

19 TRAFFIC ANALYSIS REPORTS



This is the original APM v1 Chapter 11 text. An update is in progress.

19.1 Purpose

Traffic analysis reports are a comprehensive explanation of the final recommendations and the decision making process for a project. This chapter presents an overview of the elements that document the assumptions, methods, findings and recommendations of a traffic analyses. Topics covered include:

- Background
- Technical Memorandum
- Traffic Narrative Report

19.2 Background

This chapter presents an overview of the elements that document the assumptions, methods, findings and recommendations of a traffic analyses. In many cases the narrative and associated diagrams are developed incrementally during the study process in the form of Technical Memorandums, and then circulated for review and discussion at key milestone points during the project review. Any revisions to the Technical Memorandums or new directions in the study analysis are carried forward and then compiled into a full Traffic Narrative at the end stages of the study. The Final Traffic Narrative serves as the legacy document for the study, and should be comprehensive enough to explain and support the final recommendations and decision-making process that led up to it.

19.2.1 Technical Writing Tips

Presentation of technical information in a clear, concise and readily understandable way can be challenging in many regards. This section is not intended to fully answer those challenges, but to highlight several important tips that help to make a technical document achieve these goals. The narrative author is encouraged to avail themselves of training materials or mentors that could help them become proficient technical writers. A few basic tips to suggest in preparing any report include the following:

- **Target Audience:** The intended audience for the report will help to determine the appropriate level of assumed technical knowledge about the subject at hand, and their assumed understanding of the review, adoption and implementation processes for a particular project. In general, the majority of traffic reports will be developed for the review and implementation by staff within, or contracted by, ODOT. In general, these team members have minimal background in the technical traffic issues, but significant experience with the overall process involved. To this end, the technical aspects and

outcomes of the project should be clearly explained with a minimum of technical detail necessary to support and explain the narrative. This is very important because writing at the wrong level can generate unintended questions. More extensive technical calculations, findings and other reference materials should be attached to the document as appendices.

In most cases a document could be circulated to the general public, the press, or other outside agency. In these cases, many of these more fundamental assumptions and process steps should be clearly detailed in the narrative. Presentations to the CAC groups generally handled like any general public group, with the focus on overall process, criteria, outcomes, recommendations and next steps, with a bare minimum of technical content.

- **Tone and Style:** It is recommended that the narrative, in all cases, remain objective, impartial and impersonal so that the findings and recommendations are untainted by any biases. It should be recognized that any internal ODOT document might be released for public review outside of the designated committee groups. This could occur by informal sharing in the interest of coordination or, more formally, through a legal search warrant. All report narrative documents should be treated as if the general public and press will review them, even though many only circulate to the immediate committee members. No matter the purpose or scope of the report, it is vital to maintain a clear and objective style without introducing biases into a traffic report. To be clear that any recommendations are those of the author, not necessarily of ODOT, it is preferred to use the phrase, “It is recommended that . . .”
- **Readability and Document Structure:** The following sections of this chapter have suggestions about the narrative general layout of the document, but these should be tailored, as appropriate, to address individual study scopes and objectives. One of the keys for rapidly understanding materials is to divide the document into a logical, easy-to-follow flow of narratives, summary tables and illustrations that are grouped according to key topics. In a report, for example, they would be grouped by chapter, or by sub-topic in a lengthier chapter. This basic structure provides a convenient framework for presenting and referencing a wide range of materials.
- **A Word About Acronyms:** A comprehensive list of acronyms used in transportation evaluations are assembled in the [Glossary](#) of this manual for reference purposes. However, care should be taken when developing the report narrative to limit the use of acronyms, except for the most common ones, that appear repeatedly throughout a particular document. The most common examples might include: ODOT, v/c ratio, OHP and HDM. Excessive use of acronyms can quickly degrade the readability of the narrative, even when the reader understands their meaning. It is standard practice to introduce any acronym in the narrative when it is first used by defining it. In longer reports, it is also useful to attach a short list of all the acronyms used in the report as a quick reference guide.

