

Guidelines for Preparation of Research Project Reports

UPDATED FEBRUARY 2022

Office of Performance-based Management and Research
GEORGIA DOT | 600 WEST PEACHTREE ST. NW | ATLANTA, GA 30308

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Guidelines for Preparation of Research Project Reports

Part I – General Information

These guidelines are for the preparation of research project reports prepared by or for the Georgia Department of Transportation (GDOT). The information contained herein is provided to uniformity in research reports and to ensure that applicable GDOT and Federal Highway Administration (FHWA) regulations are followed. This guide will help to promote a more efficient procedure in administering research project reports. This guide is mostly pertinent to the principal investigator, the GDOT project manager, and the GDOT technical/implementation manager, who work closely together throughout the project. Any interested persons and subject-matter experts may be involved.

The guide consists of two parts. The first part contains general information on reports required for all GDOT research projects, and the second part contains detailed instructions for preparing final reports. Any questions on reports should be directed to the Office of Performance-based Management and Research (OPMR).

All research projects require the preparation, submittal, review, and approval of appropriate written reports to document the project's objectives, activities, findings, conclusions, and recommendations and allow other appropriate persons to understand, evaluate, and duplicate the research. The reporting requirements vary from one research project to another. The type of reports to be prepared for each project, along with the due dates, are outlined and discussed in the research proposals and task orders. Please refer to the GDOT website (<https://www.dot.ga.gov/BS/Research>) for research proposal guidelines.

- *Interim or Phase-based reports* may be required for a long-term project to report on various work phases as they are completed, thus allowing prompt dissemination and implementation of project results. Interim reports should follow the formatting as outlined for the final reports (excluding front matter). However, as interim or phase-based reports may be unique to a project, alternate formatting may be allowed with prior approval by GDOT.
- *Quarterly Progress Reports* are mandatory for all research projects. They provide updates on the research work during the reporting quarter, as well as a tentative plan for the next reporting quarter. They are intended to keep all stakeholders (e.g. principal investigators, project manager, technical/implementation manager) abreast of the work status so that the project can be completed in a timely manner through their proactive coordination. In general, each report should include identification information for the research project (e.g. project number, title, author, sponsor, reporting period), progress, achievements, issues, and recommendations/solutions for these issues in the next reporting period, if applicable. Please refer to [Part II](#) of this document for more details on preparation of Quarterly Progress Reports.
- *Final reports* are mandatory for all research projects. They contain comprehensive information, such as research need, methodology, activities, findings, conclusion, and recommendations throughout the entire period. Please refer to [Part III](#) of this document for more details on preparation of final reports.

The final report is usually one of the key deliverables of a research project. Therefore, these guidelines aim to provide instructions on preparing a well-written final report that is compliant with GDOT and FHWA regulations.

Part II – Quarterly Progress Reports

GDOT requires that a Quarterly Progress Report (QPR) be submitted for each ongoing project within two weeks following the end of a calendar quarter. Requirements for the submittal of a QPR are summarized below, along with the administrative actions that will be taken by OPMR in response to late delivery or non-delivery of the quarterly reports.

Progress Report Quarters, Submittal Deadlines, and Naming Protocol

REPORT QUARTER	SUBMITTAL DEADLINE	NAMING PROTOCOL
January 1 – March 31	April 15	RP ##-##_20YY_Q1
April 1 – June 30	July 15	RP ##-##_20YY_Q2
July 1 – September 30	October 15	RP ##-##_20YY_Q3
October 1 – December 31	January 15	RP ##-##_20YY_Q4

Quarterly Progress Report Submittal

Reports must be electronically submitted to the GDOT project manager and technical/implementation manager by the submittal deadline. Hardcopies via U.S. mail are acceptable in addition to the electronic copy. Regardless of delivery method, a brief explanatory message should accompany the report, which should be provided as an attachment in PDF format. Reports should follow the guidelines shown in [Exhibit A](#) and a sample report shown in [Exhibit E](#).

