Fort Collins
Stormwater Criteria Manual

As adopted by the City Council of the City of Fort Collins, as referenced in Section 26-500 of the Code of the City of Fort Collins

December 2018

City of Fort Collins

Fort Collins Stormwater Criteria Manual

Preface

Contents

1.0 Authority

Per City Code Section 26-500, the Fort Collins Stormwater Criteria Manual (or Manual) is adopted by reference. The Fort Collins City Council has adopted this version of the Manual by Ordinance No. 159, 2018.

The Utilities Executive Director is empowered under City Code Sections 1-2 and 26-496 to delegate certain authority to staff for proper administration and enforcement of the requirements of the Manual.

2.0 Purpose

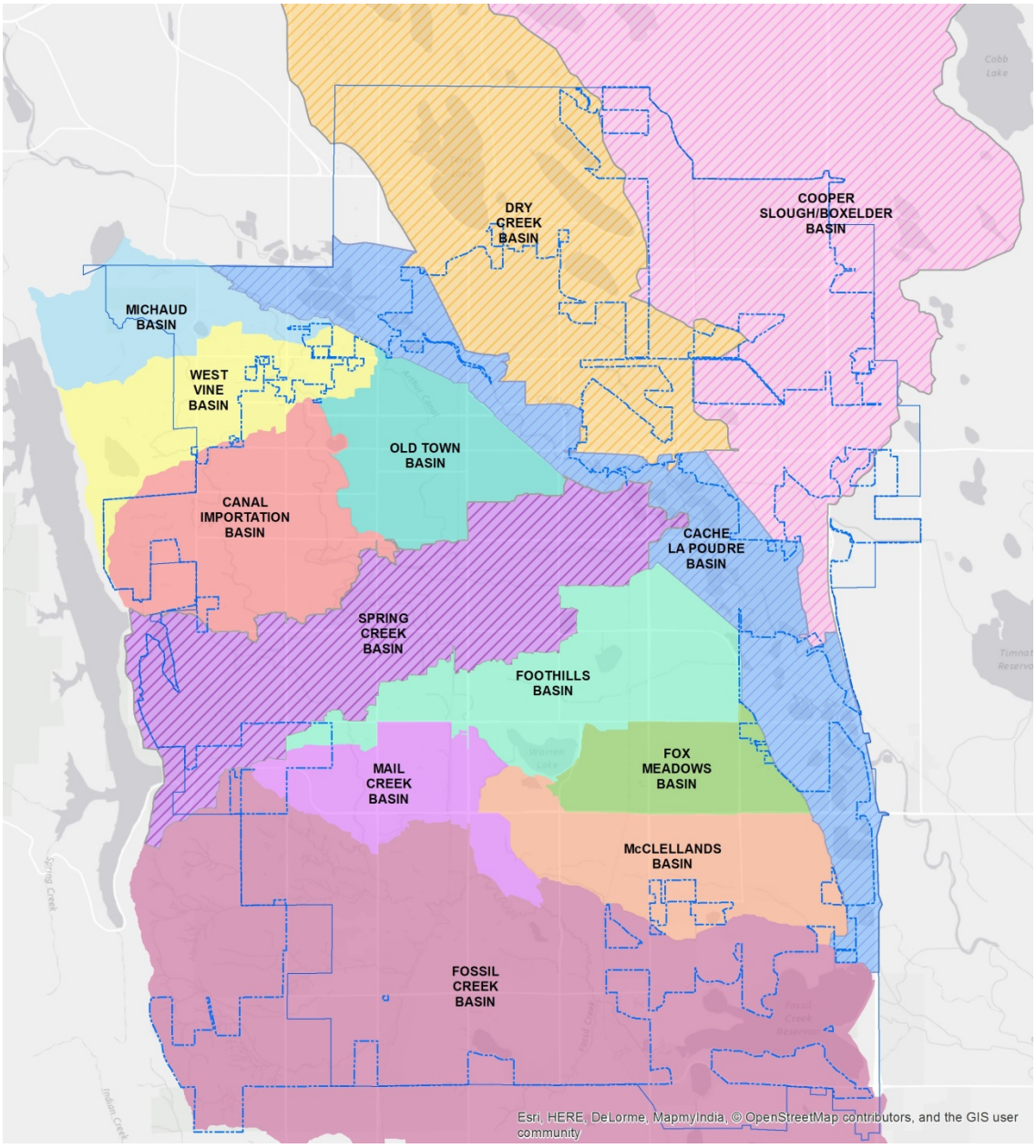
The purpose of the Fort Collins Stormwater Criteria Manual is to set forth the design guidelines and technical criteria to be utilized in the analysis and design of stormwater drainage systems. This Manual serves as the governing criteria for all stormwater improvements, public or private, that are designed and installed within Fort Collins and its Growth Management Area (GMA). The scope of this Manual does not include floodplain criteria, design for natural stream corridors or stream restoration design principles; rather, it focuses on development projects that are primarily carried out by the private sector.

