

# Crosswalk of 2007-2010 and 2020 SDFDM

## **2007-2010 ERRATA's SDFDM CHAPTER AND SECTION**

### **1 CHAPTER 1 - GENERAL INFORMATION**

#### 1.1 INTRODUCTION

#### 1.2 CITY'S AUTHORITY TO MANAGE AND OPERATE THE PUBLIC SEWER SYSTEM

#### 1.3 THE CITY SEWERAGE SYSTEM

#### 1.4 URBAN SERVICE BOUNDARY

#### 1.5 RELATIONSHIP BETWEEN THIS MANUAL AND THE STORMWATER MANAGEMENT MAN SWMM)

#### 1.6 ORGANIZATION

#### 1.7 APPLICABILITY

#### 1.8 THE NEED FOR STANDARDS

#### 1.9 MANUAL REVISION AND VARIANCE FROM THESE STANDARDS

#### 1.10 COORDINATION WITH OTHER CI BUREAUS

#### 1.11 USEFUL CONTACTS WITHI CITY

#### 1.12 COMPANION DOCUMENTS AND INTE LINKS

#### 1.13 GLOSSARY (ERRATA)

#### CHAPTER 1 NOTEWORTHY ITEMS

### **CHAPTER 2 – PROJECT DELIVERY, PERMITTING, AND GENERAL PROCEDURES**

#### 2.1 INTRODUCTION

#### 2.2 TYPES OF PROJECTS

##### 2.2.1 LOCAL IMPROVEMENT

##### 2.2.2 PUBLIC I IMPROVEMENT

#### 2.3 GENERAL DESIGN RESPONSIBILITIES

##### 2.3.1 BES STAFF

##### 2.3.2 CONSULTANT UNDER CONTRACT WITH THE CITY

##### 2.3.3 CONSULTANT UNDER CONTRACT WITH A PERMITTEE

## **2020 Chapter and Location SDFDM**

### **CHAPTER 1 – GENERAL INFORMATION**

#### 1.1 Introduction (NEW)

#### 1.2 City's Authority to Manage and Operate the Public Sewer System

#### ~~1.3 The City Sewerage System (DELETED)~~

#### 1.3 Urban Services Boundary (NEW Map)

#### 1.4 Relationship between this Manual and the Stormwater Management Manual (SWMM) (edited)

#### 1.5 Organization of this Manual (UPDATED)

#### 1.6 Applicability (NEW)

#### 1.7 The Need for Standards

#### 1.8 Manual Revision -The process for suggesting changes (Updated)

##### 1.8.1 Revision Process (UPDATED)

#### 1.9 Coordination with other City Bureaus

#### 1.10 Useful Contacts within the City (UPDATED)

#### 1.11 Companion Documents and Internet Links (UPDATED)

#### ~~1.13 Glossary (UPDATED, moved to CHAPTER 9)~~

#### CHAPTER 1 NOTEWORTHY ITEMS (UPDATED)

### **CHAPTER 2 – PROJECT DELIVERY, PERMITTING, and GENERAL PROCEDURES**

#### 2.1 Introduction

#### 2.2 Types of Projects

##### 2.2.1 Local Improvement

##### 2.2.2 Public Improvement

#### 2.3 General Design Responsibilities

##### 2.3.1 BES Staff (UPDATED)

##### 2.3.2 Consultant under Contract with the City

##### 2.3.3 Consultant under Contract with a Permittee (UPDATED)



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## **2007-2010 ERRATA's SDFDM CHAPTER AND SECTION**

