Chapter 12
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12.1 Introduction

This *Erosion Control Standard* has been developed based on a model prepared by the Urban Drainage and Flood Control District of Denver, Colorado. It has been revised to reflect the needs of the City of Huron and provides a set of criteria and technical guidance for erosion and sediment control at construction sites. In addition, it describes plan submittal requirements, planning considerations, and general exemptions followed by the City. The practices contained in this document shall be viewed as minimum requirements. A glossary of terms is included in the Appendix, 12A.2.

12.1.1 General

The Environmental Protection Agency (EPA) issued regulations on November 16, 1990, that require steps be taken to improve the quality of storm water from industrial activities, including certain construction activities. These criteria were developed to help mitigate the increased soil erosion and subsequent deposition of sediment offsite during the period of construction from start of earth disturbance until final landscaping and storm water quality measures are effectively in place. Compliance with these criteria will help meet the requirements of the EPA storm water regulations.

Submittal of an *Erosion and Sediment Control Plan* to the City does not supercede the requirement for the applicant to also obtain any required permits from the State of South Dakota, such as a South Dakota Storm Water Discharge Permit for Construction Activities. In most cases, the applicant will also have to submit a Notice of Intent to discharge storm water associated with construction activity to the South Dakota Department of the Environment and Natural Resources (SDDENR) as well as meet the requirements of the South Dakota Storm Water Discharge Permit for Construction Activities.

Implementation and maintenance of erosion and sediment control measures are ultimately the responsibility of the property owner or authorized responsible party. Because site conditions will affect the suitability and effectiveness of erosion and sediment control measures, a plan specific to each site is required. In addition, should the approved plan not function as intended, and it is determined by the City that additional measures are needed, the owner will have to provide additional measures needed to reduce soil erosion and sediment discharged from the construction site.

Nothing in these criteria limits the right of the City to impose additional or more stringent standards.

12.1.1.1 Exemptions.

1. Exemptions from the erosion control planning process will be considered for any of the following; however, exempting the owner from preparing an *Erosion and Sediment Control Plan* and applying for an Excavation and Grading Permit does not exempt the owner from controlling erosion of soil at each construction site through the use of the techniques described in this manual:

    a. Agricultural use of land.

    b. Excavation below finished grade for basements, footings, retaining walls, or other structures on lots of less than one [1] acre in size in existing subdivisions unless required otherwise.

    c. A sidewalk or driveway.

    d. Land-disturbing activities involving less than one [1] acre of disturbed area. Individual lots classified as a minor impact construction site by City ordinance involving less than one [1] acre of disturbed area in a larger subdivision project shall not be considered separate development projects, but rather as a part of the subdivision development as a whole. It will be the responsibility of the homeowner and homebuilder to conform to all requirements of the locally-approved *Erosion and Sediment Control Plan* for the subdivision. As part of any Building Permit for which a specific erosion control plan is not required, the following statement must be included: "We have reviewed the *Erosion and Sediment Control Plan* for (subdivision name) and agree to conform to all requirements contained therein and all erosion control requirements of the City of Huron. We further agree to construct and maintain all erosion and sediment control measures required on the individual lot(s) subject to this Building Permit and/or in accordance with the provisions of the City of Huron *Erosion and Sediment Control Standards*."

    e. Underground utility construction, including the installation, maintenance, and repair of all utilities under hard-surfaced roads, streets, or sidewalks, provided such land-disturbing activity is confined to the hard-surfaced area and provided that runoff and erosion from soil stockpiles are confined and will not enter the drainage system.

    f. Gravel, sand, dirt, or topsoil removal as authorized pursuant to approval of the South Dakota Board of Minerals and Environment, provided said approval includes an *Erosion and Sediment Control Plan* that meets the minimums specified.

12.1.1.2 Variances.

The City Engineer may temporarily waive or modify the standards of this chapter for the entire city due to severe local conditions. Any such citywide waiver must be determined to be necessary to prevent loss of life, personal injury, or severe property damage.

Upon request, the City Engineer may consider waiving or modifying any of the standards which are deemed inappropriate or too restrictive for site specific conditions by granting a variance. These site specific variances may be granted at the time of plan submission or formal request for plan revision. Request for variances shall include the following and must be submitted in a format that is deemed acceptable by the City Engineer.

1. The standard from which the applicant seeks a variance.
2. The justification for not complying with the standard.
3. Alternate criteria or standard measures to be used in lieu of the standard. The standards specified with this Chapter relate to the application of specific erosion and sediment control practices. Other practices or modifications to these standards may be used if approved by the City Engineer prior to installation. Such alternative practice must be thoroughly described and detailed to the satisfaction of the City Engineer.

To expedite the review and decision on variance requests, the variance request should be submitted with, or submitted prior to the initial *Erosion and Sediment Control Plan* submittal.

12.1.2 Performance Objectives

The objectives for erosion and sediment control during construction include the following:

1. Conduct all land-disturbing activities to effectively reduce accelerated soil erosion and reduce sediment movement and deposition offsite.

2. Schedule construction activities to minimize the total amount of soil exposed at any given time to reduce the period of accelerated soil erosion.

3. Establish temporary or permanent cover on areas that have been disturbed as soon as possible after final grading is completed.

4. Design and construct all temporary or permanent facilities for the conveyance of water around, through, or from the disturbed area to limit the flow of water to non-erosive velocities.

5. Remove sediment caused by accelerated soil erosion from surface runoff water before it leaves the site.

6. Stabilize the areas of land disturbance with permanent vegetative cover or storm water quality control measures.

12.1.3 *Erosion and Sediment Control Plan*

An *Erosion and Sediment Control Plan* consisting of a written narrative report and a site plan map must be submitted to the Office of the City Engineer for review and acceptance prior to any unauthorized soil disturbance activities.

A professional engineer must develop the site specific *Erosion and Sediment Control Plan* that is in full compliance with the erosion and sediment control standards established in this chapter.

The City Engineer may require the responsible party's authorized representative and their consulting engineer to attend a field site visit with City staff to identify concerns, improvements or efficiencies before the *Erosion and Sediment Control Plan* is accepted.

The accepted *Erosion and Sediment Control Plan* must be reviewed to ensure compliance with these standards anytime a site's planned development changes impact the soil disturbance activities or effect drainage of site. If this review determines that the *Erosion and Sediment Control Plan* needs revision, it must be resubmitted and accepted by the City Engineer prior to the soil disturbance activities caused by the planned development changes.

12.1.3.1 *Erosion and Sediment Control Plan* Narrative Report. The narrative report must contain, or refer to, the drainage report and shall contain the following:

1. **Name, mailing address, e-mail address if available, and telephone number of the responsible parties.** The name, mailing address, e-mail address and telephone number of the professional engineer preparing the *Erosion and Sediment Control Report* shall also be included if different from the applicant.

2. **Project description.** A brief description of the nature and purpose of the land-disturbing activity, the total area of the site, the area of disturbance, and project location including township, range, section, and quarter-section, or the latitude and longitude of the approximate center of the project.

3. **Existing site conditions.** A description of the existing topography, vegetation, and drainage; and identify any drainageways, water bodies (wetlands) on the site.

4. **Adjacent areas.** A description of neighboring areas such as streams, lakes, residential areas, roads, etc., that might be affected by the land disturbance.

5. **Soils.** A brief description of the soils on the site, including information on soil type and names, mapping unit, erodibility, permeability, hydrologic soil group, depth, texture, and soil structure. (This information may be obtained from the soil report for the site, or, if available, from soils reports from adjacent sites.)

6. **Areas.** An estimate of the surface area (in acres) of the proposed disturbance.

7. **Erosion and sediment control measures.** A description of the methods described in the Huron *Erosion and Sediment Control* standard plates, which will be used to control erosion and sediment on the site. The erosion and sediment control narrative should be phased to reflect the major planned construction stages of the project.

    a. Major site grading

    b. Public infrastructure improvements

    c. Individual lot development

    Additional measures as necessary to control air emissions like dust from construction activities.

8. **Construction site nonstructural control measures.** A description of the methods described in the Huron *Erosion and Sediment Control* chapter, which will be used to control storm water pollution, erosion, sediment, and spills on the site. During the construction process, the developer is responsible for maintaining all compliance documentation records.

9. **Time schedule.** A time schedule indicating the anticipated starting and completion time periods of the site grading and/or construction sequence, including workday, week, or date of completion. The schedule will include the installation and removal time periods of erosion and sediment control measures, and the time of exposure of each area prior to the completion of temporary erosion and sediment control measures.

10. **Permanent stabilization.** A brief description, including specifications of how the site will be stabilized after construction is completed.

11. **Storm water management considerations.** Explain how storm water runoff from and through the site will be handled during construction. Provide a brief description of the post-construction storm water quality control measures to be included as a part of the site development.

12. **Maintenance.** A schedule of regular inspections during construction and repair of erosion and sediment control structures shall be described. A description of routine maintenance for sediment control facilities shall also be included.

13. **Dewatering.** Provide detail on how any planned dewatering shall be managed on the site, or state that no groundwater or surface water dewatering shall occur on site during construction activity.

14. **Variances**. Professional engineer shall list any request for variance of these standards and justification as required in Section 12.1.1.2.