This Manual replaces in their entirety the previously adopted "Fort Collins Amendments to the Urban Drainage and Flood Control District Criteria Manual" dated December 2011. This Manual also changes from a format making "amendments" to the Urban Drainage and Flood Control District Criteria Manual to a stand-alone document that incorporates all key design guidance and more effectively communicates the criteria for Fort Collins and its GMA.

This Manual utilizes much of the information included in the Urban Storm Drainage Criteria Manual published by the Urban Drainage and Flood Control District (UDFCD), old and new, and continues to recognize the UDFCD for its conducted research, data collection and development of analytical methods for the design and installation of stormwater infrastructure. The UDFCD Manual has become a common reference document for Fort Collins Utilities (FCU) staff and Design Engineers alike because of the design tools and spreadsheet capabilities. It has also become an industry standard reference for Low Impact Development (LID) information and design guidance. However, there are some criteria in the UDFCD Manual that are not applicable in Fort Collins and its GMA and do not meet the requirements set forth in this Manual. In addition, there are certain requirements that FCU continues to regulate by, that are set forth in this Manual, which are no longer fully addressed in the current UDFCD Manual.

In addition, this Manual recognizes the various Master Drainage Plans that have been developed for all the major drainage basins within and around Fort Collins. Each Master Drainage Plan provides detailed analysis and selected plan improvement guidance for major stormwater infrastructure needs throughout Fort Collins and its GMA, see **Figure 2.0-1** below. This Manual directs users to apply allowable release rates for storm drainage that have been established by the various Master Drainage Plans and to incorporate any selected plan improvements (where appropriate) into their design. This Manual does not provide direction or requirements for Master Drainage Plan updates.

Figure 2.0-1. Master Drainage Basin Map with City Limits and GMA



3.0 Revisions and Updated Criteria

This Manual may be amended, including but not necessarily limited to, when new technology is developed or as experience is gained in the use of the Manual. Amendments may be made administratively pursuant to City Code Section 26-500 or pursuant to City Council action. FCU will maintain this Manual and any amendments thereto and will post this Manual and amendments on the City's website (fcgov.com). FCU does not keep a database of holders of this Manual. It shall be the responsibility of each holder to verify the most current Manual is being used for any development.

4.0 Other Related Standards

- Chapter 26 of City Code and this Manual sets forth the minimum standards for designing stormwater infrastructure in Fort Collins.

- All public stormwater improvements shall comply with the conditions and regulations established in the applicable Master Drainage Plan(s).

- Materials and installation of stormwater improvements shall comply with the City of Fort Collins Water, Wastewater, Stormwater Development Construction Standards.

- The Planning Services in the Community Development and Neighborhood Services Department administers the Fort Collins Land Use Code which defines the various processes required for development projects within the City.

- Engineering Development Review administers the Larimer County Urban Area Street Standards (LCUASS) which set forth standards for certain public improvements within City right-of-way and public easements.

