CITY OF CHESTERFIELD

SEDIMENT AND EROSION CONTROL MANUAL

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Department of Public Services
690 Chesterfield Pkwy W
Chesterfield, MO 63017-0760
www.chesterfield.mo.us

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CITY OF CHESTERFIELD
SEDIMENT & EROSION CONTROL MANUAL

I. GENERAL PROVISIONS

A. Purpose

The purpose of this document is to set forth minimum requirements, and provide guidance and additional resources to facilitate control of soil erosion on land that is undergoing development for non-agricultural uses, and to preserve the natural terrain and waterways within the incorporated limits of the City of Chesterfield. The guidelines will assist designers in development of stormwater pollution prevention plans, but are not intended to act as a sole source regarding acceptable methods. Engineering professionals are encouraged to design innovative ways to address site specific conditions.

Soil erosion scars the land and creates sediment that clogs storm sewers and road ditches, chokes streams and creates silt lakes, all of which pose a threat to public health and safety. The provisions in this manual are intended to provide a natural community environment, to prevent soil erosion and to reduce costly repairs to gullies, washed out fills, storm water conveyance systems, roads and embankments. Application of the requirements of this manual can mitigate the negative impacts of development on stormwater quality.

1. The primary requirement of the sediment and erosion control manual is the development of a plan outlining grading activities, and the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) that:

   a. Incorporates the required practices identified
   b. Incorporates sediment and erosion control practices specific to site conditions
   c. Provides for maintenance and adherence to the plan

2. Prior to removing any site vegetation or disturbing earth, the permittee shall obtain a grading permit from the Department of Public Services. In order to obtain a grading permit, the permittee shall submit a grading permit application, a grading plan, and an SWPPP specific to the land disturbance activities proposed at the site. The grading plan and SWPPP must be approved by the Department of Public Services before a grading permit can be issued.

3. The purpose of the SWPPP is to ensure the design, implementation, management, and maintenance of "Best Management Practices" (BMPs) in order to reduce the amount of sediment and other pollutants in stormwater discharges associated with the land disturbance activities, and ensure compliance with the terms and conditions stated in this manual.

4. The permittee shall select, install, operate, and maintain BMPs to adequately control erosion, capture sediment and prevent pollution. Guidance in the concepts and methods of erosion and pollution control can be found in the following documents:

   a. The details and standards contained in this manual.
      i. Appendix A – Chapter 31, Article 04, Section 11 and Chapter 31, Article 10, Section 11 of the Code of the City of Chesterfield – Grading Permits and

Grading, Sediment, and Erosion Control Terms
ii. Appendix B - BMP Matrix
iii. Appendix C - Typical Erosion Control BMPs
iv. Appendix D - Typical Pollution Prevention BMPs
v. Appendix E - Typical Runoff Management BMPs
vi. Appendix F - Typical Sediment Capture BMPs
vii. Appendix G – Typical Tracking Control BMPs
viii. Appendix H – Stormwater Management Products Matrix
ix. Appendix I – Grading Permit Checklist
x. Appendix J – General Guidelines for SWPPP Inspection Requirements
xi. Appendix K – Form for Special Inspector's Report on SWPPP

b. *Stormwater Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices,* Document number EPA 832-R-92-005 published by the United States Environmental Protection Agency (USEPA)
c. *Protecting Water Quality: A field guide to erosion, sediment and stormwater best management practices for development sites in Missouri* published by the Missouri Department of Natural Resources
d. *Illinois Urban Manual,* published by the Illinois Natural Resource Conservation Service
e. USEPA Menu of Best Management Practices for NPDES Stormwater
f. *Designing for Effective Sediment and Erosion Control on Construction Sites*, Jerald S. Fifield, PhD, CPESC, 2001, Forester Press
g. *Rainwater and Land Development,* Ohio's Standards for Stormwater Management, Land Development and Urban Stream Protection
h. *Maryland Stormwater Design Manual, Volumes I and II,* published by the Maryland Department of the Environment

The permittee is not limited to the use of these guidance manuals. Other commonly accepted publications may be used for guidance and must be referenced in the SWPPP if used. In addition, the permittee is not limited to the use of BMPs identified in these manuals. However, any alternative BMPs should be justified by site conditions, described in the SWPPP, and approved by the Department of Public Services.

B. Scope of Authority

Any person, firm, corporation or business proposing to clear or grade land within the incorporated limits of the City of Chesterfield shall apply to the Department of Public Services for a grading permit as required under Chapter 31, Article 4, Section 11 of the Code of the City of Chesterfield – Grading Permits.

C. Surety

Prior to approval of the required grading plan and SWPPP, and prior to the issuance of a grading permit, the Department of Public Services shall require the applicant to post surety, as required by Chapter 31 of the Code of the City of Chesterfield, in an amount required to guarantee the performance, restoration, maintenance and/or rehabilitation of the site, including all work to be done under the SWPPP. The surety shall include engineering and inspection costs sufficient to cover the cost of failure or repair of work and devices. If requested by the permittee, a partial surety release may be processed after all erosion control

measures are in place as certified by the design engineer or individual who prepared the SWPPP, and as approved by the Department of Public Services. Partial releases shall be in accordance with the Department of Public Service's escrow release policy.

II. STANDARDS

A. A grading permit shall be issued and shall remain in force only upon compliance with the following requirements:

1. *Surface waters; damage.* Adequate provision shall be made to prevent any surface waters from damaging the cut face of an excavation or the sloping surface of a hill. Existing erodible slopes that are to remain undisturbed shall be protected from storm water runoff associated with any disturbed or developed area. No storm water shall be allowed to flow from an area that has been graded or improved to the undisturbed slope. Grading and storm sewer systems shall be designed to collect or direct storm water to an adequate natural discharge point.

2. *Retaining walls; cribbing.* Retaining walls or cribbing shall be required whenever necessary to prevent the surface of any excavation or fill from exceeding at any point the maximum allowable slopes as set forth herein.

3. *Drainage.* All drainage provisions shall be of such design to carry surface waters, without detriment to adjacent properties, to the nearest practical storm drain, natural water course or street as approved by the Department of Public Services as a suitable place to deposit and receive such waters.

4. *Protection of streets, property.* No excavation shall be made so close to the property line to endanger any adjoining public or private street or property without supporting and protecting such public or private street or property from settling, cracking or other damage.

5. *Fill-location.* No fill shall be made so as to cause or to allow the same to be deposited upon or to roll, flow or wash upon or over the premises of another without the express written consent of the owner of such premises so affected; or upon or over any public street, walk, place or way, nor so close to the top of a bank of a channel as to create the possibility of bank failure and sliding or violate the Natural Watercourse Protection regulations.

6. *Materials.* Materials for fills shall consist of material obtained from excavation of banks, borrow pits or other approved source. Material shall be free of vegetative matter and deleterious material and shall not contain large rocks or lumps except as certified by a registered professional engineer to be acceptable fill material.

7. *Minimum standards.* Minimum standards of excavations and fills shall be as follows:

   a. No excavation shall be made with a cut face steeper in slope than three (3) horizontal to one vertical, unless as provided for in (7c).
   b. No fill shall be made which creates an exposed embankment face steeper in slope than three (3) horizontal to one vertical, unless as provided for in (7c). The embanked end of the fill shall be uniformly compacted as provided in subsection (8)

hereof and stable under the proposed conditions.

c. Individual and isolated slopes, rock dikes, undisturbed natural slopes and slopes blending with the natural terrain may be steeper than the requirements in (7a) and (7b) based on the design of a registered professional engineer, including recommendations covering construction and recommendations on maintenance of the slope, and as approved by the Department of Public Services.

d. All proposed work shall be in compliance with the City's Natural Watercourse Protection regulations.

8. *Compaction.* All fills intended to support buildings or structures, sewers and conduits shall be compacted to a minimum of ninety (90) percent compaction as determined by Modified Proctor, ASTM D- 1557. Compaction of fills for these uses must be certified by a registered professional engineer at the owner's expense. Compaction of other fills shall be required where necessary as a safety measure to aid in preventing the saturation, slipping or erosion of the fill.

9. *Rock.* Solid rock, shale or similar materials shall be removed to a depth below the subgrade for paved areas. In those circumstances where rock is within two (2) feet of the proposed pavement subgrade, the engineer shall design a system, acceptable to the Department of Public Services, to prevent pavement migration.

10. *Removal of timber, rubbish, etc.* Timber, logs, trees, brush, vegetative matter and rubbish of any description shall be removed and disposed of so as to leave the disturbed area with a neat and finished appearance. Tree stumps, masonry and other obstructions, within lawn areas shall be removed to a minimum depth of two (2) feet below finished grade. Tree removal shall be in accordance with Section 31, Article 4, Section 2 of the City of Chesterfield Code.

11. *Demolition of Existing Structure.* A demolition permit shall be obtained from the St. Louis County Department of Public Works. Authorization from the City of Chesterfield will be required in order to obtain the permit. Septic tanks, cisterns, and wells shall be removed, filled and/or capped in accordance with requirements of the Missouri Department of Natural Resources and St. Louis County.

B. Quality

Settleable Solids shall not exceed a maximum of 2.5 ml/L/hr. for each stormwater outfall. Disturbed areas tributary to a water body identified by the Missouri Department of Natural Resources' Water Protection Program are subject to additional and/or more stringent water quality requirements. Settleable Solids from a stormwater outfall in these areas shall typically not exceed 0.5 ml/L/hr.

C. Sampling

The Department of Public Services may sample, and/or may require sampling and reporting as a result of illegal discharges, compliance issues, complaint investigations, or such other evidence of off-site contamination from activities at the site. If such an action is needed, the Department will specify in writing any additional sampling requirements, including such information as location, extent, and parameters.

III. REGULATIONS

Prior to removing any site vegetation or disturbing earth, the permittee shall obtain a grading permit from the Department of Public Services. In order to obtain a grading permit the permittee shall submit a grading permit application, a grading plan, and SWPPP specific to the land disturbance activities proposed at the site.

A. Grading Plan Requirements:

The following information shall be shown on the grading plan. See Appendix I, Grading Permit Checklist, for specific requirements:

1. Existing and proposed contours.
2. Location of grading, structures, etc.
3. Owner, Developer, and Engineer information.
4. Benchmark information.
5. Trees to be saved or removed.
6. Floodplain and floodway delineated.
7. Off-site grading.
8. Any water body depicted as a blue line on the USGS map.

B. SWPPP Requirements:

The following information and practices shall be provided for in the SWPPP. See Appendix I, Grading Permit Checklist, for specific requirements:

1. Site Description.
2. Drainage areas
3. Description of Best Management Practices
4. Erosion and sediment control plans
5. The proposed phasing of development of the site
6. The measures to be taken to meet erosion control principles and standards as defined in Section 31-04-11 of the Chesterfield Code. The plan must ensure that sediment is not transported from the site by a storm event of 15 year (frequency) 20 minute (inlet time) or less.
7. The measures to be taken if sediment containment devices fail and sediment is transported from the site.
8. Construction waste and hazardous substance control.

C. Grading Plan and SWPPP Approval:

1. Comments/Approvals may be required from the following agencies:

    a. Missouri Department of Natural Resources (MODNR). The permit applicant must obtain a land disturbance permit from MODNR for any site where one (1) acre or more of land will be disturbed. A copy of the permit must be provided to the City before beginning any work authorized by a City grading permit. This requirement

applies to sites of less than one acre that are part of a proposed development that will ultimately disturb one acre or more.

b. United States Army Corp of Engineers

c. Monarch-Chesterfield and Howard Bend Levee District. When work is proposed for property in or within two thousand (2,000) feet of the Monarch-Chesterfield Levee or Howard Bend Levee, the applicant shall submit plans to the appropriate levee district for comments.

d. Missouri Department of Transportation

e. Metropolitan St. Louis Sewer District

f. St. Louis County Department of Transportation

g. Spirit of St. Louis Airport

h. Conservation District. When a plan is submitted by the Department of Public Services to the USDA Natural Resources Conservation Service, the NRCS District may make comments and recommendations. Such comments may pertain but need not be limited to:

   i. Erosion and sedimentation control
   ii. Soil use limitations
   iii. Environmental considerations

2. Prior to issuance of a grading permit, evidence of the proposed inspector's current certification as a Major Land Disturbance Special Inspector by St. Louis County shall be submitted.

D. Modifications and Changes

1. Amending/Updating the SWPPP: The permittee shall amend and update the SWPPP as appropriate during the term of the land disturbance activity. The permittee shall amend the SWPPP, at a minimum, whenever the:

   a. Design, operation, or maintenance of BMPs is changed;
   b. Design of the construction project is changed that could significantly affect the quality of the stormwater discharges;
   c. Permittee's inspections indicate deficiencies in the SWPPP or any BMP;
   d. MoDNR and/or the City of Chesterfield notifies the permittee of deficiencies in the SWPPP;
   e. The Department of Public Services, or other responsible party, determines the SWPPP to be ineffective in significantly minimizing or controlling erosion and sedimentation (e.g., there is visual evidence, such as excessive site erosion or excessive sediment deposits in streams or lakes);
   f. The Department of Public Services, or other responsible party, determines the SWPPP to be ineffective in preventing pollution of waterways from construction wastes, chemicals, fueling facilities, concrete truck washouts, toxic or hazardous material, site litter or other substances or wastes likely to have an adverse impact on water quality;
   g. Total Settleable Solids from a stormwater outfall exceed 2.5 ml/L/hr. unless the disturbed area is near a Valuable Resource Water as defined under "Applicability to Valuable Resource Waters". Total Settleable Solids from a stormwater outfall in

these areas shall not exceed 0.5 ml/L/hr.

h. MoDNR, or other responsible party determines violations of Water Quality Standards may occur or have occurred.

E. Permittee's Responsibilities Regarding SWPPP

The permittee shall:

1. Notify all contractors and other entities who will perform work at the site, of the existence of the SWPPP and what actions or precautions shall be taken while on site to minimize the potential for erosion and the potential for damaging any BMP.

2. Determine the need for and establish training programs to ensure that all site workers have been trained, as a minimum, in erosion control, material handling and storage, and housekeeping.

3. Provide copies of the SWPPP to all parties who are responsible for installation, operation or maintenance of any BMP.

4. Update the SWPPP throughout the duration of the project, as necessary, and maintain a current copy of the SWPPP on the site at all times.

IV. INSPECTION AND MAINTENANCE OF SWPPP

A. Special Inspector

The permittee and property owner/developer shall ensure that the land disturbance site is inspected on a regular schedule by a qualified inspector who is currently certified as a Major Land Disturbance Special Inspector by St. Louis County. On projects that are small in nature, this requirement may be waived at the discretion of the Director.

B. Responsibilities

1. The inspector shall inspect the site weekly to ensure proper installation, operation and maintenance of BMPs. Weekly inspections shall be documented on the City's inspection form, or another form approved by the City, and said form shall be provided to the City on a weekly basis. Locations where stormwater leaves the site shall be inspected for erosion or sediment deposit. The overall effectiveness of the SWPPP shall be evaluated and the need for additional control measures addressed if needed. See Appendix J for general guidance on inspection requirements. Any deficiencies shall be noted in a report of the inspection.
2. Additional inspections shall also be carried out within 24 hours of a rainfall event of 0.25 inches or more.
3. The inspector shall promptly notify the permittee and the site contractors responsible for operation and maintenance of BMPs of the deficiencies found during the inspection.
4. The permittee shall correct the deficiencies within one (1) calendar day of the inspection in emergency conditions and four (4) calendar days of the inspection for routine maintenance unless otherwise approved or required by the Department.

C. Inspection and Corrective Action Report

A written report of each inspection and the corrective actions taken shall be kept. The report shall include the following minimum information: inspector's name, date of inspections, observations relative to the effectiveness of the BMPs, actions taken or necessary to correct deficiencies, and listing of areas where land disturbance operations have permanently or temporarily stopped. The report shall be signed by the inspector and shall be submitted to the Department within 5 business days of the inspection. See Appendix K for a sample report form which can be used. Similar forms shall be acceptable if approved by the City.

D. Record Retention

The permittee shall retain copies of the grading permit, the grading plans, the SWPPP and all amendments for the site named in the permit, results of any monitoring and analysis, and all site inspection records required by this permit. The permittee shall retain these records at a site which is readily accessible from the permitted site until final stabilization of a site is achieved. The local office of the permittee, their contractor or consultant is considered to be readily available from the project site if it is located in the same county as the project site. The records shall be accessible during normal business hours. After final stabilization, the records may be maintained at the location of the permittee's main office or other designated storage location. The records shall be retained for a period of at least three years from project completion.

V. CITY INSPECTION AND VIOLATIONS

A. Inspections

By applying for a grading permit, the applicant consents to the City inspecting the proposed development site and all work in progress.

B. Violations

In the event of a violation, the Surety may be used by the City to complete and/or maintain the planned sediment and erosion control measures and/or restore the site. In addition, the City may assess penalties for violation(s) as detailed in Chapter 31, Article 8 of the City Code.

VI. TRANSFER OF OWNERSHIP

Chesterfield ordinances require a permit, as well as sediment and erosion control measures for disturbed areas in excess of 5,000 square feet disturbed as part of a common plan or sale. That language means the lot(s) (commercial, industrial, or residential) when sold to an entity for construction (unless sold to an individual for purposes of building their own private residence) is (are) also subject to regulations because they are part of the common sale. The existing permittee who intends to transfer ownership of a lot or parcel of the overall permitted area is still responsible for the terms of the SWPPP and erosion control on that site unless the new owner applies for and receives other permits for land disturbance activities.

VII. GLOSSARY

For the purposes of this manual, the following words and phrases shall have the meanings respectively ascribed to them by this section. See Chapter 31, Article 10, Section 11 of the Code of the City of Chesterfield – Grading, Erosion, and Sediment Control Terms for additional definitions.

Department of Public Services. The Director of Public Services or his representative, including, but not limited to, the Public Works Director and Planning and Development Services Director.

Existing grade. The vertical location of the existing ground surface prior to excavation or filling.

Finished grade. The final grade or elevation of the ground surface conforming to the proposed design.

Heavy Rain. A rainfall event of .25 or more inches of precipitation.

Natural Watercourse. A channel formed in the existing surface topography of the earth prior to changes made by unnatural conditions. (See also Chapter 31, Article 4, Section 11, Subsection M)

Site Development. Altering terrain and/or vegetation and constructing improvements.

Streambank, Top of Existing. The usual boundaries, not the flood boundaries, of a stream channel. The top of the natural incline bordering a stream. (See also Chapter 31, Article 4, Section 11, Subsection M)

APPENDIX A

Chapter 31, Article 04, Section 11 of the Code of the City of Chesterfield Grading Permits

Chapter 31, Article 10, Section 11 of the Code of the City of Chesterfield Grading, Erosion, and Sediment Control Terms

Chapter 31. Unified Development Code

Article 04. Development Requirements and Design Standards

Sec. 31-04-11. Grading permits.