15. **Other information.** Other information or data as may be reasonably required by the City Engineer. Information required by the SDDENR General Permit for Storm Water Discharges Associated with Construction Activities in addition to the information listed above shall also be included in the narrative report.

16. **The following note.** "This *Erosion and Sediment Control Plan* appears to fulfill the technical criteria and the criteria for erosion control and requirements of the City of Huron. I understand that additional erosion and sediment control measures may be needed if unforeseen erosion problems occur or if the submitted plan does not function as intended. The requirements of this plan shall run with the land and be the obligation of the responsible party until such time as the plan is properly completed, modified, or voided."

17. **Signature page and statement.** Signature page for owner/developer and may also include the general contractor acknowledging the review and acceptance of responsibility for erosion and sediment control, and a statement by the professional engineer acknowledging responsibility for the preparation of the *Erosion and Sediment Control Plan*.

12.1.3.2 *Erosion and Sediment Control Plan Sheet.* The *Erosion and Sediment Control Plan* Sheet shall be separate from the narrative report. The plan shall be prepared at a minimum scale of one (1) inch equals one hundred (100) feet and include the following:

1. **Property line.** The property lines for the site where the work will be performed.

2. **Existing topography.** Existing topography with one- (1-) or two-foot (2-) contour intervals, and encompass the area shown on the final drainage plan (drawn to scale). Additional information may be required.

3. **Proposed topography.** Proposed topography with **one (1) or two-foot (2)** contour intervals; the map shall show elevations, dimensions (drawn to scale), location, extent, and the slope of all proposed grading.

4. **Existing Facilities.** Location of any existing structures or hydrologic features on the site.

5. **Existing Conditions.** Location of all structures or natural features on the land adjacent to the site as required for the final drainage plan. The plan shall show the location of the street, street right-of-way, storm sewer, channel, or other waters receiving storm water runoff from the site. Any potential wetlands identified on inventory maps or observed shall be clearly identified as nonjurisdictional or jurisdictional.

6. **Proposed Facilities.** Show all proposed structures and development on the site.

7. **Proposed Conditions.** The plan shall indicate the proposed changes to the location of street, street right-of-way, storm sewer, channel, wetlands, water bodies or other waters receiving stormwater runoff.

8. **Limits of Construction**. Delineate allowable limits of disturbance for each phase of construction development.

9. **Location of soil stockpiles**. Areas designated for topsoil and subsoil storage.

10. **Location of storage areas**. Areas designated for equipment, fuel, lubricants, chemical, and waste storage.

11. **Location of concrete washout facilities**. Areas designated for the washout of concrete equipment.

12. **Location of temporary roads** designated for use during the construction period.

13. **Plans of all drainage features.** Show all structural and nonstructural erosion and sediment controls, paved areas, retaining walls, cribbing, planting, temporary or permanent soil erosion control measures, or other features to be constructed in connection with, or as a part of, the proposed work, together with a map showing the drainage area of land tributary to the site and estimated two-year runoff of the area served by all drains.

14. **Detail drawings**. Design drawings of sediment controls, temporary diversions, and any practices used that are not referenced in these criteria.

15. **Other information.** Other information or data as may be reasonably required by the local jurisdiction.

16. **Detailed schedule.** Detailed schedule of events including dates (workday or week) of completion of the erosion and sediment control measures.

17. **Display Requirements.** Provide location for sign that complies with Section 12.8.5.3.

12.1.3.3 Erosion Sediment Control for Individual Lots of a Subdivision.

Individual lots involving less than one (1) acre of disturbed area in an approved subdivision or larger common plan of development or sale shall not be considered a separate construction project, but rather as a part of the subdivision development as a whole. It will be the responsibility of the homeowner and their contractors to conform to all requirements of the locally approved *Erosion and Sediment Control Plan* for the subdivision. Subdivision *Erosion and Sediment Control Plans* must incorporate a separate detail drawing and narrative describing minimum erosion and sediment control measures of individual lots within the approved subdivision or larger common plan of development or sale. It is understood that the City of Huron may require additional erosion and sediment control measures if unforeseen erosion problems occur or if the submitted *Erosion and Sediment Control Plan* does not function as intended.

If any individual lot within a subdivision or larger common plan of development or sale is greater than one (1) acre or does not want coverage under the subdivision's *Erosion and Sediment Control Plan*, that lot must fully comply with all conditions of the Chapter 12, Erosion Control Standards.

12.1.3.3.1 Individual Lot Erosion and Sediment Control Detail Drawing

Separate example Detail Drawing demonstrating the typical minimum erosion control measures for a standard platted lot within the approved subdivision. Detail drawing shall include the following:

a. Subdivision Name is Required.

b. Subdivision Location is Required.

c. Limits of Construction is Required.

   i. Limits of construction shall be at the property lines or no more than 10 feet beyond property lines with authorization by adjacent property owner.

   ii. Authorized limits of construction must be physically demarcated on the property.

   iii. The limits of construction must be marked with at least a 4-foot-high post with at least the top 12 inches painted or coated with an orange

fluorescent color at the corners of each authorized limit line or an approved alternative.

1. Contiguous lots with the same responsible party may choose to only mark the perimeter boundaries of the multiple lots.
2. Contiguous lots with different responsible parties may share limits of construction markers at the shared boundaries upon mutual agreement.

d. Vehicle Tracking Control in accordance with Section 12.3.1.

e. Erosion Control Soil Surface Stabilization is Required.

f. BMP approved under Section 12.2 or an approved alternative. f.

Stabilized Staging Area as Deemed Necessary.

g. Concrete Washout Area as Deemed Necessary.

h. Stockpile Area as Deemed Necessary.

i. Non-structural BMP as Deemed Necessary.

j. Sediment Control approved under Section 12.3 as Deemed Necessary.

i. Alternate standard plate for “Minor Impact Construction Site Silt Fence.”

ii. Alternate standard plate for “Minor Impact Construction Site Filter Strip.”

iii. Alternate standard plate for “Minor Impact Construction Site Vehicle Tracking Control.”

12.1.3.3.2 Individual Lot Erosion and Sediment Control Narrative

Subdivision Construction Plans shall have a separate Narrative describing the minimum typical erosion and sediment control measures for a standard platted lot within the approved subdivision. Narrative shall include the following:

a. Lot owner or general contractor is responsible for training all subcontractors to follow this *Erosion and Sediment Control Plan* prior to entering the work area. Training/discussions with subcontractors shall include but not be limited to:

i. Define limits of construction and the method and location of physical demarcations.

ii. Define location and limits of stockpile areas if required.

iii. Removal of sediment and debris leaving property.

iv. Location of stabilized staging area and protection requirements if required.

v. Restricted use of vehicles or equipment on and off of unstabilized areas with entrance and egress through the lot’s vehicle tracking station.

vi. Location of Concrete Washout Area on lot or subdivision if required.

vii. Identify required structural and nonstructural BMP that must be maintained.

viii. Identify soil surface stabilization measures that should not be disturbed.

b. The site shall be inspected and maintained by the owner or his authorized representative at least every 14 calendar days or after precipitation, snowmelt, or runoff that causes surface erosion, sediment transport, or vehicle tracking of debris off of property. Where runoff is unlikely due to winter conditions, such inspections shall be conducted at least once per month. Based on the results of the inspection, the plan shall be revised and implemented, in no case later than seven days following the inspection.

c. Individual lot owner and/or their general contractor shall be responsible for implementing and maintaining the subdivision's approved structural BMP that is now located on their property and within their approved limits of construction.

d. Lot owner and general contractor or their representative shall ensure that soil, landscape materials, rock, or mulch is not stockpiled, stored, or placed on streets, sidewalks, or storm water flow lines.

12.1.3.3.3 Sediment Control on Subdivision

Sediment entrapment facilities that were originally designed and constructed for major grading operations and infrastructure public improvements of a subdivision or larger common plan of development or sale may be reduced or removed prior to completion of individual lot residential construction upon meeting the following criteria:

a. Owner/developer manages individual lots as minor impact construction sites in compliance with appropriate ordinances and standards.

b. *Erosion and Sediment Control Plan* for individual lots identifies any additional lot specific sediment control measures necessary.

c. Disturbed areas from soil disturbance activities have reached the following soil stabilization and management:

i. Areas still owned or managed by the subdivision owner/developer shall meet permanent revegetation in accordance with Sections 12.2.3, 12.2.3.1 and 12.2.3.3 (Permanent Revegetation).

ii. Individual lots sold or transferred shall meet one of the following:

a. Permanent stabilization in accordance with Sections 12.2.3, 12.2.3.1 and 12.2.3.3 (Permanent Revegetation).

b. Temporary stabilization in accordance with Section 12.2.2 (Mulching) or Sections 12.2.3, 12.2.3.1 and 12.2.3.2 (Temporary Revegetation).

iii. Individual lots sold or transferred must have the City's notice of stabilization form or an alternative executed by property owners.

12.1.3.4 Acceptance of *Erosion and Sediment Control Plan*.

An *Erosion and Sediment Control Plan* must be accepted prior to issuance of an Excavation and Grading Permit by the City. Acceptance of the *Erosion and Sediment Control Plan* does not imply acceptance or approval of drainage plans, utility plans, street or road plans, design of retaining walls, or any other aspect of site development.

