPONENTS

5.1 Applicant Information

This section must be completed with names and contact information for all listed parties involved with the project.

5.2 Project Information

This section must be completed with all known information to the applicant at the time of completion.

- Site Plan: If the site plan is available, check the “Site Plan attached” box, and attach the site plan when submitting the MOU. If the site plan is unavailable, at a minimum, an exhibit with the access points should be submitted with the MOU.
- Additional Jurisdictions: If other jurisdictions will be reviewing the traffic study, list those jurisdictions in the “Additional Jurisdictions” box.
- Type of Study: Applicant is to review [Section 3.1](#) and [Section 7.1](#) in determining type of study needed and check the appropriate box.
- Action Required: If applicant knows the action being requested check the appropriate box (i.e. Site compliance, Rezoning, etc.).

5.3 Scope of Study

- Intersections to be Studied: Under this section applicant must identify all intersections proposed to be evaluated in the study. Typically, the nearest signalized intersection or roundabout in each direction from a Development site should be included in a TIS. Lower volume intermediate intersections may be considered to be excluded unless determined to be required by the Division. For each intersection, the applicant must indicate whether a new traffic count will be taken or an existing count will be used. If an existing count is used, it must be no older than three years and the date of the count must be included in the box. For studies that involve 9 or more intersections to be studied, check the corresponding box and attach the requested information for the additional intersections.

- Analysis Scenarios: Under this section applicant must check which scenarios will be identified. All studies must include opening year analyses and if applicable the design year. Opening year analysis is described under [Section 6.10.1](#) and design year is defined under [Section 6.5](#). If the Development is large in scope and it will take many years to complete, then an interim date must be evaluated. The applicant must check the boxes for the scenario that will be used and include the year in the respective box located on the right side of the scenario selected. For a TIS, the applicant must assume that a figure showing a breakdown between site traffic and growth traffic will be needed for all intersections in the study, unless otherwise noted within comments on the MOU.
- Scope of Study: The applicant must check whether the AM and PM peaks will be used for the street or the generator. Typically street AM and PM peaks are used. If the weekend peak is also going to be analyzed, check the weekend box and explain why.
- Non-Motorized Mode Considerations: As a part of the initial evaluation of the limits of the study the Division must be consulted to establish the need for this analysis and to determine the scope and approach. An evaluation of the existing and proposed pedestrian and transit facilities must be provided to the Division for an initial qualitative review and additional quantitative review may be necessary, as further detailed in [Section 6.11](#).

5.4 Data Sources/Collection

- Traffic Counts to be Collected: This section requires inputting where the traffic counts will be taken and the type of count.
- Type of Traffic Count Data: Under this section the applicant must include, if available, the growth rate to be used. Currently, growth rates are obtained by using recently approved rates in the same area or contacting the Mid-Ohio Regional Planning Commission for an approved growth rate. In the near future, approved growth rates will be available for applicants on the Department's website. The default peak hour factor to be used is to be 0.92, unless otherwise approved by the Division.
- Trip Generation Rates: The applicant must check where the Trip Generation Rates will be obtained. Applicant must also check the box and input the appropriate percentage if using mode split, pass-by, or internal capture in traffic study.
- Key Analysis Items: The applicant must check the boxes for the analyses that will be completed. Each analysis is described under [Section 6.10](#).

SECTION 6: TRAFFIC IMPACT STUDY COMPONENTS

All components must be incorporated into a traffic study for the study to be considered complete. A study will not be reviewed unless it is complete. Non-complete studies will be returned to the preparer and an email will be sent to the preparer and the developer explaining why the study was not reviewed. If a section is intentionally being omitted, the reason why, if known at time of submittal, must be documented on the MOU. If not included on the MOU, then the applicant must explain the reason why in the traffic study. The Division will determine whether the traffic study is completed for review.

The following components must be included in a TIS:

6.1 Approved Memorandum of Understanding

See [Section 4.2](#) and [Section 5](#) for requirements of a MOU.

6.2 Completed Checklist

Checklist can be found on the Department's website.