[Ord. No. 2801, § 3 (Exh. A), 6-16-2014]

A. Permit required. Except as herein provided, no grading activity shall commence on any site without obtaining a grading permit from the Department. Such activities include clearing, excavation, fill or any combination thereof. A separate permit shall be required for each site; provided, however, that one (1) permit may cover both the excavation and fill made from excavated materials. An application for a grading permit shall be in writing on forms provided by the Department, and filed with the Department, and must be accompanied by a grading plan and SWPPP.

B. Exceptions.

1. A grading permit shall not be required in the following instances, provided that no change in drainage patterns or sedimentation onto adjacent properties will occur:

   (a) Grading for the foundation or basement of any building structure or swimming pool for which a building permit has been duly issued;

   (b) Grading activities on previously developed property which result in a disturbance of less than five thousand (5,000) square feet;

   (c) Grading for or by any public utility for the installation, inspection, repair or replacement of any of its facilities;

   (d) Grading of property for or by any governmental agency in connection with a public improvement or public work on said property;

   (e) Grading of land for farming, nurseries, landscaping, or gardening or similar agricultural or horticultural use whenever there is substantial compliance with recommendations or standards of the local soil conservation authority;

   (f) Grading activities in public rights-of-way covered by an appropriate special use permit;

   (g) Grading activities in quarries and permitted sanitary landfills.

2. While these activities are exempt from obtaining a grading permit, all grading activities are still required to adhere to all standards set forth in the City's Sediment and Erosion Control Manual.

C. Minimum requirements. The Manual, as may be updated and modified by the Department, sets forth minimum requirements that must be met in order to obtain a grading permit. This document

also provides guidance and additional resources to facilitate control of soil erosion on land that is undergoing development.

D. Application procedure. An application for a grading permit shall be in writing on forms provided by the Department, and submitted to the Department. The application shall be completed in the form and manner prescribed by the Department and shall include required information as outlined in the Manual. The grading plan and the SWPPP shall be prepared and sealed by a licensed engineer, unless the requirement is specifically waived by the Planning and Development Services Director.

E. Surety.

1. *Performance guarantee.*

(a) Prior to the issuance of a grading permit, the applicant shall deposit a surety with the City as described below and as required for particular sites. Said grading permit shall be issued upon the approval of the Department and the applicant depositing with the City a sum equal to that which would be required to guarantee the performance, restoration, maintenance and/or rehabilitation of said site based upon the approved grading plans and the approved SWPPP. In the case of owners, contractors or builders who have previously violated the subject and provisions of this Section, the amount of the surety shall be increased in each case based on such previous experience.

(b) If at any time the Department determines that the surety deposited with the City is in an amount that is not sufficient to guarantee the performance, restoration, maintenance and/or rehabilitation of the site based upon the approved grading plans and the approved SWPPP, the permittee shall deposit additional surety with the City in an amount determined by the Department within fifteen (15) days after receiving notification from the Department. If the permittee does not deposit the additional surety with the City, the Department may issue a stop-work order as outlined in Section 31-02-12(H) of this UDC.

(c) The surety shall be released as detailed in the Manual.

(d) Any portion of the deposit not expended or retained by the City hereunder shall be refunded when the grading operation is completed and the soil and drainage conditions are stabilized to the satisfaction of the City.

(e) The Planning and Development Services Director or the Public Works Director may perform, or have performed, any work necessary to restore, maintain and/or rehabilitate the site based upon the approved grading plan, approved SWPPP, and/or the requirements of this Article. All costs incurred in the performance of this work shall be charged against the surety the applicant deposited for the grading permit. By applying for a grading permit, the applicant consents to the City or its contractor entering the property and holds them harmless regarding any work that they perform.

(f) Deposits required by this Section shall be in conjunction with a deposit agreement and may be in the form of cash or letters of credit as follows:

(1) Cash deposits shall be required when the estimate developed by the Department for the performance guarantee as set out herein is less than ten thousand dollars ($10,000.00) and in all other cases where the owners, contractors, or builders shall wish to make cash deposits, the same shall be deposited with the Finance Director to be held in an interest-bearing account dedicated for that purpose, with all interest accruing to the City to offset administrative and other costs of maintaining the cash deposits;

(2) An irrevocable letter of credit drawn on a local financial institution acceptable to and in a form approved by the City Attorney and the Public Works Director. The instrument may not be drawn on a financial institution with whom the developer or a related entity has any ownership interest or with whom there is any joint financial connection that creates any actual or potential lack of independence between the institution and the developer. The letter of credit shall be drawn on a local banking institution within the greater Metropolitan St. Louis area and within the State of Missouri. The letter of credit shall provide that the issuing institution will pay on demand to the City such amounts as the City may require to fulfill the obligations herein and may be reduced from time to time by a writing of the Director. The letter of credit shall be irrevocable for at least two (2) years and shall state that any balance remaining at the expiration, if not renewed, shall automatically be deposited in cash with the Finance Director, unless a new letter of credit is issued and agreed to by the City or the City issues to the institution a written release of the obligations for which the letter of credit was deposited. The developer shall pay a nonrefundable fee of two hundred dollars ($200.00) to the City with submission of a letter of credit and one hundred dollars ($100.00) for any amendment or extension thereof, to partially reimburse the City's administrative and review costs in accepting and maintaining such letter of credit.

(3) Certificates of deposit, treasury bills, or other readily negotiable instruments, the type of which has been approved by the Finance Director, endorsed to the City, the cash value of which shall be in an amount not less than the amount specified by the Department in its estimate of the cost for grading, restoration, maintenance, and/or rehabilitation of said site based upon the approved grading plans.

2. *Downstream impoundment protection and restoration guarantee.*

(a) If, in the opinion of the Department, lakes, ponds, detention areas or other impoundment areas may be impacted by proposed work, the permittee shall perform preconstruction and post-construction surveys of each facility and post a bond, in a form acceptable to the City, as guarantee that the permittee will perform work in such a manner as to protect downstream facilities and will restore any damage or negative impact his development had on the facilities.

(b) Preconstruction surveys shall be performed prior to any clearing, grading, demolition or other construction related to the proposed development and prior to plan approval.

(c) An acceptable bond shall be submitted prior to plan approval.

(d) Post-construction surveys shall be performed within twelve (12) months of the completion of the proposed development or two (2) years from the start of the development, whichever is greater.

(e) Within three (3) months of the post-construction survey, the developer shall restore affected impoundment areas to the condition they would have been in if his development had not occurred.

(f) If the owner/operator of potentially impacted facilities will not grant the developer the necessary easements to complete the surveys or restoration work, the requirements of this Subsection are null and void.

F. Inspections.

1.

The applicant shall provide a qualified inspector to conduct regular inspections of the proposed development site. The qualifications of the inspector and frequency of inspection shall be as detailed in the Manual.

2. By applying for a grading permit, the applicant consents to the City inspecting the proposed development site and all work in progress. The applicant shall notify the City upon commencement and completion of the following: clearing, rough grading, finish grading before stabilization; and all reestablishment and construction work. Said notice shall be made as detailed in the permit issued to the applicant.

G. Use of streets during grading operations.

1. *Notice*. At least five (5) working days prior to the use of any street in the City by trucks or hauling or grading equipment engaged in grading activities in the City which requires the use of the streets maintained by the City, the contractor in charge may be required to submit a written report to the Department, specifying the kind and description of trucks or hauling or grading equipment, and the loaded, and unloaded weight of trucks and hauling equipment, and the number of each and the length of time they will be required to use the streets of this City. The contractor shall furnish the Department with all other information required of him to estimate or determine the amount of wear and tear, or damage, if any, that may be caused to streets by such usage. The applicant shall also provide the Department visual documentation, such as a video, and/or photographs, of the existing condition of the streets to be used. Before construction actually commences or while the work on the streets is in progress, the Department may require the applicant to post a pavement restoration bond, in such sum as is directed by the Department, with the City to guarantee the City compensation for any damage to streets, curbs, sidewalks or public facilities.

2. *Routes*. The Department shall, at least two (2) working days before the commencement of work and usage of the streets of the City, notify the contractor of the route or routes to be used by such trucks and equipment. The permittee and contractor shall be charged with the duty of seeing that the trucks or equipment use only the route or routes approved by the Department. In the event of any emergency requiring a change in route or routes, or if the Public Works Director finds or determines that any route or routes so designated are not safe or that excessive damage is being caused to any street or streets in the City by such usage, or if he finds the welfare of the City so requires, he may, upon one (1) days' notice to the permittee and contractor, order that the trucks or equipment use only the alternate route or routes so designated by the Public Works Director.

3. *Inspection*. The Public Works Director shall cause a thorough inspection to be made of the condition of the pavement of the streets designated and used under the permit, as well as the curbs and sidewalks, and shall make written reports of his findings, including with his report after termination of the work, his estimate of the cost of restoring the street, curbs and/or sidewalks to their original condition.

H. Damage to streets, etc. At the time the Department approves the route or routes to be used as provided in this Section, the applicant shall be notified that the City will hold the applicant liable for unusual wear and tear or damage to the streets, curbs, and sidewalks resulting from such usage, and that acceptance of the route or routes by the applicant shall constitute an agreement on his part to pay the reasonable cost of restoring the streets, curbs and sidewalks in question to their original condition. Within thirty (30) days after notification, the applicant shall cause the streets, sidewalks and curbs to be restored to their original condition. Failure to effect the repairs shall be cause for action against the surety.

I. Construction dirt, debris, waste.

1.

BMPs at construction site. After excavation or construction is commenced on any lot or tract of land in the City, and until sodding, planting, concreting, paving or other final surfacing is in place which will avoid washing or spreading of dirt and mud onto other property, sidewalks, curbs, gutters, streets and the space between sidewalks and curbs, the permittee, the owner of the property, contractor or developer in charge of work shall construct and maintain temporary siltation control devices or other approved measures to prevent such washing or spreading of mud or dirt. As may be required throughout the day, during the course of excavating or construction, dirt and mud on the sidewalks, curbs, gutters and streets, and the space between sidewalk and street resulting from work must be removed.

2. *Removing mud from vehicle wheels.* The permittee, owners, contractors, and developers, jointly and severally, shall provide their personnel with shovels, a wash-down station, or other equipment as necessary to remove dirt from the wheels of all vehicles leaving any clearing or grading site where mud has accumulated on the wheels, before such vehicles enter any public or private street of the City. It shall be unlawful for the permittee, or any owner, contractor, developer to permit any vehicle to leave such place with mud on the wheels which is liable to be dispersed over any public or private street of the City, and it shall be unlawful for any driver of a vehicle to enter upon the public or private streets of the City without having removed or had mud removed from the wheels prior to such entry. Each occurrence shall be a separate offense.

3. *Spilling materials on streets.* The permittee, owners, contractors, and developers, jointly and severally, who may load dirt, mud or other materials on any vehicle at any grading site in the City, during construction or otherwise, shall so load the same that no portion thereof shall be spilled or be liable to be spilled on the streets of the City in violation of this provision, and it shall be unlawful for any driver to operate a vehicle on the streets of the City which is loaded in such manner that it spills or is liable to spill mud, dirt, or other materials on the streets.

4. *Boards over sidewalks.* Boards, tracks, or other protection must be laid over sidewalks, curbs and gutters to avoid dirt and mud accumulating therein, as completely as possible and to prevent breakage or damage to such installations of whatever material constructed. Damage to walks, curbs and gutters will be repaired by the permittee, owner, contractor, or developer, or the Public Works Director may, upon ten (10) days' notice, cause to have them repaired at the permittee's, owner's, contractor's or developer's expense.

5. *Waste material.* During the course of construction, excavation, or grading, the permittee, owners, contractors, and developers are required to collect and dispose of all paper, refuse, sticks, lumber and other building waste, and all other waste material, and to prevent the same from blowing or otherwise being scattered over adjacent public or private property. Any waste material that is blown or scattered over the site, as well as on any adjacent public or private property, shall be picked up daily, and disposed of properly. Washout from concrete trucks must be controlled in a manner so as not to adversely impact the site, adjacent public or private property, or adjacent streams and storm sewer systems.

6. *Sanitary facilities.* Adequate provisions must be made for sufficient temporary sanitary facilities to serve the number of workers on the site.

7. *Planting ground.* All disturbed areas shall be sodded, planted, concreted, paved or otherwise surfaced within five (5) calendar days after completion of each phase of work to avoid washing or spreading of dirt and mud onto other property, sidewalks, curbs, gutters, streets and the space between sidewalks and curbs. If determined by the City that an undue hardship exists because of unfavorable ground conditions, the City may grant an extension of time by which the disturbed areas have to be surfaced.

8.

Grading. All grading activity shall be conducted in conformance with the hours of operations as specified in the UDC, as may be amended or replaced.

J. Spill prevention and control facilities.

1. The permittee shall take appropriate measures to prevent spills and shall develop necessary control facilities for materials such as paint, solvents, petroleum products, chemicals, toxic or hazardous substances, substances regulated under the Resource Conservation and Recovery Act (RCRA) or the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and any wastes generated from the use of such materials and substances, including their containers. Any containment systems employed to meet this requirement shall be constructed of materials compatible with the substances contained and shall be adequate to protect both surface water and groundwater.

2. On-site fueling facilities shall adhere to applicable federal and state regulations concerning storage and dispensers.

K. Enforcement.

1. *Agency responsibility.* Enforcement of this Section shall be the responsibility of the City of Chesterfield or official(s) as determined by the City.

2. *Responsible parties for enforcement purposes; defined.* The party or parties responsible and liable for actions or nonaction taken in relation to this Article, including responsibility for abating violations of this Article, shall be the owner, applicant, any co-applicants, permittee, contractor, developer and any other responsible party and employees thereof.

3. *Complaints.* The City shall receive complaints and inquiries and route the complaint/inquiry to the appropriate responsible enforcement agency.

L. Wetland mitigation for Chesterfield Valley area. A program that provides required mitigation for jurisdictional wetland areas in Chesterfield Valley has been approved by the United States Army Corps of Engineers and funded and constructed by the City of Chesterfield and the Monarch-Chesterfield Levee District. Prior to approval of grading and improvement plans on any parcel in Chesterfield Valley on which jurisdictional wetlands have been identified, the developer/property owner shall reimburse a pro rata share of the cost of development of the mitigation area.

M. Natural watercourse protection.

1. No clearing, grading, excavation, construction or disturbance of any kind is permitted within fifty (50) feet of the top of bank of Bonhomme Creek, Caulks Creek or Creve Coeur Creek, or within twenty-five (25) feet of the top of bank of all other natural watercourses depicted on the most current United States Geological Survey (USGS) 7.5 Minute Series (Topographic) Maps for the City of Chesterfield, Missouri (buffer areas). Permanent vegetation and existing ground elevations and grades within the above-mentioned buffer areas shall be left intact and undisturbed except as permitted in Section 31-04-11(M)(2) of this Article. If no top of bank is apparent, the ten-year, twenty-four-hour or fifteen-year, twenty-minute water surface elevation will determine the top of bank. The top of bank and the buffer area shall be depicted on the grading plan.

2. The following structures, practices and activities are permitted in the buffer areas:

(a) Roads, bridges, trails and utilities approved by the Public Works Director are permitted within the buffer areas, provided that an alternative analysis has clearly demonstrated that no other feasible alternative exists and that minimal disturbance will take place. Following any disturbance, the impacted area shall be restored.

(b) Stream restoration projects are permitted within the buffer area.

(c) Horticultural practices may be used to maintain the health of the natural vegetation. Individual trees may be removed which are dead, diseased and/or dying, are in danger of falling, causing damage to nearby structures, or causing the blockage of the watercourse.

N. Penalties for violation. See Article 08 of this UDC for penalties for violation of this Section of the UDC.

City of Chesterfield, MO
Friday, December 4, 2015

Chapter 31. Unified Development Code

Article 10. Definitions

Sec. 31-10-11. Grading, erosion and sediment control terms.

[Ord. No. 2801, § 3 (Exh. A), 6-16-2014]
As used in this chapter, the following terms shall have the meanings indicated:

ADVERSE IMPACT
A negative impact on land, water, and associated resources resulting from grading activity. The negative impact includes increased risk of flooding, degradation of water quality, increased off-site sedimentation, reduced groundwater recharge, adverse effects on aquatic organisms, wildlife, and other resources, and threats to public health, welfare and safety.

BEST MANAGEMENT PRACTICES or BMPS
Practices, procedures or a schedule of activities to reduce the amount of sediment and other pollutants in stormwater discharges associated with construction and grading activities. For examples of BMPs, refer to the City of Chesterfield's Sediment and Erosion Control Manual.

CLEARING
Any activity that removes vegetative surface cover.

CONTRACTOR
A person who contracts with the owner, developer, or another contractor to undertake any or all grading activities covered by this UDC. This definition encompasses subcontractors.

EROSION
The wearing away of the land surface by the action of wind, water or gravity.

EROSION CONTROL or SEDIMENT CONTROL
Practices, measures or a schedule of activities to reduce the wearing away of the land and reduce the sediment and other pollutants carried by stormwater, wind or gravity.

EXCAVATION
Any act by which earth, sand, gravel, rock or any other similar material is cut into, dug, uncovered, removed, displaced, relocated or bulldozed, and shall include the conditions resulting therefrom.

FILL or FILLING
Any act by which earth, sand, gravel, rock or any other similar material is deposited, placed, pushed, pulled or transported to a place other than the place from which it was excavated and shall include the conditions resulting therefrom.

GRADING or GRADING ACTIVITY

Clearing, excavation or fill or any combination thereof and shall include the conditions resulting from any excavation or fill.

GRADING PERMIT

Written approval from the City of Chesterfield authorizing grading activities.

GRADING PLAN

A plan that accurately depicts a representation of the existing, intermediate and final rough grading prior to construction of improvements and structures.

INSPECTOR

A person who, under the direction of the Public Works Director, reviews any grading activity for compliance with this UDC.

NON POINT SOURCES AND LAND DISTURBANCE PERMITS (NPDES)

Refers to Section 402 of the Missouri Department of Natural Resource's Water Pollution Control Program.

PERMITTEE

The applicant in whose name a valid permit is duly issued pursuant to this UDC, and his/her agents, employees, and others acting in his/her direction.

SEDIMENT AND EROSION CONTROL MANUAL (MANUAL)

A manual which establishes minimum requirements, and provides guidance and additional resources to facilitate control of soil erosion on land that is undergoing development for nonagricultural uses, and to preserve the natural terrain and waterways within the incorporated limits of the City of Chesterfield.

SEDIMENT or SEDIMENTATION

Solid material, mineral or organic, that has been moved from the point of origin by erosion.