5.0 Abbreviations

BDR	Basic Development Review (as defined in the Land Use Code)
BMP	Best Management Practice
CDPHE	Colorado Department of Public Health and Environment
CDPS	Colorado Discharge Permit System

CMP	Corrugated Metal Pipe
CR	Conceptual Review (as defined in the Land Use Code)
CRS	Colorado Revised Statutes
CWCB	Colorado Water Conservation Board
CWQCC	Colorado Water Quality Control Commission
CWQCD	Colorado Water Quality Control Division
DCIA	Directly Connected Impervious Area
DCP	Development Construction Permit
DRCOG	Denver Regional Council of Governments
EDB	Extended Detention Basin
EGL	Energy Grade Line
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
FCSCM	Fort Collins Stormwater Criteria Manual
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FCU	Fort Collins Utilities
FP	Final Plan (as defined in the Land Use Code)
GMA	Growth Management Area
HGL	Hydraulic Grade Line

H:V	Horizontal to Vertical Ratio of a Slope
I	Percent Imperviousness of a Catchment
IDF	Intensity-Duration-Frequency curve
LCUASS	Larimer County Urban Area Street Standards
LID	Low Impact Development
MDCIA	Minimized Directly Connected Impervious Area
MS4	Municipal Separate Storm Sewer Systems
NAVD	North American Vertical Datum
NGVD	National Geodetic Vertical Datum
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Services
ODP	Overall Development Plan (as defined in the Land Use Code)
PDP	Project Development Plan (as defined in the Land Use Code)
PDR	Preliminary Design Review (as defined in the Land Use Code)
PICP	Permeable Interlocking Concrete Pavers
PLD	Porous Landscape Detention (current vernacular is bioretention or rain garden)
PDR	Preliminary Design Review (as defined in the Land Use Code)
RCP	Reinforced Concrete Pipe
SCS	Soil Conservation Service (now the Natural Resources Conservation Service (NRCS))
SEO	Colorado State Engineer's Office

SOP	Standard Operating Procedure
SWMM	EPA Stormwater Management Model
UDFCD	Urban Drainage Flood Control District
USDCM	Urban Storm Drainage Criteria Manual published by UDFCD
USACE	United Stated Army Corps of Engineers
WQCV	Water Quality Capture Volume

6.0 Defined Terms

404 Permit: A federal discharge permit authorized under Section 404 of the Clean Water Act, which regulates the discharge of dredged, excavated, or fill material into wetlands, streams, rivers, and other Waters of the U.S. The U.S. Army Corps of Engineers is the federal agency authorized to issue Section 404 Permits for certain activities conducted in wetlands or other U.S. waters. When working in or around waterways or wetlands, 404 Permits are often required.

Adjacent: Having a common endpoint or bordering lot lines or parcels.

Area of Disturbance: Total area at the site where any Construction Activity is expected to result in disturbance of the ground surface. This includes any activity that could increase the rate of erosion, including but not limited to, clearing, grading, excavation, and demolition activities, installation of new or improved haul roads and access roads, staging areas, heavy vehicle traffic areas, stockpiling of fill materials, and borrow areas.

As-Builts: Refer to the definition for Record Drawings.

Best Management Practice (BMP): Best Management Practices is used interchangeably with the term Control Measure throughout this Manual. Refer to the definition of Control Measure.

Buffer Zone: Also referred to as a Natural Habitat Buffer Zone, a designated transitional area around a stream, lake, wetland, irrigation ditch or other natural habitat or feature left in a natural, usually vegetated state so as to protect the ecological character of the resource from impacts associated with development. Development is often restricted or prohibited in a buffer zone, pursuant to section 3.4.1 of the Fort Collins Land Use Code.

Building Permit: As defined in the Land Use Code

Certificate of Occupancy: As defined in the Land Use Code

City: Refers to the City of Fort Collins, a Colorado municipal corporation

City Code: Refers to the Fort Collins Municipal Code, as the same may be amended

Clean Water Act: Federal legislation that provides statutory authority for the National Pollutant Discharge Elimination System (NPDES) program and other water quality protection requirements; Public law 92-500; 33 U.S.C. 1251 et seq. Also known as the Federal Water Pollution Control Act. Under the Clean Water Act stormwater requirements, most urban areas must meet requirements of Municipal Separate Storm Sewer System (MS4) permits, and many industries and institutions such as state departments of transportation must also meet NPDES stormwater permit requirements. Operators of regulated MS4s are required to develop a Stormwater Management Plan (SWMP) that includes measurable goals and to implement needed stormwater management controls (BMPs). MS4s are also required to assess controls and the effectiveness of their stormwater programs and reduce the discharge of pollutants to the "maximum extent practicable."