6.3 Traffic Study Project Description

This section includes a detailed description of what is being proposed for the site. Including, but not limited to:

- Land use, size and density: Applicant must identify within the Development the overall size, land use, and size and density of each individual land use type.
- Project build-out date and phasing plan: If the Development is to be constructed in phases, applicant must describe each phase and schedule.
- Access point locations and design: Applicant must identify Development access points; access points adjacent and/or directly opposing to the site; each access point's proximity to adjacent access points and the interaction between turns; and a site plan with maps as appropriate.
- Connectivity and Circulation: Access must connect to adjacent properties whenever possible to encourage alternate ways to access the property. The internal drives or street network must be planned in a manner to discourage high vehicular speeds. If future Columbus Multimodal Thoroughfare Plan streets are incorporated within the proposed site, these must be identified.

6.4 Applicable Study Area

This section describes the character and use of the surrounding Development and street network—including pedestrian and bicycle accommodations. This may be accomplished by a combination of maps and text. The report must include both existing and future conditions based on known plans for other Developments and transportation projects. Specifically, the report must include the following:

- Identification of adjacent land use types: All land use types surrounding the Development must be identified. All Developments within the study area that have been approved, or are likely to occur by the specified horizon year, must be identified and incorporated into the study.
- Identification of adjacent street network: All Columbus Multimodal Thoroughfare Plan streets and local streets adjacent to the site must be identified. Also, all existing pedestrian, bicycle, and transit accommodations must be identified. Speed limits, roadway widths, shoulder widths, and any unique roadway characteristics must be documented (i.e. vertical and horizontal curves, geometric deficiencies, drainage concerns, etc.).
- Location of intersections and traffic control devices: All intersections being studied must be noted as a roundabout, signalized, or unsignalized (traffic control described). Pedestrian and bicycle crossings must also be identified and located. Turn lane storage at existing intersections or driveways must be provided.
- Location of public space: All parks, open space, trails, schools, etc. within a walkable (1/2 mile) and bikeable (2 mile) distance to the site must be identified. The ability to connect the proposed Development to public space through walks and paths must be documented.
- Future transportation improvements: Document all planned future transportation improvements, including pedestrian and bicycle accommodations. These improvements must include both public and private projects. In each case, the status and anticipated date of implementation must be identified. The Division may be able to assist with this information.

6.5 Design Years and Time Periods Analyzed

TIS are to address traffic conditions in the anticipated completion year of the proposed Development, assuming full build-out and occupancy, or ten years beyond the current year, whichever is later. If the proposed Development is to be implemented in phases, it may be appropriate to analyze each major phase (i.e. an initial phase, one intermediate phase, and full project build-out).

The design time periods to be used in a TIS will be confirmed in the MOU. At a minimum, all studies must include assessments of conditions during both AM and PM street peak hours (unless told otherwise by the Division). However, land use classifications which experience highest trip generation levels during periods other than weekday street peak hours, may require analyses for such periods to determine proper site access and turn lane storage requirements. Examples of such land use classifications include, but are not limited to: shopping centers, discount stores, restaurants, schools, churches, garden centers, and recreational uses (i.e. theaters, zoos, theme parks, stadiums, arenas).

Traffic signal warrants normally require determination of traffic volumes for more than the weekday street peak hour. As a result, longer time periods are needed for these analyses.

6.6 Background Traffic Volumes and Growth Rates

Background traffic consists of existing traffic and growth calculated for each design year. In some cases, traffic generated by other non-site Developments in the area may also contribute to background traffic. The TIS needs to clearly delineate the different sources of background traffic in all exhibits.

The most recent available traffic counts must be used in developing background traffic. These counts are available on MORPC's website, <https://www.morpc.org/tool-resource/traffic-counts/>. In situations where counts are not available, or older than three years, additional traffic counts must be conducted.

All traffic counts included in the TIS report:

- Must be referenced in a separate technical appendix;
- Must be taken on a fair weather day and on a Tuesday, Wednesday, or Thursday;
- If taken near a school, must not be taken in the summer, unless approved by the Division; and
- Must not be taken between Thanksgiving and New Year's Day, unless approved by the Division.

Where traffic counts on a transportation corridor have been conducted at different times of the year or in different years, the traffic volumes must be balanced entering and exiting the intersections studied.

The Division will inform the applicant during the creation of the MOU of any nearby Developments or planned improvements that must be included in the background analysis.

If data from a recent nearby study is unavailable, the applicant may contact the Mid-Ohio Regional Planning Commission to determine the appropriate growth rate to be used.

6.7 Trip Generation Estimation

Trip generation is the process of estimating the amount of traffic to be generated by a particular Development or redevelopment.