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

The SWPPP covers required sediment and erosion control practices specific to site conditions and maintenance and adherence to the SWPPP plan. Its purpose is to ensure the design, implementation, management and maintenance of BMPs in order to reduce the amount of sediment and other pollutants in stormwater discharges associated with land disturbance activities, comply with the Missouri Water Quality Standards and ensure compliance with the terms and conditions of the NPDES.

APPENDIX B

BMP MATRIX

MODEL BEST MANAGEMENT PRACTICES (BMPs)
CITY OF CHESTERFIELD
January 25, 2006

BMP No.	Title	Description Revision Date (if any)	Detail No.	Detail Revision Date (if any)	ENVIRONMENTAL CATEGORY					USE	
					Erosion Control	Pollution Prevention	Runoff Managem't	Sediment Capture	Tracking Control	Tempor-ary	Perman-ent
EC-1	Bonded Fiber Matrix	1/25/2006	---		P					X	
EC-2	Dust Control		---		P					X	
EC-3	Erosion Control Blankets	1/25/2006	---		P					X	X
EC-4	Mulching	1/25/2006	---		P					X	X
EC-5	Rock Outlet	1/25/2006	EC-5	12/5/03	P		A			X	
EC-6	Seeding	1/25/2006	---		P					X	X
EC-7	Sodding		EC-7		P						X
EC-8	Soil Binders	1/25/2006	---		P					X	
EC-9	Streambank Protection	1/25/2006	---		P						X
EC-10	Temporary Stream Crossing	1/25/2006	EC-10	12/5/03	P					X	
PP-1	Non-Sediment Pollution Control	1/25/2006	---			P				X	
RM-1	Check Dam	1/25/2006	RM-1				P	A		X	
RM-2	Diversion-Ridge & Channel	1/25/2006	RM-2	12/5/03			P			X	
RM-3	Diversion-Storm Sewer	1/25/2006	---				P			X	
RM-4	Gradient Terrace	1/25/2006	RM-4		A		P	A			X
RM-5	Grass Lined Channel	1/25/2006	RM-5	12/5/03	A		P			X	X
RM-6	Gravel Bags	1/25/2006	RM-6	12/5/03	A		P	A		X	
RM-7	Level Spreader	1/25/2006	RM-7	12/5/03			P	A		X	
RM-8	Surface Roughening	1/25/2006	RM-8		A		P	A		X	
RM-9	Temporary Slope Drain	1/25/2006	RM-9		A		P			X	
SC-1	Filter Strip	1/25/2006	SC-1		A		A	P			X
SC-2	Inlet Protection-Block & Gravel	1/25/2006	SC-2	12/5/03				P		X	
SC-3	Inlet Protection-Fabric Drop	1/25/2006	SC-3					P		X	
SC-4	Inlet Protection-Gravel & Wire Mesh	1/25/2006	SC-4	12/5/03				P		X	
SC-5	Inlet Protection-Sod Filter	1/25/2006	SC-5		A		A	P			X
SC-6	Sediment Basin	1/25/2006	SC-6	10/6/05			A	P		X	
SC-7	Sediment Trap	1/25/2006	SC-7.1 - 7.3	12/5/03			A	P		X	
SC-8	Silt Fence	1/25/2006	SC-8	12/5/03	A		A	P		X	
TC-1	Construction Entrance		TC-1	12/5/03	A			A	P	X	
TC-2	Construction Parking		---		A				P	X	
TC-3	Construction Road		TC-3	12/5/03	A			A	P	X	
TC-4	Washdown Station		TC-4	12/5/03					P	X	

Note: P - Primary BMP function; A - Additional uses

APPENDIX C

TYPICAL EROSION CONTROL BMPS

BMP	Page
Bonded Fiber Matrix	EC-1
Dust Control	EC-2
Erosion Control Blankets	EC-3
Mulching	EC-4
Rock Outlet	EC-5
Seeding	EC-6
Sodding	EC-7
Soil Binders	EC-8
Streambank Protection	EC-9
Temporary Stream Crossing	EC-10

BONDED FIBER MATRIX

PHYSICAL DESCRIPTION:

A bonded fiber matrix (BFM) is a hydraulically applied continuous layer of elongated fiber strands held together by a water resistant bonding agent designed to protect exposed soil by eliminating direct impact of precipitation. BFMs adhere directly to the surface of the soil, eliminating gaps between the product and the soil; therefore no special treatment is required at the upstream end of the BFM. BFMs have a high water-holding capacity, but do not form a water-insensitive crust that would inhibit plant growth. BFMs biodegrade completely into material known beneficial to plant growth.

WHERE BMP IS TO BE INSTALLED:

Typically installed on slopes where erosion control blankets are impractical and other mulching methods are inadequate.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow: Sheet flow only

WHEN BMP IS TO BE INSTALLED:

Immediately after completion of a phase of grading

INSTALLATION/CONSTRUCTION PROCEDURES:

Follow manufacturer's recommendations to maximize usefulness

O&M PROCEDURES:

✓ Inspect at least every week and after every storm until vegetation is fully established
✓ Repair eroded areas and reapply product and vegetation

SITE CONDITIONS FOR REMOVAL:

Typically left in place to degrade naturally

TYPICAL DETAILS: Not Applicable

DUST CONTROL

PHYSICAL DESCRIPTION:

Control measures designed to reduce the transport of dust, thereby preventing pollutants from infiltrating into stormwater. Examples for construction activities include vegetative cover, wind barriers, minimization of soil disturbance, spray on adhesives, tilling, chemical treatment and water sprays.

WHERE BMP IS TO BE INSTALLED:

Critical in areas of exposed soil.

CONDITIONS FOR EFFECTIVE USE OF BMP:

A combination of the following actions should be used to help reduce the dust and air pollution at a construction site.

Minimize Concurrent Areas of Soil Disturbance - Phase work to the extent practical

Vegetative Cover - For areas not subjected to traffic, vegetation provides the most practical method of dust control and should be established as early as possible. Temporary vegetation should also be used. See Seeding and Sodding BMPs for additional information.

Sprinkling - The site can be sprinkled with water until the surface is moist. This practice is effective for dust control on large areas, haul routes or other traffic routes, but constant repetition is required for effective control.

Tilling - Roughen the surface and bring clods to the surface. This is an emergency measure that should be used before soil blowing starts. Begin tillage on windward side of the site. Chisel plows with shanks spaced about 12 inches to 18 inches apart and spring toothed harrows are examples of equipment that may produce the desired effect. See Surface Roughening BMP for additional information.

Wind Barriers - Solid board fences, snow fences, burlap fences, crate walls and similar materials can be used to control air currents and blowing soil. Barriers placed at right angles to prevailing wing currents at intervals of about 10 times their height are effective in controlling soil blowing.

Street Cleaning - Paved areas that have soil on them from construction sites should be cleaned continuously, at least daily, utilizing a street sweeper or bucket type endloader or scraper.

Mulching - This practice offers a fast and effective means of controlling dust when properly applied. Binders and tackifiers should be used on organic mulches. Mulching is not recommended for areas with heavy traffic. See Mulching BMP for additional information.

NOTE: If calcium chloride or spray-on adhesives are used for dust control, a permit may be required from the Missouri Department of Natural Resources.

WHEN BMP IS TO BE INSTALLED:

Routinely, especially in advance of and during periods of dry weather

INSTALLATION/CONSTRUCTION PROCEDURES: See Conditions for Effective Use above

O&M PROCEDURES:

Inspect daily and renew as needed

SITE CONDITIONS FOR REMOVAL:

Maintain practices until all disturbed areas are vegetated or paved and blowing soil is no longer a concern.

TYPICAL DETAILS: Not Applicable

EROSION CONTROL BLANKETS

PHYSICAL DESCRIPTION:

An erosion control blanket is a preformed protective blanket of plastic fibers, straw or other plant residue designed to protect soil from the impact of precipitation and overland flow, and retain moisture to facilitate establishment of vegetation. There are many products on the market designed for a variety of applications.

WHERE BMP IS TO BE INSTALLED:

Typically installed on slopes or in channels prior to establishment of vegetation.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Several factors, such as soil conditions, steepness and length of slope, depth of flow, runoff velocities, and time required to establish desired vegetation, influence the choice of product. Manufacturer's recommendations should be followed. Products are available for a variety of uses:

Netting - synthetic or natural fiber mesh installed over disturbed area to hold organic mulch and/or seed in place

Biodegradable Erosion Control Blanket - natural fiber blanket held together by netting to provide temporary erosion protection on slopes and channels.

Permanent Erosion Control Blanket - synthetic blanket material which provides permanent erosion control on slopes and channels with increased water flow velocities.

Turf Reinforcement Mat - 3-dimensional permanent synthetic mat that provides a matrix to greatly reinforce the root system of the desired vegetation for permanent erosion protection in high flow channels and on critical slopes.

WHEN BMP IS TO BE INSTALLED:

Dependent upon intended use - immediately after completion of a phase of grading, or installation of vegetation

INSTALLATION/CONSTRUCTION PROCEDURES:

Follow manufacturer's recommendations and specifications, particularly noting requirements for check slots, fastening devices and need for firm contact with soil.

O&M PROCEDURES:

- ✓ Inspect at least every week and after every storm until adequate vegetation is established
- ✓ Repair erosion and/or undermining at top of slope
- ✓ Repair undermining beneath blankets - pull back the blanket(s), fill and compact eroded area, revegetate and then secure blanket(s) firmly
- ✓ Reposition or replace blankets that have moved along the slope or channel and secure firmly
- ✓ Replace damaged blankets

SITE CONDITIONS FOR REMOVAL:

Temporary blankets will generally degrade naturally; permanent blankets remain in place

TYPICAL DETAILS: Not Applicable

Category: EROSION CONTROL
Use Group: TEMPORARY OR PERMANENT
ISSUED 6-1-03
REVISED 1-25-06

MULCHING

PHYSICAL DESCRIPTION:

A layer of organic material designed to protect exposed soil or freshly seeded areas from erosion by eliminating direct impact of precipitation and slowing overland flow rates. Mulch materials may include, but are not limited to, such things as grass, hay, straw, wood chips, wood fibers, and shredded bark.

WHERE BMP IS TO BE INSTALLED:

Typically installed on seeded areas for temporary use, and in landscaped areas for permanent use

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow:	Sheet flow only
Slopes:	See attached chart for types of mulch acceptable as a function of slope length and steepness
Mulching Rates:	See attached table

WHEN BMP IS TO BE INSTALLED:

Immediately after grading landscaped areas or seeding other areas

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Install upstream BMPs to protect area to be mulched
- ✓ Rough grade area and remove all debris larger than 1 inch if area is to be vegetated and mowed in the future, larger than 2 inches if area is to be permanently mulched
- ✓ If area is to be seeded, follow requirements of Seeding BMP
- ✓ Spread mulch and anchor by punching it into the ground, using netting, peg and twine, or tacking with liquid binder

O&M PROCEDURES:

- ✓ Inspect at least every week and after every storm until adequate vegetation is established; annually for permanent mulch
- ✓ Protect from vehicular and foot traffic
- ✓ Repair damaged, degraded or eroded areas – reseed as needed and replace mulch

SITE CONDITIONS FOR REMOVAL:

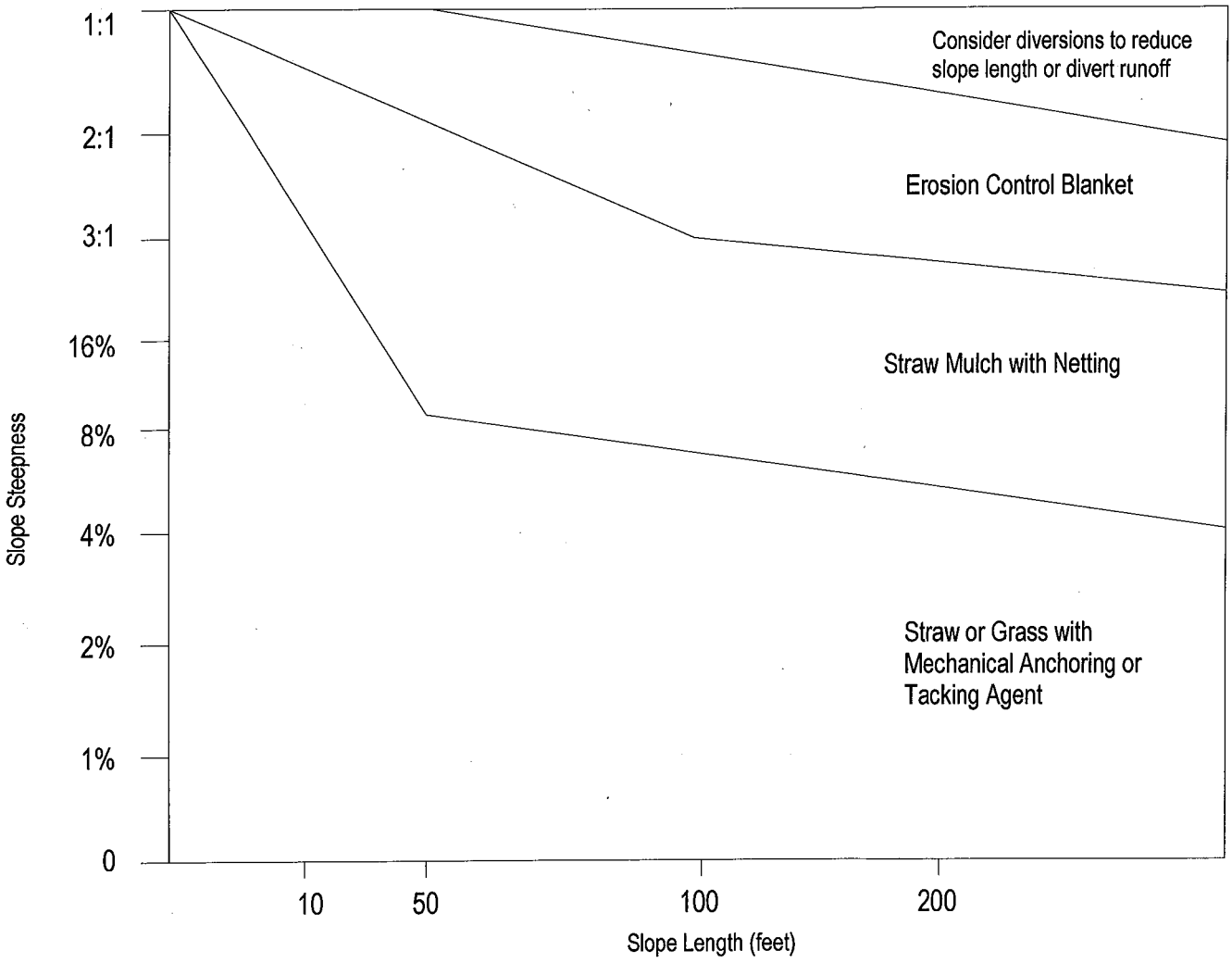
Temporary mulch should be removed when adequate vegetation is established

TYPICAL DETAILS:

Type of mulch required for various slopes and application rates attached

MULCHING (CONT.)

MULCH SELECTION AS A FUNCTION OF SLOPE



GENERAL MULCH RECOMMENDATIONS TO PROTECT FROM SPLASH AND SHEET FLOW

Material	Rate Per Acre	Requirements	Notes
Straw	2-2 ½ tons	Dry, unchopped, unweathered; avoid weeds.	Spread by hand or machine; must be tacked or tied down.
Wood Fiber or Wood Cellulose	½ - 1 ton		Use with hydroseeder; may be used to tack straw. Do not use in hot, dry weather.
Wood Chips	5 – 6 tons	Air Dry. Add Nitrogen fertilizer at 12 lb/ton	Apply with blower, chip handler, or by hand. Not for fine turf areas.
Bark	35 yd^3	Air dry, shredded, or hammermilled; or chips.	Apply with mulch blower, chip handler, or by hand. Do not use asphalt tack.

ROCK OUTLET

PHYSICAL DESCRIPTION:

A rock apron installed over a geotextile fabric at a point of concentrated discharge, designed to slow the velocity of flow and protect the receiving area from erosion.

WHERE BMP IS TO BE INSTALLED:

Installed at BMP outlets, for example, at the end of pipe slope drains, the emergency overflow or outlet pipe of a sediment basin.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow:	Concentrated flow
Flow at Outlet:	Maximum velocity of 10 fps

WHEN BMP IS TO BE INSTALLED:

With the construction of the upstream BMP that creates the concentrated discharge.