Colorado Discharge Permit System (CDPS): The State of Colorado's system of permitting discharges (e.g., stormwater, wastewater) to Waters of the State that corresponds to the federal NPDES permits under the federal Clean Water Act.

Common Plan of Development or Sale: A contiguous area where multiple separate and distinct Construction Activities may be taking place at different times on different schedules, but remain related. The Water Quality Control Division within CDPHE, has determined that “contiguous” means Construction Activities located in close proximity to each other (within ¼ mile) as per CDPS General Permit on Construction Activity.

Construction Activity: As defined in CDPS State Stormwater Discharge Permit, with the following clarifications:

- Clearing shall include grubbing activities.
- Demolition shall not include demolition activities entirely comprised of interior demolition (as those should be considered remodel).
- Activities to conduct repairs that are not part of regular maintenance and activities that are for replacement are considered construction activities and are not considered routine maintenance.
- Repaving activities where underlying or surrounding soil is cleared, graded, or excavated as part of the repaving operation are construction activities unless they are excluded site under the MS4 General Permit.

- Construction activity occurs from initial ground breaking until the final stabilization regardless of ownership of the construction activities.

Construction Control Measure: Typically refers to structural and non-structural Temporary Control Measures during Construction Activities. In general, the Control Measures can be broken into groups around Erosion Control Measures, Sediment Control Measures, Site Management Controls (sometimes called administrative controls), and/or Materials Management Controls (sometime called source controls).

Construction Drawings: The plans or working drawings showing what is proposed to be built. These are typically referred to as Utility Plans in the City.

Control Measure: A technique, process, activity or structure used to reduce pollutant discharges in stormwater. Control measures include source control practices (non-structural control measures) and engineered structures (structural control measures) designed to treat runoff. Control measures are most effective when used in combination and selected and designed based on site-specific characteristics. Control measures can include but not be limited to schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the State. Control measures also include treatment requirements, operating procedures, pollution prevention, and practices to control site runoff, spillage or leaks, waste disposal, or drainage from material storage. Control measures can be either temporary or permanent depending on the intended use. The term Control Measure has shown to be a more precise word and may be used in place of the more recognizable term Best Management Practices (BMPs).

Dedicated Asphalt Plants and Concrete Plants: Portable asphalt or concrete plants that are located on or adjacent to a construction site and that provide materials only to that specific construction site.

Design Engineer: Refers to the person(s) in responsible charge of formulating the design, analysis, reporting and Construction Plans for a project.

Detention Basin, Facility or Pond: The temporary capture and slow release of stormwater from an excavated area, enclosed depression or tank. Detention is used for pollutant removal and stormwater peak flow reduction. Detention basins, facilities and ponds are considered to be “stormwater detention and infiltration facilities” under CRS §37-92-602(8).

Development: As defined in the Land Use Code

Developer: As defined in the Land Use Code.

Development Agreement: As defined in the Land Use Code.

Development Review Guide: A flowchart outlining the development review process for the City.

Disturbed Area: Refer to the definition for Area of Disturbance.

Distributed Controls: The use of multiple control measures distributed throughout a development site to control and treat stormwater close to its source as opposed to routing flows to a larger, centralized stormwater facility. Use of distributed stormwater controls is a key component of Low Impact Development. Distributed Controls may also commonly be referred to as a Treatment Train.

Drainage Certification Escrow: Money collected by the City when the Developer wishes to obtain the Certificate of Occupancy for the project prior to the full completion of all site improvements and/or submittal and acceptance of the drainage certification. The amount of escrow is determined based on the amount of improvements yet to be installed when the Certificate of Occupancy is requested.