2.4 PLAN, SPECIFICATION, COMPUTATION AND OTHER REQUIREMENTS

2.4.1 PLAN REQUIREMENTS

2.4.2 SPECIFICATION REQUIREMENTS

2.4.3 USE OF STANDARD PLANS (ERRATA)

2.4.4 COMPUTATION AND OTHER SUPPORTING DOCUMENT REQUIREMENTS

2.4.5 OWNERSHIP OF DOCUMENTS

2.4.6 CONSISTENCY

2.4.7 BES LACKS PERMITTING JURISDICTION FOR OTHER CITY BUREAUS OR OUTSIDE AGENCIES

2.5 PUBLIC WORK PERMITS

2.5.1 PUBLIC WORKS PERMIT APPLICATION REQUIREMENTS (ERRATA)

2.5.2 PUBLIC WORKS PERMIT PROCESS (ERRATA)

2.5.3 Level 2 Simplified Permit in Public ROW / Easements Formerly Short Sewer Extension Permit) (ERRATA)

2.5.4 Level 3 Public Works Permit process(ERRATA)

2.5.4 Level 3 Public Works Permit Process (no change to text – provided for context)

2.6 DESIGN MANUAL REVISION AND VARIANCE REQUEST

2.6.1 MANUAL REVISIONS - THE PROCESS FOR SUGGESTING CHANGES TO MANUAL

2.6.2 THE DESIGN VARIANCE PROCESS - REQUESTING A CHANGE FROM THESE STANDARDS

CHAPTER 2 NOTEWORTHY ITEMS

**CHAPTER 3 – GENERAL DESIGN REQUIREMENTS**

3.1 PROJECT SERVICE LIFE

3.2 SERVICE REQUIREMENTS

## **2020 Chapter and Location SDFDM**

2.4 Plan, Specification, Computation and other Requirements

2.4.1 Plan Requirements (UPDATED)

2.4.2 Specification Requirements

2.4.3 Use of Standard Details and Drawings (UPDATED)

2.4.4 Computation and Other Supporting Document Requirements

2.4.5 Ownership of Documents

2.4.6 Consistency

2.4.7 BES Lacks Permitting Jurisdiction for other City Bureaus or Outside Agencies

2.5 Public Works Permits

2.5.1 Public Works Permit Application Requirements (UPDATED)

2.5.2 Level 1 Sewer Connection Permits(UPDATED)

2.5.3 Level 2 Simplified Permit in Public ROW/Easements (formerly Short Sewer Extension permit

2.5.4 Level 3 Public Works Permit process(UPDATED)

2.5.4 Level 3 Public Works Permit Process (no change to text – provided for context)

2.6 Design Manual Revision and Variance Request

2.6.1 Manual Revisions - The Process for Suggesting Changes to the Manual (COMBINED WITH 1.8)

2.6.2 The Design Variance Process - Requesting a Change from these Standards

CHAPTER 2 NOTEWORTHY ITEMS (NEW)

**CHAPTER 3 – GENERAL DESIGN REQUIREMENTS**

3.1 Project Service Life (UPDATED)

3.2 Service Requirements



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## **2007-2010 ERRATA's SDFDM CHAPTER AND SECTION**

- 3.2.1 SERVICE TO EXISTING AND FUTURE DEVELOPMENT
- 3.2.2 GRAVITY SYSTEMS VERSUS PUMPED SYSTEMS (ERRATA)
- 3.2.3 SEWER SEPARATION
- 3.2.4 SANITARY SEWERS
- 3.2.5 STORM DRAINAGE FACILITIES
- 3.2.6 COMBINED SEWERS
- 3.3 DRAINAGE FOR SEEPS, SPRINGS AND ARTESIAN CONDITIONS
- 3.4 STANDARD SEWER LOCATIONS
  - 3.4.1 WITHIN A RIGHT OF WAY
  - 3.4.2 WITHIN A PUBLIC EASEMENT
  
- 3.5 OBTAINING EASEMENTS - PREPARATION, FORM AND RECORDING
  
  
- 3.6 DRAINAGE RESERVE (CITY CODE CHAPTER 17.38 AND ZONING CODE TITLE 33 PLANNING AND ZONING)
- 3.7 SURVEY REQUIREMENTS
  - 3.7.1 SURVEY STANDARD
  - 3.7.2 CITY OF PORTLAND DATUM (ERRATA)
  - 3.7.3 VERTICAL CONTROL
  - 3.7.4 HORIZONTAL CONTROL
- 3.8 GEOTECHNICAL INVESTIGATIONS RE REQUIREMENTS
  - 3.8.1 UTILITY INVESTIGATION RE REQUIREMENTS
  - 3.8.2 UNDERGROUND UTILITY LOCATION

