

# **Minnesota Department of Transportation Research Report Guidelines**

*Prepared by*

**Center for Transportation Studies  
University of Minnesota**

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*NOTE:*

**Please check the following Web sites for updates of this document and the requirements for publishing research reports:**

**Mn/DOT Research Site: <http://research.dot.state.mn.us>**

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## Acknowledgments

This guide draws ideas and some language from the following sources:

1. Upper Great Plains Transportation Institute. *Research Report Guidelines*. 2007.
2. Arizona Transportation Research Center. *Guidelines for Preparing ATRC Research Reports*. 2003.
3. Utah Department of Transportation–Research Division. *Guidelines for Preparing Utah Department of Transportation Research Reports*. 2007.
4. Washington State Department of Transportation. *Research Report Guidelines*. 2007.

The metric units in this guide are those adopted by the U.S. government (see the *Federal Register* of December 20, 1990; Federal Standard 376A, *Preferred Metric for Use by the Federal Government*; and PB 89-226922, *Metric Handbook for Federal Officials*). They are identical to the units in the following publications, which constitute the standard reference works on metric in the United States:

- ASTM E 621, *Standard Practice for Use of Metric (SI) Units in Building Design and Construction*, and  
IEEE/ASTM SI-10, *Standard for Use of the International System of Units (SI) – The Modern Metric System* (revision and redesignation of IEEE Standard 268 and ASTM E 380).

For editorial matters, also refer to:

- American National Metric Council, *Metric Editorial Guide*, and
- U.S. Metric Association, *Metric Units of Measure and Style Guide*.

See the “Metric References” section of this guide for ordering information.

## METRICATION

The United States Congress passed legislation in 1998 making the use of metric units of measurement by states optional for the highway industry. On January 26, 1999, the decision was made that Mn/DOT would revert to the English system of units. However, Mn/DOT Technical Memorandum No. 99-14-TS-02, dated April 8, 1999, states that due to reporting needs to the Federal Highway Administration, and other national/international implications, metric units will continue to be used for research documents. Mn/DOT reports should include metric units of measurement, followed by English units in parentheses. Example: 178 mm (7 inches).

# Chapter 1

## Understanding the Process

### 1.1 Report Review Process

Research reports go through a technical and editorial review process before the final submittal of the report. Here is a quick look at the report review process.

- The Principal Investigator (PI) works with the project's Technical Advisory Panel (TAP). The panel consists of the PI, Technical Liaison (TL), Administrative Liaison (AL), and other experts who may contribute to the project and provide input during the research process and the writing of the report.
- When a draft research report is ready, researchers should submit a Draft Submission Cover Sheet and a PDF file of the draft report for editorial and technical review to the Director of Research Administration at CTS. She/he records the delivery and turns it over to the Program Coordinator, who distributes copies of the report to the TL for technical review. The TL distributes it to the TAP members. The TAP returns their technical comments to the TL, who then turns them over to the Program Coordinator. The Program Coordinator then sends them all to the PI for incorporation.
- Once technical comments have been incorporated, the PI sends the draft back to the Program Coordinator so she/he can send it out for editorial review. If the need is immediate, the Program Coordinator will have both the editorial and technical reviews done simultaneously.

(Reports must follow the editorial guidelines that are outlined in Chapter 2, *Formatting the Report*. The guidelines help ensure quality and consistency in the presentation of research results. It is highly recommended that all researchers review this chapter prior to working on a draft report. A great deal of time can be saved by following these guidelines from the beginning of the process.)

- The PI receives editorial comments from the Program Coordinator and incorporates them into the report. The TL and the Program Coordinator are available to resolve questions or concerns.
- The PI submits, in separate files, the report, the Technical Report Documentation Page, and an Executive Summary in one of the following formats: Microsoft Word (2003 compatible), Rich Text Format (RTF), or Unicode (UTF-8 or UTF-16) text to the Program Coordinator. The PI also submits the final PDF of the entire report.

Chapter 3, *Preparing the Electronic File*, outlines the deliverable requirements. Use both the "Draft" and "Final" Submission Cover Sheets to make sure you are including all the required deliverables during both submissions.

- A last review of the final deliverable will take place. If necessary, the PI may be asked to make minor corrections and resubmit deliverables.

## **1.2 Distribution**

Promoting the availability of research results is an important component of advancing implementation and innovation. With electronic publishing, communicating the availability of research reports takes a different form.

Mn/DOT will send e-mails announcing newly published research reports to transportation practitioners on its Report Dissemination Categories list. The project's TL checks those boxes he/she feels should receive the announcement. PIs may submit additional e-mail addresses.

In addition, Mn/DOT will continue to highlight research results and the availability of research reports in its publications and communications.

## **1.3 Responsibilities**

Electronic publishing involves several key steps, with researchers and Mn/DOT sharing responsibility for the tasks involved in publishing a research report.

The following summary describes who is responsible for the key tasks.

Researchers (PIs) are responsible for the following tasks:

- Producing a PDF file of the draft research report
- Submitting all deliverables as outlined in the deliverable section
- Submitting e-mail addresses of those they would like to receive announcements of report availability
- Addressing all technical comments. In cases of disagreement regarding technical or editorial content, the Administrative Liaison will start a resolution process.
- Incorporating editorial comments
- Adhering to these guidelines. Exceptions to the guidelines are allowed if they add to the reader's understanding of the content. These guidelines are specific to Mn/DOT reports and may differ from requirements of other publishing organizations.

CTS is responsible for the following tasks:

- Working with the TL to facilitate the addressing of technical comments
- Providing editorial review
- Reviewing draft and final reports
- Generating report covers

Mn/DOT is responsible for the following tasks:

- Posting PDFs to the Web site
- Sending e-mail announcements

## **Chapter 2**

### **Formatting the Report**

These guidelines apply to research reports that are produced for the University of Minnesota's Center for Transportation Studies (CTS) and the Minnesota Department of Transportation (Mn/DOT). Researchers who prepare reports are responsible for following these guidelines, which help ensure quality and consistency in the presentation of research results.

#### **2.1 Report Format**

Reports must be formatted according to these guidelines. Reports that are not formatted according to the guidelines will be returned to the author, who will be responsible for revising the report.

##### **2.1.1 General**

- Follow the *Chicago Manual of Style* for guidelines related to punctuation.
- Another information source is *Guidelines for Preparing Federal Highway Administration Publications* (Chapter 5 of FHWA's *Publications and Printing Handbook*), found here: <http://www.fhwa.dot.gov/legsregs/directives/orders/h17104.htm>.
- Your report will go through an editing process at the University of Minnesota's Center for Transportation Studies (CTS). The editor will primarily check for compliance with these formatting guidelines. It will be the author's role to make corrections in response to the edit. Please note that the editor will not check for grammar and spelling except in the Executive Summary and abstract. Frequently, issues (i.e., hyphenation) that are flagged in the Executive Summary are also prevalent throughout the report. It is the author's role to check the remainder of the report for these issues as well as for errors in spelling, grammar, mathematical equations, etc.
- It is the author's role to obtain permission to use copyrighted material. Permission must be obtained to use any table, photo, artwork or significant excerpts of text. The author will be liable for any violation of copyright laws.
- Do not use footnotes for references. However, a footnote can be used as a supplementary comment that does not warrant its own appendix. Only use an asterisk if a numeral could lead to confusion (i.e., being mistaken for an exponent).
- Be consistent in the use of capitalization, hyphens, titles, specialized terms, etc., with the exception of material that is directly quoted or imported appendix content.