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Grade subgrade of rock blanket to required section
- ✓ Place filter fabric, providing enough slack to assure that rock will not tear the fabric when it is placed
- ✓ Install rock with uniform profile and cross section

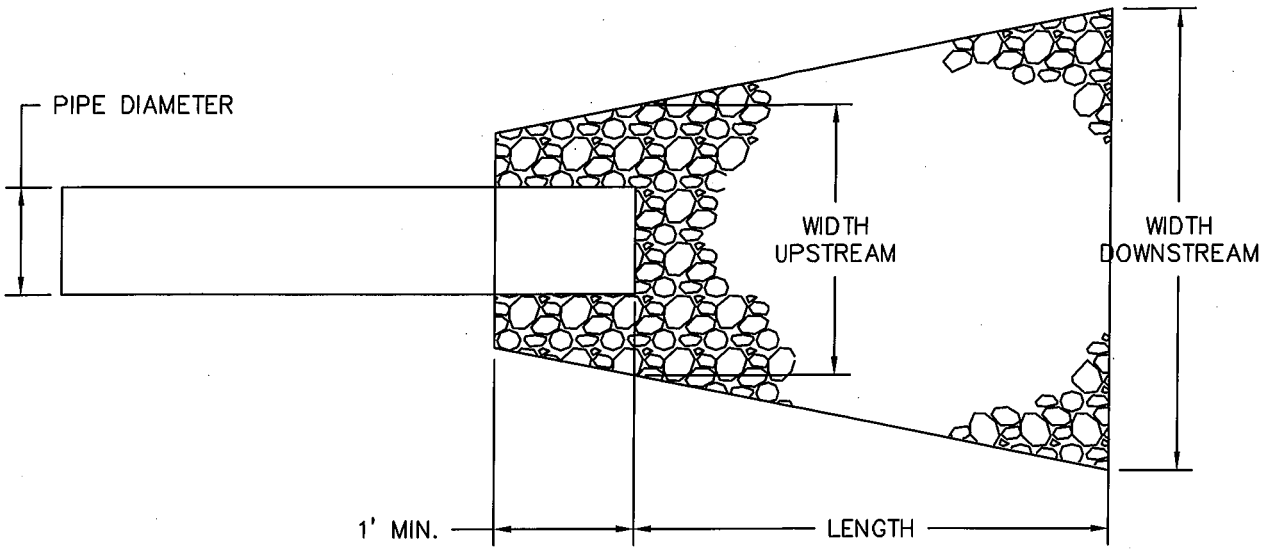
O&M PROCEDURES:

- ✓ Inspect at least every week and after every storm during construction
- ✓ Remove sediment and trash accumulation
- ✓ Replace displaced rock - larger rock may be required.
- ✓ Stabilize eroded areas - extend if necessary

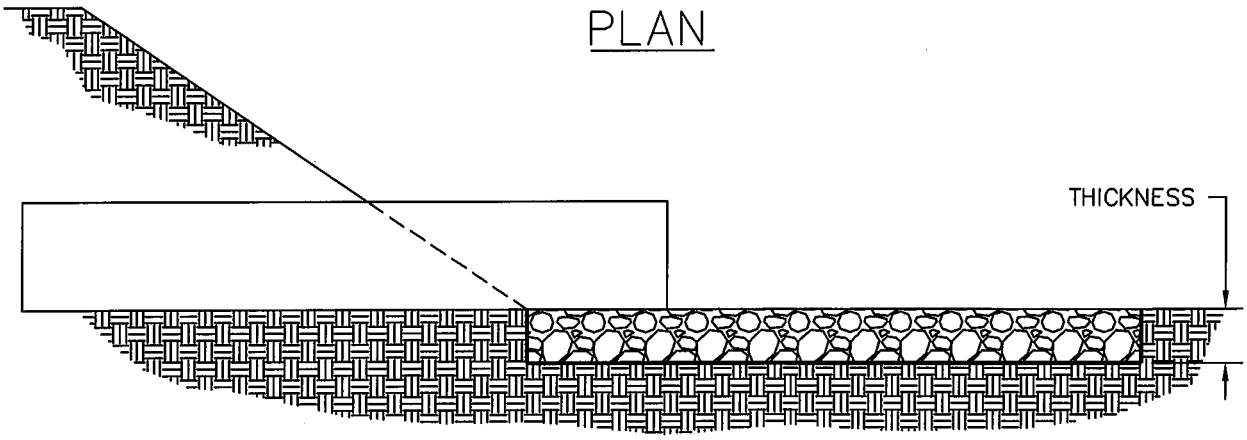
SITE CONDITIONS FOR REMOVAL:

Removed concurrently with upstream BMP.

TYPICAL DETAIL: EC-5



PLAN



GEOTEXTILE FABRIC ALONG BOTTOM
AND ALL SIDES

SECTION/ELEVATION

PIPE DIAMETER (INCHES)	WIDTH UPSTREAM (FEET)	WIDTH DOWNSTREAM (FEET)	LENGTH (FEET)	ROCK SIZE (INCHES)	THICKNESS (INCHES)
6	1.5	8	8	5–10	15
12	3	12	12	5–10	15
18	4.5	16	16	9–14	21
24	6	20	20	9–14	21
30	7.5	22	22	9–14	21

NOTE: WIDTH UPSTREAM IS MEASURED AT END OF PIPE

DRAWING EC-5

ISSUED	REVISIONS
6-1-03	12-5-03

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL

ROCK OUTLET

SEEDING

PHYSICAL DESCRIPTION:

Establishment of vegetation by spreading grass seed designed to protect exposed soil from erosion by eliminating direct impact of precipitation and slowing overland flow rates. Once established, the vegetative cover will also filter pollutants from the runoff.

WHERE BMP IS TO BE INSTALLED:

Exposed soil after a phase of rough or finish grading has been completed, or areas where no activity will occur for 5 days

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow:	Sheet flow
Contributing Slope Length:	30 foot maximum for 3:1 slopes 50 foot maximum for slope between 3:1 and 10:1 100 foot maximum for slopes under 10%
Minimum Rates:	See attached chart(s)
Acceptable Dates:	See attached chart

WHEN BMP IS TO BE INSTALLED:

Immediately after rough or finished grading is completed

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Install upstream BMPs to protect area to be seeded
- ✓ Rough grade area and remove all debris larger than 1 inch in diameter and concentrated areas of smaller debris
- ✓ Install stabilization grids, if needed
- ✓ Mix soil amendments (lime, fertilizer, etc.) into top 3"-6" of soil as needed
- ✓ Plant seed ¼ - ½ inch deep
- ✓ Roll lightly to firm surface
- ✓ Cover seeded area with mulch unless seeding completed during optimum spring and summer dates
- ✓ Install additional stabilization (netting, bonded fiber matrix, etc.) as required
- ✓ Water immediately – enough to soak 4 inches into soil without causing runoff

O&M PROCEDURES:

- ✓ Inspect at least every week and after every storm
- ✓ Protect area from vehicular and foot traffic
- ✓ Reseed areas that have not sprouted within 21 days of planting.
- ✓ Repair damaged or eroded areas and reseed and stabilize as needed
- ✓ Do not mow until 4 inches of growth occurs
- ✓ During the first 4 months, mow no more than 1/3 the grass height
- ✓ Refertilize during 2nd growing season

SITE CONDITIONS FOR REMOVAL:

Does not require removal, but temporary seeding can be removed immediately prior to work returning to an area

TYPICAL DETAILS:

Minimum seeding rates and acceptable dates for work attached

SEEDING REQUIREMENTS

Dates For Seeding

Permanent Seeding	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Tall Fescue			O	O	O			O	O			
Smooth Brome			O	O	O			O	O			
Fescue & Brome			O	O	O	O		O	O			
Fescue, Rye & Bluegrass	A	A	O	O	O	P	P	O	O	P	P	A

Temporary Seeding	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rye or Sudan	A	A	O	O	O	O	O	O	O	O	A	A
Oats		A	O	O	O	O	O	O	O			

O - Optimum seeding dates A - Acceptable seeding dates

P - Permitted seeding dates with reseeding 2 months later - Initially use 50% of seed and 75% of fertilizer. Reseed with additional 75% seed and remaining fertilizer.

Minimum Fertilizer and Seeding Rates

Permanent Seeding *	Lb./acre	lb./1000 sq.ft.
Tall Fescue	300	7
Smooth Brome	200	4.6
Mixture #1	250	5.7
Mixture #2	210	4.8

Mixture #1 - Tall Fescue @ 150 lbs./ac. and Brome @ 100 lbs./ac.

Mixture #2 - Tall Fescue @ 100 lbs./ac., Perennial Rye Grass @ 100 lbs./ac. and Kentucky Bluegrass @ 10 lbs./ac.

* Seeding rate for slopes in excess of 20% (5:1) shall be 10 lb./1000 sq. ft.

Temporary Seeding	Lb./acre	lb./1000 sq.ft.
Rye or Sudan	150	3.5
Oats	120	2.8

Fertilizer	Permanent Seeding (lb./acre)	Temporary Seeding (lb./acre)
Nitrogen	45	30
Phosphate	65	30
Potassium	65	30
Lime - ENM	600	600

ENM - effective neutralizing material per State evaluation of quarried rock

SODDING

PHYSICAL DESCRIPTION:

A ¾-1 inch thick mat of vigorous turf, free of disease, insects and weeds. Sod prevents raindrops from disrupting the soil structure and causing erosion. Sod slows water runoff and acts as a filter when sediment laden runoff crosses over the sodded area.

WHERE BMP IS TO BE INSTALLED:

Typically installed in areas requiring immediate erosion protection, such as swales or detention ponds and as filter strips, around inlets, and adjacent to curbs. Also installed in areas requiring immediate aesthetic appearance or function such as entrances to new subdivision and off site construction areas.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow: Sheet flow and low concentrated flows with velocities less than 5 fps

WHEN BMP IS TO BE INSTALLED

Immediately after finish grading, installation of area inlets, and installation of underground services and foundations of new homes.

INSTALLATION/CONSTRUCTION PROCEDURES:

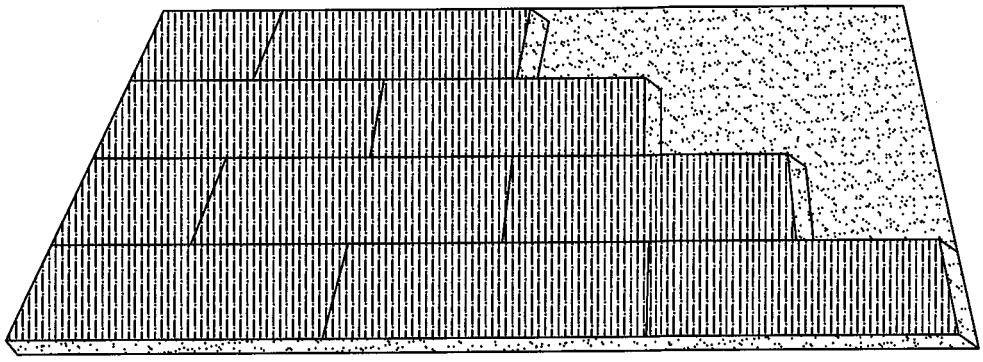
- ✓ Rough grade area and remove all debris larger than ½ inch in diameter and concentrated areas of smaller debris.
- ✓ Soil preparation of area to be sodded shall be determined by tests to determine lime and fertilizer requirements. Soil amendments shall be mixed into top 3~6 inches of soil by disking or other means.
- ✓ Level and roll soil lightly to provide an even grade and firm the surface. Soil should not be excessively wet or dry.
- ✓ Lay first row of sod perpendicular to the slope or direction of flow. Butt subsequent rows tight against previous rows with strips staggered in brick-like pattern. Fill minor gaps with good soil and roll entire surface to ensure contact.
- ✓ Stake, staple and/or net corners and centers of sod strips as required.
- ✓ Water immediately after installation enough to soak 4 inches into soil without causing runoff.

O&M PROCEDURES:

- ✓ Water sod daily for 3 weeks - enough to soak 4 inches into soil without causing runoff.
- ✓ Reposition areas of sod that has moved along the slope.
- ✓ Remove sediment accumulations – replace sod if necessary.
- ✓ Repair any eroded areas, replace sod, and stabilize as needed
- ✓ Do not mow until 3 inches of new growth occurs. During the first 4 months, mow no more than 1/3 the grass height.

SITE CONDITIONS FOR REMOVAL: Not Applicable

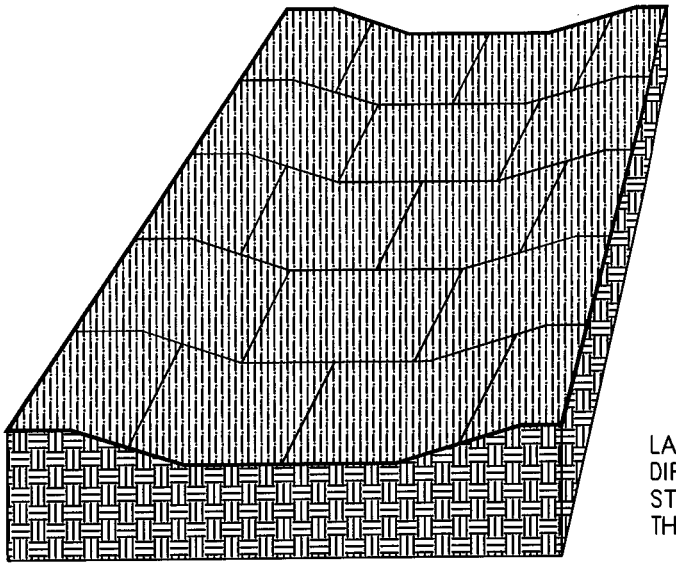
TYPICAL DETAIL: EC-7



LAY SOD IN A STAGGERED PATTERN WITH STRIPS BUTTED TIGHTLY AGAINST EACH OTHER.

ON SLOPES > 4%, USE PEGS OR STAPLES TO FASTEN SOD FIRMLY AT THE CORNERS AND CENTERS.

INSTALLATION OF GRASS SOD



LAY SOD PERPENDICULAR TO THE DIRECTION OF FLOW. USE PEGS OR STAPLES TO FASTEN SOD FIRMLY AT THE CORNERS AND CENTERS.

INSTALLATION OF SOD IN WATERWAYS

JUTE MATTING CAN BE USED WHERE ADDITIONAL STABILITY IS REQUIRED

DRAWING EC-7

ISSUED	REVISIONS
6-1-03	

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL

SODDING

SOIL BINDERS

PHYSICAL DESCRIPTION:

A material sprayed onto the surface of exposed soils designed to protect against erosion for wind or runoff. The useful life of most products is 3 to 6 months. Examples of materials used include vegetable-based adhesives, copolymers, petroleum oils and resin-emulsions.

WHERE BMP IS TO BE INSTALLED:

Typically used in disturbed areas and in combination with other BMPs such as perimeter controls, seeding or mulching.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow: Sheet flow

WHEN BMP IS TO BE INSTALLED:

Immediately after completion of a phase of grading

INSTALLATION/CONSTRUCTION PROCEDURES:

Follow manufacturer's recommendations to maximize usefulness and avoid formation of pools or impervious areas where stormwater cannot infiltrate

O&M PROCEDURES:

✓ Inspect at least every week for damage from vehicles, runoff, or freeze-thaw conditions
✓ Reapply product or utilize additional BMP

SITE CONDITIONS FOR REMOVAL:

Typically left in place to degrade naturally

TYPICAL DETAILS: Not Applicable

Category: EROSION CONTROL
Use Group: PERMANENT
ISSUED 6-1-03
REVISED 1-25-06

STREAMBANK PROTECTION

PHYSICAL DESCRIPTION:

A vegetative, structural or combination treatment of streams designed to stabilize the stream and reduce erosion. It is important to note that a systemic analysis of the entire reach of stream must be conducted in order to avoid unintended negative impacts on a stream as a result of a corrective action at an isolated location. A wide array of products and methodologies can be used to stabilize streams: live stakes; cellular confinement matrices; articulated block pavers; rip rap; gabion baskets; turf reinforcement mats; fabric formed revetments; cedar tree revetments; straw wattles; grade control structures; stilling basins; etc.

WHERE BMP IS TO BE INSTALLED:

Open channels downstream from developed areas.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Acceptable methods vary widely due to the unique nature of each reach of channel. Design considerations include: current and future watershed conditions; discharge; velocity; sediment load; channel slope; control of bottom scour (incising); soil conditions; compatibility with other improvements; changes in channel alignment; and protection and maintenance of fish and wildlife habitats and existing tree canopy.

WHEN BMP IS TO BE INSTALLED:

Well in advance of disturbing any upstream areas in order to give plant material a relatively long period to become established and allow ample time for inspection and necessary repairs during construction of the remainder of the development.

INSTALLATION/CONSTRUCTION PROCEDURES:

Procedures are specific to materials used. General construction principles include:

- ✓ Stabilize the channel bottom first to prevent incising and knick points from undermining the bank protection
- ✓ Start and stop bank protection at stable points along the channel
- ✓ Minimize the size of all disturbed areas and stabilize as soon as each phase of construction is complete
- ✓ Use other BMPs to prevent runoff from disturbing the streambank protection area until it has been completed
- ✓ Store all construction materials well away from the stream
- ✓ At the end of each workday, move all construction equipment out of and away from the stream to prevent flooding
- ✓ Avoid steep slopes on the streambank
- ✓ Fence the construction area and post warning signs if trespassing or vandalism is likely

O&M PROCEDURES:

- ✓ Inspect at least every week and after every storm during construction; and once each season thereafter
- ✓ Repair, relocate, or add BMPs protecting channel until the streambank protection is operational
- ✓ Remove sediment as needed for proper establishment of protection measures
- ✓ Repair gaps in vegetative cover by replacing plants or designing alternative methods/materials
- ✓ Repair structural systems as needed

SITE CONDITIONS FOR REMOVAL: Not Applicable

TYPICAL DETAILS: Not Applicable

Category: EROSION CONTROL
Use Group: TEMPORARY
ISSUED 6-1-03
REVISED 1-25-06

TEMPORARY STREAM CROSSING

PHYSICAL DESCRIPTION:

A stabilized stream crossing designed to protect the stream banks while facilitating access for construction vehicles and equipment. Use of temporary stream crossings is discouraged - crossings are a direct source of pollution and should be avoided if alternatives are feasible. If the work involves construction below the normal water of a defined channel, a permit will need to be obtained from the US Army Corps of Engineers prior to the City approving the SWPPP.

WHERE BMP IS TO BE INSTALLED:

At locations where work and disruption in creek can be minimized

CONDITIONS FOR EFFECTIVE USE OF BMP:

When no other feasible alternative exists, crossing streams may be permitted. Design considerations include: current and proposed watershed conditions; average and peak discharge (2 year, 24 hour storm); effect on water surface elevation off-site; velocity; sediment removal; and protection of fish and wildlife habits and existing trees. Criteria for certain types of crossings follow.

Low Water Crossing - Any constant flow less than 3" deep; light traffic; bank height less than 5 feet; perpendicular to flow or with slight upstream arc

Culvert - Sized for 2 year, 24 hour storm with 1 foot freeboard and no flooding of offsite areas; pipe parallel to flow; embankment perpendicular to channel or with slight upstream arc; rip rap on exposed faces sized for overtopping during a peak storm period

WHEN BMP IS TO BE INSTALLED:

During dry periods in advance of need to cross stream.

INSTALLATION/CONSTRUCTION PROCEDURES:

Procedures are specific to type of crossing used. Procedures for low water crossings and culverts include:

- ✓ Ensure that all necessary materials are on site before beginning work
- ✓ Provide a stable means to bypass normal channel flow prior to disturbing channel
- ✓ Scarify and stabilize channel bottom to provide even foundation for crossing
- ✓ Install culvert, if needed – place clayey soil to required dimensions around pipe
- ✓ Grade and compact access ramps
- ✓ Place and compact soil embankment for culvert; rip rap for low water crossing, if needed
- ✓ Install fabric under crossing and to required distance from creek bank
- ✓ Install stone on access ramps and cellular confinement system for driving surface of crossing
- ✓ Place rip rap on faces of and downstream from culvert embankment

O&M PROCEDURES:

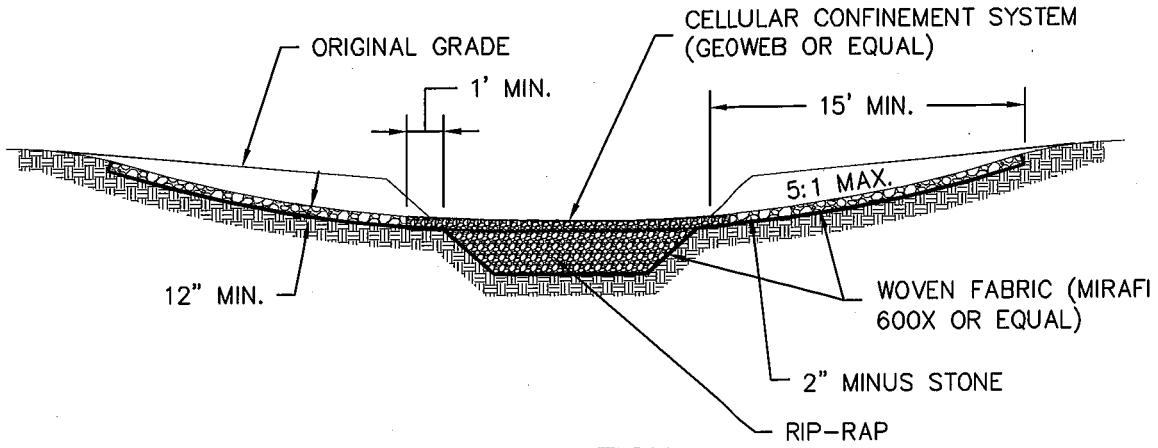
- ✓ Inspect at least every week and after every storm
- ✓ Remove sediment and trash accumulation at inlet
- ✓ Repair settlement, cracking, or piping holes
- ✓ Stabilize eroded areas at outlet – extend rip rap if necessary

SITE CONDITIONS FOR REMOVAL:

Remove as soon as alternative access is available. All foreign materials should be removed from creek. The streambed and banks should be returned to the original contour and should be stabilized if necessary.