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- 3.2.1 Service to Existing and Future Development
- 3.2.2 Gravity Systems versus Pumped Systems
- 3.2.3 Sewer Separation (NEW)
- 3.2.4 Sanitary Sewers
- 3.2.5 Storm Drainage Facilities
- 3.2.6 Combined Sewers
- 3.3 Drainage for Seeps, Springs and Artesian Conditions (NEW)
- 3.4 Standard Sewer Locations
  - 3.4.1 Within a Right of Way
  - 3.4.2 Within a Public Easement
    - 3.4.2.1 Location
    - 3.4.2.2 Width (UPDATED)
    - 3.4.2.3 Uses and Encroachments (NEW)
- 3.5 Obtaining Easements - Preparation, Form and Recording
  - 3.5.1 Separate Document
  - 3.5.2 Eminent Domain and condemnation
  - 3.5.3 Permit Project Easement
  - 3.5.4 Private Easements (NEW)
- 3.6 Drainage Reserve (NEW)
- 3.7 Survey Requirements
  - 3.7.1 Survey Standard
  - 3.7.2 City of Portland Datum
  - 3.7.3 Vertical Control
  - 3.7.4 Horizontal Control
- 3.8 Geotechnical Investigations Requirements (UPDATED)
  - 3.8.1 Utility Investigation Requirements
  - 3.8.2 Underground Utility Location



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## **2007-2010 ERRATA's SDFDM CHAPTER AND SECTION**

### 3.8.3 ADDRESSING AND RESOLVING UTILITY RELOCATION CONFLICTS

### 3.9 ODEQ REVIEW OF CITY PROJECTS

### 3.10 FLOW CONVERSION FACTORS

### CHAPTER 3 NOTEWORTHY ITEMS

## **CHAPTER 4 - GENERAL PIPELINE DESIGN CRITERIA AND PROCEDURES**

### 4.1 INTRODUCTION

### 4.2 PIPE MATERIALS

#### 4.2.1 PIPELINE MATERIALS

#### 4.2.2 JOINTS

#### 4.2.3 FUSION WELDING

#### 4.2.4 SELECTION OF PIPE CLASS AND WALL THICKNESS

### 4.3 GENERAL HORIZONTAL ALIGNMENT

#### 4.3.1 NO CURVED SEWERS REQUIRING PULLED JOINTS AND THE USE OF BLIND BENDS (ERRATA)

### 4.4 GENERAL VERTICAL ALIGNMENT

#### 4.4.1 MINIMUM DEPTH DETERMINATION (ERRATA)

#### 4.4.2 MINIMUM VERTICAL SEPARATION

#### 4.4.3 CROSSING BETWEEN SANITARY SEWERS AND WATER LINES

#### 4.4.4 VERTICAL ALIGNMENT - PROFILE REQUIREMENT

#### 4.4.5 DETERMINING SEWER SLOPE BETWEEN MANHOLES/ STRUCTURES

### 4.5 PIPELINE STRENGTH DESIGN

#### 4.5.1 DEAD (SOIL) LOADS

## **2020 Chapter and Location SDFDM**

### 3.8.3 Addressing and Resolving Utility Relocation Conflicts

### 3.9 Environmental Investigation Requirements. (NEW)

#### 3.9.1 City Staff and Consultant Designers for City Projects (NEW)

#### 3.9.2 Public Works Permit Projects (NEW)

### 3.10 Resiliency and Seismic Considerations (NEW)

### 3.11 ODEQ Review of City Projects (UPDATED)

### 3.12 Flow Conversion Factors

### CHAPTER 3 NOTEWORTHY ITEMS (NEW)

## **CHAPTER 4 - GENERAL PIPELINE DESIGN CRITERIA AND PROCEDURES**

### 4.1 Introduction

### 4.2 Pipe Materials

#### 4.2.1 Pipeline Materials (UPDATED)

#### 4.2.2 Joints (NEW)

#### 4.2.3 Fusion Welding (UPDATED)

#### 4.2.4 Selection of Pipe Class and Wall Thickness (UPDATED)

### 4.3 General Horizontal Alignment (Updated)

#### 4.3.1 No Curved Sewers Requiring Pulled Joints and the Use of Blind Bends

### 4.4 General Vertical Alignment

#### 4.4.1 Minimum Depth Determination

#### 4.4.2 Minimum Vertical Separation

#### 4.4.3 Crossing between Sanitary Sewers and Water Lines

#### 4.4.4 Vertical Alignment - Profile Requirement

#### 4.4.5 Determining Sewer Slope between Manholes/Structures

### 4.5 Pipeline Strength Design

#### 4.5.1 Dead (Soil) Loads



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## **2007-2010 ERRATA's SDFDM CHAPTER AND SECTION**

