

**Volume 3, Chapter 7 - Construction BMPs**

**Users' Guidance:**

If a UDFCD *Section* number in this Chapter is **skipped**:

It was adopted as is; please refer to that Section in the **corresponding UDFCD Manual**, Volume, Chapter and *Section*.

If a UDFCD *Section* number in this Chapter is **amended** or a new COFC *Section* in this Chapter is **added**:

It is **listed below**; please refer to it in **this document**.

If a UDFCD *Section* in this Chapter is **deleted** then it was **not** adopted by the City of Fort Collins;

The deleted UDFCD *Section* number will be **identified as deleted in the text below**.

(1) A new *Section 1.1* is added, to read as follows:

**1.1 Purpose and Scope**

The Stormwater Criteria Manual provides the minimum design and technical criteria for the design and analysis of drainage and erosion control plans. The erosion-related requirements of this Manual are intended to reduce erosion to an acceptable level, emphasizing the control of erosion and sediment transport from the surface of disturbed land by water. Channel erosion control for temporary channels (diversions, gullies) and major channel stabilization are addressed as erosion control matters in this Manual. The requirements of Volume 3, Chapter 7, as amended, apply to all land disturbing activities covered by this Manual, except for the following:

- (1) Single Family Residential lots less than ten thousand (10,000) square feet in area and less than four to one slopes except when construction activities are within 50 feet of the outer limits of sensitive areas including floodplains, slopes, riparian corridors, lakes, irrigation ditches, or other features subject to natural areas buffer requirements under the City Land Use Code; and
- (2) Emergency work disturbing ten thousand (10,000) square feet or more in area will not be required to supply an Erosion Control Plan and/or Report, but must comply with otherwise applicable erosion control requirements except to the extent precluded by the emergency circumstances necessitating the emergency work.

(2) A new *Section 1.2* is added, to read as follows:

**1.2 Review and Acceptance**

The City will review all erosion control submittals for general compliance with this Manual. An acceptance by the City does not relieve the owner, engineer, or designer from responsibility of ensuring that calculations, plans, and specifications are in general compliance with the criteria.

(4) A new *Section 1.3* is added, to read as follows:

## **1.3 Policy, Standards and Submittal Requirements**

### **1.3.1 Policy**

Erosion and sedimentation are natural processes, the intensity of which is increased by land disturbing activities. Clearing and stripping of land can cause localized increased erosion rates with subsequent deposition of sediments and damage to adjacent downstream and leeward properties. Erosion can reduce or destroy the aesthetic and practical values of neighboring properties, streams and lakes.

The City is committed to the enhancement and protection of existing development, streams, lakes, wetlands and rivers that may be impacted by sediment laden runoff resulting from land-change activities.

Therefore, it is the policy of the City to encourage maintenance of the natural balance between sediment supply and transport.

It is also the City's policy to encourage water erosion control by leaving land undisturbed as long as possible (by project phasing) and using temporary and permanent erosion control Best Management Practices (BMPs).

### **1.3.2 Elements of an Erosion Control Plan**

Erosion control plans must consist of the elements noted below. For developments subject to the subdivision review process, these must be submitted with the final drainage reports. All reports must be typed on 8-1/2" x 11" paper and bound. Drawings, figures, plates, and tables must be bound with the report. The report must include a cover letter presenting the plan for review and must be prepared by or supervised by an engineer licensed in Colorado.

Information used for the Erosion Control Plan must be consistent with the Drainage Report and the grading and drainage plans.

For City projects, the Erosion Control Plan must be submitted and reviewed through the Construction Coordination process, or through the specific department's review process.

### **1.3.3 PDP Erosion Control Report and Drawings Submittal Requirements**

Erosion Control Report and Plans are required at time of PDP Submittal.

The Erosion Control Report must contain or comply with the following:

- a. A written analysis of the area proposed for construction in reference to developed conditions, rainfall erodibility, and proposed rainfall erosion and sediment control methods. Control of rainfall erosion and sediment transport shall be analyzed in a manner that clearly demonstrates an understanding of how temporary and permanent mitigation methods will be used, including a discussion of the timing of construction phases and the sequential installation of all erosion and sediment control Best Management Practices (BMPs) proposed in the plan.
- b. Stormwater Management Controls:  
Include a description of all stormwater management controls that will be implemented as part of the construction activity to control pollutants in stormwater discharges. The appropriateness and priorities of stormwater management controls should reflect the potential pollutant sources identified at the facility. The description of stormwater management controls should address the following components, at a minimum:
  - i.) Identify SWMP Administrator: Identify a specific individual(s), position, or title that is responsible for developing, implementing, maintaining, and revising the SWMP. This designated individual(s) should address all aspects of the facility's SWMP.
  - ii ) Identification of Potential Pollutant Sources: Identify and describe sources that may contribute pollutants to runoff, and provide means of control through BMP selection and implementation. At a minimum, evaluate each of the following potential sources of pollution:
    1. All disturbed and stored soils;
    2. Vehicle tracking of sediments;
    3. Management of contaminated soils;
    4. Loading and unloading operations;
    5. Outdoor storage activities (building materials, fertilizers, chemicals, etc.);