12.2 Erosion Control

Planning for the installation of permanent or temporary soil erosion controls is needed in advance of all major soil disturbance activities on the construction site. After construction begins, soil surface stabilization shall be applied within 14 days to all disturbed areas that may not be at final grade but will remain dormant (undisturbed) for periods longer than 21 calendar days. Within 14 days after final grade is reached on any portion of the site, permanent or temporary soil surface stabilization shall be applied to disturbed areas and soil stockpiles. When the initiation of stabilization measures are stopped due to snow cover or arid conditions, stabilization measures shall be initiated as soon as possible.

Soil surface stabilization protects soil from the erosive forces of raindrop impact, flowing water, and wind. Erosion control practices include surface roughening, mulching, erosion control blankets, establishment of vegetative cover by seeding and mulching, sod, and the early application of gravel base on areas to be paved. Stabilization measures to be used shall be appropriate for the time of year, site conditions, and estimated duration of use. The maximum time limits of land exposure for selection of erosion controls are summarized in Table 12.1.

12.2.1 Surface Roughening

Surface roughening provides temporary stabilization of disturbed areas from wind and water erosion. It is particularly useful where temporary revegetation cannot be immediately established due to seasonal planting limitations.

The soil surface is considered roughened if depressions are created 2 to 4 inches deep and are spaced approximately 4 to 6 inches apart. If slopes are sufficiently rough after final grading, no further treatment is required. The surface of exposed soil can be roughened by a number of techniques and equipment. A chisel or ripping implement can be used in most soil conditions. Roughening cannot be performed in very sandy or rocky soil.

Surface roughening, also referred to as scarification, shall be performed after final grading. Fill slopes can be constructed with a roughened surface. Cut slopes that have been smooth graded can be roughened as a subsequent operation. Roughening of ridges and depressions shall follow along the contours of the slope. On slopes steeper than 2:1, the tracks left by a dozer working perpendicular to the contour can leave acceptable horizontal depressions.

Care shall be taken not to drive vehicles or equipment over areas that have been scarified. Tire tracks will smooth the roughened surface and encourage runoff to collect into channels. As surface roughening is only a temporary control, additional treatments may be necessary to maintain the soil surface in a roughened condition.

12.2.2 Mulching

All disturbed areas shall be mulched, or seeded and mulched, within 14 days after final grade is reached on any portion of the site not otherwise permanently stabilized. Areas that will remain in an interim condition for more than one (1) year shall also be seeded. (See Section 12.2.3.2)

To protect newly seeded areas and to provide temporary cover on other disturbed areas that will not require temporary revegetation or cannot be seeded due to seeding date limitations, a mulch shall be applied consisting of:

1. Clean, weed- and seed-free, long-stemmed grass hay (preferred) or cereal grain straw. Hay is preferred as it is less susceptible to removal by wind. Mulch shall be applied evenly at a rate of two tons per acre. At least 50 percent of the mulch, by weight, shall be 10 inches or more in length.

   Mulch shall be anchored. This can be accomplished mechanically by crimping or with the aid of tackifiers or nets. Anchoring with a crimping implement is preferred, and is the recommended method for all areas equal to or flatter than 3:1. Mechanical crimpers shall be capable of tucking the long mulch fibers into the soil 4 inches deep without cutting them.

   On small areas sheltered from the wind and from heavy runoff, spraying a tackifier on the mulch is satisfactory for holding it in place. For steep slopes and other special situations, blankets, anchored with staples, may be required instead of mulch.

2. Hydraulic mulching shall be limited to those situations where it is too difficult to apply and anchor a mulch of long-stemmed grass hay or cereal straw; namely, slopes steeper than 3:1 or where access is limited. Wood cellulose fibers shall be mixed with water and a tackifying agent and applied at a rate of 1,500 pounds per acre with a hydraulic mulcher.

3. Mats, blankets, and nets are available to help stabilize steep slopes and drainage channels. Depending on the product, these may be used alone or in conjunction with grass or straw mulch. Normally, use of these products will be restricted to relatively small areas. Mats made of jute, coconut fiber, or various geosynthetic fibers can be used instead of mulch. Blankets are straw mulch that have been woven and oftentimes include a synthetic layer or net. Plastic netting may be used to anchor mulch.

4. Some synthetic tackifiers or binders may be used to anchor mulch. Caution shall be used to prevent the introduction of any potentially harmful material into the environment. Manufacturer's recommendations shall be followed at all times.

12.2.3 Revegetation

A viable vegetative cover shall be established within one (1) year on all disturbed areas and soil stockpiles not otherwise permanently stabilized. Vegetation is not considered established until a uniform vegetative ground cover with a density of at least 70% is achieved, or which, in the opinion of the City, is sufficiently mature to control soil erosion and can survive severe weather conditions.

12.2.3.1 Seedbed Preparation. Areas to be revegetated shall have soil conditions capable of supporting vegetation. Overlot grading will oftentimes bring to the surface subsoils that have low nutrient value, little organic matter content, few soil microorganisms, and conditions less conducive to infiltration of precipitation. Under certain conditions, soil amendments and treatments may be necessary to provide an adequate growth medium to sustain vegetation.

Whenever possible, topsoil shall be salvaged for respreading on areas to be revegetated. The depth of soil stripping is determined by the depth of available topsoil.

The rooting zone of most semi-arid grasslands is 6 to 18 inches. At a minimum, the upper 6 inches of topsoil can be stripped and stockpiled, and respread to a thicker depth on surfaces not planned for buildings or impervious areas. If the surface is compacted, ripping of subsoils prior to topsoiling is recommended. Scarification will assist in placement of a stable topsoil layer on steeper slopes, and allow percolation and root penetration to greater depth.

Fertilizer can be added to improve nutrient levels necessary for plant growth. Other treatments, such as liming, can be used to adjust soil conditions as

necessary with amendments. Soil testing is recommended to determine appropriate amendments required.

A suitable seedbed will enhance the success of revegetation efforts. The upper layer of soil shall be in a condition suitable for seeding at the proper depth and conducive to plant growth.

Construction sites may be required by the City Engineer to sample and analyze soils to verify that appropriate soil conditions exist including but not limited to organic matter, pH, nitrogen, phosphorous and potash.

12.2.3.2 Temporary Revegetation. Temporary revegetation is required on all disturbed areas having a period of exposure prior to final stabilization of one (1) year or longer. All temporary seeding shall be protected with mulch.

To provide temporary vegetative cover on disturbed areas that will not be paved, built upon, or fully landscaped within 12 months but will be completed within 24 months, plant an appropriate annual grass and mulch the planted areas. The annual grasses generally suitable for this area are listed in Table 12.2. These are to be considered only as a general recommendation whenever specific design guidance for a particular site is not available.

12.2.3.3 Permanent Revegetation. To provide vegetative cover on disturbed areas not paved or built upon for two years or longer, or for an indeterminate length of time, a perennial grass mix shall be planted. Each site will have different characteristics, and a landscape professional should be contacted to determine the most suitable seed mix for a specific site. In lieu of a specific mix and for planning purposes, one of the perennial grass mixes listed in Table 12.3 can be used. The pure live seed (PLS) rates of application recommended in these tables are considered to be absolute minimum rates for seed applied using proper drill-seeding equipment. All permanent seeding shall be protected with mulch.

12.2.4 Roads and Soil Stockpiles

Road cuts, road fills, and parking lot areas shall be covered with the appropriate aggregate base course on the surfaces to be paved in lieu of mulching. Early application of road base is suitable where a layer of course aggregate is specified for final road or parking lot construction. This practice may not be desirable in all instances, and is not needed when final pavement construction will take place within 30 days of grading to final contours. All non-paved portions of road cut, fill, and parking lot areas shall be seeded and mulched as soon as possible after final grading has occurred, but in no case later than 14 days after grading has been completed.

Soils planned to be stockpiled for more than 60 days shall be seeded with a temporary or permanent grass cover within 14 days after completion of stockpile

construction. Mulching is recommended to assure vegetation establishment. If stockpiles are located within close proximity to a drainageway (i.e., one hundred [100] feet), additional sediment control measures, such as a temporary diversion dike or silt fence, shall be provided. (See Section 12.3)

12.3 Sediment Control

Installation of Sediment Control Measures. All construction sites must install necessary perimeter sediment control measures in their approved *Erosion and Sediment Control Plan* prior to grading activities authorized by their Excavation and Grading Permit. This only allows the minimum amount of soil disturbance necessary that is directly related to the installation of these sediment control measures. The City Engineer may require construction sites to be inspected to verify that these sediment control measures have been properly installed prior to the issuance of an Excavation and Grading Permit by the City.

The installation of all other sediment entrapment and control facilities shall begin before major land disturbance activities begin on a construction site in accordance with their time schedule established in their *Erosion and Sediment Control Plan*.

Sediment control will be site specific (located on the site under construction unless designated and approved by the City Engineer) and can include vehicle tracking controls; sod buffer strips around the lower perimeter of the land disturbance; sediment barriers, filters, dikes, traps, or sediment basins; or a combination of any or all of these measures.

Sediment controls shall be constructed before land disturbance takes place. Earthen structures such as dams, dikes, and diversions shall be mulched within 14 days of installation. Earthen structures that are expected to remain in place for more than one (1) year shall be seeded and mulched.

