

Traffic Impact Study Checklist: Traffic Data Collection

Traffic data is the foundation of an impact study and you can get the existing data through four methods:

1. Find it through the state or local agency.
2. Collect it yourself.
3. Hire someone else to get it.
4. Estimate it.

Details you'll need for the data collection, whether you're doing it in-house or outsourcing it:

- Location maps.
- Days and periods to be counted.
- Types of counts to be performed.
- Date you need the data back.
- Format you want the data in.
- Identification of the police/public works departments covering the area of your field work; permits may be needed – contact them before data collection starts.
- Online check to ensure there are no big events that would have an impact on your counts.

Here are items you'll need if you're leading a manual data collection team (turning movement counts or other type such as gap studies or queuing studies):

- Maps for all of the data collectors giving clear instructions on where they're counting and what movements they're responsible for.
- Information for counters on where they should park.
- Enough count boards – ideally including a spare.
- Extra AA batteries.
- Business cards for all of your data collectors.
- "Traffic count in progress" signs for everyone.
- Summer - Bug spray, sunscreen, umbrellas and lawn chairs.
- Winter – Blankets, hot chocolate and other "warm things."

You'll need to develop your own checklist if you're using automatic equipment, such as tube counters or video cameras, to collect traffic data. Be sure you quality check the data as soon as you get it to confirm it looks reasonable. You may need to talk to the field staff about anomalies and remember that you'll get the clearest answers if it's fresh in their minds.

Traffic Impact Study Checklist: Document Existing Conditions

1. Use online mapping tools to document the physical details of each study intersection. The following are items to note:
 - a. Exclusive left or right turn lanes - measure their storage lengths on the aerial and include them on the sketch
 - b. Through lanes and/or shared lanes if turn lanes aren't provided
 - c. Traffic control - stop signs, traffic signals or roundabouts
 - d. Medians
 - e. Shoulders
 - f. Sidewalks/trails/paths
 - g. On-street bike lanes
 - h. Nearby parking lots
 - i. On-street parking
 - j. Street names
2. Confirm the above details during a field visit. Following are items to also note:
 - a. Transit stops
 - b. Traffic signal operations, including left turn phasing
 - c. No turn on red restrictions
 - d. Parking restrictions
 - e. Speed limits
 - f. Non-ADA compliant signal push-buttons or pedestrian ramps
 - g. Excessive grades or slopes
 - h. Excessive grades that may affect traffic
 - i. Objects or buildings on the intersection corners that block sight lines
3. Collect photos or videos of your study area.
4. If a technician prepares sketches with the above items, do your own field verification. While you perform your own field visit, also be aware of items that could affect traffic in your study area:
 - a. Large parking lots that could affect the balance of traffic between study intersections
 - b. Large pedestrian generators, such as schools
 - c. Road construction
 - d. Developments under construction
5. During rush hour, analyze the following items:
 - a. Do shoulders get used by cars as separate right turn lanes or bypass lanes?
 - b. Do the traffic signals along a corridor seem to be coordinated, so through traffic moves down the corridor smoothly?
 - c. What are the signal cycle lengths?
 - d. Are there any queues backing up from turn lanes into the through lane or do queues extend back from one intersection blocking the upstream intersection?
 - e. Is it hard to turn onto a major street from a cross street with a stop sign?
 - f. Do the routes cars will take to get to and from your site correspond to the major traffic flow you're watching?

Traffic Impact Study Checklist: Assumptions to Reviewers

If time permits, call the appropriate folks who will be reviewing your study to let them know you'll be sending them a comprehensive email about the project. Here are topics to cover in your email to the reviewers of your study at the city/county/state. Ensure you work with the actual people who will be commenting on your study, which could end being their consultant:

1. Give an overview of the proposed development.
 - a. Brief description.
 - b. A location map.
 - c. A concept plan showing the proposed access points.
 - d. Anticipated build-out year.
 - e. Phasing plan if your development will be built in stages.
 - f. Development size, such as square footage or dwelling units.
2. Provide the preliminary framework of your study.
 - a. A map with the intersections and corridors you propose to study.
 - b. A map showing the distribution pattern you expect the site's traffic will use. Mark it preliminary and ask if you are missing anything, especially backdoor routes you may not be aware of.
 - c. A table giving the traffic generation of the proposed development. Mark it preliminary.
 - d. A list of the study periods you plan to study (daily, a.m. peak hour, p.m. peak hour and/or Saturday midday peak hour).
 - e. A list of your proposed analysis years.
 - f. Documentation of how you'll increase the existing traffic counts to your future no-build scenario traffic counts.
 - g. A list of the methodology and software you'll use for your analyses.
3. Request traffic signal timing plans if they have control over the traffic signals at any of your study intersections.
4. Ask about or confirm proposed development and roadway projects planned within the study area.
5. Ask if they have policies, ordinances, traffic impact fees and/or standards related to traffic studies.
6. Provide your schedule and ask about their typical review process and its associated timeline (for instance, how much time will they need to review your traffic study).

Traffic Impact Study Checklist: Prepare Traffic Forecasts

1. No-Build, Future Year Forecasts
 - a. Determine method for increasing existing traffic volumes
 - i. Growth rate based on past traffic data in area
 - ii. Growth rate backed out from transportation plan forecasts
 - iii. Based on other area traffic studies
 - iv. Combination of the above
2. Volumes Due to your development
 - a. Trip Generation (start with ITE *Trip Generation*)
 - i. Use average rates
 - ii. Use best variable, such as employees or square feet
 - iii. Use the right time frame (i.e. THE peak hour vs. the peak hour of the adjacent street traffic between 7-9 a.m.)
 - b. Trip Generation Discounts
 - i. Internal trips at commercial or mixed use developments
 - ii. Pass-by/diverted trips – ensure they aren't a large portion of the road's existing traffic (rule of thumb – limit to 10% of existing traffic)
 - iii. If there is heavy transit use or in a dense urban neighborhood, should you reduce the trip generation to account for alternate modes of transportation?
 - iv. If you're implementing a Travel Demand Management Plan for your development, should you discount the trip generation?
 - c. Trip Distribution
 - i. Ensure you distribute the traffic per your agreed on trip distribution pattern.
 - ii. Ensure the numbers coming in and out of your development site match the trip generation table you prepared.
 - d. Reasonableness Check
 - i. Ensure pass-by diverted trips don't assume half the traffic on the adjacent road is going to go in and out of your development.
 - ii. Ensure the trip generation seems reasonable for local conditions – half a small town isn't going to visit your development every day.
3. Build, Future Year Forecasts: ensure the No-Build + Volumes Due to Development = Build Volumes
4. Round your forecasts to the appropriate level of accuracy
 - a. Nearest five vehicles on low volume, peak hour movements
 - b. Round one and two up to five since there's a little bit of traffic on that movement
 - c. Nearest ten vehicles on all other peak hour movements
 - d. Nearest hundred vehicles on daily volume forecasts
 - e. If the software you are using doesn't round, describe the accuracy of the forecasts in the study.
5. Ensure the volumes going between adjacent intersections add up on all Volume Due to Development forecasts and between adjacent intersections in the No-Build and Build forecasts if there are no intersections between them. Cars don't levitate.



Traffic Impact Study Checklist: Perform Capacity Analyses

The following are items you'll need to enter into whichever software package you're using to perform the traffic capacity analyses of your study intersections:

1. Lane configurations
2. Lane widths (default 12 feet)
3. Turn lane lengths
4. Right turn restrictions
5. Peak hour turning movement volumes
6. Peak hour factors (we recommend 0.92 as the default, 0.90 in low volume or small town areas, 0.94 in built-out suburban/urban environments)
7. Heavy vehicle percentages (default 3%)
8. Traffic control
9. Roundabout geometry
10. Signal timing plans

Here are default items in the models that may be adjusted, but typically aren't:

1. Saturation flow rates
2. Bus blockages
3. Adjacent parking lane maneuvers
4. Pedestrian and bicycle crossings per hour

Be certain you have a quality control process in place to assure all details in your model are correct. Ideally, the person who checks the details is not the one who created the model. Building the capacity models is optimally done while the traffic data is being collected.