##### **2.1.2 Font**

- Use the typeface Times, or a variation of Times, as the report font. Select at least 11-point type for body copy; 12-point is the recommended font.

##### **2.1.3 Report Pages**

- Use one-inch margins on all sides.
- Single-space the report body.
- Begin each chapter on its own page; include the chapter's title at the top of the page.

- Use Arabic numerals for page numbering in the report's body. Start page numbering with the introduction (Chapter 1). This page numbering style should end with the references.
- Leave the Technical Report Documentation Page, Title Page, Acknowledgments, Table of Contents, List of Tables, List of Figures, and Executive Summary unnumbered. An exception can be made for the Executive Summary if you wish to use lowercase Roman numerals to distinguish it from the rest of the report.
- Center page numbers at the bottom of the page within the one-inch margin.
- Do not include author name, decorative elements, date, logos, or other information on the top or bottom of the page.
- Do not include any blank pages in the report
- Avoid placing the last line of a paragraph by itself on a following page, particularly when it would fall on an otherwise blank page. Likewise, avoid positioning the first line of a paragraph alone on a preceding page.

#### **2.1.4 Abbreviations**

- Define abbreviations, acronyms, and symbols the first time they appear, both in the Executive Summary and the report text, and then use the abbreviation in additional uses; for example, the Federal Highway Administration (FHWA).
- Be sure to spell out the Minnesota Department of Transportation the first time it appears and use the correct abbreviation in subsequent references; for example, the Minnesota Department of Transportation (Mn/DOT).

## **2.2 Report Contents**

Organization of the report may vary depending on its subject, length, and complexity. However, in most situations reports should contain the following elements in the order shown below:

- Report cover (furnished by CTS)
- Technical Report Documentation Page
- Title Page
- Acknowledgments (optional)
- Table of Contents
- List of Tables and List of Figures (not required for reports with fewer than 10 pages)
- Executive Summary (3-page maximum)
- Report Body
  - Chapter 1: Introduction
  - Subsequent Chapters
  - Final Chapter: Recommendations and/or Conclusions
  - References
- Appendices (optional)

Direction on each of the above elements is provided below. Please note documents that should be sent as separate files.

### **2.2.1 Report Cover**

CTS furnishes this item.

### 2.2.2 *Technical Report Documentation Page*

Submit the Technical Report Documentation (TRD) Page as a separate Microsoft Word, RTF, or Unicode text file. Information services and libraries use information on this page for their databases, which transportation practitioners and others access to find information.

Either fill in the following elements of a blank Technical Report Documentation Page or provide the following information:

- Title and subtitle
- Report date
- Author(s), name, and address of organization that conducts the research
- Contract or grant number
- Sponsoring agency name and address
- Type of report (final, interim)
- Abstract (maximum 250-word summary of the report's most significant information)
- Document analysis/descriptors (also known as keywords)

Note: Keywords are terms that would call attention to a report in a Web search.

An example and instructions for completing the TRD page are shown in Appendix A. If a report consists of separate volumes, a TRD page is needed for each volume.

### 2.2.3 *Title Page*

Submit the title page as a separate Microsoft Word, RTF, or Unicode text file. Provide the following information for the title page, vertically and in order:

- 1) Title of the report in **bold**. Note that the title is limited to 250 characters including spaces.
- 2) Type of report (final report, interim report, summary report, other) in **bold**.
- 3) Prepared by: (can be *italicized*, but not necessary)
- 4) Author's name(s) (only separate names if from different organizations)
- 5) Organization(s) represented by the author(s).
- 6) Date (month, year) of publication (same size font as #2) in **bold**.
- 7) Published by (can be *italicized*, but not necessary):  
Minnesota Department of Transportation, Research Services Section, 395 John  
Ireland Boulevard, Mail Stop 330, St. Paul, MN 55155 (five lines total).
- 8) Any applicable disclaimer(s).

Use this disclaimer:

This report represents the results of research conducted by the authors and does not necessarily represent the views or policies of the Minnesota Department of Transportation or (author's organization). This report does not contain a standard or specified technique.

When mentioning products, add:

The authors, the Minnesota Department of Transportation, and (author's organization) do not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to this report.

See Appendix B for title page layout and examples of title pages using various disclaimers. Use the format shown on these examples and choose font styles and sizes that are complementary to those used in the report text.

#### **2.2.4 Acknowledgments**

The inclusion of acknowledgments is optional. The Acknowledgments page recognizes the individuals and organizations that significantly contributed to the research project. Keep acknowledgments to a maximum of one page. The Acknowledgments page comes before the Table of Contents and the Executive Summary. See Appendix C for examples.

#### **2.2.5 Table of Contents**

General rules for the Table of Contents are as follows and are illustrated by example in Appendix D:

- Reports consisting of 10 pages or less do not require a table of contents.
- Titles for each chapter listing should read exactly as in the report body.
- Tables of contents should reflect the hierarchy of chapters and sections. Hierarchy can be reflected by indenting sections. Table of Contents items should be identical to text headings. Appendix titles (but not page numbers) should be included in the table of contents.
- If chapters are written separately by different authors, their names should not appear in the Table of Contents, but should be noted under the appropriate chapter heading in the report body.
- The Table of Contents should not include a listing of any pages that are not numbered.
- Table of Contents pages are not numbered.

#### **2.2.6 List of Tables and List of Figures**

If the report includes tables and figures, a List of Tables and List of Figures are required, following the Table of Contents. The list of tables and/or list of figures sequentially lists each table/figure number and title, as well as the page number on which the table/figure appears. You may add the List of Figures and/or List of Tables on the same page as the Table of Contents, if space allows without going to a new page. Otherwise, begin the List of Tables and/or List of Figures on a new page.

#### **2.2.7 Executive Summary**

An Executive Summary is required for all Mn/DOT reports. Submit the Executive Summary as a separate Microsoft Word, RTF, or Unicode text file. The Executive Summary provides a concise synopsis of the research issue, the main findings or results, conclusions, the significance of the research, and recommendations. Limit the length of the Executive Summary to no more than three pages. The Executive Summary should be able to stand alone as a brief summary of the research project. Because it is written for a general audience, technical details should be limited.

Readers often turn first to the Executive Summary for an overview of the project. Because of its importance, you may be asked to rewrite or rework the Executive Summary to better reflect the research project findings and conclusions.

In cases of a complex research project with multiple parts, researchers may choose to prepare a summary document, usually 10 to 20 pages. This summary document may be produced as its own report, with the approval of CTS or Mn/DOT. This does not replace the need for an Executive Summary in the main report.

In a few cases, because of patent rights or length and complexity of the material, only an Executive Summary will be published. In this instance, the summary will be longer and contain more detail. The decision to publish only an Executive Summary will be made jointly by the Technical Advisory Panel, Mn/DOT's Research Services Section (RSS), the PI, and other relevant Mn/DOT offices. Note that a decision to publish only an Executive Summary does not eliminate the author's contractual requirement for submittal of a full report to Mn/DOT in publishable format. [The cover and box #13 of TRD will state "Summary Report."]

### **2.2.8 Introduction**

The Introduction serves as the report's first chapter. It addresses the following:

- The purpose of the report (research objective)
- A description of the research problem and its historical background
- Research goals and the basic approach to the project
- The scope and limits of the research. This describes what is and is not covered in the report
- A brief overview of the general organization of the report

Unlike the Executive Summary, it does not include research results, conclusions, recommendations, or implementation.

