# Hydraulic Design Manual

# Manual Notices Archive

# Manual Notice 2015-1

**From:** *Rene Garcia*, P.E.

**Manual:** *Hydraulic Design Manual*

**Effective Date:** August 31, 2015

## Contents

The following updates were made to the *Hydraulic Design Manual*:

- Chapter 4 - Hydrology
  - Section 6 - Updated the note to Table 4-2 regarding AEP for scour computations.
  - Section 11 - Modified language regarding sheet flow to limit length to 100 feet,
  - Section 14 - Included WinTR-55 in References.
- Chapter 13 - Storm Water
  - Section 1 – Updated the link for *Storm Water Management Guidelines for Construction Activities* (TxDOT, 2002) to reflect that the manual is under revision.

## Supersedes

The revised manual supersedes prior versions of the manual.

## Contact

Contact Stan Hopfe at Stan.Hopfe@txdot.gov (512) 416-2219, Roadway Design Section, Design Division with any questions or comments.

## Archives

Past manual notices are available in a PDF archive.

# Manual Notice 2014-1

March 26, 2014

**From:** Mark A. Marek, P.E.
Director, Design Division

**Manual:** *Hydraulic Design Manual: Effective Date May 1, 2014*

---

## Purpose

Additions were made to Chapter 4 based on TxDOT research. Chapter 10 is revised; information has been updated or rearranged, and extraneous material has been removed.

## Contents

Chapter 4 – Hydrology

- Contains new information and procedures based on recent TxDOT research.
    - Section 6 – added language to clarify the statement "Structures and roadways should be serviceable (not inundated) up to the design standard."
    - Section 11 – discussion of calculation of $t_c$ in watersheds with low (flat) topographic slope
    - Section 13 – discussion of watershed subdivision and recommendations of when subdivision is appropriate
    - Section 13 – clarification of NRCS dimensionless unit hydrograph method

Chapter 5 – NFIP Design of Floodplain Encroachments & Cross Drainage Structures

- Section 6 – added language to clarify FPA notification.

Chapter 10 – Storm Drains

- The chapter has been reorganized to improve readers' comprehension.
- Separated equations from Section 5, Storm Drain Inlets, into a new section called Gutter and Inlet Equations.
- Added discussion:

- Minimum Cover (Section 2)
- Check Flood (Section 2)
- Runoff from Outside Department ROW (Section 3)
- Trench Drains (Section 5)
- Inlet and Access Hole Energy Loss Equations (based on HEC-22) (old Section 7, new Section 8)

- Expanded discussion:
  - Conduit Design Procedure (old Section 6, new Section 7)
- Condensed discussion:
  - Special Outfall Appurtenances (Section 2)
  - Design Documentation (Section 2)
  - Documentation Requirements (Section 2)
  - Hydroplaning (Section 4)
  - Slotted Drains (Section 5)
- Removed:
  - Vehicle Speed in Relation to Hydroplaning (Section 4)
  - Water Depth in Relation to Hydroplaning (Section 4)
  - Slotted Drain Inlet Design (Section 5)
  - Bicycle Safety for Grate Inlets on Grade (Section 5)
  - Splash Over Velocity Calculation Equations for inlet types not used by TxDOT (Section 5)
  - Splash Over Velocity Calculation Equations for metric (Section 5)
  - Manhole Spacing Criteria for metric (old Section 6)
  - Manhole Loss Equations (based on old methodology) (old Section 7)

### Supersedes

The revised manual supersedes prior versions of the manual.

### Contact

Contact Amy Ronnfeldt at Amy.Ronnfeldt@TxDOT.gov or (512) 416-2328, Roadway Design Section, Design Division with any questions or comments.

### Archives

Past manual notices are available in a PDF archive.

# Manual Notice 2011-1

**From:** Mark A. Marek, P.E.

**Manual:** *Hydraulic Design Manual*

**Effective Date:** October 01, 2011

## Purpose

This manual provides guidance and recommended procedures for the design of Texas Department of Transportation drainage facilities. This revision reorganizes and updates the manual content to reflect current policies and to incorporate recent research in the field of hydrology and hydraulics. It also updates examples, streamlines the organization of the manual, and corrects minor errors.

