

ENGINEERING DESIGN GUIDELINES

SECTION 7– POLLUTION CONTROL

DG7.0

GENERAL

- A. The purpose of this section is to provide a resource document and policy to protect land and water resources from the adverse effects of erosion and sedimentation and to promote compliance with the City of Pflugerville's Municipal Separate Storm Sewer System (MS4) Phase II permit. Additionally, the criteria have been fashioned to complement the language of the Texas Pollution Discharge Elimination System (TPDES) General Permit (TXR150000).
- B. The conversion of land from its natural state or agricultural use to urban use can accelerate the processes of erosion and sedimentation. These accelerated processes can negatively impact natural resources such as drinking water supply, aquatic life, floodplain capacity, natural beauty, and recreational resources. As additional development and urban growth takes place in the City of Pflugerville, the City's natural resources will experience accelerated degradation if erosion and sedimentation is not properly controlled. The protection of these natural resources is easier and less expensive than their restoration.
- C. Construction activities that discharge storm water runoff into or adjacent to any surface water of the state are regulated by the State of Texas under the Construction General Permit (CGP) (TXR150000). The governing agency is the Texas Commission on Environmental Quality (TCEQ). Construction related sediment is a significant pollutant of streams, lakes, ponds and reservoirs. Sedimentation can also carry pesticides, phosphates and many other chemical pollutants which can be carried to the waterway and reduce the quality of water.
- D. Erosion can be quite destructive and can threaten property, roads, utilities, infrastructure, and structures. During most development/construction projects, the major period for erosion potential exists between the time of existing vegetation removal at commencement of site work and the time of construction completion or final revegetation. There are numerous activities associated with construction and land development that accelerate the rate of erosion. Virtually all of these activities involve the removal of vegetation and/or disturbance of the native geologic structure. Appropriate planning and implementation of these activities and preventative measures will reduce the adverse impact upon the site and the environment in general. Construction activities are regulated according to the area of land disturbed.

- E. The erosion and sediment best management practices (BMPs) included in Appendix A (BMP Technical Specifications) provide several methods to address the dual problems of erosion and sedimentation, they are in no way an exhaustive list of possible actions; and alternative site specific methods may be required to adequately control the problems. The City shall approve BMPs not included in the manual prior to their use.

DG7.1

EROSION AND SEDIMENT CONTROL POLICY

- A. The City of Pflugerville Erosion and Sedimentation Control policy shall govern the planning, design, installation, maintenance and inspection of temporary and permanent erosion and sedimentation controls associated with development/redevelopment/construction within the City in accordance with this section and Chapter 158, Storm Water Pollution Control Ordinance. This policy is the official criteria required by the TPDES MS4 Phase II permit, and such strives to comply with all federal and state mandates associated with the permit.
- B. Erosion and sediment BMPs are required for all construction, (conducted with or without a permit) and all other activities for which land clearing, trenching, or grading is a part. It is the intent of City of Pflugerville policy to closely parallel the requirements set forth in the Texas Pollution Discharge Elimination System (TPDES) Construction General Permit (TXR150000), the City of Pflugerville's MS4 Phase II Permit and any applicable updates to National Pollution Discharge Elimination System (NPDES) or TPDES.
- C. The policy objectives are to:
 - 1. Ensure Municipal Separate Storm Sewer System (MS4) Phase II Permit & TPDES Construction General Permit Compliance.
 - 2. Minimize the erosion and sedimentation of soil resulting from construction activities in streams, creeks, lakes, waterways, storm drains, etc.
 - 3. Protect and improve the quality of surface water, minimize flooding hazards and maintenance cost associated with excessive sedimentation and erosion in storm drains and waterways.
 - 4. Preserve and protect existing vegetation to the greatest extent possible, particularly native plant and wildlife habitats.

5. Provide for revegetation of sites to minimize environmental impacts of construction activity.

DG7.2 TEMPORARY STABILIZATION CONTROLS

- A. Temporary controls shall be used during construction to prevent the erosion of soil and sedimentation of waterways until restoration is complete. Temporary controls shall be used in accordance with the City of Pflugerville Construction Standards.

DG7.3 FINAL STABILIZATION CONTROLS

- A. The subdivider shall restore all areas within public right-of-ways and public easements that have been disturbed as a result of construction activities. Such areas shall be returned to pre-disturbed conditions or better. New open areas or facilities within the public right-of-ways or public easements shall be covered with a minimum of four (4) inches of topsoil prior to the application of grass seed. Grass seed shall be applied in accordance with Figure 7.8, hereof.