While both the Introduction and the Executive Summary discuss the research issue, the Introduction describes the research issue within the context of preparing the reader for what is to follow in the text of the report. It emphasizes the historical background of the research problem, what the research attempts to discover, and the basic scheme of the procedure or methods used. The Introduction also briefly describes the general organization of the report so that the reader knows what to expect.

The Introduction will vary depending on the objectives stated in the work plan. In some cases the Introduction may mention previous research done in the report's topic field including the chief contributions of others.

### **2.2.9 Report Body**

The report body's organization and content vary depending on the nature of the research project, but usually follow the direction that the work plan outlines. Information to be included and organization of the report will be determined during the various TAP meetings and will usually follow the direction indicated in the work plan. Most reports include the background of the research problem; the research approach and methods; an analysis of research results; conclusions; and recommendations for implementation and further testing. Segment the report into chapters numbered sequentially beginning with Arabic numeral 1. Subheadings may be distinguished either by numbered subsets (1.1, 1.2, etc.) or through font changes and indentations as used in this document. Start each chapter on its own page, with the introduction as the report's first chapter.

Design headings to distinguish chapters, sections, subsections, etc., from each other as well as from body text and table/figure labels. Consistency is the most important aspect of heading format. Make chapter headings stand out the most (i.e., larger font, centered, bold). Make other levels of headings display hierarchy through diminishing size and/or distinction. For example:

- Level 1 chapter titles (including “Acknowledgments,” “Table of Contents,” “References,” etc.): **Times, 14 point, bold, centered**
- Level 2 (i.e., 1.1): **Times; 12 point; bold**
- Level 3 (i.e., 1.1.1): Times; 12 point; not bold; *italics* or underline
- Table/Figure Labels: **Times; 11 or 12 point; bold; no italics or underlining**
- Body text: Times, 11 or 12 point (12 recommended); not bold; no italics or underlining

### ***2.2.10 Conclusion and Recommendations***

The final chapter within the body should generally contain recommendations and/or conclusions.

### ***2.2.11 References***

Do not cite references through the use of footnotes in the report’s text. Instead, place a reference number to a citation in parentheses or brackets at the end of a sentence in the text, like this [1]. Create a reference section at the end of the report, which lists the full citations in the report body. Full citations appear in the same order as in the report body with the corresponding number. If you cite the same reference more than once, continue to use the same number first assigned to the reference in the report body. See below for examples on preparing the references.

List complete references, including names of authors or editors; article titles; chapter, book, journal, or report title; publisher or issuing agency; location of publisher and year of publication; volume and issue or report number; and page numbers.

In the main reference list, include only references cited in the text, numbered in the order in which they are first cited. If you wish to list other references that are not cited in the report, use the same format, but without numbering each. These should be listed under a separate heading, “Additional References.” Place this immediately after “References” but do not list it separately in the Table of Contents.

Attribute unpublished material, telephone conversations, and other personal communication in the reference section. Your report may be returned to you if key information is missing.

For Web sources, include the complete URL and the date accessed. Because of the impermanence of Web pages, be sure to include enough detail so that a user can find the source even if the URL changes over time.

Use the samples cited in Appendix E to establish a consistent citation style. While the first style in the examples that follow are preferable, you may use another style (such as author-date) as long as you follow it consistently throughout and include the required information.

### **2.2.12 Appendix(es)**

Appendices, which are placed at the end of the research report, consist of materials that support the report but are not critical in understanding project results. Appendices follow the report body.

- Label appendices by letter (Appendix A, Appendix B, Appendix C, etc.)
- Include an unnumbered title page for each appendix. The title page should include the Appendix letter (for example, Appendix A) and the appendix title.
- Begin numbering each appendix after the title page. Use the following page numbering system for each appendix: letter of appendix followed by a dash and page number (i.e., A-1, A-2, A-3, etc., for Appendix A, and B-1, B-2, B-3, etc., for Appendix B, etc.)

### **2.2.13 Graphics**

The inclusion of graphics is optional. Because some readers may print reports in black-and-white, use colors that will allow for clear and legible graphics to be printed in black-and-white. Mn/DOT acknowledges that this is not always possible. Clarity can be created through the use of patterns such as lines, cross-hatching, and dots.

- Provide graphics that are extractable in their original form. If they are not extractable from a Microsoft Word file, provide them in a separate (e.g., .jpg) file.
- Place graphics immediately after they are referenced in the text, at the end of the applicable chapter, or in the appendix section.
- Embed graphics in the page on which you intend them to appear in the report; do not use object links to other files.
- Make all efforts to avoid placing graphics so the report must be turned sideways for viewing. If sideways placement is unavoidable, place it so that the top of the graphic is on the left side of the page.
- Check to make sure that your colors convert properly after saving the file as a PDF document.
- Include brief captions to describe each graphic.
- Keep the type size to 10 points or larger to ensure legibility.
- Number tables and figures separately and consecutively as they appear, and use a two-number format to indicate the chapter number (for example, Figure 1.1 is the first figure in Chapter One).
- Refer to each table and figure in the text.
- Place table numbers and titles above the graphic. Place figure numbers and titles below the graphic.
- Illustrations do not always look the same in printed form as they do on a computer screen. Use the highest possible resolution.
- Where possible, reference appendices in the text.

## Chapter 3

### Preparing the Electronic File

The requirements in this chapter are critical to facilitating the electronic publishing of research reports.

#### 3.1 Electronic Publishing Requirements

Follow the requirements in this chapter when submitting a research report for publishing. All research reports will be disseminated in PDF using e-mail and the Internet. Our goal is to receive all draft and final report submittals in PDF. You may use whatever software you prefer to generate the report, as long as it can produce PDF files for the draft and final submittals. If you cannot create PDF files from your software, consider using a third party vendor that can scan a camera-copy-printed report into PDF format.

Remember also to follow the editorial guidelines in Chapter 2: *Formatting the Report* when creating the report.

##### 3.1.1 Software

- Use Microsoft Word (compatible with Word 2003) to create the report. (Be certain that Adobe Acrobat can convert the file format to PDF before selecting the software.)
- Use Adobe Acrobat software to generate a PDF file from your document. (Use Adobe Acrobat distiller to create the PDF.)
- Test your PDF file by opening and printing it for a visual check.

##### 3.1.2 Graphics

- Embed graphics into the document
- Do not use object links to other files. (An object link is a highlighted link to a separate file, often a file that contains a graphic. Even if the separate file is provided, the file may not be placed into the PDF during PDF conversion.)

##### 3.1.3 Maps and Special Graphics

- If the graphic is small, generate a TIF file at a resolution of 200 dots per inch and import the TIF file into your document
- If the graphic is large or created in a specialized software, generate a PDF of the graphic from the software. (Leave a blank page in the PDF report file as a placeholder where the graphic should appear and then insert the PDF of the graphic in place of the blank page. Please note the PDF of the graphic will take at least one page, even if it appears less than one page.)
- If it is not possible to generate a PDF of the graphic, scan the graphic and insert it in the PDF report file

##### 3.1.4 Files

- Include all parts of the report, except the Title Page and Technical Report Documentation Page, as one document

- Provide a separate file of the executive summary in Microsoft Word, RTF, or Unicode text (also must be included as part of the PDF file).
- Save the PDF in Adobe Acrobat version 7 or higher.
- Select keywords that describe the document and type them in the keywords section under PDF options/document information. (These keyword descriptors help online users find your report.)
- When converting, select the option to generate a high-resolution PDF file. (As part of its preferences, the Adobe Acrobat software offers the option of producing a high-resolution PDF. Select “High-Quality Print” in the Acrobat options.)