Data sources and methods of estimating trip generation:

- ITE Trip Generation Manual (latest edition): This report contains data from observations around the country for over forty years.
- Prior local (Columbus area) studies: Studies may be conducted for various reasons, but are applicable for the purpose of estimating trip generation for site development. The use of a previously submitted and approved TIS is applicable for uses not defined by the ITE Trip Generation Manual.
- Prior studies made outside the Columbus area: These must be used only when appropriate prior local studies are not available.

- Special analyses conducted especially for the study at hand. Developments analyzed should be representative of the Development for which the trip generation estimate is to be made. Developments must be local when similar Developments exist locally, and can be isolated for study. Developments may be located out of town if no adequate local examples exist. Proper procedures must be used.
- A combination of the above, adding local data to the ITE data, or combining local and special study data. Additions to ITE data must be compared with data in the latest edition of the Trip Generation, if available, to check for consistency.

6.8 Trip Reduction Measures (as required)

Depending on the Development, it may be appropriate to adjust the calculated trip generation.

- Internal Capture Trips: When a Development contains a mix of uses, internal capture trips are expected to occur within the Development and to not enter onto the external street network. ITE internal capture methodology must be used to calculate these trips.
- Pass-by Trips: These are all trips already on the roadway network, but stop at the Development on route to the primary destination. Pass-by trips must be determined by using ITE pass-by trip methodology.
- Multimodal Reductions: Depending on the location of a proposed Development and the viability of alternate modes including pedestrian, bicycle and transit modes, multimodal reductions may be applied, as approved by the Division.

6.9 Trip Distribution and Assignment

After the trips are generated for the proposed Development, trips must be distributed to the street network and assigned to various intersections.

The directions from which traffic will approach and depart the site can vary depending on several location-specific factors including:

- Type and size of the proposed Development;
- Surroundings;
- Competing land uses, population, and employment distributions (in some cases); and
- Prevailing conditions on the existing street system.

To help in the distribution of traffic, an influence area may be defined. The influence area must be large enough to include most of the trip ends attracted to the site. Ideally, an existing market study may be used to establish the influence area. However, if no such study exists, the influence area must be

established and documented based on reasonable estimates. Existing trip distribution data, from actual sites within the immediate vicinity, may be used for the purpose of making traffic assignments.

Traffic assignments must consider logical routings, available and projected roadway capacities, and travel times. Realistic estimates must include, if expected, traffic diverted to avoid design year congestion. Assignments must consider the transportation improvements projected to be in place by each analysis year. If the site is a redevelopment project, assigned traffic generated by the old or existing Development must first be subtracted to avoid double counting, unless the existing land uses have already been removed or are out of operation at the time of data collection.

6.10 Determining Traffic Impacts

The Development's transportation impacts must be compared to the baseline conditions for all design years and peak hour conditions. The following analysis may be required to determine the impact of the proposed Development:

6.10.1 Capacity Analysis:

When required, an intersection Level-of-Service (LOS) analysis must be completed for all study intersections. The summary of the LOS and delay analysis must be provided in a table format.

All scenarios checked on the MOU form shall be analyzed. Scenarios within a traffic study are generally shown in the following order:

- Opening Year Conditions without Development
- Opening Year Conditions with Development
- Interim Year Conditions without Development
- Interim Year Conditions with Development
- Design Year Conditions without Development
- Design Year Conditions with Development

When transportation improvements are needed to mitigate impacts for any of the scenarios listed above, an additional scenario that would include necessary improvements shall be provided.

The Department recognizes designing for unrealistically high levels of service is not only cost prohibitive, but it encourages speeding by creating overly wide streets. This is against the Vision Zero goals of the City. Therefore, minimum acceptable level of service in the City is "D". An acceptable analyses must show an overall intersection LOS of "D", with no individual movement operating at less than an "E" LOS.

The Department realizes that some areas of the City have higher levels of pedestrian activity, parking, dense Development, and other factors that may be appropriate for a lower level of service if it improves the ability to balance the needs of multiple modes. In order to construct context-sensitive roadway

improvements, the Division has the authority to use engineering judgment to waive the need to construct roadway modifications that are deemed to be excessive for the area.