6. Vehicle and equipment maintenance and fueling;
  7. Significant dust or particulate generating processes;
  8. Routine maintenance activities involving fertilizers, pesticides, detergents, fuels, solvents, oils, etc;
  9. On-site waste management practices (waste piles, liquid wastes, dumpsters, etc.);
  10. Concrete truck/equipment washing, including the concrete truck chute and associated fixtures and equipment;
  11. Dedicated asphalt and concrete batch plants;
  12. Non-industrial waste sources such as worker trash and portable toilets; and
  13. Other areas or procedures where potential spills can occur.
- c. For the establishment of dryland vegetation, the discussion must include soil types, seed mix, soil amendments, and mulches.
- d. Detailed sequence of construction activities must be submitted as part of the erosion and sediment control plan. The plan identifies the sequence for all the major construction and erosion and sediment control activities, including overlot grading, soil and aggregate stockpiling, construction of permanent drainage facilities, and maintenance activities. The construction sequence will be used as a basis for inspection of construction sites for compliance with the erosion and sediment control plan.

The sequencing plan must clearly indicate the timing, extent and location where temporary BMP measures are installed and/or removed, depending on the type of construction activities undertaken, e.g. site grading, utilities installation, paving, flatwork, or vertical construction.

The construction sequence must include at least the following:

1. Installation of temporary erosion and sediment control measures
  2. Sequence of all land disturbing activity
  3. Drainage facility construction
  4. Sediment basins, temporary channel stabilization
  5. Seeding
  6. Mulching
  7. Required maintenance activities (e.g. expected frequency of sediment pond cleaning, after-storm checks of all BMPs, etc.)
- e. Erosion control security calculations.

The Erosion Control Drawing must contain or comply with the following:

The Erosion Control Drawing must use same base used for drainage study. The erosion and sediment control plan may be combined with the grading plan, providing all the required information can be shown, and the combined plan is not so cluttered with

information that all the elements cannot be readily seen and deciphered. All drawings must be twenty-two by thirty-four (22x34) inches in size. A General Location Map shall be provided in sufficient detail to identify drainage flow entering and leaving the development and general drainage patterns. The map should be at a scale of 1" = 1000' to 1" = 8000' and show the path of all drainage from the upper end of any off-site basins to major drainageways. The map must identify any major construction (i.e., development, irrigation ditches, existing detention facilities, culverts, storm sewers) along the entire path of drainage. Basins and divides are to be identified and topographic contours are to be included. The Erosion Control Plan drawings of the proposed development or redevelopment must have a scale of 1" = 20' to 1" = 200' on 22" x 34" drawings.

- a. Standard and job-specific construction details of erosion and sediment control measures, and standard and job specific erosion and sediment control notes.
- b. List vegetative specifications from this Manual if standard vegetation is to be used. Include alternate specifications and justification if they are to be used.
- c. List structural specifications from this Manual if standards are to be used. Include other specifications and justifications if they are to be used.
- d. A construction detail for all proposed construction BMPs.
- e. The following standard erosion and sediment control notes:
  - 1) The City Stormwater Department erosion control inspector must be notified at least 24 hours prior to any construction on this site.
  - 2) All required BMPs shall be installed **prior** to any land disturbing activity (stockpiling, stripping, grading, etc). All of required erosion control measures must be installed at the appropriate time in the construction sequence as indicated in the approved project schedule, construction plans, and erosion control report.
  - 3) Pre-disturbance vegetation shall be protected and retained wherever possible. Removal or disturbance of existing vegetation shall be limited to the area required for immediate construction operations, and for the shortest practical period of time.
  - 4) All soils exposed during land disturbing activity (stripping, grading, utility installations, stockpiling, filling, etc.) shall be kept in a roughened condition by ripping or disking along land contours until mulch, vegetation, or other permanent erosion control is installed. No soils in areas outside project street rights of way shall remain exposed by land disturbing activity for more than thirty (30) days before required temporary or permanent erosion control (e.g. seed/mulch, landscaping, etc.) is installed, unless otherwise approved by the Stormwater Department.