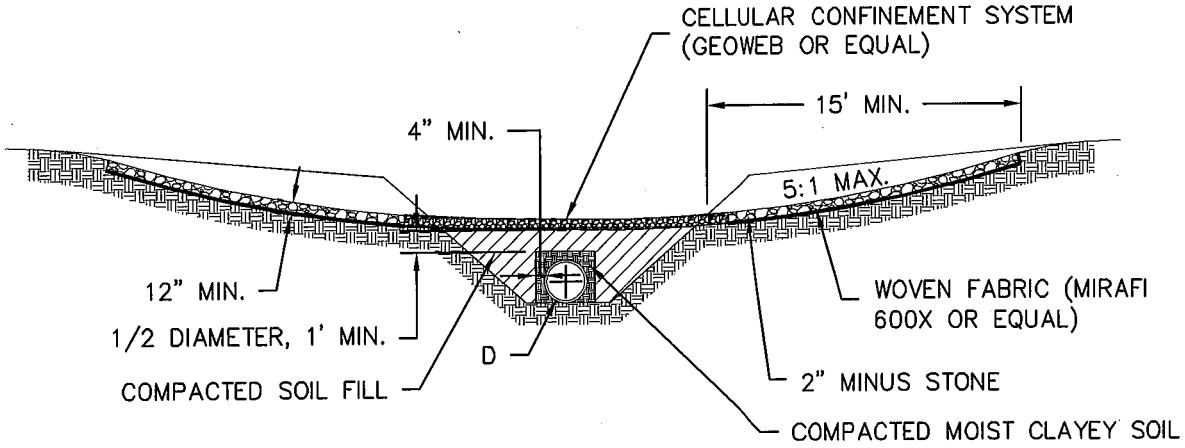
TYPICAL DETAIL: EC-10

LOW WATER CROSSING

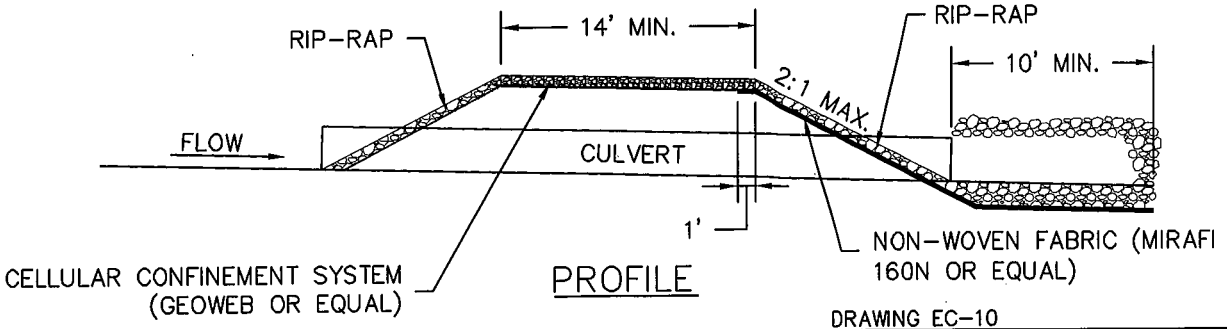


ELEVATION

CULVERT



ELEVATION



PROFILE

NOTE:

1. MULTIPLE CONDUITS CAN BE USED.
2. ELEVATION OF CONDUITS CAN VARY.

DRAWING EC-10

ISSUED	REVISIONS
6-1-03	12-5-03

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL
TEMPORARY
STREAM CROSSING

APPENDIX D

TYPICAL POLLUTION PREVENTION BMPS

BMP	Page
Non-Sediment Pollution Control	PP-1

Category: POLLUTION PREVENTION
Use Group: TEMPORARY
ISSUED 6-1-03
REVISED 1-25-06

NON-SEDIMENT POLLUTION CONTROL

PHYSICAL DESCRIPTION:

Control measures designed to prohibit chemicals, hazardous materials, solid waste, human waste and construction debris from polluting stormwater. Pollutants carried in solution or as surface films on runoff will be carried through most erosion control and sediment capture BMPs. Keeping substances like fuel, oil, asphalt, paint, solvents, fertilizer, soil additives, concrete wash water, solid waste, human waste and construction debris from polluting runoff can be accomplished to a large extent through good housekeeping on the site and following the manufacturer's recommendations for disposal.

WHERE BMP IS TO BE INSTALLED:

Temporary sanitary facilities,collection, storage and fueling areas should be located onsite in an area that does not receive a substantial amount of runoff from upland areas and does not drain directly to lakes, creeks, streams, rivers, sewers, groundwater, wetlands, or road ditches.

CONDITIONS FOR EFFECTIVE USE OF BMP:

- ✓ Reduction in pollutants depends heavily on how construction personnel perform their duties. An effective management system requires training and signage to promote proper storage, handling and disposal of materials. Follow up observations of actions and inspection of storage areas by management personnel is also required.
- ✓ Plans should contain notes clearly stating requirements for addressing potential pollutants
- ✓ Fueling areas and storage areas for hazardous materials should be protected by berms or other means of catching leaks or spills

WHEN BMP IS TO BE INSTALLED:

Immediately following installation of construction entrance and wash station

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Place waste receptacles near area of work
- ✓ Construct protective berm or other devices around fueling and hazardous materials storage areas
- ✓ Install appropriate signage
- ✓ Post guidelines for proper handling, storage and disposal of materials, and emergency spill cleanup on site
- ✓ Provide sufficient temporary toilet facilities to serve the number of workers on the site

O&M PROCEDURES:

- ✓ Inspect activities on regular basis
- ✓ Inspect storage areas and control devices at least every week and after every storm
- ✓ Maintenance of temporary toilet facilities should be frequent and thorough
- ✓ Make necessary corrections and repairs

SITE CONDITIONS FOR REMOVAL:

Maintain practices until all construction on the site has been completed

TYPICAL DETAILS:

General pollution prevention notes attached

Category: POLLUTION PREVENTION
Use Group: TEMPORARY
ISSUED 6-1-03
REVISED 1-25-06

POLLUTION PREVENTION PROCEDURES

1. HANDLING AND DISPOSAL OF HAZARDOUS MATERIALS

   DO: Prevent spills
   Use products up
   Follow label directions for disposal
   Remove lids from empty bottles and cans when disposing in trash
   Recycle wastes whenever possible

   DON'T: Don't pour waste into sewers or waterways on the ground
   Don't pour waste down the sink, floor drain or septic tanks
   Don't bury chemicals or containers, or dispose of them with construction debris
   Don't burn chemicals or containers
   Don't mix chemicals together

2. Containers shall be provided for collection of all waste material including construction debris, trash, petroleum products and any hazardous materials to be used onsite. All waste material shall be disposed of at facilities approved for that material.

3. No waste materials shall be buried on-site.

4. Mixing, pumping, transferring or otherwise handling construction chemicals such as fertilizer, lime, asphalt, concrete drying compounds, and all other potentially hazardous materials shall be performed in an area away from any watercourse, ditch or storm drain.

5. Equipment fueling and maintenance, oil changing, etc., shall be performed only in an area designated for that purpose. The designated area is equipped for recycling oil and catching spills.

6. Concrete wash water shall not be allowed to flow directly to storm sewers, streams, ditches, lakes, etc without being treated. A sump or pit shall be constructed to contain concrete wash water.

7. If substances such as oil, diesel fuel, hydraulic fluid, antifreeze, etc. are spilled, leaked, or released onto soil, the soil shall be dug up and disposed of at a licensed sanitary landfill (not a construction/demolition debris landfill). Spills on pavement shall be absorbed with sawdust, kitty litter or product designed for that purpose and disposed of at a licensed sanitary landfill. Hazardous or industrial wastes such as most solvents, gasoline, oil-based paints, and cement curing compounds require special handling. These materials will be removed from the site and recycled or disposed of in accordance with MoDNR requirements.

8. State law requires the party responsible for a petroleum product spill in excess of 50 gallons to report the spill to MoDNR (537-634-2436) as soon as practical after discovery. Federal law requires the responsible party to report any release of oil if it reaches or threatens a sewer, lake, creek, stream, river, groundwater, wetland, or area, like a road ditch, that drains into one of the above.

9. Sufficient temporary toilet facilities to serve the number of workers on the site shall be provided. The facilities shall be serviced frequently to maintain a sanitary condition.

APPENDIX E

TYPICAL RUNOFF MANAGEMENT BMPS

BMP	Page
Check Dam	RM-1
Diversion-Ridge & Channel	RM-2
Diversion-Storm Sewer	RM-3
Gradient Terrace	RM-4
Grass Lined Channel	RM-5
Gravel Bags	RM-6
Level Spreader	RM-7
Surface Roughening	RM-8
Temporary Slope Drain	RM-9

Category: RUNOFF MANAGEMENT
Use Group: TEMPORARY
ISSUED 6-1-03
REVISED 1-25-06

CHECK DAM

PHYSICAL DESCRIPTION:

A small dam built within a drainage swale or temporary diversion channel designed to pond water and cause sediment to settle out. Dams can be constructed of rock, sand bags or gravel bags.

WHERE BMP IS TO BE INSTALLED:

At intervals along drainage swales or channels. The top of the downstream check dam should be level with the base of the upstream check dam.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow:	Moderate concentrated flow
Contributing Area:	Maximum of 2 acres
Channel Slope:	Maximum of 2%

WHEN BMP IS TO BE INSTALLED:

Prior to disturbance of natural vegetation in contributing drainage area; immediately after construction of drainageway

INSTALLATION/CONSTRUCTION PROCEDURES:

✓ Grade drainageway and compact area of check dam
✓ Place rock, sand bags or gravel bags to required configuration perpendicular to flow

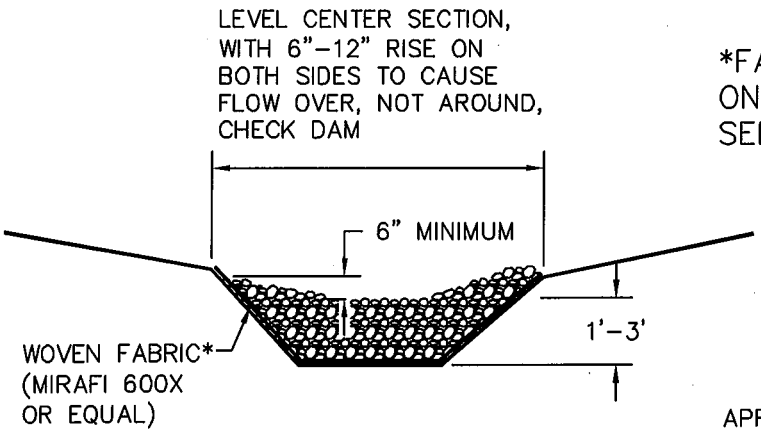
O&M PROCEDURES:

✓ Inspect at least every week and after every storm
✓ Remove trash and leaf accumulation
✓ Remove sediment buildup once it reaches ½ depth of check dam or 12" depth, whichever is less
✓ Restore dam structure to original configuration to protect banks
✓ Replace rock on upstream face of dam if ponding does not drain in reasonable timeframe

SITE CONDITIONS FOR REMOVAL:

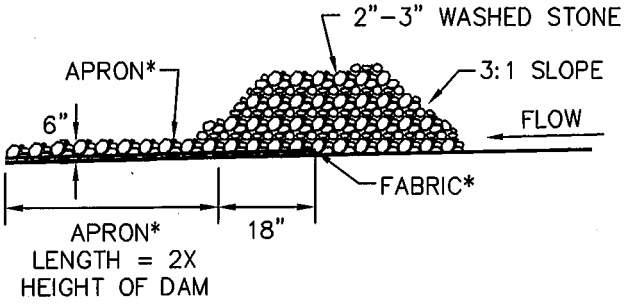
Remove after contributing drainage areas have been adequately stabilized and vegetation is adequately established in drainageway. Regrade and vegetate area of check dam.

TYPICAL DETAIL: RM-1



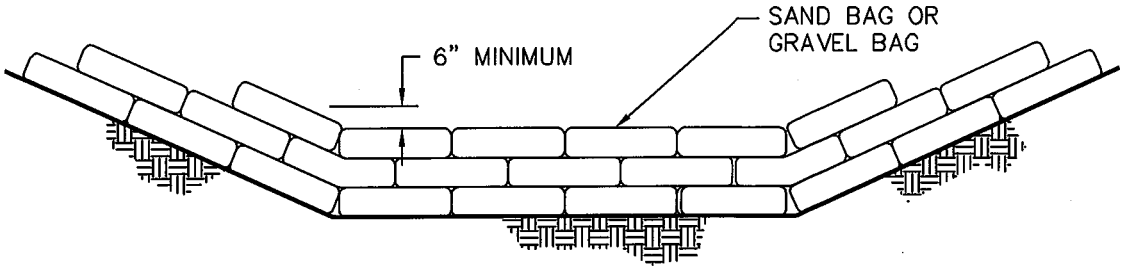
CROSS SECTION

*FABRIC AND APRON INSTALLED ON LAST CHECK DAM IN NEWLY SEEDED DRAINAGE WAYS.

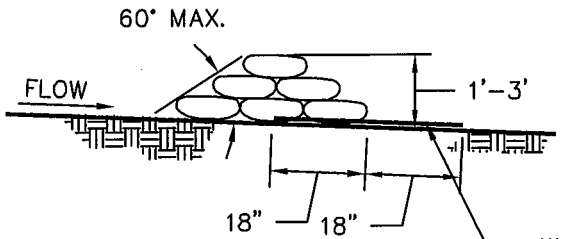


PROFILE

ROCK CHECK DAM



CROSS SECTION



PROFILE

NOTES:

1. NUMBER OF BAGS AND ARRANGEMENT MAY VARY WITH ON–SITE CONDITIONS.
2. SEE GRAVEL BAG BMP FOR ADDITIONAL INFORMATION.

WOVEN FABRIC* (MIRAFI 600X OR EQUAL)

SAND BAG OR GRAVEL BAG CHECK DAM

DRAWING RM–1

ISSUED	REVISIONS
6–1–03	

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL

CHECK DAM

Category: RUNOFF MANAGEMENT
Use Group: TEMPORARY
ISSUED 6-1-03
REVISED 1-25-06

DIVERSION-RIDGE & CHANNEL

PHYSICAL DESCRIPTION:

A compacted earth or gravel ridge, excavated channel or a combination of ridge and channel designed to direct runoff away from or around disturbed areas and cause sediment to settle out. Diversions built on a level contour are used in combination with temporary slope drains to provide adequate conveyance. Diversions built with positive drainage slopes release runoff into additional BMPs such as sediment traps or level spreaders. BMPs such as check dams can also be used in diversion channels to slow velocities.

WHERE BMP IS TO BE INSTALLED:

At top of disturbed slopes and other sensitive areas to protect them from upstream runoff; intermediate locations along long slopes to reduce slope length; and perimeter of construction area

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow:	Sheet flow and low-volume concentrated flows
Contributing Area:	Contributing slope length – 300 feet maximum; 100 feet for slopes greater than 5%
Channel Lining:	Diversions of slopes exceeding 5% should be lined with gravel or other material due to high velocity

WHEN BMP IS TO BE INSTALLED:

Prior to disturbance of natural vegetation on slopes and at intervals during construction of fill slopes

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Grade and compact channel and/or ridge
- ✓ Install vegetation or protective lining
- ✓ Stabilize outfall area as depicted on plan
- ✓ Install lathe or post at each end of diversion, and at 20 foot intervals. Mark maximum allowable sediment depth at ½ the depth of the channel.