Synchro or Highway Capacity Software (HCS) may be used. Adequate documentation within the capacity analysis reports is required to be provided to document signal phasing and timing assumptions. Unless otherwise directed by the Division for an industrial Development or an area with higher heavy vehicle percentages, a default heavy vehicle percentage of 2% may be utilized for all movements. Assumptions for bus blockages, on-street parking maneuver and pedestrian calls shall be utilized, as appropriate. A Highway Capacity Manual (HCM) Platoon Ratio of 1.00 is the default value with an HCM Platoon Ratio of 1.33 that is supported in a coordinated corridor. Signal timing assumptions for existing intersections must match the existing timing plans available. Signal timing assumptions for proposed intersections must be in conformance with the requirements of the Traffic Signal Design Manual.

6.10.2 Signal Warrant Analysis:

Signal warrant analysis may be required at unsignalized intersections within the study area to determine the need for installing traffic signals. The signal warrant analysis must be performed in accordance with requirements of the Ohio Manual of Uniform Traffic Control Devices (OMUTCD). Right turn reductions are to be performed in accordance with the methodologies in the Ohio Department of Transportation (ODOT) Traffic Engineering Manual (TEM). PC-Warrants software must be used for the analysis.

6.10.3 Roundabout Feasibility Analysis:

Roundabout feasibility analysis may be required—in lieu of, or as a supplement to—signal warrant analysis. Roundabouts have fewer intersection conflict points and are designed to slow traffic speeds as vehicles enter the roundabout. Roundabouts have been proven to provide significant safety benefits by reducing injury and fatal crashes. A roundabout analysis will include a capacity analysis using Sidra software and may include a conceptual layout and/or other planning level analyses.

6.10.4 Turn Lane Warrants and Length Analysis:

Turn lane warrants and length analyses must be evaluated for each site drive in accordance with Ohio Department of Transportation (ODOT) Location and Design Manual turn lane warrants. If a turn lane is warranted for a specific direction, the length shall be determined using methodologies in the ODOT Location and Design Manual, unless otherwise determined by the Division. However, the Division's policy is not to include No Block Lengths for turn lane length calculations.

6.10.5 Sight Distance Analysis:

A sight distance analysis is required for each access point into the Development to assure there are no sight distance issues. Reference Columbus DPS Design Memo 4.11 for further information.

6.10.6 Interim Review of Traffic Forecast:

An interim review of traffic forecast may be needed for larger studies with extensive traffic forecasts. This interim review may be beneficial for larger studies by assuring agreements on traffic assumptions before beginning analysis. As a result, reducing the amount of rework needed on subsequent study submittals. An interim review of traffic forecast will be reviewed within 30 calendar days. This review occurs after the trip generation is completed and the traffic has been distributed and assigned for all the years being studied.

6.10.7 Queuing Analysis at Signalized Intersections:

Queuing analysis utilizing the SimTraffic Queuing and Blocking Report within Synchro software is required at signalized intersections if there are legs of an intersection that are believed to back up past drives or intersections, resulting in safety concerns.

6.11 Determining Non-Motorized Mode Impacts

When new Development sites are developed the City is responsible for ensuring that adequate public facilities are in place for users of non-motorized transportation modes.

Additional off-site pedestrian infrastructure may be required by the City if the level of Development on a site would exceed any of the following thresholds:

- Residential: 50 units;
- Retail and/or Restaurant Uses: 20,000 square feet; or
- Other Nonresidential (includes Mixed Use Developments): 30,000 square feet.

If the above thresholds are exceeded, a determination on whether existing off-site pedestrian facilities provide at a minimum, but not limited to:

- adequate off-site pedestrian connections to access the existing sidewalk network
- adequate off-site pedestrian connections to access the nearest transit stop for each cardinal direction of travel in the vicinity of the site
- adequate crosswalk facilities within the vicinity of the site

The traffic study may include reviewing the travel of non-motorized users entering and exiting the Development, as well as, along the frontage of the Development. This evaluation may include treatments such as raised medians, modified signage, rectangular rapid flashing beacons, pedestrian hybrid beacons, pedestrian traffic signals, routing non-motorized users to an adjacent traffic signal, or other improvements to promote pedestrian safety.

6.12 Findings and Commitments

Transportation system improvements and other measures required to ensure acceptable operations must be identified in the TIS report. Where physical roadway improvements are not possible or are not advisable, mitigation may include strategies to shift trips to non-single occupancy vehicle modes. For Developments occurring in phases, the triggers for each mitigation must be identified and a schedule of implementation for the identified mitigation strategies must be included in the study.