## Contents

The first 5 chapters are completely new chapters. Chapters 6 through 14 are existing chapters in which information has been updated or rearranged, and irrelevant material has been removed. Changes to Chapters 6, 7 and 14 are relatively minor.

Chapter 1 - Manual Introduction

- Presents organization of the manual and introductory material.

Chapter 2 - Hydraulic Practices and Governing Law

- Lists the various federal and state laws, regulations, and agencies to be considered in hydraulic design
- Provides definitions of policy, standards, and other items, as well as details of the roles and responsibilities in hydraulic design
- Provides guidance for responding to drainage complaints, connection to TxDOT structures, and dams.

Chapter 3 - Processes and Procedures in TxDOT Hydrologic and Hydraulic Activities

- Provides guidance on the scope of hydraulic activities, evaluation of risk in hydraulic design, and design activities by project phase from initial planning through PS&E development
- Provides guidance on hydraulic documentation and deliverables, including a comprehensive table of the data or documentation, the stage at which it's needed, and where the data is to be stored
- Section on Risk has been moved from Chapter 9 (Bridges) to apply to all designs, not just bridges.

Chapter 4 - Hydrology

- Contains new information and procedures based on recent research
- The existing information has been reorganized, outdated information has been removed, and references have been updated.

Chapter 5 - NFIP Design of Floodplain Encroachments and Cross Drainage Structures

- Provides a description of the National Flood Insurance Program (NFIP), definitions, guidance on TxDOT's responsibility under the NFIP, and detailed procedures for hydraulic designers.

Chapter 6 - Hydraulic Principles

- Provides an expanded definition of Froude Number with a discussion on its meaning and importance.

Chapter 7 - Channels

- Reformatted to improve reader's comprehension
- Corrects, and updates information; supplementary information has been removed.

Chapter 8 - Culverts

- The chapter has been reformatted to improve reader's comprehension
- Information has been corrected, updated, new information added, and supplementary information has been removed.

Chapter 9 - Bridges

- The chapter has been reformatted to improve reader's comprehension
- Information has been corrected, updated, new information added, and supplementary information has been removed
- Bridge scour section has been removed and inserted in the Bridge Division Geotechnical Manual. The Geotechnical section is the OPR for bridge scour
- Moved section on Risk to Chapter 3 to apply to all designs, not just bridges.

Chapter 10 - Storm Drains

This chapter has not been altered at this time. It will be addressed in the next revision.

Chapter 11 - Pump Stations

- The chapter has been rewritten with new information
- Information deemed supplementary has been removed.

Chapter 12 - Reservoirs

- The chapter has been reformatted to improve reader's comprehension
- Information has been corrected, updated, new information added, and supplementary information has been removed.

Chapter 13 - Storm Water Management

- The chapter has been reformatted to improve reader's comprehension
- Information has been corrected, updated, some new information added, and supplementary information has been removed
- Further revision is anticipated because of pending environmental regulations and the implementation of a TxDOT-wide EMS program.

Chapter 14 - Conduit Strength and Durability

- This chapter has been removed from this manual; questions regarding this subject can be addressed by the Bridge Division.

**Contact**

Address questions concerning the information contained in this manual to the Roadway Design Section in the Design Division.

**Copyright Notice**

This *Hydraulic Design Manual* and all future revisions: Copyright ©2011 by Texas Department of Transportation (TxDOT). Published by the Design Division (DES). All rights reserved.

**Archives**

Past manual notices are available in a PDF archive.

## Manual Notice 2009-1

**From:** Mark A. Marek, P.E.

**Manual:** Hydraulic Design Manual

**Effective Date:** March 01, 2009

### Purpose

This revision is intended to update the *Hydraulic Design Manual*, specifically to include TxDOT's Nondiscrimination Policy.

### Contact

Address questions concerning the information contained in this manual to the Roadway Design Section in the Design Division.

### Copyright Notice

This *Hydraulic Design Manual* and all future revisions: Copyright ©2009 by Texas Department of Transportation (TxDOT). Published by the Design Division (DES). All rights reserved.