19.2.2 Diagrams and Illustrations

Technical diagrams can be a powerful resource for quickly explaining report assumptions, findings and recommendations. One measure of a high quality report would allow a reader to scan through the study tables and figures, and then be able to glean the general conclusions

without reading any of the narrative. For the purposes of traffic study reports, the technical diagrams include the following list of typical illustrations:

- Study area map.
- Local street and highway system.
- Traffic volumes on links or turning movements at intersections or junctions.
- Trip patterns or trip distribution routes.
- Lane diagrams of existing or proposed intersection approaches.
- Existing or proposed circulation routes within the study area.
- Existing and proposed street or ramp centerline alignments.
- Alternative street improvement scenarios.
- Preferred street improvement scenario.
- Land use and zoning maps.

The best report graphics clearly label key reference streets, maintain a reasonable minimum 8-point font size, and avoid trying to illustrate many layers of new information at one time. A good rule-of-thumb is to limit the number of new layers to three or less for any diagram. Examples of different information layers would be streets, peak hour volumes and functional street class. Complex diagrams can be developed in stages, explaining each new set of layers. In general, street project alternatives should be illustrated on separate diagrams.

All documents need to be legible and usable in black and white.

19.2.3 Tables

Summary tables should be included for ease in making comparisons among scenarios and alternatives. Failing conditions should be denoted with white text on a black background. The preferred software to build tables is MS Word as opposed to MS Excel, due to formatting issues, although MS Excel may be acceptable for appendices.

19.3 Technical Memorandum

19.3.1 Purpose

A technical memorandum (TM) typically addresses one major stage of the project evaluation process, and presents the analysis, findings and any potential next steps for that stage. Subsequent technical study stages build on the information presented in the previous memorandums, and allow for an incremental process to assess, refine and build consensus on the preferred project. These technical memorandums are also described in Chapter 2.

19.3.2 Products

The focus of a technical memorandum can vary widely, but, in general, they include the following technical materials, in a typical 3-stage study development process.

TM #1 - Existing/No-Build System Analysis: This memo presents the key system inventory features and performance deficiencies that will shape development of study alternatives. The

memo should include statements on the project purpose and need, study area background, and existing and future volume development. Discussed results should include the crash analysis and possible countermeasures, preliminary signal warrants, access or spacing issues, the volume-to-capacity ratios and LOS, if appropriate, and the 95th percentile queues.

TM #2 - Preliminary Alternatives Screening: This memo presents the screening criteria, the initial roster of project alternatives and the scoring of how well the preliminary alternative matched up with the screening criteria. Screening criteria are more general indicators of performance. This could include performance analyses, or these could be deferred until the next stage. Screening performance results typically include Level of Service results, volume-to-capacity ratio results and model-based results (travel times, speeds, v/c ratios, relative comparisons). Remember to keep track of the reasons why alternatives were dropped (will be needed for the narrative).

TM #3 - Future Alternatives Analysis: This memo presents the detailed evaluations of all alternatives that progressed through the screening process. These alternatives have full performance assessments and any other related evaluations (preliminary environmental, compliance with standards, etc.) as defined in the study criteria. Detailed performance results typically include Level of Service results, volume-to-capacity ratio results, 95th percentile queues, storage lengths required and simulation results.

For consultants doing ODOT analysis work, all input and output sheets shall be included with all technical memos and narratives.

19.3.3 Distribution

The technical memorandums should be distributed to the PT and the CAC for review and comment. The Region Traffic Manager should be added to the distribution list where he/she is not a member of the PT.

19.4 Traffic Narrative Report

19.4.1 Purpose

The majority of the traffic study analysis will be completed by the point that the Draft Traffic Narrative Report is developed. The purpose of this report is to present the final solution selected from the study alternatives.

19.4.2 Product

The Draft Traffic Narrative Report should present the full study process and outcomes, include the interim Technical Memorandums and any feedback from work team committees or other ODOT units that reviewed and commented on this effort. The major step to be completed with the Draft Traffic Narrative Report is to provide conclusions on the function of alternatives from a traffic analysis standpoint.

The project team selection process for a preferred alternative overall uses the analytical evaluation outcomes, relative scoring evaluations to isolate one alternative, or a hybrid of several alternatives that best meet the study objectives. This is necessarily a collaborative process with established Project Management Team members and affected ODOT technical units.

The report itself should be developed consistent with the following standard outline. [Example Narratives](#) have been provided in the APM Appendices.