Late- or Non-Delivery of Progress Reports

As detailed above, Quarterly Progress Reports are expected to be submitted no later than two weeks after the end of the quarter. If a late submittal is necessary, it must be justified in an email from the principal investigator to the GDOT project manager and approved by OPMR management one week before the deadline. If a progress report is not submitted by the deadline, the project manager will contact the principal investigator. If the requested report is not received within one week thereafter, all invoices will be held until the report is received. The following instructions explain how to complete the standard Research Project Progress Report form. Detailed instructions for each part of the report are provided herein, and an example of a properly completed report is included after the instructions.

BLOCK	INSTRUCTION
Report No.	Number reports consecutively.
Date	Date progress report is prepared.
Report Period	If the project begins within a reporting period, the first progress report will cover the time from the beginning of the project through the end of that particular period. The dates for the reporting period should be given in this block.
Project No.	The Georgia DOT research project number.
Project Title	Project title as contained in the research project proposal.
Research Agency(ies)	List performing research agency or agencies.
Principal Investigator(s)	List principal investigator(s).
Starting Date	Date project officially began. Obtain this date from the date of contract or notice to proceed, which must match the date of contract.
Completion Date	Date project to be completed.
Total Months	Total project duration in months.

Time Expended	Based on the total project duration, the total months and percent of time that has elapsed from the beginning of the project through the end of the reporting period. The total project time includes any approved time extensions.
Funding Source	Indicate if funding source is State Planning & Research (SP&R), 100% Federal, or otherwise. SP&R is applicable to the majority of projects and should be used as the default source unless GDOT specifies otherwise. The term “SP&R” should be entered in this part of the report to indicate that funding source.
Funds Authorized	Total funds authorized for the research project. Obtain from research project contract including any amendments providing additional funds. If funds are used from two or more sources, indicate by using agency abbreviations in front of the amounts authorized for each agency.
Funds Expended in Report Period	Funds expended during the report period. The principal investigator(s) should obtain the correct dollar amount from the invoices submitted by their organization.
Funds Expended Total	Total (cumulative) project funds expended from the beginning of the project through the reporting period.
Objectives/Tasks	A brief description of the project objectives and tasks, usually taken from the proposal. It should give enough information so that a person not familiar with the project can understand the work.
Status	A brief summary of the progress made on the project from the beginning of the project to the beginning of the reporting period. The progress of each task, as well as the project itself, should be approximated in percentage of completion.
Progress in Report Period	This item is one of the most important in the report and should contain sufficient detail on project work completed during the period. Each research task or phase as given in the research project proposal should be listed, along with a description of the work completed on each. Include sufficient information so that a reviewer need not refer to the project proposal to understand the work statement. If no work was done on a particular task or phase, list the item and state “No Activity.” A work plan schedule may be added to the report on a separate page for complex projects having several research tasks.
Work Planned for Next Report Period	Describe proposed activity for each task or phase, as appropriate, for the next period, using additional sheets as necessary.
Findings	Describe any significant technical information, findings, or implementation resulting from work conducted during the period or to date.
Anticipated Problems/Course of Action	Describe any administrative or technical problems in the conduct of the project. Explain the need for any anticipated or imminent changes in project scope, time, or cost.

At the end of the report include the name and title of the person preparing the report.

Example: See [Exhibit E](#)

Part III – Final Reports

This section provides guidance relating to the report format and various elements of the report. It is mostly referenced from the [FHWA¹ Research Publication Development Tools’ website](#) and “Chapter 5: Preparing a Research Report” of the [Turner-Fairbank Highway Research Center Communication Reference Guide \(CRG\)](#). Any items not covered herein are left to the discretion of the writer. OPMR can be contacted for further guidance.

A. Contents and format

The table below details the main contents of a research report:

SECTION	CONTENTS
Covers	Front Cover (Exhibit B and Exhibit F). Technical Report Documentation Page (Form DOT F 1700.7). (Exhibit C and Exhibit G .)
Front Matter	Title page (Exhibit D , Exhibit H , and Exhibit I) Preface* Metric Conversion Chart (Exhibit J) Table of Contents (Exhibit K and Exhibit L)** List of Figures (required for reports containing figures) (Exhibit M) List of Tables (required for reports containing tables) (Exhibit M) List of Abbreviations and Symbols* (Exhibit N)
Body of Report	Executive Summary Introduction Main text separated into chapters Conclusion Recommendations*
Back Matter	Appendices* (Exhibit O and Exhibit P) Glossary* Acknowledgements* References (Exhibit Q and Exhibit R) Bibliography* Index*
Back Covers	Blank