Traffic Impact Study Checklist: Determine Necessary Improvements

From the capacity analysis, identify and write down your problem areas by scenario. As you determine appropriate mitigation, consider safety, right-of-way and feasibility of any improvements. Also consult local or state standards for guidance on when some improvements could be considered. Mitigation to resolve the issue(s) may be on the demand side (amount of traffic) or the supply side (roadway capacity). Remember, you're being hired to make the proposed development work – start with the supply side.

Supply side mitigation could include:

1. Signal timing improvements
2. Traffic signal phasing changes
3. Improved signing and/or pavement markings
4. Peak hour turning restrictions
5. Traffic control change
6. Addition of an exclusive turn lane
7. Addition of a through lane
8. Alternative intersection traffic control
9. Access management
10. Intelligent Transportation Systems (ITS) options

Demand side mitigation could include:

1. Pay for parking
2. Peak hour parking restrictions
3. Truck/delivery peak hour restrictions
4. Staggered work hours
5. Smaller development size

Traffic Impact Study Checklist: Determine Whether to Use Simulation

The Highway Capacity Manual is a deterministic traffic analysis tool based on observed or theoretical parameters. In comparison, stochastic analysis models simulate traffic based on vehicle and driver behavior parameters. You may need to use micro-simulation if you answer “yes” to one or more of these questions:

1. Does the approving agency require its use?
2. Is there unique geometry or a special situation in any of your study scenarios that can't be analyzed by the HCM?
3. Are there progression issues from intersections over-capacity or the mixing of traffic control options, primarily a roundabout within a timed traffic signal corridor?
4. Are any measures of effectiveness needed that cannot be determined from the HCM, such as corridor travel times?
5. Will visualization be needed for agency meetings or other public involvement?

Once the need is established, the type of simulation software to use will depend on the needs of your analysis, the requirements of the approving agency and/or the industry standards in your area.

Whichever software you use, keep the following factors in mind:

1. When in doubt, use the defaults. Don't adjust default parameters without good reason and the ability to discuss this reasoning in public.
2. Learning and using functions to move quickly between peak hours and scenarios will save time.
3. Run the simulation more than once. The size and complexity may require ten runs or more to provide an accurate estimate of traffic operations. We typically recommend five runs.
4. Match results against your observations as a check on your inputs. Remember the saying “garbage in, garbage out.”



Traffic Impact Study Checklist: Site Review

Review the proposed development site for potential issues:

1. CCR – circulation, conflicts and regulations
2. Overall circulation patterns, including drive-throughs
3. Truck circulation to and from the loading docks
4. Bicycle paths and racks
5. Parking dimensions and layout
6. Walking paths to and from the parking area and transit stops
7. Pedestrian crossing locations
8. Location of shopping cart corrals
9. Signing and striping based on the MUTCD
10. ADA requirements

Improving the safety of conflict areas (pedestrian-vehicle) will improve the safety of the entire site.

Traffic Impact Study Checklist: Prepare Documentation

Here is a basic outline for your report:

1. Executive Summary – although first in the report, this is usually written last as a summary of the information and final conclusions in the report.
2. Introduction – present basic description of your project.
3. Existing Conditions – present existing data and analysis.
4. Proposed Conditions – present the traffic forecasts and analysis along with improvements already planned by government agencies.
5. Mitigation and Improvements – if needed, present the proposed mitigation and accompanying analysis.
6. Site Review – discuss the site analysis.
7. Final Conclusions and Recommendations – make clear recommendations with associated time frames.
8. Appendix – include traffic counts and full analyses, at a minimum.

Keep in mind your audience. Most reports become available for public consumption, so keep technical language to a minimum. Prepare the following graphics for the report, they tell a better tale than tables or words:

1. Location Map
2. Existing Conditions
3. Existing Volumes
4. Development Volumes
5. Future No Build Volumes
6. Future Build Volumes
7. Mitigation

Always remember to have a second set of eyes review your report before submission.