12.3.1 Vehicle Tracking

Wherever construction vehicles enter onto paved public roads, provisions shall be made to prevent the transport of sediment (mud and dirt) by vehicles tracking onto the paved surface. It is recommended that coarse-aggregate rock surfacing be provided to keep most construction traffic from coming into contact with mud and dirt. In other words, stabilized access, parking, staging, and loading and unloading areas will reduce the likelihood that vehicles will come into contact with mud. Sites that have not voluntarily implemented these practices may be required to construct a stabilized vehicle tracking control device.

For sites greater than one (1) acre, a stabilized vehicle tracking control shall be constructed. Whenever deemed necessary by the City, wash racks shall be installed to remove mud and dirt from the vehicle and its tires before it enters onto public roads.

Whenever sediment is transported onto a public road, regardless of the size of the site, the road shall be cleaned at the end of each day. Sediment shall be removed from roads by shoveling or sweeping with dust control measures and be transported to a controlled sediment disposal area. Street washing shall not be allowed until after sediment is removed in this manner. Storm sewer inlet protective measures shall be in place at the time of street washing.

12.3.2 Slope—Length and Runoff Considerations

Cut-and-fill slopes shall be designed and constructed to minimize erosion. This requires consideration of the length and steepness of the slope, the soil type, upslope drainage area, groundwater conditions, and other applicable factors. Slopes that are found to be eroding excessively will require additional slope stabilization until the problem is corrected. The following guidelines shall assist site planners and plan reviewers in developing an adequate design:

1. Rough soil surfaces are preferred over smooth surfaces on slopes (see Section 12.2.1).

2. Temporary slope diversion dikes (as discussed in Section 12.3.2.1) can be constructed at the top of long or steep slopes, or hillslopes that have an upslope tributary drainage area over five (5) acres. Diversion dikes or terraces (Sections 12.3.2.1 and 12.3.2.3) may also be used to reduce slope length within the disturbed area.

   Temporary diversion dikes shall be provided whenever:

   $$S^2L>2.5 \qquad \text{(Equation 1)}$$

   Where: S = slope of the upstream tributary area (in feet/foot); and
   L = length of the upstream slope (in feet)

3. Concentrated storm water shall not be allowed to flow down cut or fill slopes unless contained within an adequately-sized temporary channel diversion, a permanent channel, or temporary slope drain (see Section 12.3.2.4).

4. Wherever a slope face crosses a water seepage plane that endangers the stability of the slope, adequate drainage shall be provided.

5. Provide sediment traps, basins, or barriers (silt fences or wattles) below slopes to reduce off-site sediment transport or to reduce slope lengths (see Section 12.3.3).

   12.3.2.1 Slope Diversion Dikes. A temporary slope diversion dike is a horizontal ridge of soil placed perpendicular to the slope and angled slightly to provide drainage along the contour. Temporary diversion dikes can be

constructed by excavation of a V-shaped trench or ditch and placement of the fill on the downslope side of the cut.

There are two types of temporary slope diversion dikes:

1. A diversion dike located at the top of a slope to divert upland runoff away from the disturbed area. The discharge from undisturbed or previously-developed upland areas collected by these diversion dikes may be directed to a permanent channel or temporary channel diversion. (See Section 12.4.2)

2. A diversion dike located at the base or midslope of a disturbed area to divert sediment-laden water to a sediment trap or basin. The discharge from these diversion dikes may be directed to a temporary slope drain or sediment basin.

12.3.2.2 Roads and Roadside Swales. The drainage system provided for roads will define to some extent the length and area of individual slope segments within the disturbed area. A number of smaller hillslope segments will be created by construction of roads. These areas shall require erosion control as described in Section 12.2.4, and sediment controls dependent on the size of upslope tributary area. (See Section 12.3.3)

For road areas that are not paved within 30 days of final grading, and have not received early application of roadbase (see Section 12.2.4), rough-cut street controls shall be used. These are runoff barriers that are constructed at intervals down the road. The barrier projects perpendicular to the longitudinal slope from the outer edge of the roadside swale to the crown of the road. The barriers are positioned alternately from the right and left side of the road to allow construction traffic to pass in the unbarricaded lane.

12.3.2.3 Terracing. Sediment can be controlled on slopes that are particularly steep by using terracing. During grading, relatively flat sections, or terraces, are created and separated at intervals by steep slope segments. The steep slope segments are prone to erosion, however, and must be stabilized in some manner. Retaining walls, gabions, cribbing, deadman anchors, rock-filled slope mattresses, and other types of soil retention systems are available for use. These shall be specified in the plan and installed according to manufacturer's instructions.

12.3.2.4 Slope Drains. There are certain instances when runoff must be directed down a slope within the disturbed area. A temporary slope drain can be used to protect these hillslope areas from scour and additional erosion. A number of alternative designs and materials can be used for a slope drain.

The sizing of temporary slope drains shall be defined but do not need rigorous hydraulic analysis. Slope drains shall be sized for a two-year storm event. The

discharge from all slope drains shall be directed to a stabilized outlet. (See Section 12.4.3)

12.3.3 Sediment Entrapment Facilities

Sediment entrapment facilities are necessary to reduce sediment discharges to downstream properties and receiving waters. Sediment entrapment facilities include silt fences, sod filter strips, sediment traps, sediment basins, silt ditches, and wattles. The type of sediment entrapment facility to be used depends on the tributary area, basin slope, and slope length of the upstream area. Table 12.4 summarizes the recommended maximum tributary areas, slope lengths, and slopes for four types of sediment entrapment facilities.

All runoff leaving a disturbed area shall pass through a sediment entrapment facility before it exits the site and flows downstream.

An established green filter strip may be adequate for small sites, provided the limits for tributary slope are not exceeded and the flow is not concentrated. Silt fences and wattles may be used for somewhat larger areas, depending on the upslope drainage area. When the tributary area is less than five (5) acres but greater than that allowed for silt fences and wattles, runoff shall be collected in diversion swales and routed through temporary sediment traps.

12.3.3.1 Silt Fence. A silt fence is made of a woven synthetic material that filters runoff. Silt fence can be placed as a temporary barrier at the base of a disturbed area but is not recommended for use in a channel or swale. The material is durable and will last for more than one season if properly installed and maintained.

12.3.3.2 Filter Strips. Vegetated filter strips cause deposition of sediment within the area of vegetation. Buffer strips of natural vegetation can be left at the time of site grading, or can be created by using sod. A dense ground cover is necessary or runoff will channelize within the area.

12.3.3.3 Sediment Traps. A sediment trap is a temporary structure that is designed to fill with sediment. A sediment trap can be constructed by either excavating below grade or building an embankment across a swale. Excavated traps are less prone to failure than embankments. No pipe is used at the outlet, as in a sediment basin, and an open-channel spillway shall be included in the design. A minimum of 3,600 cubic feet of storage volume shall be provided for each tributary acre.

If sediment traps are incorporated into the erosion control plan, provide the following guidance for the contractor:

- Sediment volume required and provided.

- Length, width, and depth of the trap.

- Provide the top elevation of the berm, and length, and elevation for the overflow assembly.

12.3.3.4 Sediment Basins. Areas draining more than ten (10) acres shall be routed through a sediment basin. Sediment basins shall be designed to a minimum 3,600 cubic feet of volume per tributary acre and be cleaned out prior to becoming half full.

Tributary acres shall be the total potential disturbed acres at one time drained to the sediment basin from a construction site or larger common plan of development or sale. This does not have to apply to storm water flows from acres that are:

- Undisturbed onsite areas with no erosion and sediment control issues.
- Previously disturbed onsite areas that have achieved final stabilization.
- Disturbed or undisturbed areas not within the construction site or larger common plan of development or sale.

Performance Standard: If the storm water flows from acreages that do not apply to this standard are sufficient to cause significant hydraulic overloads that impact the sediment basins designed performance, then alternative measures should be considered (e.g. divert flows from areas that do not apply around the disturbed areas and sediment basin or build sediment basin off-line of main drainageway and divert only disturbed areas to sediment basin).

If the site is to include a post construction storm water quality or flood control detention facility, the permanent detention facility may be used as the temporary sediment basin, provided the outlets are designed for construction activities and are later modified for post construction activities upon completion of construction and final stabilization of disturbed soils. Such permanent detention facilities or post construction water quality BMP's shall be restored to design grades, volumes, and configurations after site development is completed and the project is finalized. The outlet from a sediment basin shall be designed to empty its volume in no less than 16 hours; namely, to have an average outflow rate of 28.0 gallons/minute/tributary acre, or less. The basin length shall be no less than twice the basin width, or shall be designed in such a manner that suspended solids will settle out of suspension in an equivalent fashion. The inflow structures at the entrance of the basin shall be designed to dissipate inflow energy and to spread the flow so as to achieve uniform flow throughout the basin's width. The gravel and rip rap horseshoe sediment basin should be utilized when drainage culverts are already in place prior to site construction activities since existing culverts and roadway fill sections readily afford sediment storage area.

If sediment basins are incorporated into the *Erosion and Sediment Control Plan*, provide the following information in the plan to provide necessary guidance for the contractor:

- Delineate the tributary drainage area to each sediment basin on the erosion control plan.
- Sediment volume required and provided.
- Length, width, and depth of the basin.
- For sediment basins, give the top elevation of the berm, and length, and elevation for the overflow assembly. The outlet structure size and invert elevations will also be provided.