- 4.5.2 LIVE LOADS
- 4.5.3 TYPES OF PIPES AND THEIR DESIGN STRENGTH STANDARDS
- 4.5.4 RIGID PIPE DESIGN
- 4.5.5 FLEXIBLE PIPE DESIGN
- 4.6 MANHOLE LOCATION AND DESIGN
  - 4.6.1 TYPES OF MANHOLES
  
  - 4.6.2 HORIZONTAL AND VERTICAL MANHOLE LOCATIONS
  
  - 4.6.3 MAXIMUM AND MINIMUM SPACING BETWEEN MANHOLES
  
  - 4.6.4 MANHOLE DESIGN
  - 4.6.5 PIPE TO MANHOLE GEOMETRY (ERRATA)
  - 4.6.6 INSIDE MANHOLE DROP CONNECTION
  - 4.6.7 PIPE STUBOUTS FRO MANHOLES
  - 4.6.8 MANHOLE CHANNEL DESIGN
  - 4.6.9 MANHOLE DEPTH DESIGN
  - 4.6.10 DIAMETER OF FRAMES AND COVERS
  - 4.6.11 SETTING ELEVATION OF MANHOLE FRAME AND COVER
  - 4.6.12 ALTERNATE MANHOLE FEATURES
- 4.7 CLEANOUTS - WHEN AND WHERE THEY CAN BE USED (ERRATA)
  - 4.7.1 LATERAL CLEANOUT (ERRATA)
  - 4.7.2 TERMINAL CLEANOUT (ERRATA)
- 4.8 ABANDONMENT OF SEWERS, MANHOLES, SUMPS AND STRUCTURES
  - 4.8.1 SEWERS 12-INCHES AND LESS IN DIAMETER
  - 4.8.2 SEWERS GREATER THAN 12-INCH IN DIAMETER
  - 4.8.3 MANHOLES AND SUMPS

## **2020 Chapter and Location SDFDM**

- 4.5.2 Live Loads (UPDATED)
- Types of Pipes and Their Design Strength Standards (UPDATED)
- 4.5.3 Rigid Pipe Design
- 4.5.4 Flexible Pipe Design (UPDATED)
- 4.6 Manhole Location and Design
  - 4.6.1 Types of Maintenance Holes
  - 4.6.2 Flow Diversion Maintenance Hole Design (NEW)
  - 4.6.3 Horizontal and Vertical Maintenance Hole Locations (UPDATED)
  - 4.6.4 Maximum and Minimum Spacing between Maintenance holes
  - 4.6.5 Maintenance Hole Design
  - 4.6.6 Pipe to Maintenance Hole Geometry (UPDATED)
  - 4.6.7 Inside Maintenance hole Drop Connections
  - 4.6.8 Pipe Stubouts from MaIntenance Holes
  - 4.6.9 Maintenance Hole Channel Design
  - 4.6.10 Maintenance hole Depth Design (UPDATED)
  - 4.6.11 Diameter of Frames and Covers
  - 4.6.12 Setting Elevation of Maintenance Hole Frame and Cover (UPDATED)
  - 4.6.13 Alternate Manhole Features
- 4.7 Cleanouts - When and Where They Can be Used
  - 4.7.1 Lateral Cleanout (UPDATED)
  - 4.7.2 Terminal Cleanout
- 4.8 Abandonment of Sewers, Maintenance holes, Sumps and Structures(UPDATED)
  - 4.8.1 Sewers Less than 12-Inches in Diameter (UPDATED)
  - 4.8.2 Sewers Greater Than 12-Inch in Diameter (UPDATED)
  - 4.8.3 Manholes and Sumps (UPDATED)



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## **2007-2010 ERRATA's SDFDM CHAPTER AND SECTION**

4.9 BUOYANCY OF SEWERS

4.10 CONSTRUCTING SEWERS ON STEEP SLOPES

4.10.1 CONCRETE ANCHORS FOR PIPE 12-INCHES DIAMETER AND SMALLER AND SHALLOW BURIAL(LESS THAN 4' DEEP)

4.10.2 CONCRETE ANCHORS FOR PIPE GREATER THAN 12-INCH DIAMETER AND SHALLOW BURIAL(LESS THAN 4' DEEP)

4.11 CORROSION AND ODOR CONTROL DESIGN CONSIDERATIONS

4.11.1 DESIGN APPROACH

4.12 SEWER SYSTEM REPAIRS (ERRATA)

CHAPTER 4 NOTEWORTHY ITEMS

### **CHAPTER 5 – SANITARY SE DESIGN**

5.1 INTRODUCTION

5.2 CRITERIA FOR ESTIMATING DE FLOWS

5.2.1 DRAINAGE BASIN

5.2.2 POPULATION

5.2.3 LAND USE

5.2.4 NET DEVELOPABLE AREA

5.2.5 UNIT WASTEWATER FLOW RATES

5.2.6 CONTINGENCY FACTOR FOR UNANTICIPATED LAND USE CHANGES

5.3 CALCULATING DESIGN FLOWS

5.3.1 PEAK FACTOR

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4.9 Buoyancy of Sewers (UPDATED)