Drainage Report: A written narrative and analysis documentation that includes existing condition stormwater runoff information and proposed condition stormwater runoff information; and includes the design of a stormwater infrastructure system that is equipped to handle the proposed stormwater runoff condition. The drainage report will show how the proposed design meets the requirements of this Manual. This report generally accompanies other development submittal documents or plans. Final reports are to be submitted on 8 ½ x 11 standard paper, bound, and stamped, signed and dated by the Professional Engineer in responsible charge of the report. The requirements of the Drainage Report are discussed in Chapter 2: Development Submittal Requirements of this Manual.

Easement: An interest in land owned by another person, consisting of the right to use of control the subject land, or an area above or below it, for specific limited purposes.

Emergency Work: Work to address an issue that could potentially cause health and safety impacts to the community if not acted upon immediately. These are typically actions that have little to no planning availability. These activities, on a small scale, are exempt. However, if a disturbance of greater than an acre will occur planning will need to happen in accordance with the City's MS4 Permit.

Endangered Species Act: The federal Endangered Species Act of 1973 protects animal and plant species currently in danger of extinction (endangered) and those that may become endangered in the foreseeable future (threatened). It provides for the conservation of ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend, both through federal action and by encouraging the establishment of state programs.

Erosion: The process by which soil particles are detached and transported from the point of origin by wind, water, and gravity.

Erosion Control Administrator: The person who is responsible for all erosion control activities on the site. This person oversees or conducts activities, installation, maintenance, removal and inspection of the control measures on the site that will ensure the site is, at all times, in compliance with the various permits. This person is responsible for keeping the permit documents up to date. This person will proactively correct issues and work to get site issues identified and resolved to ensure that the site is not discharging pollutants offsite. This is identical to a SWMP Administrator on the State Stormwater Discharge Permit.

Erosion Control Criteria: All criteria set forth in any part of the Manual that relate to erosion, sediment, and pollution control. Typically the standards set out in the Construction Control Measures Chapter of this Manual and the guidance material located in the Appendices.

Erosion Control Escrow: A predetermined calculation or estimation of money that will be required, collected, and retained to ensure the Developer will complete all activities on the project without discharging pollutants from the site. This escrow is collateral to have the City correct issues in the field if the Developer cannot or will not fulfill required erosion control activities in a timely manner.

Erosion Control Material: The combinations of any planning materials used to convey how the project will prevent pollutant discharges to the maximum extent practicable. This typically includes the Erosion Control Plans that are part of the Utility Plans, an Erosion Control Report and an Erosion Control Escrow.

Erosion Control Measures: Source controls used to limit erosion of soil at construction sites and other erosion-prone areas. Representative measures include surface treatments that stabilize soil that has been exposed due to excavation or grading and flow controls that redirect flows or reduce velocities of concentrated flow.

Erosion Control Plan: A map or schematic information that gives a blue print to how to prevent pollutant discharges from the construction site.

Erosion Control Report: A written narrative describing the project and the protective actions, erosion and sediment control measures, site and materials management control measures proposed for the construction process at a particular site. The requirements of an Erosion Control Report are discussed in Chapter 2: Development Submittal Requirements of this Manual.

Established Vegetation: Refer to the definition for Final Stabilization.

Extended Detention Basin: A basin that is constructed in an excavated or depressed area that provides the temporary detention and slow release of stormwater while also promoting the settlement of pollutants. Extended detention basins are typically designed as a multi-stage facility that provides attenuation for both stormwater quantity and quality.

Final Stabilization: Condition reached when all ground surface disturbing activities at the site have been completed, and for all areas of ground surface disturbing activities, a uniform vegetative cover has been established with a vegetative cover (individual plant density) of at least 70 percent, or equivalent permanent, physical erosion reduction methods have been employed. See Chapter 4: Construction Control Measures, for more information.

First Design Point: The most upstream point in drainage analysis.

Fort Collins: Lands located within the municipal boundaries of the City of Fort Collins

Fort Collins Utilities: Those departments of Utility Services which are in charge of the stormwater facilities for the City.