For drainage locations serving less than ten (10) acres, a sediment basin or a combination of sediment basin(s) and sediment traps providing storage for 3,600 cubic feet of storage per acre drained may be required along with silt fences, silt ditches, or equivalent sediment controls on all sideslope and downslope boundaries of the construction area.

12.3.3.5 Silt Ditch. A silt ditch is constructed by excavating a small channel along and parallel to the existing contours of the land. Silt ditch can be placed as a temporary barrier at the base of a disturbed area but is not recommended for use in a channel or swale. Silt ditch shall be designed to a minimum 3,600 cubic feet of volume per tributary acre. The berm constructed on the downstream side of the excavated channel shall be seeded and mulched immediately after construction.

12.3.3.6 Sediment Control Wattles. A sediment control wattle is used to provide a flexible, lightweight, and porous sediment entrapment device. It is typically manufactured of a straw and coconut matrix, is 6–20 inches in diameter and is 10 feet long. The wattle is staked into the ground. Sediment control wattles are useful for control sediment transport in ditch bottoms, swales, and waterways. The wattles may be used in lieu of, or in conjunction with silt fence, rock check dams, or silt ditch. Refer to Table 12.4 for wattle spacing criteria.

12.4 Drainageway Protection

At times, construction activities must occur adjacent to or within a drainageway. Whenever this occurs, bottom sediments will be disturbed and transported downstream to minimize the movement of sediments resulting from construction activities that take place within any drainageway. Temporary facilities can be installed to divert flowing water around such sediment-generating construction activities within drainageways.

12.4.1 Working Within or Crossing a Waterway

Whenever work occurs within a waterway, the following shall be considered as appropriate:

1. Construction vehicles shall be kept out of a waterway to the maximum extent practicable. Where in-channel work is necessary, steps, such as temporary channel diversions, shall be taken to stabilize the work area during construction to control erosion. The channel (including bed and banks) shall be restabilized immediately after in-channel work is completed.

2. Where an actively-flowing watercourse must be crossed regularly by construction vehicles, a temporary crossing shall be provided. Two primary methods are available: a culverted crossing and a stream ford.

   A culverted crossing shall be designed to pass the two-year design flow. A ford shall be lined with a minimum 6-inch thick layer of 1.5-inch diameter rock. A permit is required for placement of fill in a waterway under Section 404 of the Clean Water Act. The Corps of Engineers office in Pierre, South Dakota, shall be contacted about the requirements for obtaining a 404 permit.

3. Whenever feasible, a temporary channel diversion (see Section 12.4.2) shall be used to bypass the work areas when work takes place within a channel.

4. Whenever possible, construction in a waterway shall be sequenced to begin at the most downstream point and work progressively upstream installing required channel and grade control facilities.

5. Complete work in small segments, exposing as little of the channel at a time as possible.

6. Where possible, perform all in-channel work between September 15 and April 15.

12.4.2 Temporary Channel Diversions

Limiting construction activities within actively-flowing water will significantly reduce sediment movement downstream from these activities. This can be done by using a temporary diversion facility that carries water around construction activities taking place within a waterway.

Permanent drainage channels shall be constructed at the earliest possible stage of development. Temporary channel diversions shall not remain in place for more than two years prior to removal or replacement by permanent facilities.

12.4.2.1 Stability Considerations. Temporary channels are not likely to be in service long enough to establish adequate vegetative lining. Temporary channel diversions must be designed to be stable for the design flow with the channel shear stress less than the critical tractive shear stress for the channel lining material. Unlined channels shall not be used unless it can be demonstrated that an unlined channel will not erode during the design flow. Design procedures for temporary channels are described in detail in the Hydraulic Engineering Circular No. 15 published by the Federal Highway Administration.

12.4.3 Outlet Protection

The outlets of slope drains, culverts, sediment traps, and sediment basins shall be protected from erosion and scour. Outlet protection shall be provided where the velocity of flow will exceed the maximum permissible velocity of the material where discharge occurs. This may require the use of a riprap apron at the outlet location.

Check dams can be used in ditches or swales and downstream of the outlets of temporary slope drains, culverts, sediment traps, and sediment basins. Check dams reduce the velocity of concentrated flows and trap sediment eroded from the upstream ditch or swale. They are not a primary sediment trapping facility and are a temporary flow-control structure.

Check dams may be used under the following conditions:

1. In temporary or permanent swales that need protection during the establishment of grasses;
2. In permanent swales that need protection prior to installation of a non-erodible lining;
3. In temporary ditches or swales that need protection where construction of a non-erodible lining is not practicable.

Check dams shall be constructed of 4- to 6-inch angular rock to a maximum height of 2 feet. The center of the top of the dam shall be 6 inches lower than the sides to concentrate the flow to the channel center. Where multiple check dams are used, the top of the lower dam shall be at the same topographical elevation as the toe of the upper dam.

Sediment that collects behind a check dam shall be removed when the sediment reaches the spillway level. Check dams constructed in permanent swales shall be removed when perennial grasses have become established, or immediately prior to installation of a non-erodible lining. All of the rock and accumulated sediment shall be removed, and the area seeded and mulched, or otherwise stabilized.

12.4.4 Inlet Protection

All storm sewer inlets that are made operable during construction shall be protected to prevent sediment-laden runoff from entering the conveyance system without first being filtered or otherwise treated to remove sediment.

Inlets may be temporarily blocked to prevent sediment-laden runoff from entering storm sewers. Inlet protection measures shall be removed after upstream disturbed areas are stabilized.

Caution must be used in temporarily blocking inlets to assure that localized flooding conditions do not develop.

Inlet protection shall be removed from storm sewer inlets within paved street sections or parking lots during the winter months between December 1 and February 15. The City may require removals earlier than December 1 or installations later than February 15 by publishing a notice on the City's website, www.huronsd.com. During the period when inlet protection has been removed, alternate sediment control methods for inlet protection must be employed if ground is not stabilized and frozen by winter conditions.

12.5 Underground Utility Construction

The construction of underground utility lines that are not exempted (see Section 12.1.1.1.e) shall be subject to the following criteria:

1. No more than 300 feet of trench are to be opened at one time.

2. Where consistent with safety and space considerations, excavated material is to be placed on the uphill side of trenches.

3. Trench dewatering devices shall discharge in a manner that will not adversely affect flowing streams, wetlands, drainage systems, or offsite from the property. Site dewatering permit requirements shall be discussed with the South Dakota Department of Environment and Natural Resources.

4. Provide storm sewer inlet protection (see Section 12.4.4) whenever soil erosion from the excavated material has the potential for entering the storm drainage system.

12.6 Disposition of Temporary Measures

All temporary erosion and sediment control measures shall be removed and disposed within 30 days after final stabilization is achieved.

Temporary erosion and sediment control measures may be removed early in the following situations in accordance with an accepted *Erosion and Sediment Control Plan* (ESCP):

1. Alternative to final stabilization for a subdivision or larger common plan of development or sale that is in compliance with Minor Impact Construction Site (MICS) ordinance and standards.

2. Subdivision or larger common plan of development or sale where all planned individual lot development sites are greater than one acre and the following conditions are met:
    a. All soil disturbance activity for major grading activities has been completed.
    b. Disturbed areas have been stabilized with permanent vegetation.
    c. Notice of stabilization form shall be used when transferring property to new owner.
    d. Each lot development shall obtain and maintain its own ESCP and permits.

3. Written authorization by the Office of the City Engineer.

Trapped sediment and disturbed soil areas resulting from the disposal of temporary measures shall be returned to final plan grades and permanently stabilized to prevent further soil erosion.

The professional engineer preparing the *Erosion and Sediment Control Plan* shall submit, as part of the narrative report, a schedule of removal dates for temporary control measures. The schedule shall be consistent with key construction items such as street paving, final stabilization of disturbed areas, or installation of structural storm water controls.

12.7 Maintenance

All temporary and permanent erosion and sediment control practices shall be maintained and repaired by the responsible party during the construction phase as needed to assure continued performance of their intended function. Silt fences and wattles may require periodic replacement and all sediment accumulated behind them shall be removed and disposed of properly. Sediment traps and basins will require periodic sediment removal when the design storage level is half full. All facilities shall be inspected in accordance with Section 12.9 by the responsible party or their representative.

As part of the narrative report, the professional engineer preparing the *Erosion and Sediment Control Plan* shall submit a schedule of planned maintenance activities for temporary and permanent erosion and sediment control measures. The schedule shall be consistent with the level of maintenance required for the control measures proposed in the plan.

12.8 Pollution Prevention Using Nonstructural BMPs

Nonstructural BMPs are to be a part of construction activities.

12.8.1 Objectives in the Use of Nonstructural BMPs

Nonstructural BMPs differ from the structural BMPs because nonstructural BMPs focus on activities rather than physical structures to control water quality. Because they rely on actions and not structures, nonstructural BMPs must be implemented constantly and repetitively over time. There are two main objectives of using nonstructural BMPs. These are:

1. Reduce or eliminate the pollutants that impact water quality at their source, thus reducing the need for structural control requirements. The use of nonstructural BMP practices may assist structural BMP efficiency and may eliminate the need for additional storm water treatment.

2. Address water quality concerns that are not considered cost-effective by structural controls such as implementing a spill prevention and containment program.