### **3.1.5 Other Documents**

- Scan those documents that are not electronically available and insert them into the PDF report file.
- Scan graphics at a resolution of 200 dots (pixels) per inch.

### **3.1.6 Macintosh Users**

- Save files with extensions for easy identification (for example, title.doc, report.PDF).

### **3.1.7 File Labels**

- Submit the files on a CD-R or CD-RW disk.
- Clearly label all disks with the report title and date.
- Submit a listing of all files contained on the disk, including software, description of each file, and date.
- Include the author and title of PDF files when naming the PDF file(s).

## **3.2 Deliverable Requirements**

The Principal Investigator is responsible for providing the deliverables listed below, after addressing all technical and editorial comments. Provide deliverables on a CD-R or CD-RW disk. Clearly label all files. Deliverables must follow the standards set forth in Chapter 2: Formatting the Report.

1. High-resolution PDF file of the entire report, including all figures, tables, and appendices
2. Title Page file (Microsoft Word, RTF, or Unicode text)
3. Technical Report Documentation Page file (Microsoft Word, RTF, or Unicode text)
4. Executive Summary file (Microsoft Word, RTF, or Unicode text). The Executive Summary must also be included in the complete report PDF
5. The complete report in Microsoft Word, RTF, or Unicode text format (Microsoft Word is preferred). If a research report is prepared using other software, it is the researcher’s responsibility to provide it in a form that can be converted easily to Microsoft Word.
6. Draft and Final Submission Cover Sheets with descriptors
7. E-mail addresses of those whom you would like to receive an e-mail announcement of the report’s publication on the Internet
8. Any graphics that could be used in other communications in separate files (save as .jpg or .gif)

## **Chapter 4**

### **Frequently Asked Questions**

**Q: Why are reports published on the Internet?**

**A:** In 2001, the Minnesota Department of Transportation (Mn/DOT) and the Center for Transportation Studies (CTS) at the University of Minnesota began exploring publishing research reports on their respective Web sites as an alternative to traditional print publishing for several reasons. The use of Web publishing helps avoid delays in printing and distribution that may occur with traditional publishing. In addition, the use of the Internet as an information source has grown and will continue to grow, making it an increasingly effective medium to reach transportation practitioners throughout the world

**Q: What is a PDF file, and how do I prepare one?**

**A:** Any Internet user with Adobe Acrobat Reader software can open, print, and download a Portable Document Format (PDF). PDF files are easy to load onto a Web site, and for the most part PDF files replicate the format of the original file. Adobe Acrobat Reader often comes with software packages and also can be downloaded at no cost to users. The PDF file is the least complicated method for researchers, Mn/DOT, and CTS to prepare a document for Internet use.

**Q: Where do I turn if I have trouble producing a PDF file?**

**A:** To create a high-resolution PDF file of a document, you will need the full version of Adobe Acrobat software, which includes the distiller that generates PDF files. This software is available for purchase. The Adobe Web site at <http://www.adobe.com/products/acrobat> has information about the full version of Adobe Acrobat, and Planet PDF at [www.planetpdf.com](http://www.planetpdf.com) provides tips and resources about creating PDF files. In addition, many local service bureaus can generate PDF files for you.

**Q: What if I need to use special software?**

**A:** Often researchers use specialized software to generate maps, figures, or mathematical formulas. To incorporate those maps, figures, or mathematical formulas into a document or PDF, generate a TIF file from the specialized software and import the TIF file into the document in the location where you want the graphic to appear. If this does not work, generate a PDF of the graphic from the software. Leave a blank page in the PDF report file as a placeholder where the graphic should appear and then insert the PDF of the graphic in place of the blank page. Please note the PDF of the graphic will take at least one page, even if it appears less than one page. If it is not possible to generate a PDF of the graphic, scan the graphic and insert it in the PDF report file

**Q: What if I have documents that are not available in electronic form?**

**A:** If you have documents as part of your report that are not electronically available, scan those documents and insert them into the PDF report file.

**Q: Who prepares the cover?**

**A:** Do not prepare a cover. Mn/DOT or CTS will prepare the report cover with the correct report number and incorporate it into your PDF.

**Q: Why must I submit separate files for the title page and Technical Report Document Page?**

**A:** Mn/DOT and CTS add information to the Title Page and Technical Report Document Page. By submitting only Microsoft Word files of those documents, Mn/DOT and CTS can add the necessary information, generate a PDF, and incorporate the PDF into your PDF of the report.

**Q: Why is it important for me to provide keyword descriptors about the project?**

**A:** Libraries and search engines use those keyword descriptors to categorize reports. Accurate keyword descriptors help users locate your report on the Web. Please fill in the descriptors on the Technical Report Documentation Page.

**Q: What is covered in the editorial review?**

**A:** The primary purpose of the editorial review is to assure conformity with the research report guidelines. The editor checks for heading format consistency, formatting of references, page numbering, table of contents formatting, and display of graphics. The editor checks the abstract and executive summary for errors in spelling and grammar, but does not check the body of the report for such errors.

**Q: What if I wish to create my report with software other than Microsoft Word?**

**A:** It is the author's role to provide Mn/DOT easily extractable text and graphics for the report. Microsoft Word (2003 compatible) is ideal for Mn/DOT use. If the author finds it necessary or beneficial to use different software, text must be provided in Rich Text Format (RTF), or Unicode (UTF-8 or UTF-16). The author must also submit the final PDF of the entire report.

**Appendix A**  
**Instructions and Example to Complete Technical Report Documentation Page**

## INSTRUCTIONS TO COMPLETE THE TECHNICAL REPORT DOCUMENTATION (TRD) PAGE

There are two ways in which the Technical Report Documentation (TRD) Page can be completed: In the first, the author submits his/her required information either by submitting the actual form (see page A-3) or a Word document with corresponding numbers (A-4). The second is when CTS completes the form using the information provided by the author and by Mn/DOT. In the first case, the author should complete the following item numbers on the form:

**4, 5, 7, 9, 13, 16, and 17**

All other item numbers should be left blank to be completed by CTS where necessary.

In the second case, the author needs to provide CTS with the same information in a separate Word document.

Instructions for these items are as follows:

**Item 4 – Title and Subtitle:** The title should be the same as that of the report. When a report is prepared in more than one volume, this block should show the main title plus the volume number and the subtitle for the volume being reported.

**Item 5 – Report Date:** Indicate the month and year of the date shown on the report title page.

**Item 7 – Author(s):** Give name(s) as listed in the same order as on the title page.

**Item 9 – Performing Organization Name and Address:** Give the name and address, including zip code, of the organization responsible for the research and preparation of the report. This should be the same as the name and address appearing on the title page.

**Item 13 – Type of Report and Period Covered:** State either “interim report,” “draft report,” “final report,” etc. For interim reports, indicate the time period covered (i.e., “Summary Report 1999-2001”).