The developer is financially responsible for the transportation improvements needed in supporting the proposed Development and mitigating adverse impacts. Normally these improvements are included as conditions of approval. When the need for improvement is attributable to several Developments, the developers may negotiate a cost-sharing arrangement.

The developer must assess the potential need to phase the Development in conjunction with the transportation infrastructure or operational improvements or in association with proposed, committed, or under-construction transportation projects.

Discussions with the Division must occur when signal timing changes are proposed to existing traffic control signals. Such discussions determine if the changes are feasible for the overall corridor signal coordination and if equipment changes are required.

A scope of work will be issued for any improvements that are required to be constructed within the public right-of-way.

6.13 Recommendations

Recommendations are to address the study's conclusions for the Development's access needs and impacts on the transportation system.

Recommendations must address the feasible transportation system improvements needed to satisfactorily accommodate site and non-site traffic (identified separately). The recommendations must reflect the improvements currently planned or programmed by any public or private agency, and may include beneficial project scheduling changes.

Recommendations for improvements must be sensitive to the following issues:

- Timing of network improvements that are already committed and scheduled;
- Anticipated time schedules of adjacent Developments;
- Size and timing of individual phases of the proposed Development;
- Logical sequencing of various transportation improvements;
- Amount of right-of-way needed and timing of acquisition;
- Local priorities for transportation improvements and funding (including the Columbus Multimodal Thoroughfare Plan);

- Cost effectiveness of implementing improvements at a given stage of Development;
- Necessary lead time for additional design and construction; and
- Standards and policies of other public agencies and jurisdictions.

The order of implementation for necessary transportation improvements shall consider the feasibility of the improvements and ensure that the improvements are compatible with existing and future roadway networks.

SECTION 7: TRAFFIC ACCESS STUDY

7.1 When is a Traffic Access Study Required

A TAS is required when there is a likelihood that a project will increase traffic, but the increase is too little to require a TIS as described under [Section 3.1](#)

A TAS may be required if the project meets one or more of the following site modification criteria AND meets one or more of the following location criteria:

- Site modification criteria:
 - New Construction;
 - Expansion of an existing building; or
 - Change of use of an existing building that represents a significant increase in trip generation of the site.
- Location criteria:
 - On a Columbus Multimodal Thoroughfare Plan Roadway;
 - On a roadway on the High Crash Prioritization List or High Injury Network;
 - On an arterial or collector roadway not contained on the Columbus Multimodal Thoroughfare Plan; or
 - On a collector or local roadway proximate to a signalized intersection, roundabout, or other arterial roadway intersection.

Refer to [Section 8](#) for required components of a TAS.

SECTION 8: TRAFFIC ACCESS STUDY COMPONENTS

A TAS may require the same components as a TIS (refer to [Section 6](#)). Specifically, a TAS analyses should focus on the impact and/or mitigation needed to establish or retain access point(s) serving the subject site. It should not include analyses needed to evaluate the potential need for mitigation of off-site intersections.

SECTION 9: REPORT PRESENTATION

A complete traffic study must be submitted to the Division for review by emailing DPSTrafficStudies@columbus.gov. A copy of the report, appendices, analysis, including PC-Warrants, HCS, Synchro, and any other capacity analysis software files—must be included. Raw traffic counts will need provided.

Studies that the Division deems complete will be reviewed and responded to within 30 business days. Any resubmissions must include the responses to all the Division’s comments in the revised study.

This outline contains topics to be included in a complete TIS report. Include all relevant topics. Relevant topics are those topics agreed to on the approved MOU.

1. **Title Page**
 - a. Development’s Name
 - b. Development’s Location
 - c. Applicant’s Name, Address, Telephone
 - d. Preparer’s Name, Address, Telephone
 - e. Preparer’s Engineering Registration Seal
 - f. Report Date
2. **Table Of Contents**
3. **List Of Figures And Tables**
4. **Executive Summary**
 - a. Introduction
 - b. Project Description and Study Area
 - c. Issues, Problems, and Needs
 - d. Principal Findings
 - e. Conclusions
 - f. Recommendations
5. **Project Description**
6. **Applicable Study Area**
7. **Horizon Years And Time Periods Analyzed**
8. **Background Traffic Volumes And Growth Rates**

