

PREFACE

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1.0 ACKNOWLEDGEMENTS

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CONTRIBUTORS TO ORIGINAL (1969) VERSION OF THE *MANUAL*

All residents of the Denver metropolitan area have benefited significantly from the pioneering vision of those who were responsible for the original (1969) version of the *Manual*, including D. Earl Jones, Jr., P.E., Dr. Jack Schaeffer, Dr. Gilbert White and Kenneth R. Wright, P.E. (lead author). The vast majority of the policies, principles, and criteria in the 1969 *Manual* are found in this updated (2001) version—a true testament to the wisdom of these leaders.

2.0 PURPOSE OF THE *MANUAL*

Volumes 1 and 2 of the *Manual* provide guidance to local jurisdictions, developers, contractors, and industrial and commercial operations in selecting, designing, constructing, and maintaining stormwater drainage and flood control facilities. This *Manual* covers a variety of topics, including the following:

Chapter 1	Drainage Policy
Chapter 2	Drainage Law
Chapter 3	Planning
Chapter 4	Rainfall
Chapter 5	Runoff
Chapter 6	Streets/Inlets/Storm Sewers
Chapter 7	Major Drainage
Chapter 8	Hydraulic Structures
Chapter 9	Culverts
Chapter 10	Storage
Chapter 11	Flood Proofing
Chapter 12	Revegetation
Chapter 13	Design Examples

A reference section is provided for each chapter, and additional materials and insight on the topics presented in the *Manual* may be found by studying the papers and documents listed at the end of each chapter. Additionally, on the CD version of this *Manual*, a series of design spreadsheets and software are provided including:

Software

CUHP 2000
 HY8 (FHWA HY8 Culvert Analysis Microcomputer Program)
 UD CHANNEL
 UD POND (Hydropond)
 UD INLET

Spreadsheets

UD-Channels
 UD-Culvert
 UD-Detention
 UD-Inlet
 UD-Raincurve

UD SEWER

UD-Rainzone

UDSWM

UD-Rational

These software programs may also be obtained through the District's Web site (www.udfcd.org, under DOWNLOADS), which should be checked for periodic updates.

The District's Maintenance Eligibility Guidelines as of June 2001 are also provided on the CD version of this *Manual*. Again, the District's Web site should also be checked for periodic updates.

The *Manual* provides the minimum criteria and standards recommended by the District. Providing for facilities that go beyond the minimum is encouraged. In addition, there may be other requirements by local, state and federal agencies that may have to be met in addition to the minimum criteria provided herein.

3.0 LIST OF ABBREVIATIONS

Commonly Used Abbreviations

ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
BCD	Baffle chute drop
BFE	Base flood elevation
BMP	Best management practice
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CGIA	Colorado Governmental Immunity Act
CMP	Corrugated metal pipe
CRS	Colorado Revised Statutes
CUHP	Colorado Urban Hydrograph Procedure
CWA	Clean Water Act
CWCB	Colorado Water Conservation Board
DCIA	Directly connected impervious area
DRCOG	Denver Regional Council of Governments
EGL	Energy grade line
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHAD	Flood Hazard Area Delineation
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study

FPE	Flood protection elevation
GSB	Grouted sloping boulder
HGL	Hydraulic grade line
HUD	U.S. Department of Housing and Urban Development
H:V	Horizontal to vertical ratio of a slope
ICC	Increased cost of compliance
LID	Low impact development
MDCIA	Minimized directly connected impervious area
NAVD	North American Vertical Datum
NFIA	National Flood Insurance Act
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PMP	Probable maximum precipitation
RCP	Reinforced concrete pipe
SBA	Small Business Administration
SEO	Colorado State Engineer's Office
SFHA	Special Flood Hazard Area
SFIP	Standard Flood Insurance Policy
SWMM	Stormwater Management Model
TABOR	Taxpayers Bill of Rights
TWE	Tailwater elevation
UDSWM	Urban Drainage Stormwater Management Model

USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
WEF	Water Environment Federation
VHB	Vertical hard basin
WQCV	Water quality capture volume

Commonly Used Units

cfs	cubic feet per second
cfs/ft	cubic feet per second per foot
ft	foot
ft ²	square feet
ft/ft	foot per foot
ft/sec	feet per second
ft/sec ²	feet per second squared
hr	hour
in	inch
in/hr	inches per hour
in/hr/ac	inches per hour per acre
lbs	pounds
lbs/cy	pounds per cubic yard
lbs/ft ²	pounds per square foot
lbs/ft ³	pounds per cubic foot
lbs PLS/acre	pounds pure live seed per acre
min	minute
psi	pounds per square inch
psf	pounds per square foot