**Item 16 – Abstract:** This is a brief (250 words or less) factual summary of the most significant information contained in the report. An abstract should state the purpose, methods, results, and conclusions of the work effort. For purpose, include a statement of goals (objectives, aims). For methods, include experimental techniques or the means by which the results were obtained. Results (findings) are the most important part of the abstract and selection should be based on one, or several, of the following: new and verified events, findings of permanent value, significant findings that contradict previous theories, or findings that the author knows are relevant to a practical problem. Conclusions should deal with the implications of the findings and how they tie in with studies in related fields. Do not repeat the title of other items provided on this page. When a report consists of a number of volumes, include the title of each of the other

volumes in each abstract. If the report contains a significant bibliography or literature survey, mention it also.

Reports presenting the results of computerized model development will use the following structure for the preparation abstracts:

- Technical Model description (nature of the model or simulator)
- Areas of model application
- Special model requirements
  - Areas of model application
  - Other special considerations

The editor will check the abstract for understandability and will make suggestions that will help the author aim it toward a lay-audience.

Description: A one- to three-sentence description will be written by the editor for use in Mn/DOT's ARTS database deliverable screen.

**Item 17 – Document Analysis/Descriptors**: This is a listing of the terms (keywords) that identify the major concept of the research. *It is especially important to identify keywords and phrases that may not appear in the report title or abstract, so as to more broadly encompass the entire research area. This will expand the field of possible terms for literature searches so that researchers can broadly identify all research sources related to their topic area.* Supplying keywords is particularly important for libraries that do not have the capability to search several different data fields, but must rely on keywords used as index entries for cataloging. For this reason, it is important to select specific and precise terms or short phrases that identify the principal subjects covered in the report.

## Technical Report Documentation Page

1. Report No. <b>MN/RC 2004-03 [CTS]</b>	2.	3. Recipients Accession No.	
4. Title and Subtitle <b>Transportation-Related Impacts of Different Regional Land-Use Scenarios</b>		5. Report Date <b>December 2003</b>	
		6.	
7. Author(s) <b>Gary Barnes</b>		8. Performing Organization Report No.	
9. Performing Organization Name and Address <b>University of Minnesota          Humphrey Institute of Public Affairs          301 19<sup>th</sup> Ave. S.          Minneapolis, MN 55455</b>		10. Project/Task/Work Unit No.	
		11. Contract (C) or Grant (G) No. <b>(C) 74708 (wo) 188 [CTS]</b>	
12. Sponsoring Organization Name and Address <b>Minnesota Department of Transportation [CTS]          395 John Ireland Boulevard Mail Stop 330          St. Paul, Minnesota 55155</b>		13. Type of Report and Period Covered <b>Final Report</b>	
		14. Sponsoring Agency Code	
15. Supplementary Notes <b><a href="http://www.lrrb.org/PDF/200403.pdf">http://www.lrrb.org/PDF/200403.pdf</a> [CTS]</b>			
16. Abstract (Limit: 250 words)  <p>This research addresses the question of how different regional land-use patterns would impact travel behavior and resulting transportation costs and benefits. This report defines six hypothetical future regional land-use scenarios for the Twin Cities region, representing combinations of different styles of residential and commercial development. The traffic patterns resulting from each of these scenarios are then used to describe the resulting congestion, air pollution, and accessibility to jobs.</p> <p>The results of the research indicate that the current conventional wisdom that compact development is better is at best an oversimplification. Certain types of compact development do appear to be better for certain goals, or for certain locations; however, at the same time they are often worse for other goals or other locations.</p> <p>Despite some difficult methodological problems, this seems like a question worth exploring further. While it appears that land use alone cannot solve transportation-related problems, it does seem that the rate at which these problems grow can be impacted at least moderately at a regional level, and sometimes very substantially at local levels.</p>			
17. Document Analysis/Descriptors <b>Land Use          Travel Behavior          Traffic Forecasting          Transportation Costs</b>		18. Availability Statement <b>No restrictions. Document available from:          National Technical Information Services,          Springfield, Virginia 22161</b>	
19. Security Class (this report) <b>Unclassified</b>	20. Security Class (this page) <b>Unclassified</b>	21. No. of Pages <b>68 [CTS]</b>	22. Price

## Technical Report Documentation Page Information

- Item 4: Development and Testing of Methods for Estimating the Impact of Safety Improvements
- Item 5: March, 2001
- Item 7: Gary A. Davis
- Item 9: Department of Civil Engineering  
University of Minnesota  
500 Pillsbury Drive SE  
Minneapolis, MN 55455
- Item 13: Final Report 1996-1999
- Item 16: This report describes a Bayesian method for estimating accident rates at individual sites, which accounts for the fact that the total traffic count usually used to measure exposure is generally not known with certainty. First, an approximation for the probability distribution of total traffic conditioned on a short count sample is derived. This approximation is then used to derive a Bayes estimator of a site's accident rate, conditioned on an accident count and a short count sample is derived using the total traffic approximation. It is then shown how computation of the accident rate estimates can be carried out using Gibbs sampling. Test using actual accident and traffic data revealed that accident rate estimates based on a two-week traffic sample are almost as accurate as estimates based on full traffic counting, but that uncertainty in the estimated accident rates increases by 20-50% when a two-day count sample is used.
- Item 17: Traffic Counts  
Accident Rates  
Gibbs Sampling

**Appendix B**  
**Examples of Title Pages Using Two Different Disclaimers**

# **MINNESOTA SEAL COAT HANDBOOK**

## **Final Report**

*Prepared by:*

David W. Janisch  
Minnesota Department of Transportation  
Office of Minnesota Road Research  
1400 Gervais Avenue  
Maplewood, MN 55109

Frank S. Gaillard  
City of Savage  
6000 McColl Drive  
Savage, MN 55378-2464

**December 1998**

*Published by:*

Minnesota Department of Transportation  
Research Services Section  
395 John Ireland Boulevard, MS 330  
St. Paul, MN 55155

This report represents the result of research conducted by the authors and does not necessarily represent the views or policies of the Minnesota Local Road Research Board or the Minnesota Department of Transportation.

# **MAINTAINING THE TRAFFIC CONTROL SYSTEM**

## **Final Report**

*Prepared by:*

Bapiraju Vinnakota  
Department of Electrical and Computer Engineering  
University of Minnesota  
Minneapolis, MN 55455

**March 1998**

*Published by:*

Minnesota Department of Transportation  
Research Services Section  
395 John Ireland Boulevard, MS 330  
St. Paul, MN 55155

This report represents the results of research conducted by the authors and does not necessarily represent the views or policies of the Minnesota Department of Transportation. This report does not contain a standard or specified technique.

The authors and the Minnesota Department of Transportation do not endorse products or manufacturers. Trade or manufacturers' names appear solely because they are considered essential to this report.

**Appendix C**  
**Examples of Acknowledgments**

## **ACKNOWLEDGMENT**

The authors express appreciation to the Office of Maintenance and the Materials and Research Laboratory of the Minnesota Department of Transportation for support of this research, and are indebted to Dr. O.S. Kwon of the 3M Company, Minnesota, for donation of hydrogel, as well as to Dean Kourtjan of the North Star Steel Co., Minnesota, for spectrographic analysis of rebar steels.

### **ACKNOWLEDGMENTS**

The fabrication and procedures presented in this report were developed in conjunction with Shannon & Wilson, Inc., Geotechnical Consultants, St. Louis, Missouri. The authors would also very much like to thank the following individuals and organizations for their contributions to this document.