Sample Outline

- **Cover Sheet**
 - Agency/Company Title, Division, Unit, City, State (in header, footer or along bound edge)
 - “Project Title Traffic Analysis” (to clarify that this is just the traffic analysis)
 - City (if applicable) and County
 - Highway Name, Number and Route Number
 - Milepoint Range
 - Month and Year report published
- **Title Page**
 - “Project Title Traffic Analysis” (to clarify that this is just the traffic analysis)
 - Highway Name, Number and Route Number
 - Milepoint Range
 - Full Mailing Address
 - Prepared by and reviewed by (including stamp by preparing PE or reviewing PE if preparer is not registered; requires signature of non-registered preparer)
- **Table of Contents, List of Figures, List of Tables, List of Appendices**
- **Executive Summary:** Summary of report including purpose, need, scope of alternatives, re-statement of conclusions and alternative recommendation.
- **Background Information:** Overview of study area including vicinity and study area maps, affected facilities and jurisdictions, past project or planning decisions that could influence outcomes, general problem statement and objectives for the study.
- **Existing Conditions:** Inventory and analysis of base year facility and operating conditions.
- **Future Year Forecasts and Needs (No-Build):** Horizon year traffic forecasts and performance assessment on the existing street system with no project improvements. Agreed upon baseline projects should be included. See Chapter 9 for more details.
- **Preliminary Alternatives Screening:** Screening criteria, concept alternatives to address outstanding needs and preliminary screening of alternatives with highlight of those set aside from further evaluation.
- **Alternative Results:** Discussion of performance results for each analyzed alternative for the build, interim and design years.
- **Alternative Summary:** The alternatives are compared and contrasted against each other, including a summary table, according to appropriate performance measures.
- **Conclusions:** The analyst should be careful to make conclusions based on the traffic analysis, rather than recommendations on a preferred alternative, as the best alternative from a pure traffic standpoint may not be the best overall. The analyst should coordinate

with the PT Leader if it is desired to also report the recommendation by the project team as to the overall preferred alternative.

- **Further Areas of Study:** Optional
- **Appendices**
 - Crash History: Detailed crash analysis and listing of crashes in study area.
 - Record of Calibration: The calibration record will vary in detail level and length by project, but the record should address the following items;
 - A table or list citing all changes that were made to the inputs or model modules to achieve calibration, beyond the standard changes that would occur after collecting field inventory (standard list found in Section 3.2). This list or table should include
 - the issue that was occurring before the change was made,
 - the goal of the change, and
 - some record how the change improved the calibration.
 - For each Measure of Effectiveness (MOE) of the calibration, include a table that shows the before and after results for each MOE. Before results should be with all standard inputs, but no changes beyond the standard adjustments. After results should recorded after all changes to achieve calibration were included in the model. Minimally, the APM requires that the MOE – “Vehicles Exited” be used to assess the calibration of microsimulations (for SimTraffic, for other software use a comparable measure that sums vehicles making individual movements).
 - The record should indicate that every movement met the calibration standards described in section 8.3 for “Vehicles Exited” (8.3 is specific to SimTraffic, but simulations in any software should meet this criteria).
 - Traffic Development: Count locations, explanation of base and future volume development, includes land use and zoning maps.
 - Existing Year Volumes: Volume diagrams for the existing (base) year.
 - Build Year Volumes: Volume diagrams for the build year.
 - Future No-Build Volumes: Volume diagrams for the future No-Build year.
 - Alternatives Considered but Dismissed: Short description of each dismissed alternative including why it was dropped.
 - Build Alternative Volumes: Volume diagrams for each alternative. Each build and design year for each alternative will be a separate appendix.
 - Analysis Methodologies: Boilerplate text on analysis methods used.
 - EIS Traffic Data: For No-Build and Build alternatives, including link diagrams.

The volume diagrams in the report should include the Preferred Alternative, and any other alternatives that were evaluated for the purposes of the environmental review process.

Technical appendices, including all data, and all software input and output files and reports should be burned to CD or DVD, and retained in the ODOT file. For consultants doing ODOT analysis work, all input and output sheets shall be included with all technical memos and narratives.

A draft of the narrative needs to be sent to Region Traffic, TEOS, the project leader, the Roadway designer, Environmental and any others who may be affected, for review and comment.

19.4.3 Distribution

Upon incorporation of comments received on the draft, the Traffic Narrative Report should be signed and stamped, and should be distributed to the following in addition to the draft reviewers:

- Project Teams
 - Project Development Team
 - Citizen Advisory Committee
- ODOT Region/District Groups
 - Traffic Operations
 - Region Traffic
 - Roadway
 - Environmental
 - Geo-Hydro
 - Bridge