12.8.2 Nonstructural BMP Effectiveness

To be effective, nonstructural BMPs need to prevent or reduce the sources of storm water pollution. They fall into the general categories of prevention and source controls. The objectives for promoting the use of nonstructural BMPs are as follows:

1. Improve the quality of receiving waters.
2. Increase consistency with storm water quality objectives.
3. Increase consistency with structural BMPs.
4. Improve cost-effectiveness.
5. Widespread applicability in all urban areas.
6. Widespread public acceptance.

12.8.3 Pollutant Removal Mechanisms

Nonstructural BMPs can, to some degree, prevent the deposition of pollutants on the urban landscape or remove pollutants at their source. The source of pollutants for assimilation into storm water is the land surface itself, especially the impervious surfaces in the urban area. Thus, it is expected that when nonstructural measures

are effectively implemented, they will reduce the amount of pollutants being deposited on land surfaces for eventual contact with storm water and transported to the receiving water system.

12.8.4 Selection of Appropriate Nonstructural BMPs

Development projects shall include nonstructural BMPs as listed in Table 12-5.

12.8.5 Good Housekeeping

12.8.5.1 Descriptions. Good housekeeping requires keeping potential areas where pollutants exist clean and orderly.

12.8.5.2 Application. Good housekeeping practices are designed to maintain a clean and orderly work environment. The most effective first steps towards preventing pollution in storm water from work sites simply involves using good common sense to improve the facility's basic housekeeping methods. Some simple procedures a site can use to promote good housekeeping are improved operation and maintenance of machinery and processes, material storage practices, material inventory controls, routine and regular cleanup schedules, maintaining well organized work areas, signage, and educational programs for employees and the general public about all of these practices.

12.8.5.3 Contact Information Display Requirement. The permittee shall post a 24-hour, 7 days-a-week sign with the contractor contact name and contractor phone number readily visible at the development site entrance. A City of Huron approved 24-hour contact number to register complaints must also be included on the sign. The contact information shall be clearly readable, securely anchored, and appropriately weatherproofed to assure its integrity throughout construction. The following or similar format shall be used:

1. To report an erosion, sediment, spill, or other problem at this construction site to the responsible contractor call:

   Contractor Name
   Contractor Phone

   To register a compliant about this construction site to the City of Huron call:

   Approved City of Huron Contact Number

12.8.5.4 Implementation. These BMPs are applicable to the following areas: operation and maintenance, material storage, material inventory, and training and participation.

***12.8.5.4.1 Operation and Maintenance*.** To assure that equipment and work related processes are working well, the following practices can be implemented:

1. Maintain dry and clean floors and ground surfaces by using brooms, shovels, vacuum cleaners, or cleaning machines rather than wet cleanup methods.

2. Regularly pick up and dispose of garbage and waste material.

3. Make sure all equipment and related processes are working properly and preventative maintenance is kept up with on both.

4. Routinely inspect equipment and processes for leaks or conditions that could lead to discharges of chemicals or contact of storm water with raw materials, intermediate materials, waste materials, or products used on site.

5. Assure all spill cleanup procedures are understood by employees. Training of employees on proper cleanup procedures shall be implemented.

6. Designate separate areas of the site for auto parking, vehicle refueling, and routine maintenance.

7. Clean up leaks, drips, and other spills immediately.

8. Cover and maintain dumpsters and waste receptacles.

12.8.5.4.2 Material Storage Practices. Improperly storing material on site can lead to the release of materials and chemicals that can cause storm water runoff pollution. Proper storage techniques include the following:

1. Provide adequate aisle space to facilitate material transfer and ease of access for inspection.

2. Store containers, drums, and bags away from direct traffic routes to prevent accidental spills.

3. Stack containers according to manufacturer's instructions to avoid damaging the containers from improper weight distribution.

4. Store containers on pallets or similar devices to prevent corrosion of containers that results from containers coming in contact with moisture on the ground.

5. Store toxic or hazardous liquids within curbed areas or secondary containers.

6. Assign responsibility of hazardous material inventory to a limited number of people who are trained to handle such materials.

12.8.5.4.3 Material Inventory Practices. An up-to-date inventory kept on all materials (both hazardous and nonhazardous) present on site will help track how materials are stored and handled onsite, and identify which materials and activities pose the most risk to the environment. The following description provides the basic steps in completing a material inventory:

1. Identify all chemical substances present at work site. Perform a walk-through of the site, review purchase orders, list all chemical substances used, and obtain Material Safety Data Sheets (MSDS) for all chemicals.

2. Label all containers. Labels shall provide name and type of substance, stock number, expiration date, health hazards, handling suggestions, and first aid information. This information can also be found on an MSDS.

3. Clearly mark on the hazardous materials inventory which chemicals require special handling, storage, use, and disposal considerations. Decisions on the amounts of hazardous materials that are stored on site shall include an evaluation of any emergency control systems that are in place. All storage areas shall be designed to contain any spills.

12.8.5.4.4 Training and Participation. Frequent and proper training in good housekeeping techniques reduces the possibility of chemicals or equipment that will be mishandled. Reducing waste generation is another important pollution prevention technique. The following are ways to get people involved in good housekeeping practices:

1. Provide information sessions on good housekeeping practices in training programs.

2. Discuss good housekeeping at meetings.

3. Publicize pollution prevention concepts through posters or signs.

12.8.6 Spill Prevention and Response

12.8.6.1 Primary Users. Facilities with fluids such as fuel, paints, and other liquids both hazardous and nonhazardous.

12.8.6.2 Description and Application. This BMP includes measures to be taken to assure that spills do not result in water quality impacts. Spills and leaks together are one of the largest sources of storm water pollutants, and in most cases are avoidable.

12.8.6.3 Implementation.

12.8.6.3.1 Spill Prevention Measures. The following preventative strategies are recommended where fluids are commonly present:

1. Identify all equipment that may be exposed to storm water, pollutants that may be generated, and possible sources of leaks or discharges.

2. Perform regular maintenance of each piece of equipment to check for: proper operation, leaks, malfunctions, and evidence of leaks or discharge (stains). Develop a procedure for spill reporting, cleanup, and repair.

3. Drain or replace motor oil or other automotive fluids in an area away from streams or storm or sanitary sewer inlets. Collect spent fluids and recycle or dispose of properly.

4. In fueling areas, clean up spills with dry cleanup methods (absorbents), and use damp cloths on gas pumps and damp mops on floors instead of a hose.

An important part of spill prevention is employee training. Make sure employees are trained in spill prevention practices and adhere to them.

The best way to prevent pollutants from entering the storm drains is to prevent storm water from contacting equipment or surfaces that may have oil, grease, or other pollutants. Some good activities to help prevent negative impacts on storm water quality include:

1. Properly dispose of storm water that has collected in containment areas (may need permit if contaminated).

2. Adopt effective housekeeping practices.

3. Assure adequate security to prevent vandalism.

12.8.7 Identification of Spill Areas

It is important to identify potential spill areas and their drainage points to determine preventative measures and spill response actions. Areas and activities that are most vulnerable to spills include transportation facilities where vehicle spills could be a problem:

1. Loading and unloading areas
2. Storage areas
3. Process activities
4. Dust or particulate generating processes

5. Waste disposal activities

In addition to these areas, evaluate spill potential in other areas (access roads, parking lots, power generating facilities, etc.). It is also important to estimate the possible spill volume and drainage paths.

12.8.8 Material Handling Procedures

Outdoor materials handling procedures include:

1. For permanent and long-term (greater than three months) storage, keep bulk solid materials (including raw materials, sand, gravel, topsoil, compost, concrete, packing materials, and metal products) covered or protected from storm water.

2. Isolate and consolidate bulk materials from storm water runoff by providing berms or other means to keep the material from migrating into drainage systems.

3. When possible, store materials such as salt, hazardous materials, and other materials prone to leaching when exposed to storm water on a paved surface.

4. Locate material storage areas away from storm drains, ponds, and drainageways.

5. Hazardous materials must be stored according to federal, state, and local HazMat requirements.

6. Adopt procedures that reduce the chance of spills or leaks during filling or transfer of materials.

7. Substitute less or nontoxic materials for toxic materials.

12.8.9 Spill Response Procedures and Equipment.

1. Wipe up small spills with a shop rag, store shop rags in covered rag container, and dispose of properly (or take to professional cleaning service and inform them of the materials on the rag).

2. Contain medium-sized spills with absorbents (kitty litter, sawdust, etc.) and use inflatable berms or absorbent rolls or “snakes” as temporary booms for the spill. Store and dispose of absorbents properly. Wet/dry vacuums may also be used, but not for volatile fluids.

3. For large spills, first contain the spill and plug storm drain inlets where the liquid may migrate offsite, then clean up the spill. Contact appropriate emergency response agency according to state and local requirements.

12.8.9.1 Spill Plan Development. A Spill Prevention Plan identifies areas where spills can occur on site, specifies materials handling procedures, storage requirements, and identifies spill cleanup procedures. The purpose of this plan is to establish standard operating procedures, and the necessary employee training to minimize the likelihood of accidental releases of pollutants that can contaminate storm water runoff.

Storm water contamination assessment, flow diversion, record keeping, internal reporting, employee training, and preventative maintenance are associated BMPs that can be incorporated into a comprehensive Spill Prevention Plan.