Ron Atkins – Instrumentation/Electrical Consultant  
Dave Newcomb – Department of Civil Engineering, University of Minnesota  
Carl Lenngren – Department of Civil Engineering, University of Minnesota  
Alberta Research Council  
Monica Penshorn – Physical Research Section, Minnesota Department of Transportation  
Carol Isberg – Mn/ROAD  
Office of Research Administration, Minnesota Department of Transportation

### **ACKNOWLEDGMENTS**

The financial and logistical support provided by the Local Road Research Board, the Minnesota Department of Transportation, the Center for Transportation Studies at the University of Minnesota, Wheeler Consolidated, Inc., and Sibley County for this work is gratefully acknowledged.

#### **Acknowledgments**

The author would like to acknowledge the help of several people whose work was instrumental to the completion of this study.

1. Kevin Kosobud, Mn/DOT Assistant Concrete Engineer
2. Mn/DOT District 7B, Windom, Maintenance Personnel
3. Steve Oakey, Mn/DOT District 7, Mankato, Materials Engineer
4. Duane Pingeon, Mn/DOT District 7B Maintenance Superintendent

## **ACKNOWLEDGMENT**

We would like to extend our deepest appreciation to the following people for their generous help and support: Ronald Lawrenz, Charles Bongo, Daniel Engstrom and Erna Janssens-Verbelen with the fieldwork: Ronald Lawrenz, Daniel Engstrom, and James Almendinger during discussions and with interpretation; and Shorn Mallman and Ronald Lawrenz by making the facilities of the St. Croix Watershed Research Station available.

This project was conducted with funding provided by the St. Croix Watershed Station, Science Museum of Minnesota, the Minnesota Department of Transportation, and from the A.W. Mellon Foundation grant to Prof. Eville Gorham, Department of Ecology, Evolution and Behavior, University of Minnesota. We greatly appreciate the help by Eville Gorham in reviewing the interim status reports and the draft of the final report.

**Appendix D**  
**Example of Table of Contents**

## TABLE OF CONTENTS

CHAPTER 1	INTRODUCTION .....
	Background .....
	Objective .....
	Report Organization .....
CHAPTER 2	LITERATURE REVIEW .....
	Types of LSAM Gradations .....
	Mix Design Practices .....
	Summary .....
CHAPTER 3	EXPERIMENTAL DESIGN AND MATERIALS .....
	Experimental Design .....
	Materials .....
CHAPTER 4	MIX DESIGNS .....
	Marshall Mix Design .....
	Volumetric Mix Design .....
CHAPTER 5	CONCLUSIONS AND RECOMMENDATIONS .....
	Conclusions .....
	Recommendations .....
REFERENCES	.....
APPENDIX A – Examples of Technical Report Documentation Pages	
APPENDIX B – Examples of Title Pages	
APPENDIX C – Examples of Acknowledgments	

## **LIST OF TABLES**

Table 2.1	Material Properties Affected By Asphalt Grade
Table 2.2	Acceptable Criteria for LSAM (Ken DOH)
Table 2.3	Penn DOT LSAM Gradation Band

## **LIST OF FIGURES**

Figure 2.1	Types of Large Stone Asphalt Mix
Figure 3.1	Aggregate Gradations
Figure 4.1	Results of Marshall Mix Design

**Appendix E**  
**Examples of References**

## REFERENCES

Examples of references for:

### Books

- [1] R.L. Davis, *Large Stone Mixes: A Historical Insight* (Phoenix: National Asphalt Pavement Association, 1989).
- [2] R.L. Davis (1989). *Large stone mixes: A historical insight*. Phoenix: National Asphalt Pavement Association.

### Journals

- [3] M. Acott, "Today's Traffic Calls for Heavy Duty Asphalt Mixes," *Roads and Bridges*, vol. 26, no. 1 (Jan. 1988), 39-45.
- [4] M. Acott (1988). Today's traffic calls for heavy duty asphalt mixes. *Roads and Bridges*, vol. 26, no. 1: 39-45.

### Reports

- [5] P.S. Kandhal, *Testing and Evaluation of Large-Stone Mixes Using Marshall Mix Design Procedures* (Auburn, Ala.: Auburn University, National Center for Asphalt Technology, 1990).
- [6] Minnesota Department of Agriculture, *Evaluation of Minnesota Agricultural Land Preservation Programs* (St. Paul: Minnesota Department of Agriculture, June 1999).

### Newspapers

- [7] Neal Gendler, "Fewer Metro Homes Being Built; Prices Rising," *Minneapolis Star Tribune*, 5 May 2000, Homezone section.
- [8] Neal Gendler (2000). Fewer metro homes being built; prices rising. *Minneapolis Star Tribune*, 5 May, Homezone section.

### Web sites/Internet resources

- [9] U.S. Department of Transportation, Federal Highway Administration (Internet), *1997 Federal Highway Cost Allocation Study*, August 1997 (Accessed January 1999), [www.fhwa.dot.gov/policy/hcas/final/index.htm](http://www.fhwa.dot.gov/policy/hcas/final/index.htm).
- [10] U.S. Department of Transportation, Federal Administration (1997). Internet. *Federal highway cost allocation study*, August (Accessed January 1999), [www.fhwa.dot.gov/policy/hcas/final/index.htm](http://www.fhwa.dot.gov/policy/hcas/final/index.htm).

### Presentations

- [11] L.W. Munnich, "Transportation Finance." Presentation, Presented at Hubert H. Humphrey Institute of Public Affairs, University of Minnesota, Minneapolis, MN, (July, 2008).
- [12] L.W. Munnich. (2008) "Transportation Finance." Presentation, Presented at Hubert H. Humphrey Institute of Public Affairs, University of Minnesota, Minneapolis, MN.

**Appendix F**  
**Rules for Writing Metric Symbols and Names**

## **RULES FOR WRITING METRIC SYMBOLS AND NAMES**

- Print unit symbols in upright type and in lower case except for liter (L) or unless the unit name is derived from a proper name.
- Print unit names in lower case, even those derived from a proper name.
- Print decimal prefixes in lower case for magnitudes  $10^3$  and lower (that is, k, m,  $\mu$ , and n) and print the prefixes in upper case for magnitudes  $10^6$  and higher (that is, M and G).
- Leave a space between a numeral and a symbol (write 45 kg or 37 ° C, not 45kg or 37°C or 37° C).
- Do not use a degree mark (°) with Kelvin temperature (write K, not °K).
- Do not leave a space between a unit symbol and its decimal prefix (write kg, not k g).
- Do not use the plural of unit symbols (write 45 kg, not 45 kgs), but do use the plural of written unit names (several kilograms).
- For technical writing, use symbols in conjunction with numerals (the area is 10 m<sup>2</sup>); write out unit names if numerals are not used (carpet is measured in square meters). Numerals may be combined with written unit names in nontechnical writing (10 meters).
- Indicate the product of two or more units in symbolic form by using a dot positioned above the line (kg·m·s<sup>2</sup>).
- Do not mix names and symbols (write N·m or Newton meter, not N·meter or newton·m)
- Do not use a period after a symbol (write “12 g”, not “12 g.”) except when it occurs at the end of a sentence.