Figure 7.8		
RESEEDING STANDARDS		
Time Of Year	Seed Type	Amount of Seed per 1,000 S.F.
October – February	Unhulled Bermuda or Winter Rye	1 lb. 3 lbs.
March – September	Hulled Bermuda	1 lb.

- B. Seedlings shall be watered until uniform growth is established. During the first two (2) months after application of the seed, the planted area shall be irrigated or sprinkled at ten (10) day intervals in a manner that will not erode the topsoil but at a rate sufficient to thoroughly soak the soil to a depth of six (6) inches. Rainfall occurrences of one-half ($\frac{1}{2}$) inch or greater shall postpone the watering schedule by ten (10) days.
- C. Restoration shall be considered to be acceptable when the grass has grown to a height of at least one-half ($\frac{1}{2}$) inch and covers ninety (90%) percent of the area with bare spots no greater than ten (10) square feet.
- D. The City Engineer may grant a variance for right-of-way or public easement restoration (regarding DG7.3.C) as related to the City’s construction acceptance process provided equivalent permanent stabilization measures formally agreed upon by the subdivider/developer and the City are in place prior to the City final acceptance. Examples of such equivalent measures are as follows:

1. Installation of additional silt fence near areas which may be prone to erosion as identified by City Engineer or designated staff. All additional silt fence will be maintained by the subdivider/developer and will put forth all possible efforts to restore that right of way. At the time of right of way restoration per specification DG7.3.C and final inspection by the City Engineering Department, the silt fence will be removed.
2. A geotextile soil retention blanket placement within affected areas as defined by City Engineer or designated staff.
3. Additional rock berms located near potential drainage erosion areas as defined by City Engineer or designated staff.

DG7.4

PLANS AND COMPUTATIONS

- A. Implementation of an effective erosion and sedimentation control plan requires a project management approach where responsibility is assigned during each phase to assure proper design, installation, maintenance, inspection, and when necessary, repair or replacement of controls during the construction. The project owner/developer, engineer and contractor are all integrally involved in this process from start to finish. In addition, an understanding by the responsible individuals of the complete process required to design and implement erosion and sedimentation controls will assist them in preparing appropriate plans, speed the review and approval process, result in fewer on-site changes and problems, and provide the appropriate degree of protection for the environment.
- B. The following section presents the minimum requirements for the planning, design, construction, operation and maintenance of erosion and sedimentation control facilities. A Design professional may select an appropriate BMP control method or combinations of methods or structures described in Appendix A, Technical Specifications and is responsible for both the adequacy and implementation of an effective erosion and sedimentation control plan (ESCP). Following the end of construction activities, the developer/owner, contractor and engineer are responsible for ensuring proper erosion and sedimentation control until all areas are stabilized.

DG7.4.1

SITE PLAN REVIEW

- A. To ensure that all applicable new development and redeveloped sites conform to the pollution control performance standards of this chapter, the developer/owner and engineer shall comply with the following as related

to project review, approval, and enforcement procedures that include:

1. Engineer/Owner/Developer shall submit revised site plan when changes are made to the ESCP for re-approval and
 2. Engineer/Owner/Developer shall submit Record Drawings or 'as-built' certifications required for storm water controls within 90 days of completion of a project.
- B. Site plan reviews, as submitted by Engineer/Owner/Developer, shall comply with the procedures described in the Unified Development Code.
- C. Project applicant shall meet the performance standards and ensure long-term maintenance as required by Engineering Design Guidelines Erosion and Sedimentation Control.

DG7.4.2 EROSION AND SEDIMENTATION CONTROL PLAN

- A. All projects disturbing natural conditions are required to plan, design, and implement BMPs to minimize erosion and sedimentation to the greatest extent practicable. All activities requiring a permit shall submit an erosion and sedimentation control plan that identifies, addresses and minimizes to the City's Engineering Department satisfaction, all potential sources of sediment and other construction related pollution.
- B. Erosion and Sedimentation plan shall include:
1. A comprehensive plan addressing limits of disturbance, phasing, temporary and permanent erosion and sedimentation BMPs that comply with all applicable Federal, State and Local regulations.
 2. Construction standards to illustrate, review and construct the BMPs that minimize erosion and sedimentation to the maximum extent practicable; (and where appropriate, correlate with and outlined in the ESCP).
 3. The general direction of flow of storm water drainage entering and leaving the site. If the drainage patterns will be altered, both the existing and proposed drainage patterns shall be shown.
 4. A description of how run-on storm water will be handled, including sheet flow entering the site from adjoining property.