A Spill Prevention Plan is applicable to facilities that transport, transfer, and store hazardous materials, petroleum products, and fertilizers that can contaminate storm water runoff.

Emergency spill cleanup plans shall include the following information:

1. A description of the facility including the nature of the facility activity and general types and quantities of chemicals stored at the facility.

2. A site plan showing the location of storage areas of chemicals, the location of storm drains, site drainage patterns, firefighting equipment and water source locations, and the location and description of any devices used to contain spills such as positive control valves.

3. Notification procedures to be implemented in the event of a spill such as phone numbers of key personnel and appropriate regulatory agencies.

4. Instructions regarding cleanup procedures.

5. Designated personnel with overall spill response cleanup responsibility.

6. Quick notification of Huron Fire and Rescue for spills that cannot be handled by local site staff.

A summary of the plan shall be written and posted at appropriate points identifying the spill cleanup coordinators, location of cleanup kits, and phone numbers of regulatory agencies to be contacted in the event of a spill. Cleanup of spills shall begin immediately. No emulsifier or dispersant shall be used. In fueling areas, absorbent shall be packaged in small bags for easy use and small drums shall be available for storage of absorbent and/or used absorbent. Absorbent materials shall not be washed down the floor drain or into the storm sewer.

Emergency spill containment and cleanup kits shall be located at the facility site. The contents of the kit shall be appropriate to the type and quantities of chemicals or goods stored at the facility.

The following procedures shall be followed when implementing an emergency spill cleanup plan:

1. Key personnel shall receive formal training in plan execution with additional training to the people who are likely to be the first on the site. All employees shall have a basic knowledge of spill control procedures.

2. A plan summary shall be posted at appropriate site locations. The summary shall include the identification of the spill cleanup coordinators, location of cleanup equipment, and phone numbers of site personnel and regulatory agencies to be contacted in the event of a spill.

3. Perform the following notifications in the event of a spill or release of a chemical or controlled substance in accordance with federal, state and local requirements:

    a. Beadle County Dispatch (911)
    b. Huron Engineering Department
    c. State and federal agencies as required by the material

4. Containment and cleanup of any spills shall begin immediately.

5. Absorbents shall be readily used in fueling areas.

6. An inventory of cleanup materials shall be maintained on site and strategically deployed based on the type and quantities of chemicals present.

12.8.9.2 Advantages and Disadvantages. Table 12.6 lists the advantages and disadvantages of different BMPs for spills.

12.9 Inspections

The permittee shall assure that qualified personnel inspect the site at least once every seven calendar days and within 24 hours of the end of a storm that is 0.5 inch or greater or snow melt event that cause surface erosion to confirm plan compliance. Where runoff is unlikely due to winter conditions, such inspections shall be conducted at least once per month. Based on the results of the inspection, the plan shall be revised and implemented, in no case later than seven calendar days following the inspection.

The inspection shall look for evidence of or the potential for pollutants entering the drainage system or leaving the site and shall include disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials, structural and nonstructural control measures, and locations where vehicles enter or exit the site.

A report summarizing the areas inspected, name(s) and title(s) of personnel making the inspection, the date(s) of the inspection, major observations, and corrective actions taken shall be made and retained as part of the plan for a least three years. Such reports shall identify any incidents of noncompliance. Where an inspection does not identify any incidents of noncompliance, the report shall contain a certification that the site is in compliance with the plan and permit. The report shall be dated and signed by the responsible party or their authorized representative. At least the last two inspection reports shall be made available to the City inspector at the time of any regulatory inspection of the construction site.

Compliance documentation is the responsibility of the Owner/Developer/Contractor as identified in Section 12.1.3.1.

12.10 Construction Control Measures.

12.10.1 Concrete Washout Facility

Concrete washout facilities (CWF) shall be constructed during any period of planned development where concrete is being used and allowed to be disposed of on site.

1. CWF should be located a minimum of 50 feet from storm drain inlets, drainage ways, and water bodies.
2. The use of a vehicle tracking control in conjunction with concrete washout area is required unless the concrete washout area is protected by the site's vehicle tracking control.
3. When CWF are no longer required for the work, the hardened concrete and materials used to construct the CWF should be removed and disposed of.
4. Holes, depressions, or other ground disturbance caused by the removal of the temporary CWF should be backfilled, repaired, and stabilized.

12.10.2 Limits of Construction

Plan shall clearly delineate allowable limits of disturbance for each phase of construction. Limits of construction are designed to delineate construction site perimeters, protect and preserve stabilized areas, drainageways, regulated water bodies (wetlands), environmental sensitive areas, historical areas, erosion and sediment control measures, and other resources.

12.11 Final Stabilization

All erosion and sediment control measures accepted in the *Erosion and Sediment Control Plan* must be maintained until final stabilization is reached which means that either:

1. All planned soil disturbing activities at the site have been completed and a uniform perennial vegetative cover with a density of 70 percent of the native cover or an equivalent permanent stabilization measure has been employed on any pervious areas of the site; or

2. A specific alternative to final stabilization as described in this chapter; or

3. A specific alternative approved by the S.D. DENR general permit for storm water discharges associated with construction activities.

Appendix

Example of Narrative Report can be found in Standard Plates Section 734.

Glossary of Terms

Erodibility: The susceptibility of a particular soil type to erosion by water or wind.

Erosion: The wearing away of the land surface by water, wind, ice, or other geological agents, including the detachment and movement of soil or rock fragments by water, wind, ice, or gravity.

Erosion Control Measures: Practices that slow or stop erosion.

Final Stabilization: All planned soil disturbing activities at the site have been completed, and a uniform perennial vegetative cover with a density of 70 percent of the native cover or an equivalent permanent stabilization measure has been employed on any pervious areas of the site

Land Disturbing Activity: Grading, cut, fill, stockpiling of dirt, removal of vegetation, or any other alteration or disturbance of the ambient land surface.

Mapping Unit: Soil name and symbol given in the Soil Conservation Service Soil Survey for each soil type.

Permanent: Installation of land-surface cover, or erosion and sediment control measures that will remain in place for a long period of time.

Sedimentation: The process of solid materials, both inorganic (mineral) and organic, coming to rest on the earth's surface either above or below sea level.

Sediment: Particulate solid material, either inorganic or organic, that will settle or be deposited in a liquid under the force of gravity.

Sediment Barrier: Silt fence or wattle.

Sediment Basin: A depression, either excavated or formed by a dam, that holds water and debris and facilitates sedimentation of soil particles. Normally used for drainage areas equal to and greater than 5.0 acres.

Sediment Trap: A small depression that holds water and debris and facilitates sedimentation. Normally used for drainage areas less than 5.0 acres.

Temporary: Installation of erosion or sediment control measures, either structural or nonstructural, that are planned to be removed or inactivated after a period of time.

Viable Vegetative Cover: Vegetation is not considered established until a uniform vegetative ground cover with a density of at least 70 percent is achieved, or which, in the opinion of the City, is sufficiently mature to control soil erosion and can survive severe weather conditions.

General Criteria 1 and 2.

GC-1 Stabilization of Disturbed Areas and Soil Stockpiles

A. Permanent or temporary soil stabilization shall be applied within 14 days to disturbed areas that will remain undisturbed for a period longer than 21 days or have reached final grade. Soil stabilization refers to measures which protect soil from erosive forces of raindrop impact, flowing water, and wind. Applicable practices include vegetative establishment, mulching, and early application of gravel base on areas to be paved. Soil stabilization measures selected shall be appropriate for the time of year, site conditions, and estimated duration of use.

B. Soil stockpiles shall be established or protected with sediment-trapping measures to prevent soil loss.

GC-2 Establishment of Permanent Vegetation

A permanent vegetative cover must be established on denuded areas not otherwise permanently stabilized. Permanent vegetation is not to be considered established until it has a viable vegetative cover.

Will construction be absent two years or more?	**No**	Protect with 12.2.3.2 Temporary Revegetation, or 12.2.2 Mulching
Yes		
See 12.2.3.3 Permanent Revegetation		

Is a seed mix available for the time of year seeding will take place?	**No**	Protect with 12.2.2 Mulching or 12.2.3.2 Temporary Revegetation until permanent seeding date.
Yes		
Seed according to Table 12.3 Perennial Grasses		

Are slopes 3:1 or greater?	**No**	Mulch according to 12.2.2.
Yes		
Consider use of blanket mulch in 12.2.2 Mulching, for critical areas.		

Table 12.1
Maximum Time Limits of Land Exposures for Selection of Erosion Controls

Erosion Control Method	Maximum Allowable Period of Exposure (Months)
Surface Roughening *	1
Mulching	12
Temporary Revegetation	12–24
Permanent Revegetation	24 or more
Soil Stockpile Revegetation	2
Early Application of Road Base	1

* The surface-roughening erosion control method may be extended up to the maximum of three months on a case-by-case basis if the City has determined that the site demonstrates the following:

- Appropriate soil conditions exist for this method of control.
- Disturbed areas will be seeded and mulched within three months.
- Seasonal planting limitations exist.
- Soil stabilization method has demonstrated its effectiveness.