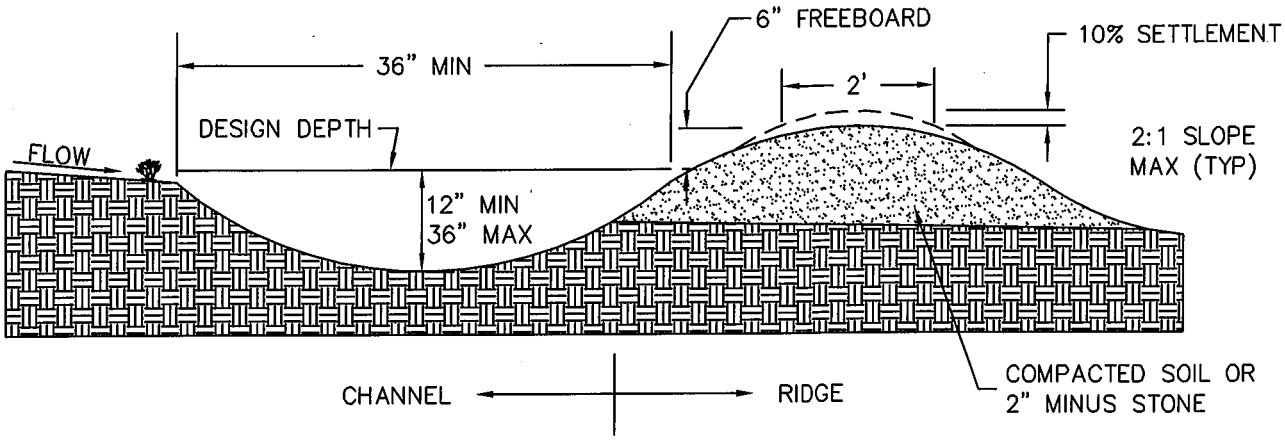
O&M PROCEDURES:

- ✓ Inspect at least every week and after every storm
- ✓ Remove sediment once sediment reaches ½ design depth, as indicated on monitoring posts
- ✓ Remove any trash accumulation
- ✓ Repair, revegetate or stabilize any erosion damage

SITE CONDITIONS FOR REMOVAL:

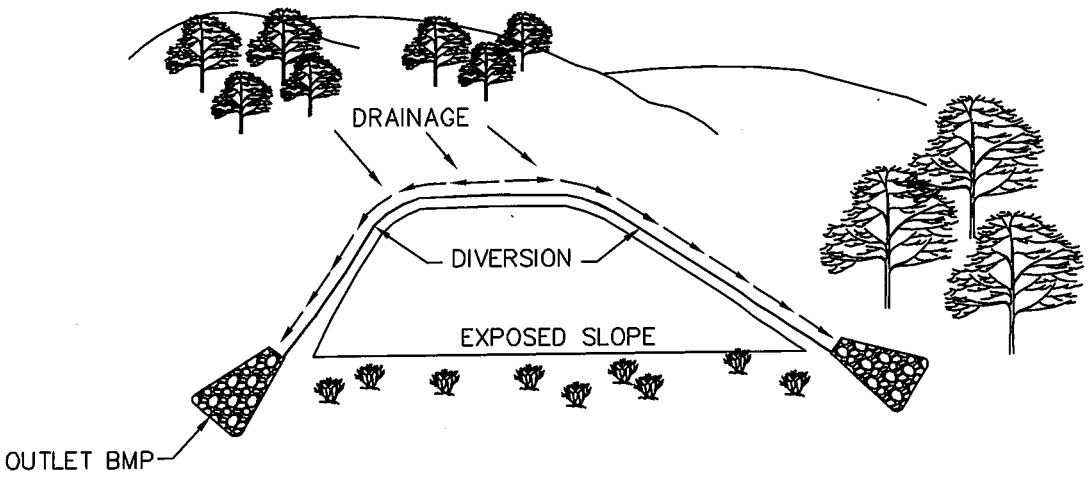
After permanent vegetation of slope is established

TYPICAL DETAIL: RM-2

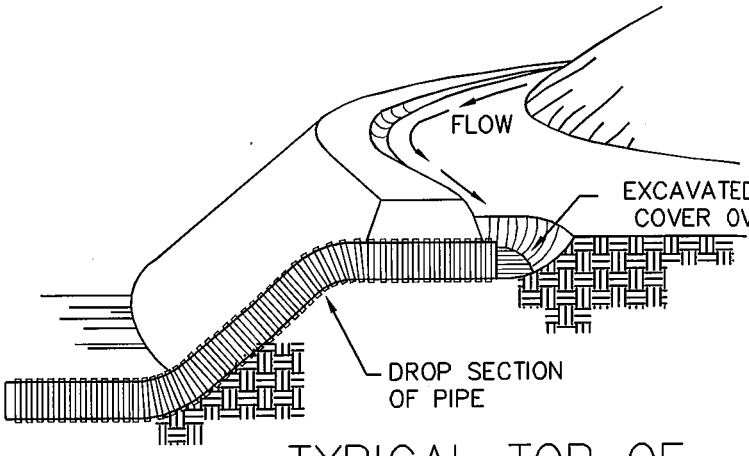


CROSS-SECTION

ALL SURFACES STABILIZED WITH MULCH, SEED OR GRAVEL



TYPICAL PERIMETER PROTECTION



NOTE: SEE TEMPORARY SLOPE DRAIN BMP FOR ADDITIONAL INFORMATION

TYPICAL TOP OF SLOPE INSTALLATION

DRAWING RM-2

ISSUED	REVISIONS
6-1-03	12-5-03

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL
DIVERSIONS-
RIDGE AND CHANNEL

DIVERSION-STORM SEWER

PHYSICAL DESCRIPTION:

A stabilized diversion designed to redirect the flow of a storm sewer system while work that impacts the system is performed. Diversions can be in the form of pipes or channels, and can handle the flows of creeks or streams or at the outlets of storm sewer pipes. Diversion channels must be stabilized to prevent erosion. Diversions can release runoff directly into the storm sewer system downstream or to additional BMPs such as sediment traps, sediment basins or rock outlets. BMPs, such as check dams, can also be used in diversion channels to slow velocities.

WHERE BMP IS TO BE INSTALLED:

Around locations that impact the flow of runoff in storm sewer systems. Diversion route should be located to minimize impact on other construction activities.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow:	Concentrated flow
Capacity of diversion device:	Sized for 15 year, 20 minute storm, while minimizing velocity of flow

WHEN BMP IS TO BE INSTALLED:

Prior to disturbance of area impacting the function of the storm sewer system

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Excavate diversion area except for area of upstream connection
- ✓ Compact as required to place diversion properly
- ✓ Install pipe bedding or channel lining as required
- ✓ Install pipe and backfill to required dimensions
- ✓ Install additional BMPs as designed – both in the diversion and downstream
- ✓ Make final connection to upstream storm sewer system

O&M PROCEDURES:

- ✓ Inspect at least every week and after every storm
- ✓ Remove trash and leaves
- ✓ Remove sediment once sediment reaches 6" in depth
- ✓ Repair eroded areas and stabilize – a wider channel or additional stabilization may need to be designed

SITE CONDITIONS FOR REMOVAL:

Remove after work impacting existing storm sewer has been completed and stabilized

TYPICAL DETAILS: Not Applicable

Category: RUNOFF MANAGEMENT
Use Group: PERMANENT
ISSUED 6-1-03
REVISED 1-25-06

GRADIENT TERRACES

PHYSICAL DESCRIPTION:

Defined swales constructed at regular intervals along the face of a slope designed to reduce erosion by capturing surface runoff and directing it to an adequate, stable outlet. Due to the steep slopes needed to create the terrace, swales may only be created by construction of earth ridges.

WHERE BMP IS TO BE INSTALLED:

Typically installed on long steep slopes on which erosion is a concern. Gradient terraces should not be constructed in sandy or rocky soil.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow:	Sheet flow
Slope Characteristics:	Maximum of 3:1 slope
Contributing Slope Length:	Maximum of 30 feet for slopes steeper than 4:1; maximum of 50 feet for 4:1 and flatter
Outlet:	HGL of outlet BMP less than or equal HGL of terrace in 15 year 20 minute storm

WHEN BMP IS TO BE INSTALLED:

Installed as fill is constructed. On existing slopes, terraces should be graded prior to removal of vegetation.

INSTALLATION/CONSTRUCTION PROCEDURES:

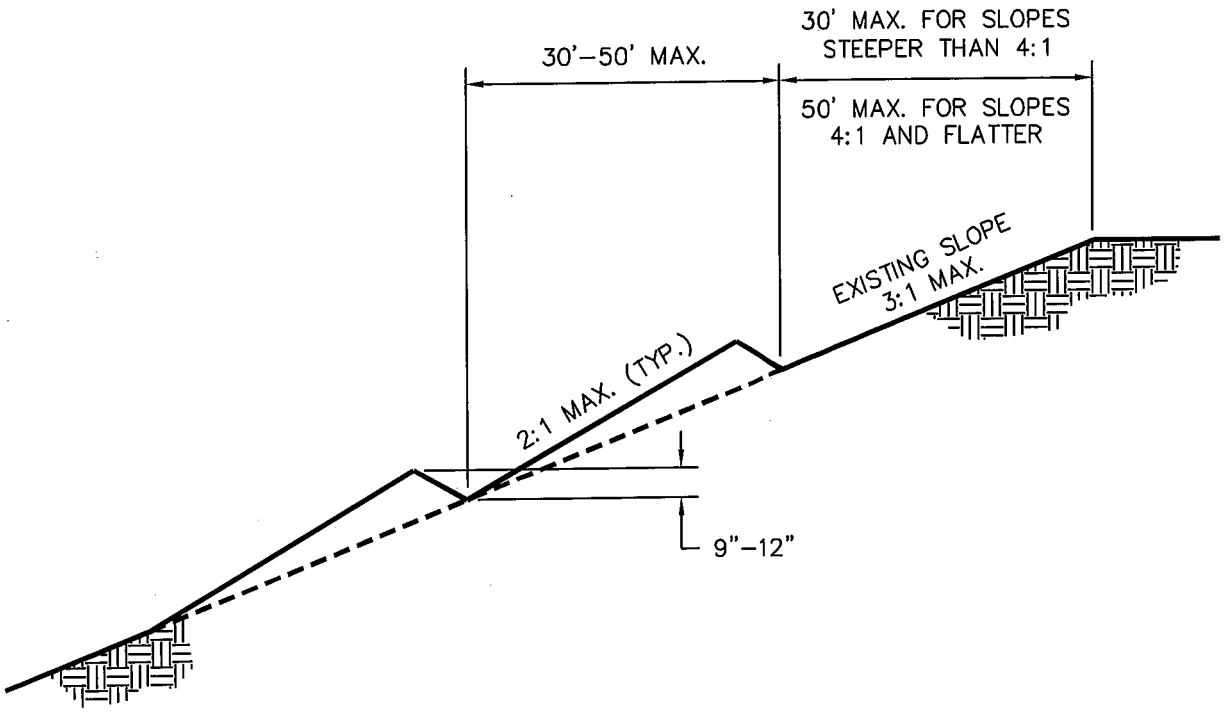
- ✓ Grade terraces as required
- ✓ Construct stable outfall as designed
- ✓ Vegetate gradient terrace

O&M PROCEDURES:

- ✓ Inspect at least every week and after every storm during construction and annually thereafter
- ✓ Remove sediment accumulations once channel depth is reduced to 6"
- ✓ Repair settlement and eroded areas
- ✓ Remove sediment and stabilize eroded areas at outlet
- ✓ Revegetate as needed

SITE CONDITIONS FOR REMOVAL: Not Applicable

TYPICAL DETAIL: RM-4



NOTES:

1. MAXIMUM CONTINUOUS LENGTH OF 2:1 SLOPE SHALL BE 15'.
2. TERRACE SHALL SLOPE AT 1%-3% AND DRAIN TO AN ADEQUATE OUTLET.
3. TERRACES MAY ONLY BE FORMED BY CONSTRUCTION OF A BERM.

DRAWING RM-4

ISSUED	REVISIONS
6-1-03	

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL

GRADIENT TERRACES

Category: RUNOFF MANAGEMENT
Use Group: TEMPORARY OR PERMANENT
ISSUED 6-1-03
REVISED 1-25-06

GRASS LINED CHANNEL

PHYSICAL DESCRIPTION:

Trapezoidal or parabolic stormwater conveyance channel lined with vegetation, designed to direct runoff and reduce the flow velocity of concentrated runoff. Channels should outlet into sediment traps, detention/retention basins, or other stable outlets. In areas with seasonally high water tables or seepage problems, subsurface drains are included under the channel. Grassed channels have a limited ability to control runoff from large storms and are often used in combination with other BMPs, such as subsurface drains and riprap stabilization.

WHERE BMP IS TO BE INSTALLED:

Used in areas where erosion-resistant conveyances are needed, including areas with highly erodible soils and moderately steep channel slopes - less than 5%. Channels should only be installed where space is available for a relatively large cross section. Channels should not make sharp, unnatural changes in direction or grade of flow.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow: Concentrated flow
Flow Properties: Maximum velocity of 5 fps

WHEN BMP IS TO BE INSTALLED:

Immediately after clearing, prior to upstream grading activities.

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Excavate and shape channel to required section
- ✓ Install subsurface drain, if needed
- ✓ Install erosion resistant lining, such as rip-rap or sod, at concentrated inflow points
- ✓ Prepare and fertilize soil
- ✓ Install sod, seed with protection such as erosion control blankets or turf reinforcement mats, or hydroseeding
- ✓ Sod should be perpendicular to flow, with a brick-like joint pattern. Stake, staple and/or net corners and centers of sod strips as required.
- ✓ Install lathe or post at each end of channel, and at 20 foot intervals. Mark maximum allowable sediment depth at 6 inches.
- ✓ Water immediately after installation - enough to soak 4 inches into soil without causing runoff.

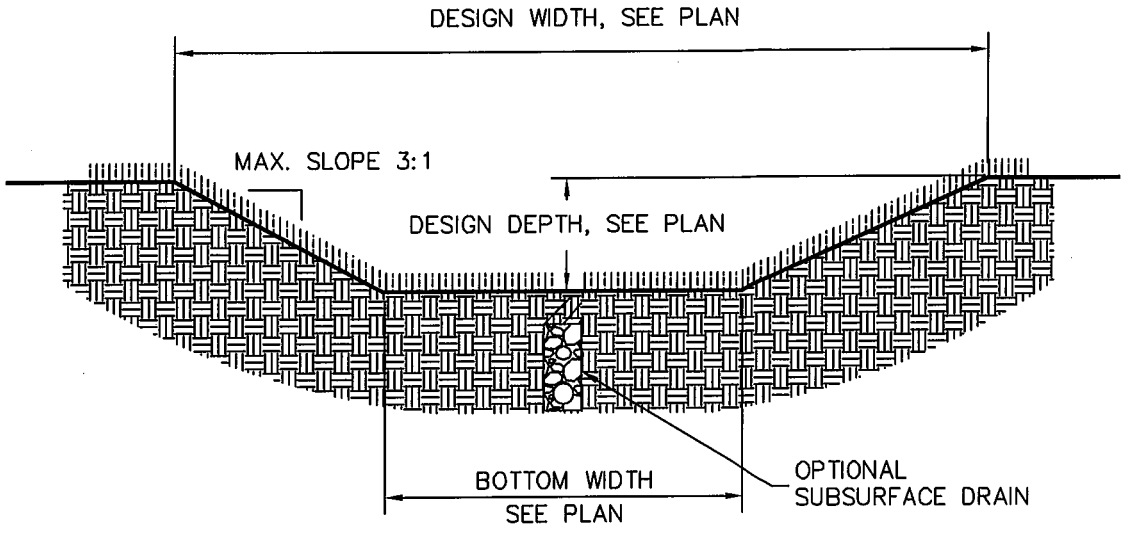
O&M PROCEDURES:

- ✓ Water sod daily for 3 weeks - enough to soak 4 inches into soil without causing runoff
- ✓ Inspect at least every week and after every storm for the duration of construction or 6 months, whichever is longer
- ✓ Remove any blockage and or debris from channel, channel outlet or road crossings
- ✓ Reposition areas of sod that have moved
- ✓ Remove sediment accumulation once sediment reaches 6" in depth, as indicated on the monitoring posts – replace vegetation if necessary
- ✓ Repair any eroded areas, revegetate, and stabilize as needed
- ✓ Do not mow until 3 inches of new growth occurs. During the first 4 months do not mow more than 1/3 the grass height.

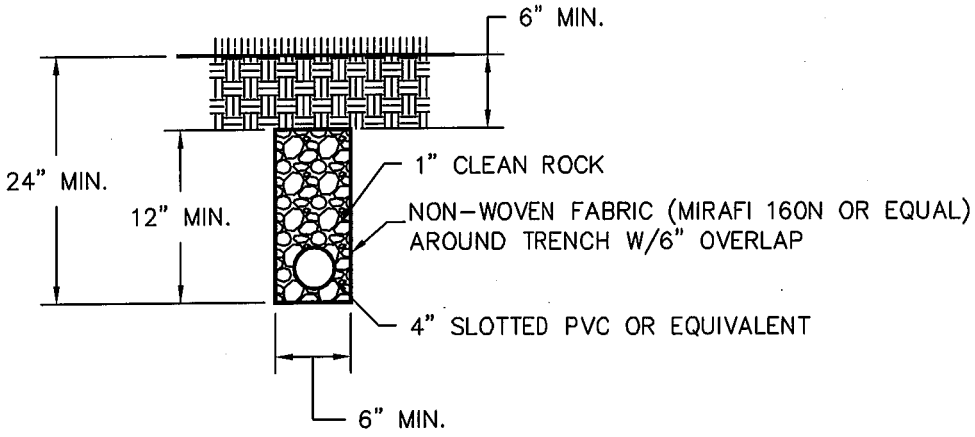
SITE CONDITIONS FOR REMOVAL:

Temporary channels can be removed after permanent storm sewer system is operational.

TYPICAL DETAIL: RM-5



ELEVATION



OPTIONAL SUBSURFACE DRAIN

DRAWING RM-5

ISSUED	REVISIONS
6-1-03	12-5-03

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL

GRASSED LINED CHANNEL

Category: RUNOFF MANAGEMENT
Use Group: TEMPORARY
ISSUED 6-1-03
REVISED 1-25-06

GRAVEL BAGS

PHYSICAL DESCRIPTION:

Open mesh nylon or burlap bags of gravel designed to pond water and cause sediment to settle out. Gravel bags can be used alone or as a part of other best management practices.

WHERE BMP IS TO BE INSTALLED:

Suitable for multiple uses including disrupting concentrated flows, redirecting concentrated flows, capturing sediment by ponding, and anchoring other devices. Can be used in place of silt fence, rock check dams, rock outlet protection, ridge diversions, inlet protection, and level spreader, or as part of the structure of sediment basins, sediment traps, storm drain diversions, and structural stabilization of streams.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow: Sheet flow and concentrated flow

WHEN BMP IS TO BE INSTALLED:

Dependent upon function it is designed to perform.

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Fill bags approximately 2/3 full
- ✓ Grade and stabilize soil on which bags are to be placed
- ✓ Install center line of bags on bottom row
- ✓ Place remaining bags on each side of center – min. width of bottom row is 3 bags
- ✓ Place upper rows of bags, staggering ends in brick-like pattern

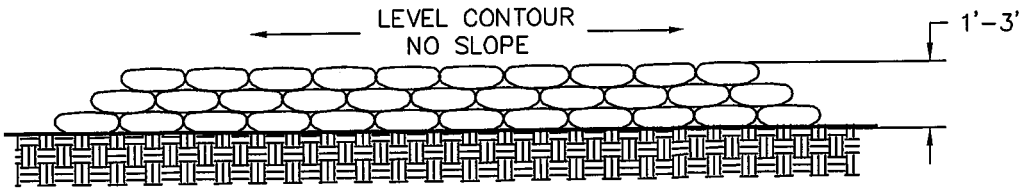
O&M PROCEDURES:

- ✓ Inspect at least every week and after every storm
- ✓ Replace and stabilize any damaged bags or bags that have moved out of place
- ✓ When silt builds up in front of a row of gravel bags performing the function of silt fence, move the row of bags in front of the sediment buildup. This "new row" will capture additional sediment and keep concentrated flows from reaching the previous sediment deposit.
- ✓ Remove sediment at rows of bags used as weirs or lips. Bags may be repositioned to facilitate removal of sediment.