## **RULES FOR WRITING NUMBERS**

- Always use decimals, not fractions (write 0.75 g, not  $\frac{3}{4}$  g).
- Use a zero before the decimal marker for values less than one (write 0.45 g, not .45 g).
- Use spaces instead of commas to separate blocks of three digits for any number over four digits (write 45 138 kg or 0.004 46 kg or 4371 kg). Note that this does not apply to the expression of amounts of money.
- In the United States, the decimal marker is a period; in other countries a comma usually is used.
- When converting numbers from inch-pounds to metric, round the metric value to the same number of digits as there were in the inch-pound number (11 miles at 1.609 km/mi equals 17.699 km, which rounds to 18 km).

## **CONVERSION AND ROUNDING**

- When converting numbers from inch-pounds to metric, round the metric value to the same number of digits as there were in the inch-pound number (11 miles at 1.609 km/mi equals 17.699 km, which rounds to 18 km).
- Convert mixed inch-pound units (feet and inches, pounds and ounces) to the smaller inch-pound unit before converting to metric rounding (10 feet, 3 inches, = 123 inches; 123 inches x 25.4 mm = 3124.2 mm; round to 3124 mm).

- In a “soft” conversion, an inch-pound measurement is mathematically converted to its exact (or nearly exact) metric equivalent. With “hard” conversion, a new rounded, rationalized metric number is created that is convenient to work with and remember.

### **VISUALIZING METRIC**

A few basic comparisons are worth remembering to help visualize metric:

- -One millimeter is about 1/25 inch or slightly less than the thickness of a dime.
- -One meter is the length of a yardstick plus about 3-1/3 inches.
- -One gram is about the mass (weight) of a large paper clip.
- -One kilogram is about the mass (weight) of a softbound model building code book (2.2 pounds).
- -One liter is about the volume of a 4 inch cube (100 mm x 100 mm x 100 mm). One liter of water has a mass of 1 kilogram.
- -One inch is 1/64 inch longer than 25 mm (1 inch = 25.4 mm; 25 mm = 63/64 inch). Four inches are about 1/16 longer than 100 mm (4 inches = 101.6 mm; 100 mm = 3-15/16 inches).
- -One foot is about 3/16 inch longer than 300 mm (12 inches = 304.8 mm; 300 mm = 11-13/16 inches).
- -Four feet are about 3/4 inch longer than 1200 mm (4 feet = 1219.2 mm; 1200 mm = 3 feet, 11 1/4 inches).
- The metric equivalent of a typical 2-foot by 4-foot ceiling grid is 600 x 1200 mm, so metric ceiling tiles and lighting fixtures are about 3/8 inch smaller in one dimension and 3/4 inch smaller in the other.
- Similarly, the metric equivalent of a 4 by 8 sheet of plywood or drywall is 1200 x 2400 mm, so metric sheets are about 3/4 inch narrower and 1 1/2 inches shorter.
- “Rounding down” from multiples of 4 inches to multiples of 100 mm makes dimensions exactly 1.6 percent smaller and areas about 3.2 percent smaller. About 3/16 inch is lost in every linear foot.

**Appendix G**  
**Report Template**

[Fill in sections 4, 5, 7, 9, 13, 16 and 17. SAVE THIS PAGE AS SEPARATE MICROSOFT WORD FILE.]

**Technical Report Documentation Page**

1. Report No.		2.		3. Recipients Accession No.	
4. Title and Subtitle				5. Report Date	
				6.	
7. Author(s)				8. Performing Organization Report No.	
9. Performing Organization Name and Address				10. Project/Task/Work Unit No.	
				11. Contract (C) or Grant (G) No.	
12. Sponsoring Organization Name and Address				13. Type of Report and Period Covered	
				14. Sponsoring Agency Code	
15. Supplementary Notes					
16. Abstract (Limit: 250 words)					
17. Document Analysis/Descriptors				18. Availability Statement No restrictions. Document available from: National Technical Information Services, Springfield, Virginia 22161	
19. Security Class (this report) Unclassified		20. Security Class (this page) Unclassified		21. No. of Pages	22. Price

**[Report Title]**

**[Title limited to 250 characters (including spaces)  
but may be several lines long.]**

**Add or delete blank lines to keep all this info on one page]**

## **Final Report**

Prepared by:

[Example: Author #1

Author #2

Department of Civil Engineering  
University of Minnesota]

[Example: Author #3

Department of Redundancy Department  
University of Texas]

**[Publication Month and Year]**

Published by:

This report represents the results of research conducted by the authors and does not necessarily represent the views or policies of the Minnesota Department of Transportation and/or (author's organization). This report does not contain a standard or specified technique.

[If report mentions any products by name include this second paragraph to the disclaimer. If no products mentioned, this can be deleted.]

The authors and the Minnesota Department of Transportation and/or (author's organization) do not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to this report.

## **Acknowledgments**

[Keep Acknowledgments to no more than one page.]

## Table of Contents

Chapter 1: Introduction .....	
Chapter 2 .....	
[Section 1] .....	
[Subsection 1] .....	
[Subsection 2] .....	
[Section 2] .....	
Chapter 3 .....	
Chapter 4 .....	
Chapter 5 .....	
References .....	
Appendix A .....	
Appendix B .....	
Appendix C .....	

[If lengthy, List of Tables and List of Figures should start on new page.]

### List of Tables

Table 1.1 [Title should match title in text] .....	
Table 2.1 [Number should include chapter number plus sequential number] .....	

### List of Figures

Figure 1.1 [Title here, should match title in text] .....	
Figure 1.2 [Title here, number should include chapter number plus sequential number] .....	
Figure 3.1 [Title here] .....	

## **Executive Summary**

[The Executive Summary should be

- Concise. Present a synopsis of the research issue, the main findings or results, conclusions, the significance of the research, and recommendations.
- 3 (or fewer) pages.
- A stand-alone summary of the research project.

Readers often turn first to the Executive Summary for an overview of the project. Because of its importance, you may be asked to rewrite or rework the Executive Summary to better reflect the research project findings and conclusions.]

**PLEASE READ THE FOLLOWING 2 PAGES AND DELETE WHEN USING THIS TEMPLATE.**

[Note: The first use of an **acronym** should be spelled out and followed by the acronym in parentheses: the Minnesota Department of Transportation (Mn/DOT). “Mn/DOT” is spelled Capital “M”, small “n,” Slash, Cap “D,” Cap “O,” Cap “T.”]

[Full names of all authors should be spelled out on the first mention.]

**[References in the text:** List full reference information in the Reference section at the end of the report. Use one of the following two citation methods:

1) In the text, refer to a citation by placing a number in [square brackets] or (parentheses) at the end of the sentence that refers to it. The References section at the end of the document should be ordered and numbered according to the numbers assigned in the text. If you cite the same reference more than once, continue to use the number that was assigned to the reference in the report body.

2) Alternatively, you may cite references in (Author, Date) format, e.g., (Jones, 1999) in the report body and alphabetize the citations in the Reference section at the end of the document. If an author has more than one citation, order with the most recent date first in the alphabetical list.

Examples:

- 1) “Research on transportation is important. An early study by Johnson and Juliar examined highway right-of-ways [1]. Killdare investigated the effectiveness of stone and wood chip mulches for controlling weeds [2]. Anderson, Jones, and Sufuentes evaluated different erosion control methods [3]....”

References at the end of the document would be listed in the following order:

1. Johnson and Juliar
2. Killdare
3. Anderson, Jones, and Sufuentes

**OR**

- 2) “Research on transportation is important. An early study by Johnson and Juliar examined highway right-of-ways (Johnson and Juliar, 2002). Killdare investigated the effectiveness of stone and wood chip mulches for controlling weeds (Killdare, 1998). Anderson, Jones, and Sufuentes evaluated different erosion control methods (Anderson et al, 2003]....”