* *Optional*

** *Examples/options provided for “Table of Contents”* ([Exhibit K](#) and [Exhibit L](#))

Use double spacing for the “Body of Report” and “Back Matter” (Examples/options provided for “Appendices” ([Exhibit O](#) and [Exhibit P](#)) and “References” ([Exhibit Q](#) and [Exhibit R](#))). Use 12-point Times New Roman font for both headings and text for “Front Matter”, “Body of Report”, and “Back Matter”. However, use the Metric Conversion Chart as provided in [Exhibit J](#). Use hyperlinks for Table of Contents, List of Figures, List of Tables, and Tables/Figures/Sections/References mentioned in the body of the report and the back matter.

Please refer to [Communication Reference Guide](#) (Chapter 5) for any other details.

¹ The Federal Highway Administration, U.S. Department of Transportation

B. Report submittal, review, approval, printing, and distribution

Submittal	<p>A draft version of the final report is submitted three (3) months before the project end date to OPMR, other relevant GDOT offices, and subject matter experts for their review. The draft final report must be edited by a professional text editor to ensure its compliance with these guidelines before submittal. The project principal investigator will be required to demonstrate that this editing has been performed.</p> <p>Submittal of drafts must be electronic (via email or a filesharing service/device), although reviewers might request hardcopies for review. Final reports must be submitted both electronically and in hardcopies identical to the electronic version; hence, they must be printed in color with high quality resolution and contrast.</p>
Review	<p>The review process normally takes three months. The project manager and the technical/implementation manager are the primary reviewers of the report. Optional reviewers are any interested person or subject-matter experts who could offer further insight into the report quality.</p> <p>It is recommended that the draft report be first reviewed by the technical/implementation manager or a subject matter expert from the end-using GDOT office for which the research project was conducted. This ensures that the report addresses all the technical requirements laid out in the contract. Their feedback will be discussed with the principal investigator in written format (e.g. via email, comments on the electronic and/or hardcopy of the draft).</p> <p>The project manager will continue the review process after the feedback from the end-using office has been addressed. Discussion and revision will continue until all parties agree that the report is now complete, and no further revision is necessary.</p>
Approval	<p>The approval of the report and acceptance for its publication are given in an email or letter transmitting review comments to the principal investigator.</p>
Printing	<p>The project contract indicates the printing responsibilities, procedures, format, and number of hardcopies of the approved final report. Also, the principal investigator will submit the electronic version of the approved/finalized report via email or a file-sharing service/device.</p>
Archiving and Distribution	<p>The archiving and distribution of the reports follows the Georgia Department of Transportation protocols.</p>

Part IV - Exhibits

Exhibit A. Quarterly Progress Report (Template)


 RESEARCH PROGRESS REPORT		Report No.	Date:
		Report Period: From: To:	
Project No.	Project Title:		
Research Agency(ies):	Principal Investigator(s):		
Starting Date:	Completion Date:	Total Months:	Time Expended Months Percent (%)
Funding Source (s):	Funds Authorized: \$	Funds Expended <i>Report Period Total</i> \$ \$	
<u>Objectives/Tasks:</u> <u>Status:</u> <u>Progress this Reporting Period:</u> <u>Work Planned for Next Reporting Period:</u> <u>Findings:</u> <u>Anticipated Problems/Course of Action:</u> <u>Progress Report Completed by:</u> <u>GLOSSARY OF TERMS</u> Add additional sheets as needed.			