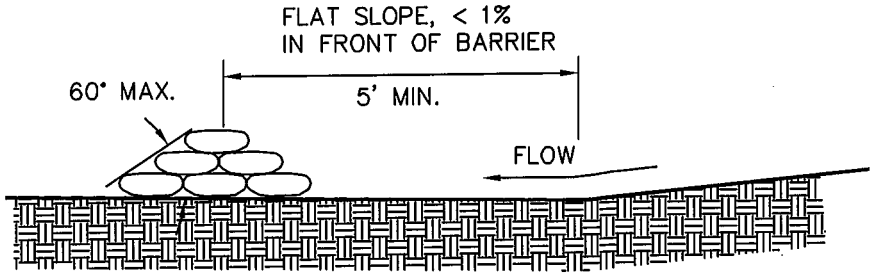
SITE CONDITIONS FOR REMOVAL:

Completion of upstream work and vegetation of contributing runoff areas.

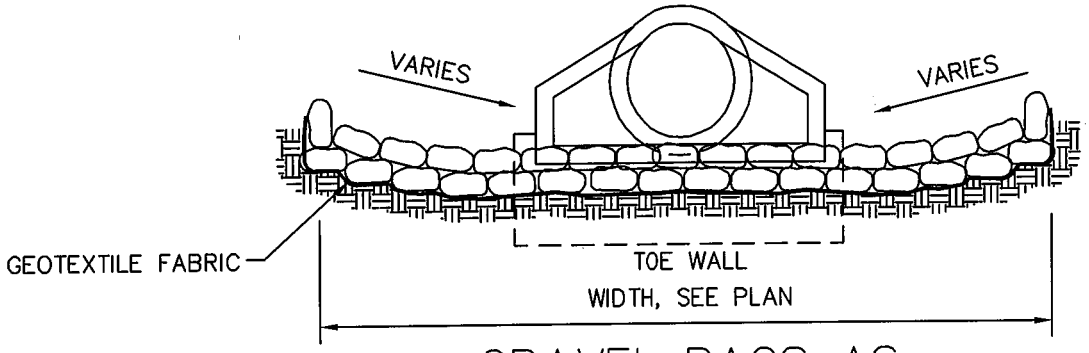
TYPICAL DETAIL: RM-6



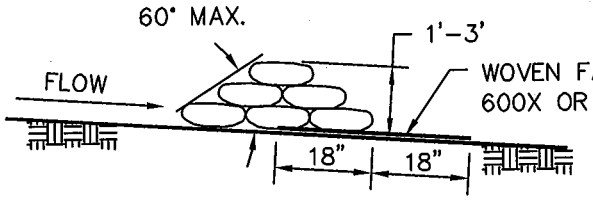
ELEVATION



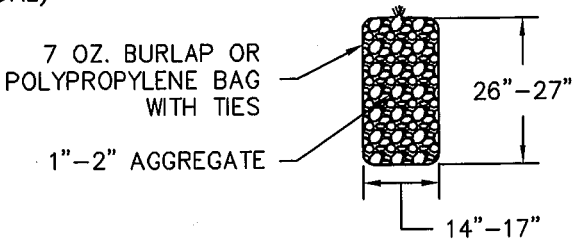
GRAVEL BAGS AS SILT FENCE



GRAVEL BAGS AS
ROCK OUTLET PROTECTION

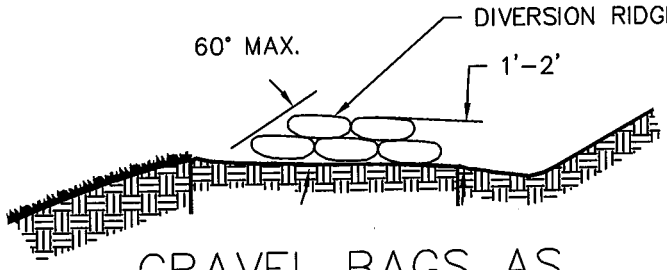


GRAVEL BAGS AS
CHECK DAM



GRAVEL BAG

NOTE: FILL BAGS 2/3 FULL,
60 LBS. MAX. WEIGHT



GRAVEL BAGS AS
DIVERSION RIDGE

DRAWING RM-6

ISSUED	REVISIONS
6-1-03	12-5-03

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL

GRAVEL BAGS

Category: RUNOFF MANAGEMENT
Use Group: TEMPORARY
ISSUED 6-1-03
REVISED 1-25-06

LEVEL SPREADER

PHYSICAL DESCRIPTION:

A level graded area designed to slow and spread runoff and release it as sheet flow to a stabilized area. The level spreader outfall can be stabilized by vegetation, erosion control blankets or a combination wood timber and gravel. Undisturbed vegetated areas with a maximum slope of 10% at the outfall do not require stabilization.

WHERE BMP IS TO BE INSTALLED:

At downstream end of diversion devices and upstream end of filter strips

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow: Sheet flow and concentrated flow
Contributing Area: Flow from 15 year, 20 minute storm under 5 cfs for vegetated lip, and up to 30 cfs for rigid lip

WHEN BMP IS TO BE INSTALLED

Immediately after rough grading - concurrent with diversion devices prior to completion of filter strips downstream

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Excavate to length, width, depth and slopes specified on plan
- ✓ For rigid lip, excavate and stabilize a level area for timber and gravel. Fill remaining excavated area behind timber with gravel.
- ✓ Seed and net or hydroseed "channel" area of spreader.
- ✓ For vegetated lip, staple erosion control blanket to protect lip
- ✓ Stabilize outfall area as depicted on plan
- ✓ Install lathe or post at each end and center of spreader. Mark maximum allowable sediment depth at ½ the depth of the spreader.

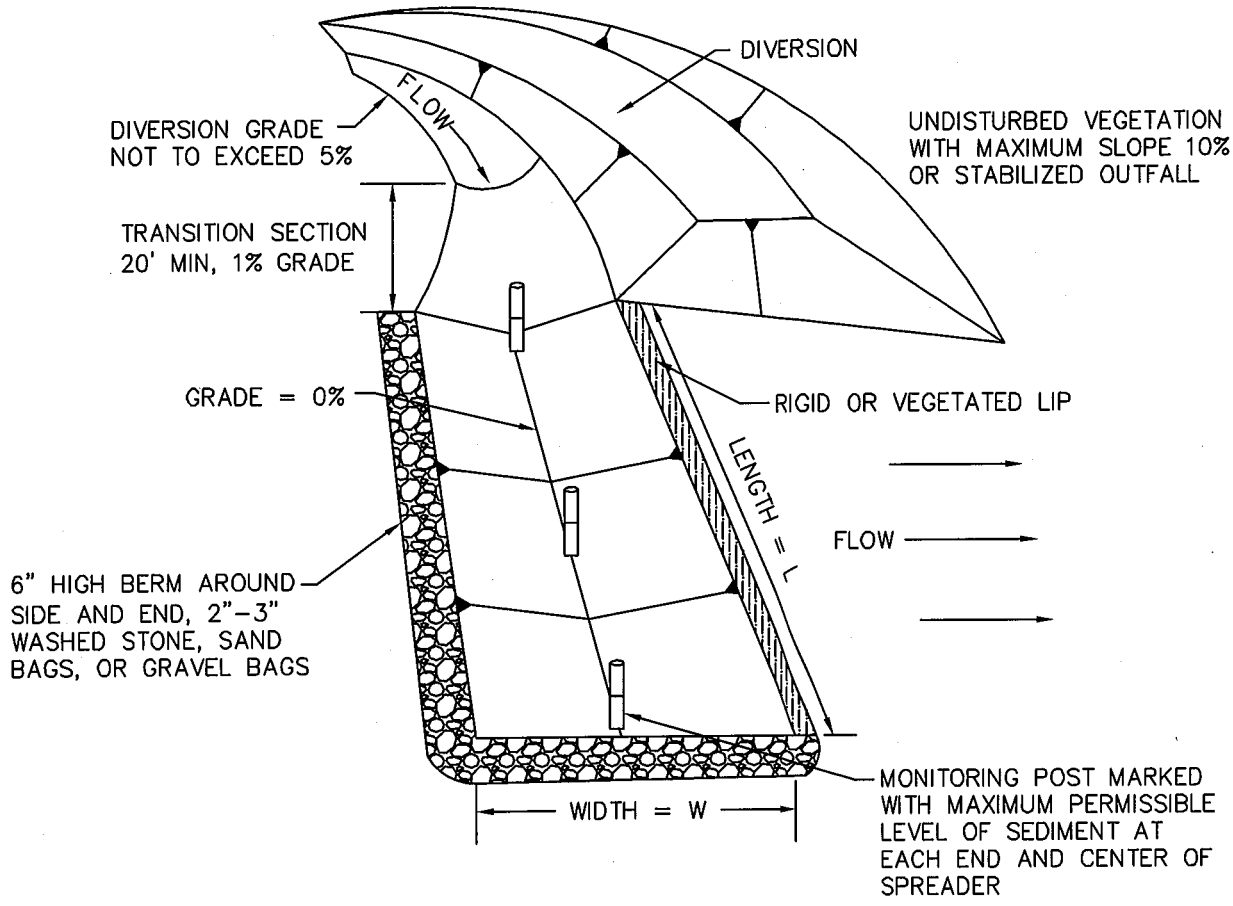
O&M PROCEDURES:

- ✓ Inspect at least every week and after every storm
- ✓ Remove sediment accumulations once sediment reaches ½ design depth, as indicated on monitoring posts
- ✓ Repair and revegetate any erosion damage in spreader "channel" or downstream of lip

SITE CONDITIONS FOR REMOVAL:

Remove after upstream areas are stabilized with vegetation, subsequent to removal of diversion devices.

TYPICAL DETAIL: RM-7



LEVEL SPREADER AT DIVERSION OUTLET

	SPREADER	
FLOW	TYPE	LENGTH
LESS THAN 5 CFS	VEGETATED LIP	20'
5 CFS TO LESS THAN 15 CFS	RIGID LIP	20'
15 CFS UP TO 20 CFS	RIGID LIP	30'

LENGTH AND WIDTH DETERMINED FOR EACH APPLICATION.
SEE PLAN.

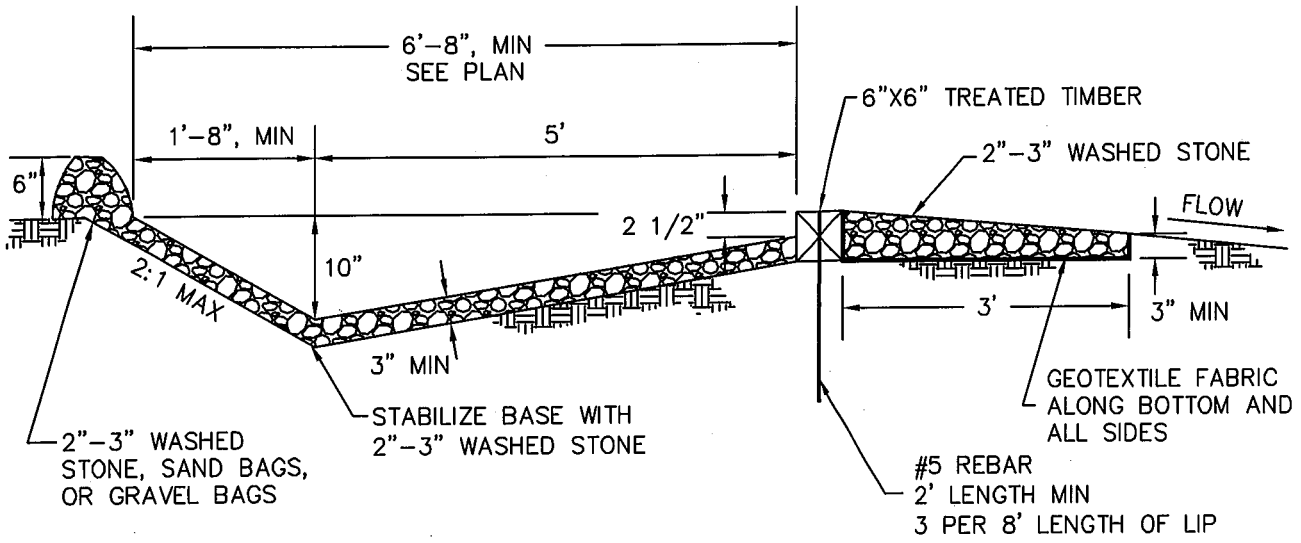
DRAWING RM-7 SHEET 1 of 2

ISSUED	REVISIONS
6-1-03	12-5-03

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

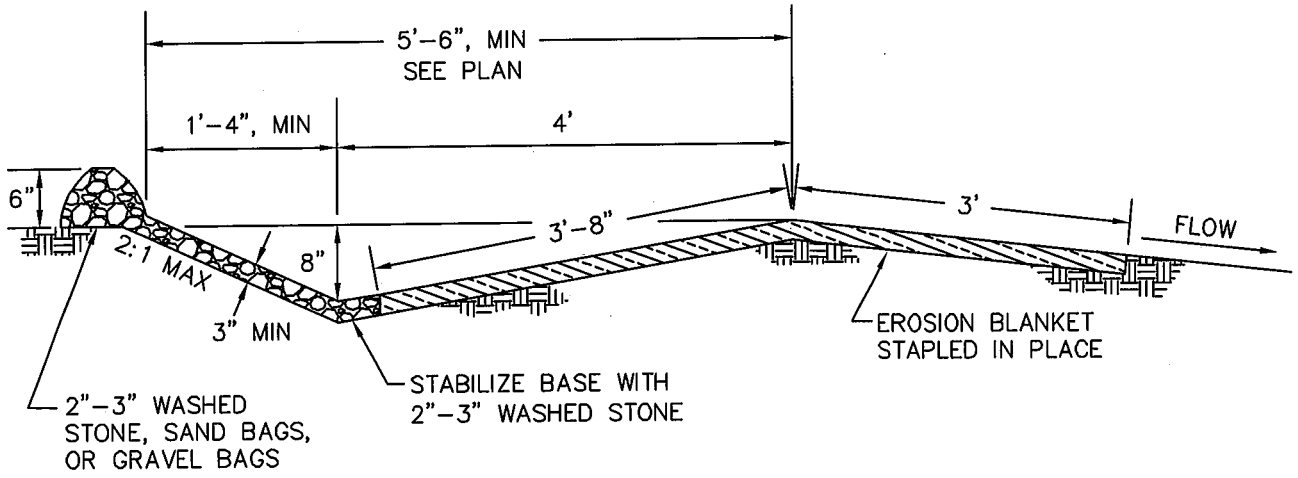
TYPICAL BMP DETAIL

LEVEL SPREADER



RIGID LIP WITH TIMBER

(DESIGN FLOWS 5 C.F.S. TO 20 C.F.S.)



VEGETATED LIP

(DESIGN FLOWS LESS THAN 5 C.F.S.)

DRAWING RM-7 SHEET 2 of 2

ISSUED	REVISIONS
6-1-03	12-5-03

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL

LEVEL SPREADER

Category: RUNOFF MANAGEMENT
Use Group: TEMPORARY
ISSUED 6-1-03
REVISED 1-25-06

SURFACE ROUGHENING

PHYSICAL DESCRIPTION:

Continuous horizontal grooves on the surface of slopes designed to reduce runoff velocity, increase infiltration, reduce erosion and trap sediment. Roughening can also be used when other methods of erosion/siltation control are not immediately available. In this case surface roughening should be supplemented with other BMPs as soon as possible.

WHERE BMP IS TO BE INSTALLED:

At the top of, and at intermediate points along, disturbed slopes to disrupt low-volume, concentrated flows, and/or at the base of disturbed slopes to slow water runoff and capture sediment laden runoff

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow:	Sheet flow
Contributing Area:	Unlimited on slopes < 10%
	Slopes > 10% require additional BMPs (such as diversion channel)

WHEN BMP IS TO BE INSTALLED:

Immediately after rough grading; prior to seeding or mulching.

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Using light weight machinery, such as tractors with a harrow, disk or box grader attachment, drag surface to create series of grooves and ridges perpendicular to water flow.
- ✓ Light weight, track driven equipment, such as a skid-steer, can be used to create the grooves; however, travel direction up and down the slope is required.

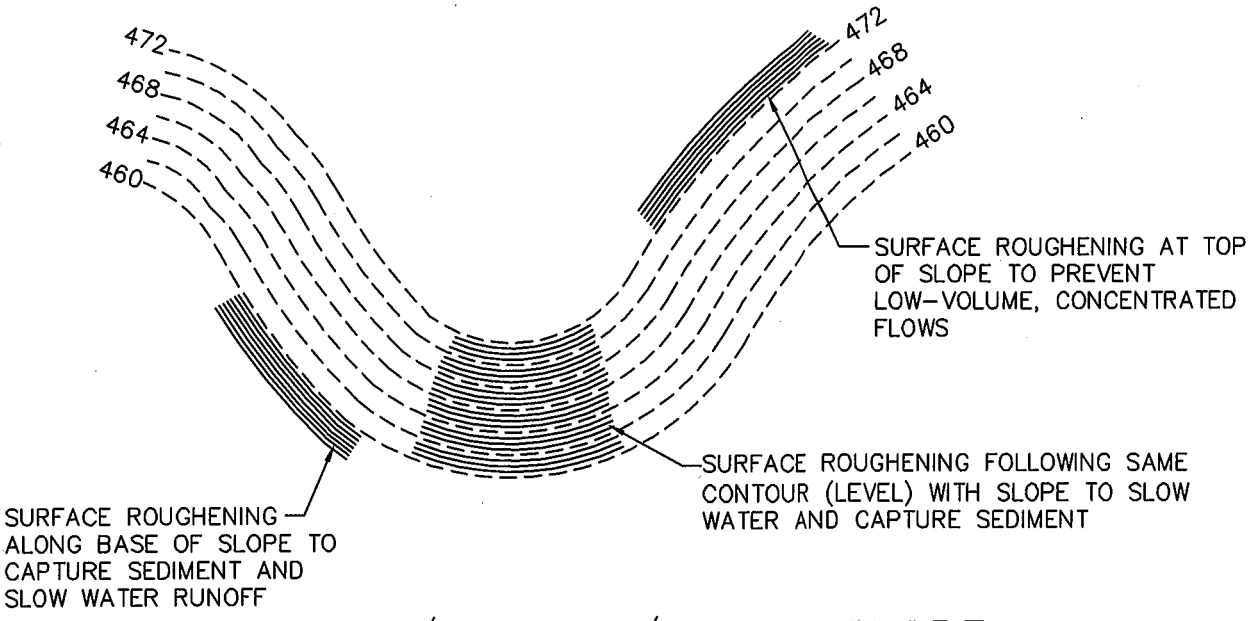
O&M PROCEDURES:

- ✓ Inspect at least every week and immediately after storms
- ✓ Rework the slope and regroove after sediment buildup is deeper than ½ the groove depth
- ✓ Rework the slope and regroove if rills have cut across the roughened surface

SITE CONDITIONS FOR REMOVAL:

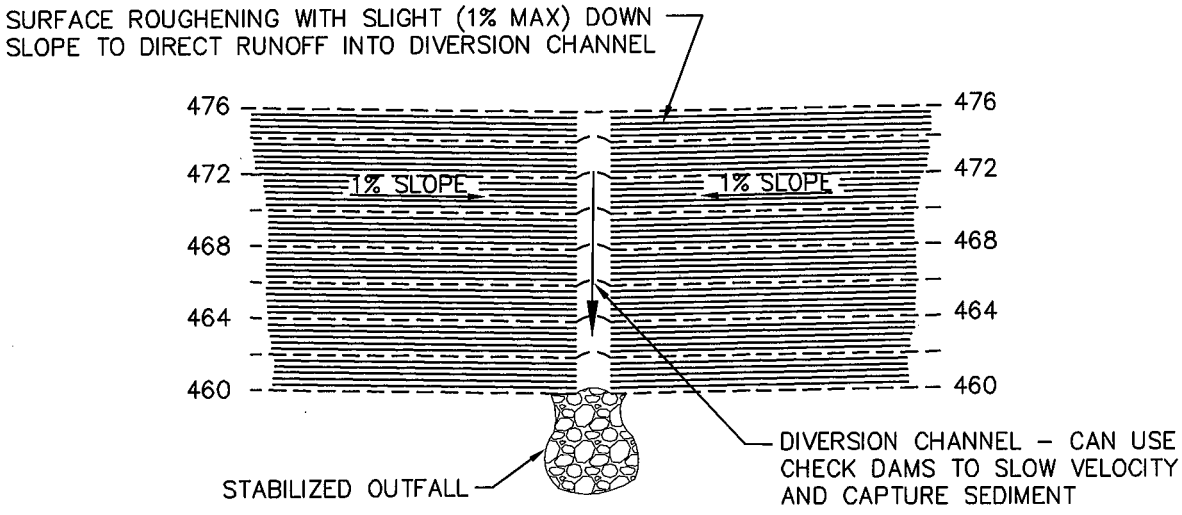
The slope should be reworked to the design grades immediately prior to final stabilization. In some cases, such as seeding the area, the roughened area could be left as is.