Grass Buffer: Uniformly graded and densely vegetated area, typically as turf grass. This control measure requires sheet flow to promote filtration, infiltration, and settling to reduce runoff pollutants, and per state guidance, need to accompany at least one other control measure in a treatment train. Grass Buffers are not the same as the Vegetated Buffer that is identified in the LID Implementation Manual and are not allowed to be considered LID.

Green Infrastructure: Planning and design of systems intended to benefit from the services and functions provided in the natural environment. In regard to wet weather management, and on a regional scale, preservation of riparian floodplains and channel stabilization that allows for vital habitat and wildlife passage through techniques similar to those found in nature, preserves ecological function and creates balance between built and natural environments. On an urban level, wet weather management practices that include infiltration help restore natural hydrology.

Illicit Discharge: A discharge to a municipal separate storm sewer (MS4) that is not composed entirely of stormwater and is not authorized by a NPDES permit, with some exceptions (e.g., discharges due to firefighting activities).

Impervious Area: A hard surface area (concrete or asphalt surface or rooftop surface) that prevents or retards the infiltration of water into the soil.

Infiltration: The percolation of water from the land surface into the ground.

Inlet: An entry into a storm sewer system, ditch or other waterway.

Land Use Code: Refers to the City of Fort Collins Land Use Code.

Larger Common Development: Refer to the definition for Common Plan of Development or Sale.

Level Spreader: An engineered structure designed to convert concentrated runoff to sheet flow and disperse it uniformly across a slope, thereby preventing/minimizing erosion.

Local Facility: Refers to a stormwater facility, typically a detention or water quality pond that services private development. These are typically owned and maintained by the property owner or HOA.

Low Impact Development (LID): LID is a comprehensive land planning and engineering design approach to managing stormwater runoff with the goal of mimicking the pre-development hydrologic regime. LID emphasizes conservation of natural features and the use of engineered, onsite, small-scale hydrologic controls that filter, infiltrate, evaporate and detain runoff close to its source to protect stormwater quality. The term Green Infrastructure (GI) may also be used.

Manual: The current Fort Collins Stormwater Criteria Manual adopted pursuant to §26-500, and be applicable to stormwater infrastructure and management, operation and maintenance of stormwater improvements, together with any technical revisions thereto, as more specifically described in §26-500.

Master Drainage Basin: Regional and individual drainage basins or watersheds. In the Fort Collins area, there are twelve different master drainage basins: Cache La Poudre, Dry Creek, Cooper Slough/Boxelder, West Vine, Old Town, Canal Importation, Spring Creek, Foothills, Mail Creek, Fox Meadows, McClellands and Fossil Creek.

Master Drainage Plan: A plan for a Master Drainage Basin that provides guidance for stormwater infrastructure improvements and also dictates site requirements for development sites.

Materials Management Controls Practices: A variety of practices implemented to limit or remove pollutant source contact with runoff thereby minimizing pollutant transport in runoff. Representative materials management controls include good housekeeping measures, landscape management practices, pet waste controls, public education regarding household hazardous waste, and/or covering outdoor storage areas. Some examples of such practices are relocating construction materials and equipment-related fluids, or by intentionally controlling and managing areas where chemicals are handled mixed and stored.

Minimizing Directly Connected Impervious Area (MDCIA): MDCIA includes a variety of runoff reduction strategies based on reducing impervious areas and routing runoff from impervious surfaces over grassy areas to slow runoff and promote infiltration. MDCIA is recommended as a key technique for reducing runoff peaks and volumes for frequently-occurring storms following urbanization. MDCIA is a key component of LID.

Modified FAA: The Federal Aviation Administration method to sizing small detention basins that is a volume-based approach and is sensitive to the release rate. "Modification" of the FAA method derives the average release from the allowable peak outflow.

Modified Impervious Area: Existing impervious areas on an existing site being removed and replaced with new impervious surfaces (e.g. existing asphalt surface becoming a rooftop surface) through a redevelopment process. Mill and overlay of asphalt areas is not considered a "modified" impervious area.

Municipal Separate Storm Sewer System (MS4): A publicly owned (state, city, town, county, district or other public body created by state law) having jurisdiction over disposal of sewage, industrial waste, stormwater or other wastes; design or used for collecting, conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels or storm drains) that discharges to water of the U.S. and is designed or used for collecting or conveying stormwater, is not a combined sewer, and is not part of a publicly owned treatment works (POTW).