Exhibit B. Front Cover (Template)

GEORGIA DOT RESEARCH PROJECT XX-YY

Final Report

RESEARCH PROJECT TITLE



Office of Performance-based Management and Research

600 West Peachtree Street NW | Atlanta, GA 30308

Month Year

Exhibit C. Technical Report Documentation Page (Template)

General instructions: To add text, click inside the form field below (will appear as a gray highlighted or outlined box) and begin typing (10-point Times New Roman). The instructions will be replaced by the new text. If no text needs to be added, remove the form field and its instructions by clicking inside the field, then pressing the Delete key twice. **One page is the recommended length for this Page. Please remove these instructions before completing form.**

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. Enter: FHWA-GA-Last two digits of Calendar year - Four digits of project number. Example: FHWA-GA-14-1207	2. Government Accession No. N/A	3. Recipient's Catalog No. N/A
4. Title and Subtitle Enter title and subtitle (use mixed case with initial caps for first word in title and subtitle) with volume and part numbers, if applicable.	5. Report Date Enter same date as is on the report cover. Enter publication month and year. Example: June 2014	
	6. Performing Organization Code N/A	
7. Author(s) Enter name(s) of person(s) responsible for writing the report, performing the research, or credited with the content of the report. Form of entry is first name, middle initial (if applicable), last name, and any additional qualifiers. Primary author is listed first. After each author name, enter ORCID (https://orcid.org/) URL, when available. Example: Josiah Carberry, Ph.D. https://orcid.org/0000-0002-1825-0097	8. Performing Organization Report No. Enter any/all unique alphanumeric report numbers assigned by the performing organization, if applicable.	
9. Performing Organization Name and Address Enter the name and address of the organization(s) performing the research.	10. Work Unit No. N/A	
	11. Contract or Grant No. Enter the number of the contract, grant, and/or project number under which the report was prepared. Specify whether the number is a contract, grant, or project number. Example: PI# 001234	
12. Sponsoring Agency Name and Address Enter name and address of the organization(s) financially responsible for the work. After each agency name, enter the funding type (e.g. SPR). Example: Georgia Department of Transportation (SPR)	13. Type of Report and Period Covered Enter the type of report (e.g. final, draft final, interim, quarterly, special, etc.) followed by the dates during which the work was performed. Example: Final Report (June 2012-June 2014)	
	14. Sponsoring Agency Code N/A	
15. Supplementary Notes Conducted in cooperation with the U.S. Department of Transportation, Federal Highway Administration. Enter information not included elsewhere, such as translation of (or by), report supersedes, old edition number, alternate title (e.g. project name), hypertext links to documents or related information in the form of URLs, PURLs (preferred over URLs - https://archive.org/services/purl/help), DOIs (https://www.doi.org/), insertion of QR codes, copyright or disclaimer statements, etc. Edit boilerplate FHWA statement above if needed.		
16. Abstract Enter a brief factual summary (200-350 words) of the most significant information, including the purpose, methods, results, and conclusions of the work. When appropriate, the abstract should include advice on how the results of the research can be used. For guidance, please see ANSI/NISO Z39.14-1997 (R2015) Guidelines for Abstracts (https://www.niso.org/publications/ansiniso-z3914-1997-r2015-guidelines-abstracts).		

17. Key Words Enter words, terms, or phrases that identify important topics in the report. When possible, terms should be selected from the Transportation Research Thesaurus (TRT) (http://trt.trb.org) in addition to terms not found in the TRT.		18. Distribution Statement No restrictions. This document is available through the National Technical Information Service, Springfield, VA 22161. Enter any other agency mandated distribution statements. Remove NTIS statement if it does not apply.	
19. Security Classification (of this report) Unclassified	20. Security Classification (of this page) Unclassified	21. No. of Pages Enter the total number of pages in the report including the front and back matters. Do not include the front and back cover page in the page count.	22. Price Free

Form DOT F 1700.7 (8-72)

Reproduction of completed page authorized.

Exhibit D. Title Page (Template)

GDOT Research Project XX-YY

Final (or Interim or Draft Final) Report

RESEARCH PROJECT TITLE IN CAPITALS

By

Name

Title

Name of Contractor

Contract with
Georgia Department of Transportation

In cooperation with
U.S. Department of Transportation, Federal Highway Administration

Month Year

The contents of this report reflect the views of the author(s) who is (are) responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Georgia Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

Exhibit E. Quarterly Progress Report (Example)