Traffic Impact Study Checklist: Preparing the Proposal

While you're on the phone with your client, here's a list of questions you should ask:

1. Details about the site:
 - a. Does he have a concept or site plan he can email you right now so you can open it while you're still on the phone? If not, get the site plan as soon as possible.
 - b. Where's his development? If you're by your computer, open an aerial.
 - c. What kind of development is it - for instance, commercial, retail, houses, industrial, office, or school?
 - d. Is there something currently on the site that's generating traffic?
 - e. How big is it - for instance, acres, gross square footage, employees, or students?
 - f. If it's a mixed use development, get a size breakdown for each use.
 - g. How many accesses or driveways are planned?
 - h. Where will the accesses be located?
 - i. Are there any existing driveways into the site?
 - j. When will his development be fully occupied?
 - k. Will his development be built in phases?
2. Details about the study area:
 - a. Does he know of any nearby recent development?
 - b. Does he know of any recent traffic studies done for this parcel or nearby parcels?
3. Details about the process:
 - a. When does he need the proposal?
 - b. When does he need the draft traffic study?
 - c. Has he discussed the traffic study with any government staff? If yes, who? Does he have notes from the meeting?
 - d. Will he want you to present the traffic study results at a government staff meeting, a neighborhood meeting, a public hearing or to the city council? Does he have any idea how many meetings you'll need to attend?
 - e. Is he getting other proposals for the traffic study? This is delicate, but it's always good to know if you have competition and if possible, to find out who.
 - f. If this is a new client, how did he find out about you? Be sure to send a thank you note to your friend if it was a referral.

Traffic Impact Study Checklist: Manage the Traffic Study

1. Internal Kick-off Meeting
 - a. Project overview including overall goals
 - b. Study schedule, including setting the next internal meeting
 - c. Worker roles and expectations
 - d. Next tasks
2. Review of the Existing Conditions
 - a. Traffic counts
 - b. Site observations
 - c. Requested data, like traffic signal timing, other roadway improvements in the area, other planned development and agency policies
3. Discussion of Traffic Forecasts
 - a. Number of scenarios
 - b. Site trip generation, including any pass-by, diverted or multi-use
 - c. Site trip distribution
 - d. Background traffic growth
 - e. Reductions for transit, bicycle or walking
4. Discussion of the Analysis
 - a. Discuss which capacity analysis software to use
 - b. Decide whether to use micro-simulation software, and, if so, which
 - c. Review standard inputs
 - d. Determine if default inputs need changing
5. Review of the Analysis Results and Mitigation
 - a. Compare results versus observations
 - b. Determine need for mitigation
 - c. Discuss potential mitigation
6. Discussion of the Mitigation Results
 - a. Do the mitigation measures result in acceptable operations?
 - b. Are there additional mitigation measures needed?
7. Review of the Report Outline
 - a. Review categories
 - b. Discuss recommendations and conclusions
8. Review of the Draft Report

Traffic Impact Study Checklist for Agency Review

1. Is there a complete project description?
 - a. Type of proposed uses
 - b. Size - building square footages, units, etc.
 - c. Construction schedule (will it be built in phases and when will it be fully operational?)
 - d. Proposed site plan
2. Do the study horizon years make sense?
3. Are the study peak hours reasonable?
4. Are all possibly impacted intersections are studied?
5. Is the trip generation reasonable?
6. Is the trip distribution pattern reasonable (this is the most subjective part of any traffic study - pay special attention)?
7. Is the analysis methods reasonable (micro-simulation if closely spaced intersections or queuing issues)?
8. Is the method for forecasting future years reasonable (typically based on a growth rate assumption)?
9. Are there other nearby developments that should be accounted for in traffic forecasts?
10. Do the forecasts make sense (peak hour volumes going between intersections balance, are the trips from the site actually distributed per distribution pattern, daily forecasts are +/- 10 times peak hour volumes, etc.)?
11. Does the technical data in the appendices appear accurate? Make sure the peak hour factor used in Level of Service analysis is reasonable. Spot check to make sure the turning movement volumes are correct and signal timing plans are reasonable in the Level of Service analysis. Request Level of Service output data sheets if they weren't included in the study appendix.
12. Does the delay and queue data match your experience in the study area?
13. If an upgrade in traffic control is recommended, is a warrant analysis included per the MUTCD?
14. Do the proposed access points meet agency access spacing guidelines? If not, full justification is needed for a variance.
15. Is sufficient right-of-way being dedicated to provide for long term traffic control and roadway geometry that may be needed?
16. If improvements are needed, who's paying?
17. Do the recommendations make sense (is there a better solution or are superficial improvements being recommended)?
18. Are there sight distance obstructions at any of the study intersections? A drive around the study area is recommended.