MS4 Permit: A state or federal stormwater discharge permit to regulate discharges from municipal separate storm sewers (MS4s) for compliance with Clean Water Act regulations.

MS4 Permitted Areas: An area that is marked in the MS4 permit to allow stormwater discharge from the areas.

National Pollutant Discharge Elimination System (NPDES): The national program under Section 402 of the Clean Water Act for regulation of discharges of pollutants from point sources to waters of the U.S.

Operator: Entity that has day-to-day supervision and control of activities occurring at the construction site. This can be the owner, the developer, the general contractor or the agent of one of these parties. It is anticipated that at different phases of a construction project, different types of parties may satisfy the definition of the Operator and that all applicable permits may be transferred as the roles change.

Outfall: The point or location where stormwater leaves the site and discharges into a receiving water or a stormwater collection system.

Owner: As defined in the City Code, Section 26-1.

Peak Runoff Rate: The highest actual or predicted flow rate for runoff from a site for a specific storm event, typically measured in cubic feet per second (cfs).

Pervious Area: A soft surface that promotes the infiltration of water into the soil, thus reducing water runoff from the surface.

Phasing: A division of geographical areas on a site or parts of the whole project that will be constructed in different schedules.

Pollutant: As defined in City Code Section 26-491.

Pollutant Load: The mass of pollutants carried in runoff, calculated based on flow volume multiplied by pollutant concentration. Pollutant loading has units of mass and is calculated over specific timescales such as day, month or year.

Professional Engineer: As defined in C.R.S. §12-25-102

Public Hearing: An official and properly-noticed meeting of a governmental body that is open to the public, during which arguments and evidence regarding a matter are presented to the governmental body pursuant to applicable rules for the hearing.

Rainfall Erodibility: A description of the potential of sediment to be suspended into runoff and transported away from its origin based upon the soil characteristics and properties.

Receiving Waters: Any classified stream segment (including tributaries) in the State of Colorado into which stormwater related to Construction Activities may discharge. This definition includes all water courses, even if they are ephemeral or usually dry, including but not limited to, borrow ditches, arroyos, and other unnamed waterways. In Fort Collins, receiving waters all directly or eventually discharge to the Poudre River or Fossil Creek Reservoir, which itself discharges to the Poudre River.

Record Drawings: A set of drawings reflecting the changes made to the working drawings or construction drawings during the construction process and show corrected dimensions, geometry and locations of all elements of the work; sometimes referred to as “as-builts”.

Re-development: Improvements to an existing developed area, typically involving removal of existing structures and construction of new buildings and associated infrastructure.

Regional Facility: Refers to a stormwater facility, typically a detention or water quality pond that services a regional area.

Retention Pond: A depression in the ground that holds a permanent pool of water. Retention ponds typically have very minimal or zero water release by gravity. Retention ponds are not allowed to serve as water quantity or quality control measures for any development within the City or its GMA.

Right-of-Way: Lands subject to public use for transport, such as streets and sidewalks. The use of the term right-of-way in the Manual shall be the same as that term is used in the City Code and Land Use Code.

Sediment: The accumulation of displaced soil particles that have been transported by wind, water, and gravity to a downslope or downstream location.

Sediment Control Measures: Practices that reduce transport of sediment offsite to downstream properties and receiving waters. Sediment controls generally either provide filtration through a permeable media or slow or detain runoff to allow settling of suspended particles.

Sensitive Areas: Areas that typically include floodplains, slopes, riparian corridors, lakes, irrigation ditches, or other features subject to natural areas buffer requirements. Refer to the Land Use Code Section 3.4.1.

Sequencing: A division of Construction Activities in one area that will progress chronologically from start to finish. Refer to the CDPHE definition of Phasing.

Sheet Flow: The portion of precipitation that flows overland in very shallow depths before reaching a concentrated flow conveyance or stream channel.