9. **Trip Generation Estimation**
10. **Trip Reduction Measures**
11. **Trip Distribution And Assignment**
12. **Determining Traffic Impacts**
 - a. Capacity Analysis
 - b. Signal Warrant Analysis
 - c. Roundabout Feasibility and Analysis
 - d. Turn Lane Warrants and Length Analysis
 - e. Sight Distance Analysis
13. **Findings And Commitments**
14. **Recommendations**
15. **Typical Appendix Sections**
 - a. Site Layout Exhibit
 - b. Approved Memorandum Of Understanding
 - c. Disposition of Comments
 - d. Documentation of Other Studies, if applicable
 - e. Documentation of Signal Timing, if applicable
 - f. Traffic Counts
 - g. Growth Rates
 - h. Trip Generation Calculations
 - i. Volume Plates
 - j. Turn Lane Warrant Charts and Length Calculations
 - k. Sight Distance Exhibits
 - l. Capacity Analysis Reports
 - m. Queuing Analysis Reports
 - n. Signal Warrant Evaluation Calculations and Reports, if applicable
 - o. Proposed Improvements Exhibit, if applicable

SECTION 10: EXHIBITS

The following maps, figures, and tables are typically submitted with a completed TIS Report and are typically provided within the sections of the Appendix. Additional maps, figures and tables may be needed for studies with additional complexities, issues, and, horizon years. Also, figures may be combined as long as there is no loss of clarity. Additionally, traffic volume figures are required to graphically depict traffic volumes in a manner that is geographically consistent with the existing and/or proposed roadway network.

10.1 Maps

- **Site Location Map**
A map of the area showing the site location and the area of influence.
- **Existing Transportation System Map**
A map of the existing roadway systems that serve the site. It must show all major streets, minor streets adjacent to site, and site boundaries. Also, include the transit, bicycle, major pedestrian routes (if applicable), right-of-way widths, and signal locations.
- **Existing and Anticipated Study Area Land Uses/Developments Map**
A map at the same scale as the “Existing Transportation System Map,” and displays the existing and proposed Development.
- **Anticipated Transportation System Map**
An area transportation system map that shows the committed and scheduled roadway, transit, bikeway, and pedestrian improvements that affect site accessor traffic flow through the study area.

10.2 Figures

- **Current Daily Traffic Volumes Figure (Use only if relevant.)**
A figure of recent or existing daily volumes on the roads in study area.
- **Existing Peak Hour Turning Volumes Figure**
A figure showing the current peak hour turning volumes at each location that is critical to site access or serves major traffic volumes through study area.

- **Estimated Non-Site Traffic Figure**
A figure showing the peak hour turning volumes generated by the off-site Development within the study area—it also includes the horizon year through traffic. This map is similar to “Directional Distribution of Site Traffic Map.”
- **Directional Distribution of Site Traffic Figure**
A figure showing by volumes and percentages, the portions of site traffic approaching and departing the area on each roadway. It may differ by land use within a multi-use Development.
- **Site Pass-By Traffic Figure**
A Figure of the anticipated roadway network showing peak hour pass-by traffic volumes within the study area.
- **Site Traffic Figure**
A figure of the anticipated roadway network showing peak hour turning volumes generated by the site Development within the study area.
- **Estimated Total Future Traffic Figure**
A figure showing the sum of traffic from the “Estimated Non-Site Traffic Figure” and the “Site Traffic Figure.” This figure is similar to the “Directional Distribution of Site Traffic Figure.”
- **Site Access and Recommended Improvements Figure(s)**
A figure or figures showing, if applicable, proposed site access locations, off-site transportation improvements, and circulation and parking features. If the phasing of improvements is anticipated, it must be demonstrated on separate figures.

10.3 Tables

- **Estimated Trip Generation for New Off-Site Development Table**
A table of trips generated by the off-site Development within the study area. It is similar in format to “Estimated Site Traffic Generation Table.”
- **Estimated Site Traffic Generation Table**
A table showing estimated peak hour trips generated by each major component of the proposed Development. The inbound and outbound directions must be shown separately.
- **Projected Levels of Service Table**
A table showing the levels of service computed for critical intersections within the study area. It must include, if applicable, existing year conditions, design year conditions without Development, design year conditions with Development and design year conditions with Development and mitigation.