 RESEARCH PROGRESS REPORT		Report No. 3	Date: 4/15/19				
		Report Period: Q1, 2019 From: 1/1/19 To: 3/31/19					
Project No. RP 18-29	Project Title: Transportation Performance Management for Systems Operations [Phase I]						
Research Agency (s): Georgia Tech Research Corporation	Principal Investigator(s): Adjo Amekudzi-Kennedy, Georgia Institute of Technology						
Starting Date: July 23, 2018	Completion Date: June 1, 2019	Total Months: 10.25	Time Expended Months = 8.25 Percent = 80%				
Funding Source (s): SP&R	Funds Authorized: \$##,###.##	Funds Expended <table border="0"> <tr> <td><i>Report Period</i></td> <td><i>Total</i></td> </tr> <tr> <td>\$##,###.##</td> <td>\$##,###.##</td> </tr> </table>		<i>Report Period</i>	<i>Total</i>	\$##,###.##	\$##,###.##
<i>Report Period</i>	<i>Total</i>						
\$##,###.##	\$##,###.##						
<u>Objectives/Tasks:</u> This research will enhance TSMO capabilities at GDOT to: (1) respond to the MAP-21/FAST Act requirements for target setting and performance reporting (short term, 6 months), and (2) engage in enhanced systematic improvement of transportation system performance (long term, 1 year plus).							
<u>Status:</u> <i>Task 1 Deliverable:</i> Map of current GDOT TSMO decision-making/support process: 100% complete <i>Task 2 Deliverable:</i> Report on best/effective TSMO practices: 100% complete <i>Task 3 Deliverable:</i> Report on improvements for next-level TSMO: 100% complete <i>Task 4 Deliverable:</i> Alpha version of TSMO tools: 45% complete							
<u>Progress this Reporting Period:</u> <i>Task 1 Deliverable:</i> Completed report on current GDOT decision-making/support process for TSMO. <i>Task 2 Deliverable:</i> N/A <i>Task 3 Deliverable:</i> Completed report on improvements for next-level TSMO at GDOT. <i>Task 4 Deliverable:</i> (1) Continued study of available data sources and development of algorithms for calculating PM3 measures. Alpha version of tools will use fixed speed limits, which may be expanded to variable speed limits for subsequent versions of tools. (2) Identified notable gaps in December 2018 NPMRDS data.							
<u>Work Planned for Next Reporting Period:</u> <i>Task 1 Deliverable:</i> None <i>Task 2 Deliverable:</i> None <i>Task 3 Deliverable:</i> None <i>Task 4 Deliverable:</i> (1) Review gaps in data with NPMRDS Support Team. (2) Continue to develop algorithms for calculating PM3 measures. (3) Begin to package tools and document workflow.							
<u>Findings:</u> (1) TSM&O best practices reflect importance of approaching TSM&O from tactical, programmatic and strategic levels through agency business processes and formal documents. (2) Tools must be configured to draw from several datasets.							
<u>Anticipated Problems/Course of Action:</u> None to report.							
<u>Progress Report Completed by:</u> Adjo Amekudzi-Kennedy, Ph.D. (PI)							
<u>GLOSSARY OF TERMS</u> MAP-21: Moving Ahead for Progress in the 21 st Century NPMRDS: National Performance Management Research Data Set FAST Act: Fixing America's Surface Transportation Act TIM: Technical Implementation Manager ITS: Intelligent Transportation Systems TSMO: Transportation Systems Management & Operations							

Exhibit F. Front Cover (Example)

GEORGIA DOT RESEARCH PROJECT 17-04

Final Report

**ECONOMIC IMPACT OF BICYCLING IN
GEORGIA**



Office of Performance-based Management and Research

600 West Peachtree Street NW | Atlanta, GA 30308

June 2021

Exhibit G. Technical Report Documentation Page (Example)

