

CHAPTER 1

INTRODUCTION

NOTE: All questions and comments should be directed to the Drainage Specialist, Design Support Area.

Revised January 2006

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1.1 INTRODUCTION/PURPOSE

The Drainage Manual was developed to provide guidance for the design of Michigan Department of Transportation (MDOT) drainage facilities. The purpose of this manual is to serve as a contract and training document for MDOT development and delivery personnel. This manual also meets stormwater best management practices required by MDOT's stormwater management program. This manual is posted on the stormwater management programs public website:

<http://www.michigan.gov/stormwater>

Michigan public transportation agencies and consultants are encouraged to use this information.

1.2 OVERVIEW

This manual was derived from AASHTO's Model Drainage Manual, Metric Version, 1999. The Model Drainage Manual was edited to meet MDOT needs and converted to English units. These edits included elimination of some chapters and the addition of material from other MDOT manuals and other agency publications.

The MDOT Drainage Manual has been developed to give the design engineer a basic working knowledge of hydrology, hydraulics and stormwater management. The user should practice good engineering judgment while using this manual.

The following outline is generally used as a format for all chapters:

- Introduction/Purpose
- Definitions
- Policy and Design Criteria
- Design Guidance and Procedures
- Maintenance (if applicable)

1.2.1 Legal Policy and Procedure (Chapter 2)

The chapter on legal policy and procedure gives an overview of Federal and State regulations that pertain to drainage, and provides some guidance on the environmental permitting process for various stormwater designs.

1.2.2 Hydrology (Chapter 3)

The chapter on hydrology gives methods to estimate design flood flows used to size drainage facilities.

1.2.3 Natural Channels and Roadside Ditches (Chapter 4)

This chapter discusses open channel systems. Principles of open channel flow theory are given in Appendix 4-C.

1.2.4 Culverts (Chapter 5)

This chapter gives procedures for the hydraulic design of highway culverts. The chapter also introduces the HY8 computer software and gives a summary of design philosophy contained in FHWA's Hydraulic Design Series Number 5.

1.2.5 Bridges (Chapter 6)

This chapter gives guidance on the hydraulic design for bridges. The design procedure emphasizes hydraulic analysis, scour analysis, and HEC-RAS computer program.

1.2.6 Road Storm Drainage Systems (Chapter 7)

This chapter provides guidance on storm sewer designs and analysis. Aspects of storm sewer design, such as system planning, pavement drainage, gutter flow calculations, inlet spacing, pipe sizing, and hydraulic grade line calculations are included.

1.2.7 Stormwater Storage Facilities (Chapter 8)

This chapter provides general design criteria for the following types of facilities: detention, retention, infiltration, and first flush. Procedures for performing basin sizing and reservoir routing calculations are also discussed.

1.2.8 Stormwater Best Management Practices (BMPs) (Chapter 9)

This chapter gives a brief overview of MDOT-approved BMP methods, both structural and managerial.

1.2.9 Pump Stations (Chapter 10)

This chapter gives an overview on the necessity to remove stormwater from highway sections that cannot be drained by gravity. The chapter follows guidance given in FHWA's "Manual for Highway Stormwater Pumping Stations."

1.3 MANUALS, COMPUTER PROGRAMS, AND REGULATIONS

References to specific computer programs, guidelines, manuals, and regulations will be noted within the manual. It is expected that the designer will be knowledgeable in the use of the referenced items.

The designer should keep current with new design documents and local, State, and Federal regulations, and other references cited in this manual.

1.4 REFERENCES AND HYPERLINKS

At all points in the manual where the designer may need more detailed source material, references are given. Topics within the manual are linked to other chapters; the user can “click” on these to move within the document. References listed at the end of each chapter in bold type are recommended documents for the designer’s library. World wide web hyperlinks are provided at the end of chapters as additional references for electronic users of this document.

1.5 ENVIRONMENTAL PROTECTION

MDOT is concerned about the potential impact of stormwater runoff on the environment. The symbol below is used to identify practices that address or involve environmental concerns.



1.6 UPDATES

Updates to this manual will periodically be issued as hard copies; however, the most current manual will always be available on the MDOT stormwater public website given at the beginning of this chapter.