4.10 Constructing Sewers on Steep Slopes (UPDATED)

4.10.1 Anchors for Pipe 24-inches Diameter and Smaller and Shallow Burial (Less than 4' deep from crown of pipe) (UPDATED)

4.10.2 Anchors for Pipe Greater Than 24-inch Diameter and Shallow Burial (less than 4' deep from crown of pipe) (UPDATED)

4.11 Minimum Shoring and Tie-Back Clearances to BES Assets in the Right of Way (NEW)

4.12 Corrosion and Odor Control Design Considerations (UPDATED)

4.12.1 Design Approach

4.13 Sewer System Repairs

4.14 The use of Trenchless Technologies in Construction (NEW)

CHAPTER 4 NOTEWORTHY ITEMS (UPDATED)

### **CHAPTER 5 – SANITARY SEWER DESIGN**

5.1 Introduction (UPDATED)

5.2 Criteria for Estimating Design Flows

5.2.1 Drainage Basin

5.2.2 Population

5.2.3 Land Use (UPDATED)

5.2.4 Net Developable Area

5.2.5 Unit Wastewater Flow Rates Residential (Map Symbol R\_) (UPDATED)

5.2.6 Contingency Factor for Unanticipated Land Use Changes

5.3 Calculating Design Flows

5.3.1 Peak Factor



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## **2007-2010 ERRATA's SDFDM CHAPTER AND SECTION**

### 5.4 DESIGN CRITERIA FOR MAINLINE SEWERS

#### 5.4.1 CAPACITY

#### 5.4.2 MINIMUM SIZE

#### 5.4.3 MANNING ROUGHNESS COEFFICIENT

#### 5.4.4 MINIMUM AND MAXIMUM VELOCITY

#### 5.4.5 MINIMUM SLOPE

### 5.5 DESIGN CRITERIA FOR SEWER SERVICE LATERALS (ERRATA)

#### 5.5.1 PIPE SIZE AND MATERIAL (ERRATA)

#### 5.5.2 HORIZONTAL ALIGNMENT (ERRATA)

#### 5.5.3 SLOPE

#### 5.5.4 VERTICAL ALIGNMENT

#### 5.5.5 CALCULATING SERVICE LATERAL AND MAINLINE INVERTS

#### 5.5.6 CITY MAINTENANCE LIMITS OF RESP RESPONSIBILITY (ERRATA)

#### 5.5.7 USE OF WYE OR WYE HEAD FITTINGS (ERRATA)

#### 5.6 DEEP CONNECTION RISER DCR)

### CHAPTER 5 NOTEWORTHY ITEMS

## **CHAPTER 6 – HYDROLOGIC ANALYSIS FOR DRAINAGE FACILITY DESIGN**

### 6.1 INTRODUCTION

### 6.2 OVERVIEW

### 6.3 APPLICABILITY

#### 6.3.1 VARIANCE FROM THESE STANDARDS

#### 6.3.2 FACILITY SIZING TO SERVE FUTURE DEVELOPMENT

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### 5.4 Design Criteria for Mainline Sewers (MINOR UPDATES THRU OUT)