TECHNICAL REPORT DOCUMENTATION PAGE			
1. Report No.: FHWA-GA-21-1810	2. Government Accession No.: N/A	3. Recipient's Catalog No.: N/A	
4. Title and Subtitle: Meeting the 21 st Century Surveying–Geomatics Education Needs of GDOT and Georgia		5. Report Date: June 2021	
		6. Performing Organization Code: N/A	
7. Author(s): David Scott (PI), PhD Gustavo Maldonado (coPI), PhD, PE Soonkie Nam (coPI), PhD Roger Purcell (Consultant-Primary Author), PhD, PE, RLS Usman Ibrahim (Graduate Research Assistant) Imran Kays (Graduate Research Assistant)		8. Performing Organization Report No.: 18-10	
9. Performing Organization Name and Address: Georgia Southern University Civil Engineering & U Dept. P.O. Box 8077 Statesboro, GA 30458		10. Work Unit No.: N/A	
		11. Contract or Grant No.: PI#0016325	
12. Sponsoring Agency Name and Address: Georgia Department of Transportation (SPR) Office of Performance-based Management and Research 600 West Peachtree St. NW Atlanta, GA 30308		13. Type of Report and Period Covered: Final Report (December 2018–June 2021)	
		14. Sponsoring Agency Code: N/A	
15. Supplementary Notes: Prepared in cooperation with the U.S. Department of Transportation, Federal Highway Administration.			
16. Abstract: This research project establishes ways to serve the surveying–geomatics (S-G) education needs of place-bound students, such as Georgia Department of Transportation (GDOT) personnel and others. It addresses the need for personnel with a 21 st century education (knowledge and skills) in surveying–geomatics. Many factors, including lack of traditional student interest, lack of student preparedness, retirement-replacement issues, ever expanding technology and education materials, and post-recession demand, have forced the Georgia S-G community to recognize the need for an alternative approach to surveying–geomatics education. Thus, this study proposes a viable solution to the lack of S-G education availability and focuses on ways to foster Professional Land Surveyor (PLS) licensure, as well as improvements in salary and benefits for educated/licensed surveyors. The study also included the administration of a detailed survey based on matrix analysis of S-G knowledge/skill expectations, S-G position characterization, and S-G education subject area coverage. The results of the survey were analyzed to support the understanding of the breadth and depth of the 21 st century S-G education among the Georgia S-G community.			
17. Keywords: Surveying-Geomatics, Body of Knowledge, Online, Place-bound, Curriculum, Program, Surveying Positions		18. Distribution Statement: No Restriction	
19. Security Classif. (of this report): Unclassified	20. Security Classif. (of this page): Unclassified	21. No. of Pages: 345	22. Price: Free

Form DOT F 1700.7 (8-72)

Reproduction of completed page authorized.

Exhibit H. Title Page (Example-authors from one organization)

GDOT Research Project 17-04

Final Report

ECONOMIC IMPACT OF BICYCLING IN GEORGIA

By

Shatakshee Dhongde, Ph.D.
Associate Professor

Sarah Tinsley
Research Assistant

Georgia Tech Research Corporation

Contract with
Georgia Department of Transportation

In cooperation with
U.S. Department of Transportation, Federal Highway Administration

June 2021

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Exhibit I. Title Page (Example-authors from multiple organizations)

GDOT Research Project 19-12

Final Report

COGNITIVE ATTENTION AND ITS APPLICATION IN COUNTERMEASURES ON A CURVE SECTION

By

Junan Shen, Ph.D.

Professor, Civil Engineering and Construction, Georgia Southern University

Weinan Gao, Ph.D.

Assistant Professor, Mechanical and Civil Engineering, Florida Institute of Technology

Mohammad Ahad, Ph.D.

Associate Professor, Electrical and Computer Engineering, Georgia Southern University

Yunfeng Chen, Ph.D.

Assistant Professor, Construction Management Technology, Purdue University

Georgia Southern University Research and Service Foundation, Inc.

Contract with

Georgia Department of Transportation

In cooperation with

U.S. Department of Transportation, Federal Highway Administration

July 2021

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Exhibit J. Metric Conversion Chart (Example)

