

**SUMMARY OF CHANGES TO VOLUME 2
of the
URBAN STORM DRAINAGE CRITERIA MANUAL
and
DISCLAIMER**

2001 Edition vs. 1969 Edition

GENERAL

- All chapters edited or rewritten. Emphasis on maintenance, public safety, and aesthetics.
- Many design aids added, including figures, nomographs, spreadsheets, etc.
- New chapters on Revegetation and Design Examples added.
- Design checklists added to many chapters.
- Stronger emphasis on “designing with nature” principles such as “bioengineering.”

HYDRAULIC STRUCTURES CHAPTER

- Revises drop structure design criteria and details.
- Provides guidance on safety considerations for boatable channels.
- Includes section on “rundowns” to convey flows into major drainageways and storage facilities.
- Also includes section on design of low tailwater basins at storm sewer discharge locations.

CULVERTS CHAPTER

- Significant changes. Emphasizes public safety with use of trash/safety racks at entrances.
- Provides minimum trash rack size guidance.
- Discourages use of grates or racks at pipe outlets.

STORAGE CHAPTER

- Totally rewritten. Emphasizes designing for maintainability, aesthetics and safety.
- Addresses protecting against catastrophic failures due to overtopping embankments.
- Gives alternative techniques for preliminary and final design sizing of facilities.
- Added guidance on sizing and use of retention facilities.
- Includes use of spreadsheets for aid in preliminary and final design.
- Provides for consistency with Volume 3 of the *Manual*.

FLOODPROOFING CHAPTER

- Contents completely rewritten, draws heavily on FEMA guidance.

REVEGETATION CHAPTER

- New chapter: provides guidance on preparation of a planting plan and use of soil amendments.
- Provides grass and wildflower seed mixes for different soil and moisture conditions.
- Lists recommended shrubs, trees and planting techniques.
- Gives details on bioengineered elements including live staking, poling and willow bundles.
- Includes a revegetation process guidance chart.

DESIGN EXAMPLES CHAPTER

- Provides a variety of design examples from around the Denver metropolitan area.

2001 through 2005 Revisions to 2001 Edition of Volume 2

ENTIRE VOLUME 2

2005-03: Reformats entire Volume 2 to facilitate future updates. (Significant Revision)

HYDRAULIC STRUCTURES CHAPTER

2002-06: Correct Tables HS-4 and HS-7a4 and Figure HS-8. (Significant Revision)

CULVERT CHAPTER

2001-07: Rewritten *Trash Rack* Section. (Major Revision)

January 2007 Update to 2001 Edition

HYDRAULIC STRUCTURES CHAPTER

- Revised Manning's n and Boulder sizing recommendations for grouted boulders.
- Simplifies Grouted Sloping Boulder (GSB) drop design, increases allowable maximum drop for the simplified design from 5-feet to 6-feet.
- Adds a smaller Impact Energy Dissipating Basin for use with outlets 18- to 48-inches in diameter.
- Adds details for the design of an impact basin for pipe outlets 18" and smaller in diameter.
- Modifies the guidance on pipe outlet rundowns, including details for a Grouted Boulder Rundown
- Adds details for a GSB drop for use in channels with sandy/erosive soils.
- Modifies concrete check structure details and adds design guidance for a sheet-pile checks.
- Clarifies parts of *Detailed Hydraulic Analysis* section including guidance for Manning's n for Concrete, Boulders and Grouted Boulders.
- Clarifies guidance on the design of low tailwater riprap basins at pipe outlets.

STORAGE CHAPTER

- Clarifies a number of topics in the *Design Storms for Sizing Storage Volumes* section, including drainage and flood control issues, spillway sizing, retention facilities, outlet works design, etc.
- Clarifies the uses Rational Formula-Based Modified FAA Procedure as being applicable only for the sizing of single return period control on-site detention basins.
- Adds Full Spectrum Detention procedure for the design of on-site detention facilities for tributary areas of one square mile and less.
- Adds a section: *On-Site Detention and UDFCD 100-year Floodplain Management Policy*.
- Expands on the discussion on use of vegetation in detention basins.
- Revises the submittal checklist.

June 2007 Correction of the 2001 Edition's January 2007 Update

STORAGE CHAPTER

- Corrected Equation SO-13 and equations shown on Figure SO-8 for perforation sizing.

April 2008 Correction of the 2001 Edition's January 2007 Update

HYDRAULIC STRUCTURES CHAPTER

- Revised Figure HS-9 to make consistent with narrative recommendations.

STORAGE CHAPTER

- Revised Figure SO-6 to show protection on the downstream face of spillway and/or embankment.

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