Site Management Controls: A combination of construction and administrative practices that help reduce pollutants leaving a construction site. Site Management Controls are typically a non-structural Control Measure that is planning and/or timed to minimize pollutant exposure and discharge. These include practices such as construction sequencing and scheduling, vehicle tracking controls and street sweeping, good management of practices associated with site construction such as stream crossing, temporary batch plants, dewatering operations and other measures. An example of using a site management control would be working in winter, as compared to summer, along a flood bank because the timing of a winter project would reduce the potential for pollutant loading.

Soils Report: Refers to a geotechnical report.

Source Controls: A variety of practices implemented to minimize pollutant transport in runoff by controlling pollutants where they originate and/or accumulate. Representative source controls include good housekeeping measures, landscape management practices, pet waste controls, public education regarding household hazardous waste, covering outdoor storage areas, etc.

Stage-Storage: The relationship between stage, or elevation, in a detention basin to the amount of volume contained in a detention basin.

State Stormwater Discharge Permit: A permit issued by CDPS issued to allow discharges to the state waters. Typically the "General Permit for Stormwater Discharges associated with Construction Activity".

Steep slopes: Any slopes that have a steeper incline than three to one (3H: 1V).

Storage: This term is used in this Manual to reflect common industry terminology; however, none of the stormwater operations discussed herein are intended to constitute "storing" or the "storage" of water as that term is defined in CRS §37-92-103(10.8) and used in the context of water rights.

Storm Event (for erosion control inspection purposes): A site condition where stormwater causes surface erosion and has the potential to suspend pollutants and impact stormwater. While this potential can occur during any rain event based upon many factors, this guideline is typical of the "water quality storm" as defined by the Water Quality Capture Volume or a storm lasting longer than 30 minutes.

Stormwater: Precipitation or other meteorological conditions that transports water to an area. Stormwater includes runoff, which is water from rain, snowmelt or irrigation that flows over the land surface.

Stormwater Management Plan (SWMP): A written plan required under state and federal stormwater discharge permits identifying measures that will be implemented to minimize the discharge of pollutants in stormwater. Requirements for SWMPs are legally specified in state and federal discharge permits. Requirements vary depending on whether the discharge permit is associated with municipal, industrial, or Construction Activities.

Surface Water: Water that remains on the surface of the ground including rivers, lakes, reservoirs, streams, wetlands, impoundments, seas, estuaries, etc.

Treatment Train: Control measures that work together in series to provide stormwater quality treatment. See Distributed Controls.

Utilities Executive Director: Refers to the Utilities Executive Director or appointed designee(s).

Utility Plans: Refers to construction plans or drawings.

Vegetative Cover: Density or thickness of vegetation covering the soil.

Water Quality Capture Volume (WQCV): This volume represents runoff from frequent storm events such as the 80th percentile runoff-producing event. The volume varies depending on local rainfall data. Within the UDFCD boundary, the WQCV is based on runoff from 0.6 inches of precipitation. This quantity also applies in Fort Collins.

Waters of the State (of Colorado): Same as "State Waters" as defined in the Colorado Water Quality Act at CRS §25-8-103(19) as: any and all surface waters and subsurface waters which are contained in or flow in or through this state, but does not include waters in sewage systems, waters in treatment works of disposal systems, waters in potable water distribution systems, and all water withdrawn for use until use and treatment have been completed. This definition can include water courses that are usually dry (typically associated to state issued permits.)

Waters of the United States: Waters that are subject to the federal Clean Water Act (typically associated with federal issued permits.)

Watershed: A geographical area that drains to a specified point on a water course, usually a confluence of streams or rivers (also known as drainage basin, catchment or river basin)

Wind Erodibility: A description of the potential for sediment to be suspended in the air and transported away from its origin based upon the soil characteristics and properties.

7.0 Commonly Used Units

cfs	cubic feet per second
cfs/ft	cubic feet per second per foot
ft	foot or feet
ft^2	square feet
ft^3	cubic feet
ft/ft	foot per foot
fps or 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/ft^2	pounds per square foot
lbs PLS/acre	pounds pure live seed per acre
min	minimum
psi	pounds per square inch
psf	pounds per square foot