5. A description and the location of any environmentally sensitive area that is located on the site or that adjoins the site and that will receive storm water directly from the site.
6. The location of any Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map 100-year floodplain boundaries, floodway boundaries, or FEMA Velocity Zone boundaries that encroach on the site. A preliminary boundary line may be used with a preliminary plat. The ESCP shall be amended prior to filing of a final plat, once a final boundary determination has been made.
7. A description and location of all temporary control measures that will be implemented during construction to control erosion, sedimentation, and the discharge of pollutants into the City's MS4.
8. Standards and schedules for maintenance and replacement for all temporary and permanent BMPs in the plans.
9. Standards for topsoil, vegetative materials and vegetation BMPs in the plans.
10. Computations for BMPs that rely on detention, sedimentation, filtration, diversion and velocity control.
11. A Licensed Professional Engineer shall sign, seal and date the erosion and sedimentation plan and engineering computations with competence in this area as required by Texas Engineering Practice Act, Section 137.

DG7.4.3 DESIGN REQUIREMENTS:

A. Storm Water Pollution Prevention Plan

1. One of the requirements of the TCEQ TPDES Construction General Permit (TXR150000), for any development, redevelopment and construction, is to develop and implement a Storm Water Pollution Prevention Plan (SWPPP). The purpose of the SWPPP is to provide guidelines for minimizing sediment and other pollutants that may originate on the site, from flowing into municipal storm systems, or jurisdictional waters during construction. The plan shall address the principal activities known to disturb significant amounts of ground surface during construction. A Notice of

Intent (NOI) or Construction Site Notice (CSN) shall be submitted to the City's Engineering Department prior to the start of construction activity.

2. The storm water management controls included in the SWPPP shall focus on providing control of pollutant discharge practical approaches that use readily available techniques, expertise, materials, and equipment.
3. An ESCP is required for all development that disturbs one quarter (1/4) acre or more and shall meet the requirements in the Checklist for ESCP as noted in Appendix B.

B. Best Management Practices (BMPs)

1. It is the responsibility of the engineer to design BMPs that address site specific conditions using appropriate design criteria for the City of Pflugerville. The source of the design criteria shall be referenced in the ESCP.
2. To preserve the existing natural resources in the City of Pflugerville and promote sustainable development, demonstration of compliance with the Site Layout permanent BMP is required in the ESCP for all developments. Factors to be considered are lots oriented and designed to minimize change in grade, drainage systems designed to minimize change in time of concentration, and street layouts designed to minimize extent of pavement.
3. In addition to the Site Layout BMP, the following minimum number of BMPs shall be provided:

BMP Requirements		
Disturbance	No. of BMPs (minimum)	
	Temporary	Permanent
< ¼ acre Disturbed Area	2	None
¼ acre ≤ Disturbed Area < 1 acre	2	Varies
1 acre ≤ Disturbed Area < 20 acres	3	1 or 2
≥ 20 Acres	3	2

4. Examples of factors that shall be considered when evaluating and selecting permanent controls for a development include:
 - a. Effect of the development on runoff volumes and rates
 - b. Potential pollutants from the development
 - c. Percent of site treated by the BMP

- d. Effectiveness of the BMP on potential pollutants from the development
- e. Natural resources on the site
- f. Configuration of site (existing waterways, topography, etc.)