References at the end of the document would be listed in the following order:

1. Anderson, Jones, and Sufuentes
2. Johnson and Juliar
3. Killdare

Documents that you did not cite specifically but did use as sources should be listed alphabetically by author under the heading "Additional References."

## Tables and Graphics:

[If possible, do not split tables across pages. If a table is so large that it goes over multiple pages, make pages end at reasonable breaking points, such as between rows.]

Table 1. Tables can have any pattern of lines and shading.  
Second line should be indented.

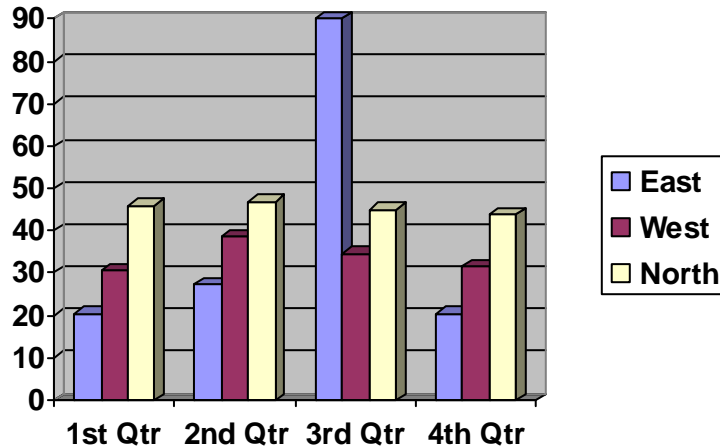



Figure 1.1. [Title Here]

[Figures and graphics **must not be linked** objects. See “Graphics” in the E-Publishing Guidelines. Any format of graph is acceptable. Type size should be 10 points or larger so it is clearly legible. Create figures and graphics so that the information displays correctly when printed in black and white.]

## Equation Editor

Microsoft Word has a built-in equation editor that is useful for showing complex equations. To insert an equation, click on the insert pull-down menu, and choose Object. Then select Microsoft Equation from the listed object types.

# **Chapter 1**

## **Introduction**

[Text starts here. 12 point Times Roman with 1-inch margins on all sides.]

[Chapter 1 = Introduction. It outlines the research issue, the historical background, the research goals, the basic approach, and the report organization. It does not include results, conclusions, or recommendations.]

[Arrange other chapters to fit your project's content and organization.]

**Chapter 2**  
**[Title Here]**

[Text starts here. All other numbered chapters follow this format and start on their own page.]

## References

[Examples below show: 1. Book, 2. Journal, 3. Report, and 4. Web site. See E-Publishing Guidelines (<http://www.dot.state.mn.us/research>), Report Format for more examples. References should be listed in the order in which they are referred to in the text. List each reference only once in this numbered list. Use the same number to refer to that text multiple times. When numbered, references do not need to be alphabetical.]

1. R.L. Davis, *Large Stone Mixes: A Historical Insight* (Phoenix: National Asphalt Pavement Association, 1989).
2. M. Acott, "Today's Traffic Calls for Heavy Duty Asphalt Mixes," *Roads and Bridges*, vol. 26, no. 1 (Jan. 1988), 39-45.
3. P.S. Kandhal, *Testing and Evaluation of Large-Stone Mixes Using Marshall Mix Design Procedures* (Auburn, Ala.: Auburn University, National Center for Asphalt Technology, 1990).
4. U.S. Department of Transportation, Federal Highway Administration (Internet), *1997 Federal Highway Cost Allocation Study*, August 1997 (cited January 1999), [www.fhwa.dot.gov/policy/hcas/final/index.htm](http://www.fhwa.dot.gov/policy/hcas/final/index.htm).

[Note: If you choose to use the (Author, Date) system instead, alphabetize this list; see page G-6 for more information.]

**Appendix H**  
**Draft Submission Cover Sheet**

**DRAFT**

**Mn/DOT Research Report**

**DRAFT Submission Cover Sheet**

To ease the publishing process, please complete this form and submit it with the CD containing the draft of your research report, or via email.

Mn/DOT Agreement No.:

Work Order No.:

RSS Administrative Liaison:

Title of Report:

Author(s) (List primary author first):

Have all technical comments been addressed and incorporated?     Yes     No

Clearly mark materials as DRAFT.

Include:

- PDF file of complete report
- One-sided hard copy printed from the PDF file

**Appendix I**  
**Final Submission Cover Sheet**

**Mn/DOT Research Report  
Submission Cover Sheet  
\* FINAL \*  
Publication Copy**

After your report has been reviewed and accepted by CTS and Mn/DOT, complete this form and submit it with the CD containing the final publishable version of your research report. **(We do not recommend sending final version of report through e-mail.)**

\* Remember to remove any electronic tags or text that identify file(s) as a draft or copy.

Mn/DOT Agreement No.:

Work Order No.:

RSS Administrative Liaison:

Title of Report:

Author(s) (List primary author first):

\_\_\_\_\_ All technical and editorial comments have been incorporated or resolved.  
*Author initial here*

Include:

- Final report in PDF format on CD, clearly labeled with title and date
- Single-sided hard copy of final report, printed from submitted PDF file
- Word files of entire Final Report, Executive Summary, Technical Report Documentation page, Title page, and Dissemination List
- List of files contained on CD: include software used to create file, description of each file, and date
- Keywords (Descriptors): \_\_\_\_\_

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- Separate files of graphics that could be used in other communications (optional)

**Appendix J**  
**Checklist for Submission of Reports**

**MINNESOTA DEPARTMENT OF TRANSPORTATION  
RESEARCH SERVICES  
CHECKLIST FOR SUBMISSION OF RESEARCH REPORTS**

**When you feel you are ready to submit your first copy of a draft research report, please use this list as a guideline to ensure that the basic elements of the report are included and are accurate before submitting the draft to the Center for Transportation Studies.**

- Clearly mark the initial submission “Draft.” Remove “Draft” from the Final Submission.
- Verify correct use of Mn/DOT reference; it must appear as “Minnesota Department of Transportation (Mn/DOT)” in first reference, then as “Mn/DOT” in subsequent references.
- All abbreviations/acronyms must be spelled out on the first reference.
- Report must include a Table of Contents, a List of Figures, and a List of Tables, each beginning on a separate page.
- Check for inclusion of an Executive Summary and an Introduction (*Chapter One is always the Introduction*).
- Report should include no headers.
- Footnotes should not be used to cite references. However, they can be used as supplementary comments that do not warrant appendices.
- Number pages starting with the introduction; center page numbers at the bottom of the page.
- Appendices should have their own cover page and their own numbering system (i.e., A-1, A-2, A-3, etc., for Appendix A, and B-1, B-2, B-3, etc., for Appendix B and others). Appendix cover page includes the appendix number and title, but is not numbered.
- Be sure the report includes a chapter on conclusions and recommendations and that they are clear.
- Spell-check the document; make sure all graphics are present and labeled. Do not use object links to other files.
- Please submit reports with corresponding “Draft Submission Cover Sheet” OR “Final Submission Cover Sheet.”

*The Electronic Publishing Guidelines* can be found at:

<http://www.dot.state.mn.us/research>