#### 5.4.1 Capacity

#### 5.4.2 Minimum Pipe Size

#### 5.4.3 Manning Roughness Coefficient

#### 5.4.4 Minimum and Maximum Velocity

#### 5.4.5 Minimum Slope

### 5.5 Design Criteria for Service Laterals

#### 5.5.1 Pipe Size and Material (UPDATED)

#### 5.5.2 Horizontal Alignment (UPDATED)

#### 5.5.3 Slope

#### 5.5.4 Vertical Alignment (UPDATED)

#### 5.5.5 Calculating Service Lateral and Mainline Inverts (UPDATED)

#### 5.5.6 City Maintenance Limits of Responsibility in the Right of Way (UPDATED)

#### 5.5.7 Pressure Service Line Systems Located in the Public Right of Way (NEW)

#### 5.5.8 Connection to the Public Sewer System (UPDATED)

#### 5.5.9 Use of wye or wye head fittings (UPDATED)

#### 5.6 Deep Connection Riser (DCR) (UPDATED)

### CHAPTER 5 NOTEWORTHY ITEMS (UPDATED)

## **CHAPTER 6 – HYDROLOGIC ANALYSIS FOR DRAINAGE (UPDATED)**

### 6.1 Introduction (UPDATED)

### 6.2 Overview (UPDATED)

### 6.3 Applicability (UPDATED)

#### 6.3.1 Variance from these Standards

#### 6.3.2 Facility Sizing to Serve Future Development (UPDATED)



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## **2007-2010 ERRATA's SDFDM CHAPTER AND SECTION**

- 6.4 FACILITY CLASSIFICATION
  - 6.4.1 RETURN PERIOD
- 6.5 HYDROLOGIC ANALYSIS – CONVERTING RAINFALL TO RUNOFF
  - 6.5.1 SELECT A STORM RETURN PERIOD
  - 6.5.2 SELECT A METHOD TO CONVERT PRECIPITATION INTO RUNOFF
  - 6.5.3 RATIONAL METHOD
  - 6.5.4 SOIL CONSERVATION SERVICE (SCS) HYDROGRAPH METHOD
  - 6.5.5 SANTA BARBARA URBAN HYDROGRAPH (SBUH) METHOD
- 6.6 COMPUTER MODELS FOR DRAINAGE SYSTEM DESIGN
  - 6.6.1 HEC HMS FORMERLY HEC-1
  - 6.6.2 EPA SWMM
- 6.7 PRECIPITATION DATA AND ANTECEDENT CONDITIONS
  - 6.7.1 TOTAL RAINFALL DEPTH
  - 6.7.2 INTENSITY-DURATION-FREQUENCY (IDF) I INFORMATION
  - 6.7.3 HETOGRAPHS - RAINFALL INTENSITY DISTRIBUTIONS
  - 6.7.4 ANTECEDENT CONDITIONS
- 6.8 PHYSICAL CHARACTERIZATION OF SITE
  - 6.8.1 AREA
  - 6.8.2 LAND USE AND SURFACE TYPE
  - 6.8.3 SOILS
  - 6.8.4 HYDROLOGIC LENGTH AND SLOPE
  - 6.8.5 LAKES, WETLANDS OR STORAGE FACILITIES
- 6.9 TIME OF CONCENTRATION
  - 6.9.1 FLOW REGIMES

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- 6.4 Facility Classification
    - 6.4.1 Return Period (UPDATED)
  - 6.5 Hydrologic Analysis – Converting Rainfall to Runoff
    - 6.5.1 Select a Storm Return Period
    - 6.5.2 Select a Method to Convert Precipitation into Runoff (UPDATED)
      - 6.5.2.1 Rational Method (UPDATED)
      - 6.5.2.2 National Resource and Conservation Service Soil Conservation Service TR-55 Hyd. Method (UPDATED)
      - 6.5.2.3 Santa Barbara Urban Hydrograph (SBUH) Method (UPDATED)
      - 6.5.2.4 Computer Models for Drainage System Design
        - 6.5.2.4.1 HEC HMS formerly HEC-1 (UPDATED)
        - 6.5.2.4.2 EPA-Stormwater Management Model(EPA SWMM)
    - 6.5.3. HEC-HMS and EPA – SWMM Applications (UPDATED)
  - 6.5.4 Precipitation Data and Antecedent Conditions
  - 6.5.5 Total Rainfall Depth
  - 6.5.6 Intensity-Duration-Frequency (IDF) Information (UPDATED)
  - 6.5.7 Hyetographs - Rainfall Intensity Distributions
  - 6.5.8 Antecedent Conditions (UPDATED)
- 6.6 Physical Characterization of Site (NEW)
  - 6.6.1 Area
  - 6.6.2 Land Use and Surface Type
  - 6.6.3 Soils (UPDATED)
  - 6.6.4 Hydrologic Length and Slope
  - 6.6.5 Lakes, Wetlands or Storage Facilities
- 6.7 Time of Concentration
  - 6.7.1 Flow Regimes





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## **2007-2010 ERRATA's SDFDM CHAPTER AND SECTION**