C. The following items are acceptable permanent BMPs for subdivisions:

1. Vegetated swales – Vegetated swales may be used if drainage design criteria are met and acceptable to the City Engineer. Vegetated swales shall be designed with a trapezoidal cross section and a gentle slope that yields a maximum velocity of 2 fps for the 2-year storm event. The engineer shall evaluate flow depths to verify no upstream flooding is caused by the vegetated swale during larger events. Design capacity of the swales is as specified in the Drainage Requirements as specified by the Engineering Design Guidelines.
2. Dedication of the 100-year drainage easement – Dedication of the 100-year fully urbanized floodplain as a public drainage easement with the creek left in its natural condition will be considered one BMP credit.
3. Landscaping – A landscape plan sealed by a landscape architect shall be submitted with the ESCP to receive BMP credit. Landscaping may be on individual and/or commonly owned lots and unpaved open space and shall include canopy-type trees at least 3 inches of caliper at time of planting. Refer to the Landscaping section in the Unified Development Code for an approved tree list. Ornamental subdivision entry-way plantings are not eligible. The landscape plan shall identify the party responsible for the installation of planting and maintenance until residence is purchased by an individual homeowner. A permanent or temporary irrigation system may be necessary to establish plantings.
4. Detention ponds – Detention may be achieved by surface ponds or subsurface structures. Detention ponds and structures shall be evaluated for the 2-, 25-, and 100-year storm events using post-development land use to verify that no structure flooding will be caused by the detention. Outfalls for detention ponds shall be designed to prevent clogging of the intake. The pond shall also be designed in accordance with other criteria in the City of Austin Drainage Criteria Manual.
5. Dedication of a private linear open space will count as one BMP credit.

6. Low Impact Development Methods – Allowed at the discretion of the City Engineer.
 - a. Low Impact Development (LID) Methods such as rain gardens, rain barrels,
 - b. Cisterns on individual lots and/or bio-retention or bio-detention facilities on common areas which treat all post-construction areas. The vegetated LID features shall consist of native plantings or plantings consistent as recommended by a Licensed Landscape Architect

DG7.4.4

INSTALLATION, MAINTENANCE AND INSPECTION CONSTRUCTION PROCEDURES

- A. Proper installation, maintenance, and inspection of the approved control methods during the construction of a project are the final steps in assuring effective control of erosion and sedimentation. Implementation requires the combined efforts of the project engineer, contractor, owner, city inspectors, and, when needed, reviewers working together to achieve the best feasible control.
 1. The contractor shall install, inspect and maintain all BMPs according to the approved erosion and sedimentation control plan (and/or SWPPP as appropriate).
 2. The contractor shall report any identified problem areas to the design engineer for recommended additions or revisions to the erosion and sedimentation control plan.
 3. The design engineer shall modify the plan as needed to minimize erosion and sedimentation to the maximum extent practicable. Any revised plan requires City Engineer approval.
 4. The owner, contractor and design engineer are responsible for installing and maintaining BMPs in a manner that complies with all applicable Federal, State and Local regulations.
 5. At the City Engineer's request, Contractor's inspection reports for all BMPs shall be provided to the City.
 6. Upon establishment of vegetation to City Standards, the Contractor shall remove all temporary BMPs, after to City acceptance of Public Infrastructure.
- B. Construction BMPs
 1. Structural and non-structural BMPs may be used for controlling pollutants for storm water discharges from small and large sites. Structural BMPs shall comply with Appendix A specifications in the latest edition of the City of Pflugerville Engineering Design

Guidelines and Construction Standards. If the most appropriate BMP is not shown in the City of Pflugerville standard details, the design engineer shall submit a detail, calculations and references for design of the BMP to the Department of Engineering for review and approval.

2. The following are acceptable temporary BMPs for use during construction:

a) Non-Structural

i. Minimizing the area of disturbance – The area of disturbance as shown by the limits of construction shall utilize the most efficient space to minimize disturbance of existing area for a proposed development site.

- ii. Preserving existing vegetation – This is a preferred BMP. When areas of existing vegetation are to be preserved, the areas shall be delineated on the plans, and the plans shall include notes stating that temporary chain-link fencing shall be installed to protect the vegetation.

b) Structural Examples

- i. Silt Fence
- ii. Triangular Filter Dike
- iii. Inlet Protection Barriers
- iv. Storm Inlet Sediment Traps
- v. Rock Berms
- vi. Stabilized Construction Entrance
- vii. Sedimentation Traps
- viii. Vegetated Buffer Strips
- ix. Temporary Detention Structure
- x. Hydromulch Seeding
- xi. Diversion Dikes
- xii. Diversion Dikes and Swales

- 3. Technical Specifications for structural BMPs can be found in Appendix A. These are suggested construction BMPs and it is the responsibility of the design engineer to select and design appropriate construction BMPs for each site.
- 4. The Design Engineer shall include any relative City of Pflugerville standard detail EC-01 through EC-10.
- 5. Any onsite temporary staging area shall include silt fence immediately adjacent to the downstream boundary limits. Silt fence shall adhere to the City of Pflugerville standard detail EC-02.
- 6. Staging areas or temporary stock piles are not allowed within designated FEMA flood zones and shall be located a minimum of 20-ft beyond any designated creek, waterway, or floodplain.