SI* (MODERN METRIC) CONVERSION FACTORS				
APPROXIMATE CONVERSIONS TO SI UNITS				
Symbol	When You Know	Multiply By	To Find	Symbol
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
AREA				
in ²	square inches	645.2	square millimeters	mm ²
ft ²	square feet	0.093	square meters	m ²
yd ²	square yard	0.836	square meters	m ²
ac	acres	0.405	hectares	ha
mi ²	square miles	2.59	square kilometers	km ²
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft ³	cubic feet	0.028	cubic meters	m ³
yd ³	cubic yards	0.765	cubic meters	m ³
NOTE: volumes greater than 1000 L shall be shown in m ³				
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
TEMPERATURE (exact degrees)				
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C
ILLUMINATION				
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m ²	cd/m ²
FORCE and PRESSURE or STRESS				
lbf	poundforce	4.45	newtons	N
lbf/in ²	poundforce per square inch	6.89	kilopascals	kPa
APPROXIMATE CONVERSIONS FROM SI UNITS				
Symbol	When You Know	Multiply By	To Find	Symbol
LENGTH				
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
AREA				
mm ²	square millimeters	0.0016	square inches	in ²
m ²	square meters	10.764	square feet	ft ²
m ²	square meters	1.195	square yards	yd ²
ha	hectares	2.47	acres	ac
km ²	square kilometers	0.386	square miles	mi ²
VOLUME				
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m ³	cubic meters	35.314	cubic feet	ft ³
m ³	cubic meters	1.307	cubic yards	yd ³
MASS				
g	grams	0.035	ounces	oz
kg	kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
TEMPERATURE (exact degrees)				
°C	Celsius	1.8C+32	Fahrenheit	°F
ILLUMINATION				
lx	lux	0.0929	foot-candles	fc
cd/m ²	candela/m ²	0.2919	foot-Lamberts	fl
FORCE and PRESSURE or STRESS				
N	newtons	0.225	poundforce	lbf
kPa	kilopascals	0.145	poundforce per square inch	lbf/in ²

* SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380. (Revised March 2003)

Exhibit K. Table of Contents (Example-Style 1)

TABLE OF CONTENTS	
CHAPTER 1. INTRODUCTION	1
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Exhibit N. List of Abbreviations and Symbols (Example)

LIST OF ABBREVIATIONS AND SYMBOLS

ACI	American Concrete Institute
ASTM	American Society for Testing and Materials
BCC	Body centered cubic crystal structure
CFRP	Carbon fiber reinforced polymer
CTL	Chloride threshold level
EAC	Environmentally assisted cracking
FHWA	Federal Highway Administration
FRP	Fiber reinforced polymer
GDOT	Georgia Department of Transportation
SCM	Supplementary cementitious material
UTS	Ultimate tensile strength
XRD	X-ray diffraction
d_{rod}	Diameter of stainless steel rod coil
$E_{breakdown}$	Potential at which passive film breaks down
w/cm	Water-to-cementitious materials ratio
γ	Austenite phase of steel
δ	Ferrite phase of steel
ΔA	Reduction in area at fracture surface
ϵ_{ult}	Ultimate strain
μ_r	Relative magnetic permeability
ρ	Electrical resistivity
σ_{ult}	Ultimate tensile strength

Exhibit O. Appendices (Example-Writing)

APPENDIX A. MATERIAL APPLICATION GUIDELINE FOR ANTI-ICING AND DEICING

INTRODUCTION

The purpose of this guideline is to provide recommendations for winter roadway maintenance operations regarding the use of anti-icing and de-icing materials in Georgia. This guideline is largely based on the results from GDOT Research Project 18-28, the FHWA guideline, and a review of other states' practice. This guideline includes recipe of the blends of the liquid and solid chemicals and the applications rate under different winter weather conditions.

ANTI-ICING AND DEICING

Anti-icing refers to pre-treatment operations before the winter event starts. The purpose of anti-icing operations is to prevent the formation of ice bond or the accumulation of snow. Pre-treatment should normally be performed 12-18 hours prior to the onset of the winter event. Applications more than three days before the event should be avoided. If the upcoming winter storm does not start with a heavy rain, liquid application (brine) is usually the most effective. Otherwise, solid application should be considered for anti-icing. Pre-treatment for bridges should be considered for all winter weather events to prevent the formation of black ice.

Deicing refers to post-treatment operations during or after the winter event. The purpose of deicing is to remove the accumulated snow or ice from the road surface and return it to a wet or clear condition quickly. Deicers may be applied in solid, liquid, and a combination

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Figure 32. Photo. Switchgrass plugs upon arrival at GSU. Taken on 08/01/2017.

Exhibit Q. References (Example-Numerical)

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Exhibit R. References (Example-Alphabetical)

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