- 5) The property must be watered and maintained **at all times** during construction activities so as to prevent wind-caused erosion. All land disturbing activities shall be immediately discontinued when fugitive dust impacts adjacent properties, as determined by the City Engineering Department.
- 6) All temporary (structural) erosion control measures must be inspected and repaired or reconstructed as necessary after each runoff event and every 14 days in order to assure continued performance of their intended function. All retained sediments, particularly those on paved roadway surfaces, shall be removed and disposed of in a manner and location so as not to cause their release into any drainageway.
- 7) No soil stockpile shall exceed ten (10) feet in height. All soil stockpiles shall be protected from sediment transport by surface roughening, watering, and perimeter silt fencing. Any soil stockpile remaining after 30 days shall be seeded and mulched.
- 8) City Ordinance prohibits the tracking, dropping, or depositing of soils or any other material onto city streets by or from any vehicle. Any inadvertent deposited material shall be cleaned immediately by the contractor.
- 9) Additional notes can (should) be added to reflect the erosion/sediment control plan of the individual development.

(4) A new *Section 1.4* is added, to read as follows:

#### **1.4 Security for Erosion Control**

No land disturbing activity subject to this Stormwater Criteria Manual can begin until an Erosion Control Plan has been approved and the Owner has submitted proof of security to ensure rehabilitation of the disturbed land. A performance bond, irrevocable letter of credit, or cash escrow, acceptable to the Utilities Executive Director, and naming the City as the protected party, is required. Such performance bond, irrevocable letter of credit, or cash escrow shall further guarantee the continued maintenance and replacement of any installed erosion control measures shown on the approved plan.

The amount of the security is based on one and one-half times the cost to revegetate the disturbed land to dryland grasses (soil preparation, seed, and mulch) based upon unit cost determined by the City Stormwater Department's Annual Revegetation and Stabilization Bid. In no instance, shall the amount of security be less than one thousand five hundred dollars (\$1,500) for residential and three thousand dollars (\$3,000) for commercial projects

Should the Owner be out of compliance with provisions of the approved Erosion Control Plan, the City may exercise its rights under the security provided. In the event that the City exercises such rights, it is not the City's intention to routinely administer the construction of the measures shown on the erosion control plans, however, the City reserves the right to enter upon the land and take whatever actions are necessary to stabilize and revegetate all disturbed areas, or to have the plan constructed and make repairs as necessary.

The erosion control security will normally be retained by the City until the project has been completed and there is no further possibility of erosion or sediment transport from the site. This includes the time for two full growing seasons for the establishment of grasses on any revegetated areas. At that time, the security will be released. However, if a part or phase of the site has been completed (including any revegetated areas which are established but have not yet reached the two growing season warranty limit), and if it can be determined by the City that there is no further erosion or sediment transport risk from that part or phase as it relates to the entire project, then the portion of the erosion control security that would apply to that part or phase can be released, whether or not the entire project has been completed. Any partial release of the erosion control security must be requested by the responsible party.

(5) A new *Section 1.5* is added, to read as follows:

### **1.5      Warranty**

The Owner must warrant that the measures shown on the approved erosion and sediment control plan are properly constructed, installed, and are free from defective materials and/or workmanship, with said warranty to continue for the terms set forth below.

The Owner shall warrant and maintain all structural measures for such period of time as construction on the site continues and/or said measures are necessary to protect against erosion and sediment transport. The Owner must warrant and maintain all vegetative measures for two growing seasons after installation. Any acceptance of installed measures shall not be construed to relieve the Owner of the duty to warrant and maintain as aforesaid.

(6) A new *Section 1.6* is added, to read as follows:

### **1.6      Enforcement**

No land disturbing activity subject to this Stormwater Criteria Manual can begin on any project unless it is associated with an approved Erosion Control Plan, a signed Development Agreement, and a submitted erosion control security. All erosion control measures must be installed when they are necessary as indicated by the approved Erosion Control Plan and Report, and maintained in accordance with these Criteria. In order to ensure that all required measures have been correctly installed and are in proper order and repair, no building permit will be issued on any project until an inspection of the site and its required erosion control measures has been made and deemed acceptable by the City.