Table 12.2
Minimum Drill Seeding Rates for Annual Grasses[a]

Species	Growth Season	Pounds of Pure Live Seed (PLS)/acre[b]
Annual ryegrass	Cool	20
Cereal rye	Cool	30
Winter wheat/barley	Cool	30
Spring wheat/barley	Cool	30
Millet	Warm	20
Oats		60

[a] Successful seeding of annual grass resulting in adequate plant growth will usually produce enough dead-plant material residue to provide protection from wind and water erosion for an additional year. This assumes that the cover is not disturbed or mowed closer than 8 inches.

Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1 or where access limitations exist. When hydraulic seeding is used, hydraulic mulching shall be done as a separate operation to prevent the seeds from being encapsulated in the mulch.

[b] Seeding rates shall be increased by 50 percent if seeding is done by hydraulic seeding or using a Brillion Drill; or doubled if seed is broadcast.

If irrigation water is available and applied in an appropriate manner, seeding dates for annual grasses can be extended throughout most of the growing season.

Table 12.3 Minimum Drill Seeding Rates for Perennial Grasses[a]	
	Pounds of PLS/acre
Alkali Soil Seed Mix	
Alkar tall wheatgrass	28.0
	Total: 28.0
Fertile Loamy Soil Seed Mix	
Option 1	
Lincoln smooth brome	4.0
Bonilla big bluestem	4.0
Forestburg switchgrass	2.0
Pierre sideoats grama	4.0
	Total: 14.0
Option 2	
Matua bromegrass	4.0
Western wheatgrass	4.0
Forestburg switchgrass	2.0
Pierre sideoats grama	4.0
	Total: 14.0
High Water Table Soil Seed Mix	
Option 1	
Garrison creeping foxtail	1.0
Reed canarygrass	1.0
Lincoln smooth brome	3.0
Forestburg switchgrass	1.0
Alkar tall wheatgrass	5.5
	Total: 11.50
Option 2	
Garrison creeping foxtail	5.75
Reed canarygrass	5.75
	Total: 11.50

Table 12.3 Minimum Drill Seeding Rates for Perennial Grasses[a]	
	Pounds of PLS/acre
Transition Turf Seed Mix[b]	
Option 1	
Kentucky bluegrass	0.5
Durar hard fescue	1.0
Perennial ryegrass	3.0
Lincoln smooth brome	3.0
	Total: 7.5
Option 2	
Kentucky bluegrass	1.0
Seville perennial ryegrass	3.5
Matua bromegrass	3.0
	Total: 7.5
Sandy Soil Seed Mix	
Option 1	
Bonilla big bluestem	3.0
Pierre sideoats grama	3.0
Lincoln smooth brome	4.0
Forestburg switchgrass	1.0
Indian grass	1.0
	Total: 12.0
Option 2	
Pennlawn red fescue	6.0
Hard fescue	3.0
Chewings fescue	3.0
	Total: 12.0
Heavy Clay, Rocky Foothill Seed Mix	
Option 1	
Alkar tall wheatgrass	9.0
Pierre sideoats grama	4.0
Lincoln smooth brome	5.0
	Total: 18.0

Table 12.3

Minimum Drill Seeding Rates for Perennial Grasses[a]

	Pounds of PLS/acre
Option 2	
Alkar tall wheatgrass	9.0
Pierre sideoats grama	4.0
Matua bromegrass	5.0
	Total: 18.0

Footnotes:

[a] All of the above seeding mixes and rates are based on drill seeding followed by crimped hay or straw mulch. These rates shall be doubled if seed is broadcast and shall be increased by 50 percent if the seeding is done using a Brillion Drill or is applied through hydraulic seeding. Hydraulic seeding may be substituted for drilling only where slopes are steeper than 3:1. If hydraulic seeding is used, hydraulic mulching shall be done as a separate operation.

[b] If the site is to be irrigated, the transition turf seed rates shall be doubled.

Notes:

To provide temporary erosion control between the seeding dates, use surface roughening (on the contour or perpendicular to prevailing winds) and apply a mulch as specified above.

Perennial grasses can be seeded using a drill seeder in areas previously planted with a temporary grass cover. In this case, the annual grass may need to be mowed before perennial grasses are seeded. Broadcast seeding or hydroseeding shall not be done on areas that have a live crop of annual grasses without first reworking and preparing the topsoil.

Seeding options are to be identified on the plan drawings.

Table 12.4
Sediment Entrapment Facility Limitations

Sediment Control Facility	Allowable Maximum Limit		
	Tributary Drainage Areas (ac)	**Tributary Slope Length (ft)**	**Tributary Slope Gradient**
Sod Filter Strips	n/a	50	6:1 (17%)
Wattles	n/a	100	<4:1 (25%)
		40	4:1 (25%)
		30	3:1 (33%)
		20	2:1 (50%)
		10	1:1 (100%)
Silt Fence	**0.5 per 100 lineal ft	200	2:1 (50%)
Silt Ditch	*0.5 per 100 lineal ft	n/a	n/a
Sediment Trap	5.0	n/a	n/a
Sediment Basin	n/a	n/a	n/a

*The loading to the silt ditch may be increased if the typical section is greater than 2 feet in depth and 5-foot bottom width. Refer to standard plate 734.22.

**No silt fence shall be constructed in live streams or in swales or ditch lines where flows are likely to exceed 1.0 cfs for a 2-year return storm event.

Table 12.5
Nonstructural BMP Requirements for Various Projects

Nonstructural BMP	Project Description and Requirement
Good Housekeeping	Required for all projects.
Spill Prevention and Response	Small projects with nonreportable quantities of hazardous materials: select BMPs as appropriate. Medium sized projects with nonreportable quantities of hazardous materials: selected BMPs as appropriate; spill prevention plan reviewed on case by case basis. Reportable quantities of hazardous materials or large projects: spill prevention plan required.

Table 12.6 Advantages and Disadvantages of BMPs for Spill Prevention and Response BMPs
Best Management Practice Advantages Disadvantages
Drip Pans. Pans used to contain small volumes of leaks. Inexpensive; simple installation and operation; possible reuse/recycle of material; empty/discarded containers can be used as drip pans. Small volumes; inspected and cleaned frequently; must be secured during poor weather conditions, and personnel must be trained in proper disposal methods.
Covering. Enclosure of outdoor materials, equipment, containers, or processes. Simple and effective; usually inexpensive. Frequent inspection, possible health/safety problems if built over certain activities, large structures can be expensive.
Vehicle Positioning. Locating trucks or rail cars to prevent spills during transfer of materials. Inexpensive, easy, effective. May require redesign of loading and unloading areas, requires signage to designated areas.
Loading/Unloading by Air
Pressure or Vacuum. For transfer of dry chemicals or solids. Quick and simple; economical if materials can be recovered; minimize exposure of pollutants to storm water. Costly to install and maintain; may be inappropriate for denser materials, site-specific design; dust collectors may need permit under Clean Air Act.
Sweeping. With brooms to remove small quantities of dry chemicals/solids exposed to precipitation. Inexpensive, no special training; recycling opportunities. Labor-intensive; limited to small releases of dry materials, requires disposal to solid waste container.
Shoveling. For removal of large quantities of dry materials, wet solids and sludge. Inexpensive; recycling opportunities, remediate larger releases; wet and dry releases. Labor-intensive; not appropriate for large spills, requires backfill of excavated areas to maintain grade.
Excavation. By plow or backhoe for large releases of dry material and contaminated areas. Cost-effective for cleaning up dry materials release; common and simple. Less precise, less recycling and reuse opportunities, may require imported material for backfill.
Dust Control (Industrial). Water spraying, negative pressure systems, collector systems, filter systems, street sweeping. May reduce respiratory problems in employees around the site; may cause less loss of material and save money; efficient collection of larger dust particles. More expensive than manual systems; difficult to maintain by plant personnel; labor and equipment intensive; street sweepers may not be effective for all pollutants.
Signs and Labels. Inexpensive and easily used. Must be updated/maintained so they are legible, subject to vandalism and loss.

Table 12.6 Advantages and Disadvantages of BMPs for Spill Prevention and Response BMPs
Security. To prevent accidental or intentional release of materials. Preventative safeguard; easier detection of vandals, thieves, spills, leaks, releases; prevents spills with better lighting, no unauthorized access to facility. May not be feasible for smaller facilities; may be costly; may increase energy costs due to increased lighting; dispersed locations require individuals enclosures, requires maintenance.
Area Control Measures. Good housekeeping measures, brushing off clothing before leaving area, etc. Easy to implement; results in cleaner facility and improved work environment. May be seen as tedious by employees and may not be followed.
Preservation of Natural Vegetation
Can handle more storm water runoff than newly seeded areas; effective immediately; increases filter capacity; enhances aesthetics; provides areas for infiltration; wildlife can remain undisturbed; provides noise buffers; less maintenance than new vegetation. Planning required to preserve and maintain existing vegetation; may not be cost-effective with high land costs; may constrict area available for construction activities, may require signage or fencing, subject to disturbance.
Temporary Seeding. Short-term vegetative cover on disturbed areas. Inexpensive and easy to do; establishes plant cover quickly in good conditions; stabilizes soils well; aesthetic; sedimentation controls for other site areas; helps reduce maintenance costs of other controls. Requires soil preparation, may require mulching or reseeding of failed areas, seasonally limited, may require signage or fencing, subject to disturbance.