C. Waste and Hazardous Material Controls

- 1. Covered containers shall be provided for waste construction materials and daily trash. Hazardous material shall be stored in a manner that prevents contact with rainfall and runoff. Onsite fuel tanks and other containers of motor vehicle fluids shall comply with the latest applicable TCEQ requirements for storm water pollution controls

during construction.

2. The SWPPP shall require federal, state and local reporting of any spills and releases of hazardous materials greater than the regulated Reportable Quantity (RQ) and reporting to the City of Pflugerville Engineering Department and Public Works Department of all spills and releases to the storm drainage system.
3. All trash enclosures must drain to sewer connections.

D. Temporary Stabilization

1. Portions of a site that have been disturbed, but where no work will occur for more than 21 days shall be temporarily stabilized as soon as practicable, and no later than 14 days, except when precluded by seasonal arid conditions, or prolonged drought. A written request to the City Engineer shall be submitted for approval of exceptions.
2. Temporary stabilization shall consist of providing a protective cover, designed to reduce erosion on disturbed areas. Temporary stabilization may be achieved using temporary seeding, soil retention blankets, hydro-mulches and other techniques that cover 100 percent of the disturbed areas until either final stabilization can be achieved or until further construction activities take place.
3. Perimeter controls such as silt fence, vegetated buffer strips or other similar perimeter controls are intended to act as controls when stabilization has not occurred. Perimeter controls may remain in place during temporary stabilization.

E. Final Stabilization

1. Final stabilization within the public right-of-ways (ROWs) shall conform to Section DG7.3 Stabilization on private property may consist of soil cover as vegetation, geo-textiles or mulch. For stabilizing vegetated drainage ways, sod or seeded soil retention blankets shall be used. Hydromulch will not be allowed in vegetated swales, channels or other drainage ways.
2. The plan for final stabilization shall be coordinated with permanent controls in the ESCP and with landscaping plan if applicable.

F. Notice of Intent (NOI) or Construction Site Notice (CSN)

1. If applicable, copies of the NOI/CSN shall be sent to the Engineering Department.

G. TCEQ Site Notice

1. A signed copy of the Construction Site Notice or NOI shall be posted at the construction site in a location where it is readily viewed by the general public during all construction activity.

H. Notice of Termination (NOT)

1. All primary operators shall submit a copy of the NOT to the City Engineer after construction has been accepted.

I. Inspection and Maintenance during Construction

1. The primary operator shall construct all controls required by the SWPPP. The primary operator shall have qualified personnel inspect the controls at least every two weeks during construction and within 24 hours after a storm event of 0.5 inches, or greater. At a minimum, inspection may be performed every 7 days with no additional inspection after rain events.
2. Certified inspection reports shall be retained as part of the SWPPP on site. Within seven days of the inspection, controls identified as damaged or deteriorated shall be repaired or replaced, as appropriate. Controls shall also be routinely cleaned or repaired to maintain adequate functionality.
3. Changes, repairs and/or additions shall be made to the controls within 7 days to prevent discharges from the site. The primary operator shall implement procedures to remove discharges from all portions of the storm drainage system including streets, gutters, inlets, storm drain, channels, creeks, ponds, etc.

J. Construction and Maintenance

1. The owner shall construct all permanent BMPs and is responsible for maintenance of the BMPs. When the BMP falls within a drainage easement, the plat or separate instrument dedicating the easement shall include a statement of the owner's responsibility for maintenance.

POST CONSTRUCTION STORM WATER MANAGEMENT PLAN

- A. The following shall be addressed when permanent BMPs have been installed during construction:
- B. The Developer shall prepare a post construction maintenance and operation manual that describes the function and operation for each permanent stormwater facility to ensure compliance with the City of Pflugerville Engineering Design Guidelines and Construction Standards.
- C. The Developer shall prepare a schedule for when and how often inspection will occur to ensure proper function of the stormwater facility. The schedule shall also include periodic inspections to ensure proper performance of the facility between scheduled clean outs.
- D. The Developer shall ensure that all stormwater facilities undergo, at the minimum, an annual inspection to document the maintenance and repair needs and ensure compliance with the requirements of this ordinance and accomplishments of its purposes.
- E. The program shall require that controls are in place that will infiltrate, evapotranspire, or harvest and use stormwater from the site to meet the performance standards as determined by the City of Pflugerville to protect water quality.

END OF SECTION