If, at any time during construction activities, the Owner fails to adhere to the approved Erosion Control Plan and Report, the construction phase sequence, or any of the erosion control criteria, the City may employ any or all of the following:

- Stop all or any part of the work on the project.
- Withhold building permits.
- Withhold certificates of occupancy.
- Exercise the City's rights under the security provided
- Issue summons and or fines.

(7) *Section 2.4* is added, to read as follows:

## **2.4 Fundamental Erosion Control Principles**

The intent of erosion control design is to protect adjacent properties and downstream properties from the detrimental effects of land disturbing activity. Water erosion is always directional, i.e., always down-slope. This directional nature of water erosion can be used to design resistance to sediment movement near the downstream edge of the disturbed property. The erosion control design may govern slope placement so that sediment-laden runoff is not directly tributary to an adjacent property. The slope may need to be built to accommodate a temporary diversion channel, which keeps water on the disturbed parcel.

Control measures are necessary for each phase of development (each phase of a development must have a “stand alone” erosion control plan), and it is understood that initial grading and construction will require certain control measures, which will change or be replaced as development progresses. Temporary control measures such as silt fences or diversion structures may be used during the initial grading and construction phase and later either removed completely or replaced with grass or permanent sediment basins.

Erosion control measures can be arranged to perform in sequence so that sediment reduction caused by one measure releases less sediment to the next. In this manner, series resistance to sediment movement can be built into a project so that stormwater released to adjacent properties or streams is carrying the allowable amount of sediment. The resistance to released sediments can be designed to minimize costs and minimize interference with on-site construction activities.

The construction and maintenance of erosion control measures is critical to ensure proper performance. Erosion Control Plans must include construction details and maintenance guidelines.

(8) *Section 3.0* is deleted in its entirety

(9) *Section 3.1* is deleted in its entirety

(10) *Section 3.2.1* is amended to read as follows:

### **3.2.1 Inspection Frequency**

Documented inspections are required on a biweekly basis and within twenty four (24) hours of a storm event, with some limited, temporary exceptions for inactive sites. The City recommends spot-checking BMPs every workday. This is typically reasonable to achieve and can help to ensure that the BMPs remain in good working condition. For example, vehicle tracking of sediment onto the roadway is a common problem that often requires maintenance more frequently than weekly. Curb socks, inlet protection and silt fence are other BMPs that are prone to damage and displacement, also benefiting from more frequent inspections.

When the site or portions of the site are awaiting final stabilization (e.g., vegetative cover), where construction is essentially complete, the recommended frequency of inspection is at least once every week. Be sure that this change is documented and in accordance with relevant permit requirements prior to reducing the inspection schedule. When snow cover exists over the entire site for an extended period, inspections are not always feasible. Document this condition, including date of snowfall and date of melting



conditions, and be aware of and prepare for areas where melting conditions may pose a risk of surface erosion.

Inspections of disturbed sites must be done by the responsible party, at the minimum, on a bi-weekly basis. Records of inspections including date and time of inspection, corrective action(s) taken and future planned maintenance activities must be kept at the construction site by the responsible party and submitted to the Erosion Control Inspector upon request.

(11) *Section 4.2* is amended to read as follows:

#### **4.2 Sediment Control Measures**

Sediment control measures limit transport of sediment off-site to downstream properties and receiving waters. Sediment controls are the second line of defense, capturing soil that has been eroded. Sediment control generally rely on treatment processes that either provide filtration through a permeable media or that slow runoff to allow the settling of suspended particles. A third treatment process that is used in some parts of the country includes advanced treatment systems employing chemical addition (flocculent) to promote coagulation and settling of sediment particles. The City does not recommend the use of chemical treatment as the improper application of chemicals can be more detrimental than simply removing the sediment.

“Sediment Control” (SC) BMPs Fact Sheets in this chapter are:

- SC-1 Silt Fence (SF)
- SC-2 Sediment Control Log (SCL)
- SC-4 Brush Barrier (BB)
- SC-5 Rock Sock (RS)
- SC-6 Inlet Protection (IP) (*multiple types*)
- SC-7 Sediment Basin (SB)
- SC-8 Sediment Trap (ST)
- SC-9 Vegetated Buffers (VB)
- SC-10 Chemical Treatment (CT) (*also known as Advanced Treatment Systems [ATS]*)

No Fact Sheet is included for “SC-3 Straw Bale Barriers” (SBB) as these are prohibited from use as a post-construction sediment control measure in the City.

(12) *Fact Sheet SC-3* is deleted in its entirety.

(13) *Figure SBB-1* is deleted.