### Archives

Past manual notices are available in a PDF archive.

**Manual Notice 2004-1**

*To:* Districts and Divisions

*From:* Ken Bohuslav, P.E.

*Subject:* Manual Revision

*Manual:* *Hydraulic Design Manual*

*Date:* March 2, 2004

## Purpose

This revision is intended to update the *Hydraulic Design Manual*, specifically Chapter 13.

## Contents

Two sections have been removed from Chapter 13. They are; Section 3, Erosion Control Devices and Section 6, Quality Management. The information in Section 3 is already contained in the TxDOT publication "Storm Water Management Guidelines for Construction Purposes." The information in Section 6 is obsolete. In both cases these sections are no longer appropriate to the manual.

## Instructions

This revision will be distributed online only.

## Contact

For general comments and suggestions for future revisions of this manual, contact the Design Division, Roadway Design Section.

## Copyright Notice

This *Hydraulic Design Manual* and all future revisions:
Copyright ©2004 by Texas Department of Transportation (TxDOT)
Published by the Design Division (DES)
All rights reserved.

**Manual Notice 2002-2**

*To:* Districts, Divisions and Offices

*From:* Mary Lou Ralls, P.E.

*Manual:* *Hydraulic Design Manual*

*Effective Date:* November 1, 2002

## Purpose

This manual provides guidance and recommended procedures for the design of Texas Department of Transportation drainage facilities. This revision updates various equations and references to them, updates the procedure for conduit design, and corrects minor errors.

## Instructions

Revisions are distributed online only. This 2002-2 version supersedes the 2002-1 version.

## Contents

The manual contains fourteen chapters:

- Manual Introduction
- Policy and Guidelines
- Types of Documentation
- Data Collection, Evaluation, and Documentation
- Hydrology
- Hydraulic Principles
- Channels
- Culverts
- Bridges
- Storm Drains
- Pump Stations
- Reservoirs
- Storm Water Management, and
- Conduit Strength and Durability.

## Contact

For more information regarding any chapter or section in this manual, please contact the Hydraulics Branch of the Bridge Division.

**Manual Notice 2002-1**

**To:** Districts, Divisions and Offices

**From:** Mary Lou Ralls, P.E.

**Manual:** Hydraulic Design Manual

**Effective Date:** April 3, 2002

## Purpose

This manual provides guidance and recommended procedures for the design of Texas Department of Transportation drainage facilities. This revision adds English measurement equivalents to the metric units provided in a previous version of the manual. It also updates examples, eliminates an unnecessary section on wave runup analysis, streamlines the organization of the manual, and corrects minor errors.

## Instructions

Revisions are distributed online only. This 2002-1 version supersedes the 2001-1 version.

## Contents

The manual contains fourteen chapters – Manual Introduction; Policy and Guidelines; Types of Documentation; Data Collection, Evaluation, and Documentation; Hydrology; Hydraulic Principles; Channels; Culverts; Bridges; Storm Drains; Pump Stations; Reservoirs; Storm Water Management; and Conduit Strength and Durability.

## Contact

For more information regarding any chapter or section in this manual, please contact the Hydraulics Branch of the Bridge Division.

# Manual Notice 2001-1

**To:** Districts, Divisions and Offices

**From:** Kirby W. Pickett, P.E.
Deputy Executive Director

**Manual:** Hydraulic Design Manual

**Effective Date:** October 1, 2001

## Purpose

This manual will provide guidance and recommended procedures for the design of Texas Department of Transportation drainage facilities.

## Instructions

This manual replaces the Bridge Division Hydraulic Manual, Third Edition.

## Contents

The manual contains fourteen chapters – Manual Introduction; Policy and Guidelines; Types of Documentation; Data Collection, Evaluation, and Documentation; Hydrology; Hydraulic Principles; Channels; Culverts; Bridges; Storm Drains; Pump Stations; Reservoirs; Storm Water Management; and Conduit Strength and Durability.

## Contact

For more information regarding any chapter or section in this manual, please contact the Hydraulics Branch of the Bridge Division.