- 6.9.2 SHEET FLOW
- 6.9.3 SHALLOW CONCENTRATED FLOW
- 6.9.4 OPEN CHANNEL FLOW
- 6.10 DESIGN CRITERIA
  - 6.10.1 CAPACITY
  - 6.10.2 MANNING'S ROUGHNESS COEFFICIENT (n)
  - 6.10.3 MINIMUM CONDUIT SIZES
  - 6.10.4 MINIMUM AND MAXIMUM VELOCITY
  - 6.10.5 MINIMUM SLOPE
  - 6.10.6 ENERGY LOSSES
  
- 6.11 STREET GUTTERS AND INLETS
- 6.12 CULVERTS
- CHAPTER 6 NOTEWORTHY ITEMS

## **CHAPTER 7—COMBINED SEWER DESIGN**

- 7.1 INTRODUCTION
- 7.2 COMBINED SEWERS IN PORTLAND
- 7.3 APPLICABILITY
- 7.4 SIZING FACILITIES TO SERVE FUTURE DEVELOPMENT
  - 7.4.1 SANITARY WASTEWATER
  - 7.4.2 STORMWATER RUNOFF
- 7.5 ANALYSIS METHODS
  - 7.5.1 RATIONAL METHOD
  - 7.5.2 PDX - SWMM
- 7.6 DESIGN CRITERIA
  - 7.6.1 CAPACITY
  - 7.6.2 MANNING'S ROUGHNESS COEFFICIENT (n)

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- 6.7.2 Sheet Flow
- 6.7.3 Shallow Concentrated Flow
- 6.7.4 Open Channel Flow **(NEW)**
- 6.8 Design Criteria
  - 6.8.1 Capacity
  - 6.8.2 Manning's Roughness Coefficient (n)
  - 6.8.3 Minimum Conduit Sizes
  - 6.8.4 Minimum and Maximum Velocity
  - 6.8.5 Minimum Slope
  - 6.8.6 Energy Losses
- 6.9 Data Collection, and Monitoring, and Instrumentation Installation Requirements **(NEW)**
- ~~6.11 STREET GUTTERS AND INLETS **(DELETED)**~~
- ~~6.12 CULVERTS **(DELETED)**~~
- CHAPTER 6 NOTEWORTHY ITEMS
- CHAPTER 7—COMBINED SEWER DESIGN **(This Chapter has been reviewed and rewritten)****
  - 7.1 Introduction **(UPDATED)**
  - 7.2 Combined Sewer History in Portland **(UPDATED)**
  - 7.3 Applicability
  - 7.4 Sizing Facilities to Serve Future Development **(UPDATED)**
    - 7.4.1 Sanitary Wastewater
    - 7.4.2 Stormwater Runoff
  - 7.5 Analysis Methods **(NEW)**
    - ~~7.5.1 Rational Method **(DELETED)**~~
    - ~~7.5.2 PDX—SWMM **(DELETED)**~~
      - 7.5.1 Design Criteria
      - 7.5.2 Capacity
      - 7.5.3 Manning's Roughness Coefficient (n)



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## **2007-2010 ERRATA's SDFDM CHAPTER AND SECTION**

- 7.6.3 MINIMUM CONDUIT SIZES
- 7.6.4 MINIMUM AND MAXIMUM VELOCITY
- 7.6.5 MINIMUM SLOPE
- 7.6.6 ENERGY LOSSES
  
- 7.7 SURCHARGED COMBINED SEWERS
- 7.1 BACKGROUND
- 7.7.2 ALLOWABLE SURCHARGE CRITERIA
- 7.7.3 EXCEPTIONS REQUIRING BES APPROVAL
- 7.7.4 SERVING AND PROTECTING FUTURE DEVELOPMENT FROM BASEMEN FLOODING

## CHAPTER 7 NOTEWORTHY ITEMS

### **CHAPTER 8—HYDRAULIC DESIGN**

- 8.1 INTRODUCTION
- 8.2 FLOW FRICTION FORMULA
- 8.3 METHODS OF APPLICATION AND CA CALCULATIONS
- 8.3.1 CRITICAL FLOW CALCULATIONS
- 8.3.2 HYDRAULIC RATIOS OF STANDARD SECTIONS
- 8.3.3 HYDRAULIC GRADE LINES
- 8.4 CLOSED CONDUITS
- 8.4.1 CLOSED CONDUITS - DESIGN CRITERIA
- 8.4.2 MANNING'S  $n_{ch}$  VALUES FOR CLOSE CONDUITS
- 8.5 OPEN CHANNELS
- 8.5.1 DESIGN CRITERIA
- 8.5.2 CHANNEL CLASSIFICATION
- 8.5.3 VELOCITY LIMITATIONS

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- 7.5.4 Minimum Conduit Sizes
- 7.5.5 Minimum and Maximum Velocity
- 7.5.6 Minimum Slope
- 7.5.7 Energy Losses
- 7.5.8 Other Considerations
- 7.6 Surcharged Combined Sewers
- 7.6.1 Background
- 7.6.2 Allowable Surcharge Criteria
- 7.6.3 Exceptions Requiring BES Approval
- 7.6.4 Serving and Protecting Future Development from Basement Flooding
- 7.6.5 Rehabilitation Considerations (NEW)
- Chapter 7 Noteworthy Items
- CHAPTER 8—HYDRAULIC DESIGN (UPDATE)**
- 8.1 Introduction
- 8.2 Manning's Equation (UPDATED)
- 8.3 Methods of Application and Calculations
- 8.3.1 Critical Flow Calculations
- 8.3.2 Hydraulic Ratios of a Standard Sections (UPDATED)
- 8.3.3 Hydraulic Grade Lines
- 8.4 Closed Conduits
- 8.4.1 Closed Conduits - Design Criteria (UPDATED)
- 8.4.2 Manning's  $n_{ch}$  Values for Closed Conduits
- 8.5 Open Channels (for the sole purpose of conveyance)
- 8.5.1 Design Criteria (typically applicable for public not private development) (UPDATED)
- 8.5.2 Channel Classification (UPDATED)
- 8.5.3 Velocity Limitations



# Crosswalk of 2007-2010 and 2020 SDFDM

## **2007-2010 ERRATA's SDFDM CHAPTER AND SECTION**

8.5.4 MANNING'S  $n_{ch}$  VALUES FOR CHANNELS  
8.5.5 STABLE CHANNEL DESIGN  
8.5.6 VEGETATIVE DESIGN  
8.5.7 DESIGN PROCEDURES  
8.5.8 FLEXIBLE CHANNEL LINING (RIPRAP) DESIGN  
8.6 OUTLET STRUCTURES  
8.6.1 GENERAL  
8.6.2 OUTLET STRUCTURE TYPES  
8.6.3 ORIFICES  
8.6.4 PERFORATED RISERS  
8.6.5 PIPE AND CULVERTS  
8.6.6 SHARP-CRESTED WEIR (ERRATA)  
8.6.7 BROAD-CRESTED WEIRS  
8.6.8 V-NOTCHED WEIR  
8.6.9 PROPORTIONAL WEIRS  
8.6.10 COMBINATION OUTLETS  
8.6.11 CLOGGING POTENTIAL FOR SMALL DIAMETER ORIFICES  
8.7 SECONDARY OUTLETS  
8.8 TRASH RACKS AND SAFETY GRATES  
8.8.1 TRASH RACK DESIGN  
8.9 ENERGY DISSIPATION  
Appendix A (ERRATA)  
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10 INDEX (DELETED)

## **2020 Chapter and Location SDFDM**

8.5.4 Manning's  $n_{ch}$  Values for Channels  
8.5.5 Stable Channel Design (UPDATED)  
8.5.6 Vegetative Design  
8.5.7 Design Procedures (UPDATED)  
8.5.8 Flexible Channel Lining (Riprap) Design (UPDATED)  
8.6 Outlet Structures  
8.6.1 General  
8.6.2 Outlet Structure Types  
8.6.3 Orifices (UPDATED)  
8.6.4 Perforated Risers  
8.6.5 Pipe and Culverts (UPDATED)  
8.6.6 Sharp-Crested Weir (UPDATED)  
8.6.7 Broad-Crested Weir  
8.6.8 V-Notched Weir  
8.6.9 Proportional Weirs  
8.6.10 Combination Outlets  
8.6.11 Clogging Potential for Small Diameter Orifices (DELETED)  
8.7 Secondary Outlets  
8.8 Trash Racks and Safety Grates  
8.8.1 Trash Rack Design  
8.9 Energy Dissipation (EDITS)

Appendices (ALL HAVE BEEN DELETED)

**CHAPTER 9– DEFINITIONS, REFERENCE MATERIALS LIST**