TYPICAL DETAILS: RM-8

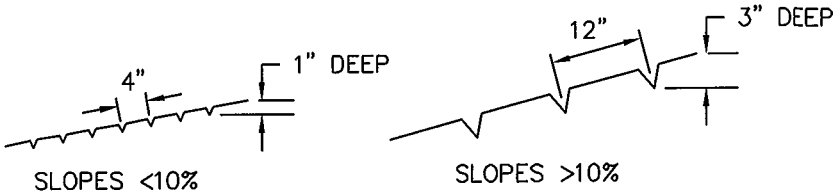


TOP/BOTTOM/ALONG SLOPE SURFACE ROUGHENING TYPES

*TYPES CAN BE USED INDIVIDUALLY OR IN COMBINATIONS TO INCREASE EFFECTIVENESS.



DOWN SLOPE SURFACE ROUGHENING WITH DIVERSION CHANNEL



PROFILES

DRAWING RM-8

ISSUED	REVISIONS
6-1-03	

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL

SURFACE ROUGHENING

TEMPORARY SLOPE DRAIN

PHYSICAL DESCRIPTION:

A flexible tubing or rigid conduit extending from the top to the bottom of a cut or fill slope designed to protect exposed slopes from upstream runoff. Slope drains typically extend beyond the toe of slope to a stable area or outlet.

WHERE BMP IS TO BE INSTALLED:

Typically installed on long slopes where runoff cannot easily be directed to the ends of a section of cut or fill.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow: Sheet flow and concentrated flow
Contributing Area: Maximum 5 acres per slope drain; pipe sized for 15 year, 20 minute storm

WHEN BMP IS TO BE INSTALLED:

Concurrently with diversion devices and at the end of each work day for slopes 10 feet or more in height

INSTALLATION/CONSTRUCTION PROCEDURES:

Temporary slope drains must be installed and maintained properly because failure will usually result in severe erosion of the slope. Other points of concern are failure from overtopping due to inadequate pipe inlet capacity or blockage, and lack of maintenance of the upstream diversion device capacity.

- ✓ Install slope drain down the slope, extending beyond toe of slope
- ✓ Install flared end or t-section at pipe inlet. Section should be well entrenched and stable so water can enter freely.
- ✓ Compact fill over and around pipe in area of diversion device
- ✓ Ensure that all pipe connections are secure and watertight
- ✓ Securely anchor the exposed section of the drain with stakes
- ✓ Install flared end section at pipe outlet – discharge into a sediment trap or other stabilized outlet

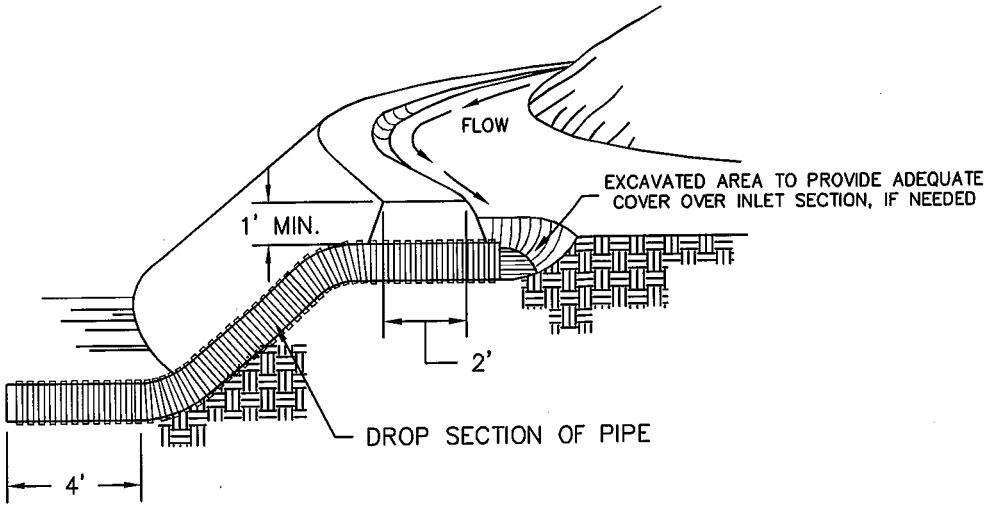
O&M PROCEDURES:

- ✓ Inspect at least every week and after every storm
- ✓ Remove sediment and trash accumulation at inlet
- ✓ Repair settlement, cracking, or piping holes
- ✓ Repair leaks or inadequate anchoring along pipe
- ✓ Remove sediment and stabilize eroded areas at outlet – extend if necessary

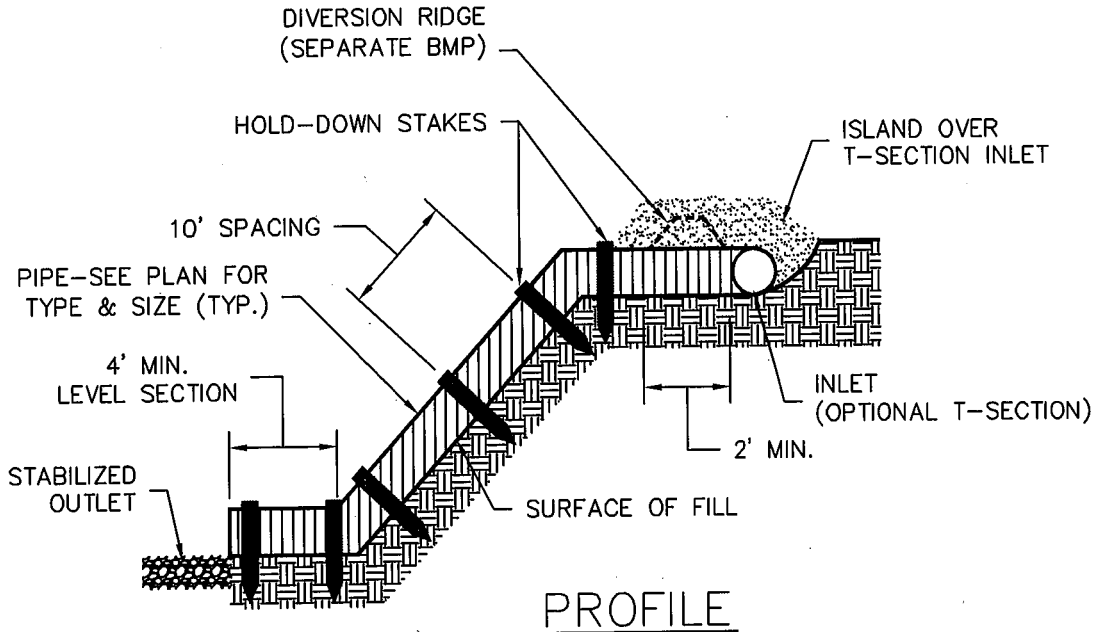
SITE CONDITIONS FOR REMOVAL:

Remove concurrently with upstream diversion device; immediately prior to permanent vegetation of slope

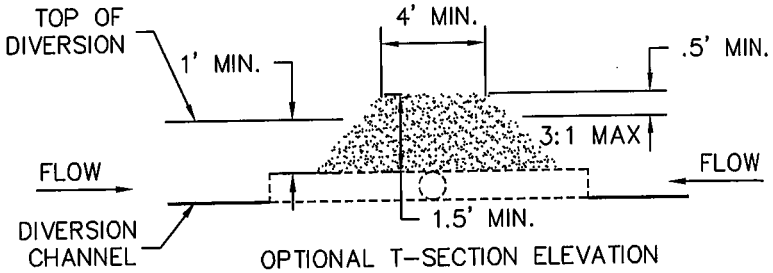
TYPICAL DETAIL: RM-9



PERSPECTIVE



PROFILE



OPTIONAL T-SECTION ELEVATION

DRAWING RM-9

ISSUED	REVISIONS
6-1-03	

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL

TEMPORARY SLOPE DRAIN

APPENDIX F

TYPICAL SEDIMENT CAPTURE BMPS

BMP	Page
Filter Strip	SC-1
Inlet Protection-Block & Gravel	SC-2
Inlet Protection-Fabric Drop	SC-3
Inlet Protection-Gravel & Wire Mesh	SC-4
Inlet Protection-Sod Filter	SC-5
Sediment Basin	SC-6
Sediment Trap	SC-7
Silt Fence	SC-8

Category: SEDIMENT CAPTURE
Use Group: PERMANENT
ISSUED 6-1-03
REVISED 1-25-06

FILTER STRIP

PHYSICAL DESCRIPTION:

A wide belt of vegetation running along a contour designed to provide infiltration, intercept sediment and other pollutants, and reduce stormwater flow and velocity. Vegetation may be in the form of natural wooded strip or proposed mix of erosion resistant plants that form a dense mat and effectively bind the soil.

WHERE BMP IS TO BE INSTALLED:

Adjacent to low or medium density residential areas on gently sloping ground (less than 15%).

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow: Overland sheet flow only – cannot treat high velocity flows
Contributing Area: Maximum of 5 acres, with less than 15% slope

WHEN BMP IS TO BE INSTALLED:

Immediately after rough grading to trap sediment during construction and or immediately after final grading as a permanent measure to control surface runoff.

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Fence off any undisturbed wooded strips to be preserved. No activity, including parking vehicles or equipment and storing clearing, grubbing or construction debris, shall be permitted in the wooded strip.

If a grass filter strip is constructed, it must be completed and vegetated before construction in the impervious area is started.

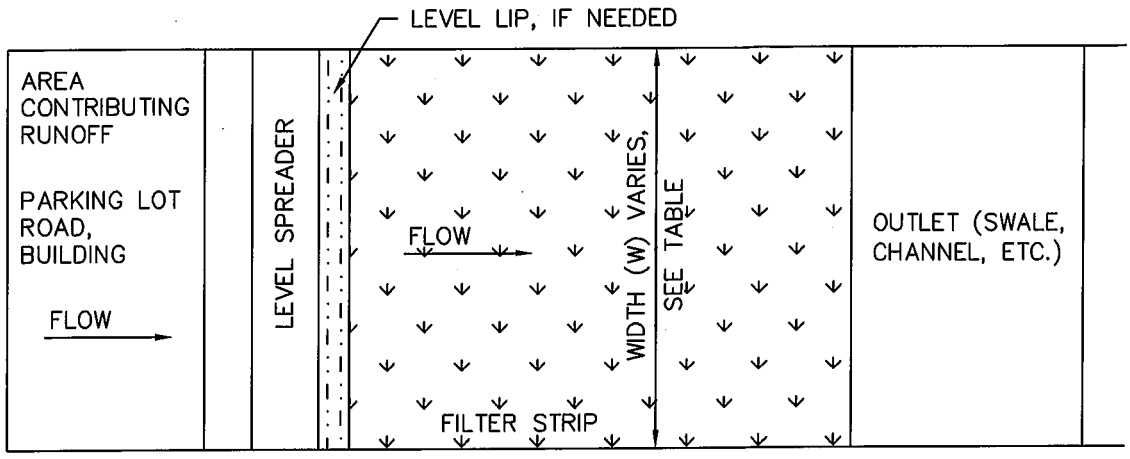
- ✓ Clear and grub the filter strip area
- ✓ If the adjacent area does not have a level edge, install a level spreader to distribute runoff evenly. See Level Spreader BMP for information.
- ✓ Fertilize and vegetate strip with erosion resistant plants that form a dense mat and effectively bind the soil. Eg: crown vetch, sod, or seed and mulch

O&M PROCEDURES:

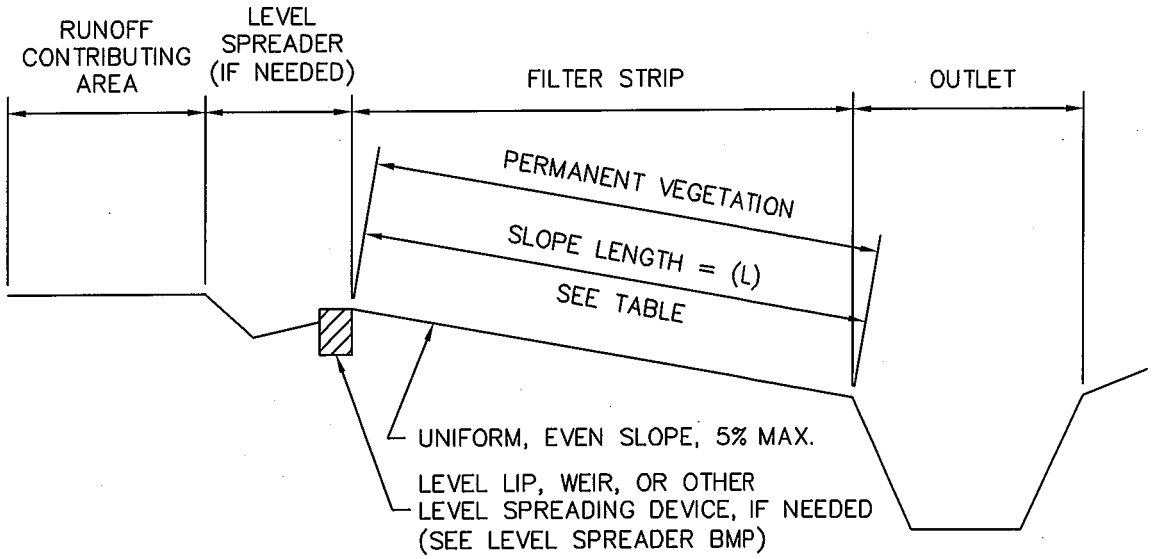
- ✓ Inspect at least every week and after every storm during construction, and annually thereafter.
- ✓ Fill and compact eroded areas and reseed, mulch and fertilize or establish other vegetation in the affected areas.
- ✓ After improvements are complete, regrade and reseed the top edge of the filter strip to remove sediment trapped during construction and prolong the effective use of the filter strip.
- ✓ Apply a complete fertilizer annually until the desired density of vegetation is obtained. Thereafter, apply fertilizer in accordance with the soil test recommendations.
- ✓ Protect new plantings from wildlife.
- ✓ Mow grass strips to a height of 6 to 12 inches two to three times a year to suppress weeds and woody vegetation unless natural, woody vegetation is planned.
- ✓ Repair foot paths and traffic ruts.

SITE CONDITIONS FOR REMOVAL: Not Applicable

TYPICAL DETAIL: SC-1



PLAN VIEW



SECTION VIEW

SLOPE OF LAND %	WIDTH (W) OF FILTER STRIP FOR GRASSED AREAS (ft)	WIDTH (W) OF FILTER STRIP FOR WOODED AREAS (ft)	SLOPE LENGTH (L) OF FILTER STRIP
0	10	25	Lmin=LENGTH OF CONTRIBUTING AREA, 50' MIN.
2	12	29	Lmin + 8 ft.
4	14	33	Lmin + 16 ft.
6	16	37	Lmin + 24 ft.
8	18	41	Lmin + 32 ft.
10	20	45	Lmin + 40 ft.
15	25	55	Lmin + 60 ft.

DRAWING SC-1

ISSUED	REVISIONS
6-1-03	

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL

FILTER STRIP

Category: SEDIMENT CAPTURE
Use Group: TEMPORARY
ISSUED 6-1-03
REVISED 1-25-06

INLET PROTECTION-BLOCK & GRAVEL

PHYSICAL DESCRIPTION:

A temporary sediment control barrier consisting of a short concrete block wall supporting gravel filter media around a grated inlet designed to prevent sediment from entering the storm sewer. Shallow temporary ponding during and after rainfall should be expected.

WHERE BMP IS TO BE INSTALLED:

At inlets where heavy flows are expected and an overflow capacity is necessary to prevent excessive ponding around the structure.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow: Sheet flow and concentrated flow
Contributing Area: Maximum of 1 acre

WHEN BMP IS TO BE INSTALLED:

Immediately after placement of inlet.

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Backfill, compact and uniformly grade area around inlet
- ✓ Install first row of concrete blocks adjacent to the inlet sill, placing one block on its side on each side of inlet. The blocks are placed against the sill for lateral support and to avoid washouts when overflows occur.
- ✓ If needed for lateral support, install 2 x 4 lumber through vertical block openings
- ✓ Fill vertical block openings with gravel for stability
- ✓ Place second row of block offsetting one-half block from the first row, in a brick-like pattern
- ✓ Fill vertical block openings with gravel
- ✓ Anchor wire screen over horizontal block openings to support gravel
- ✓ Place gravel around the blocks

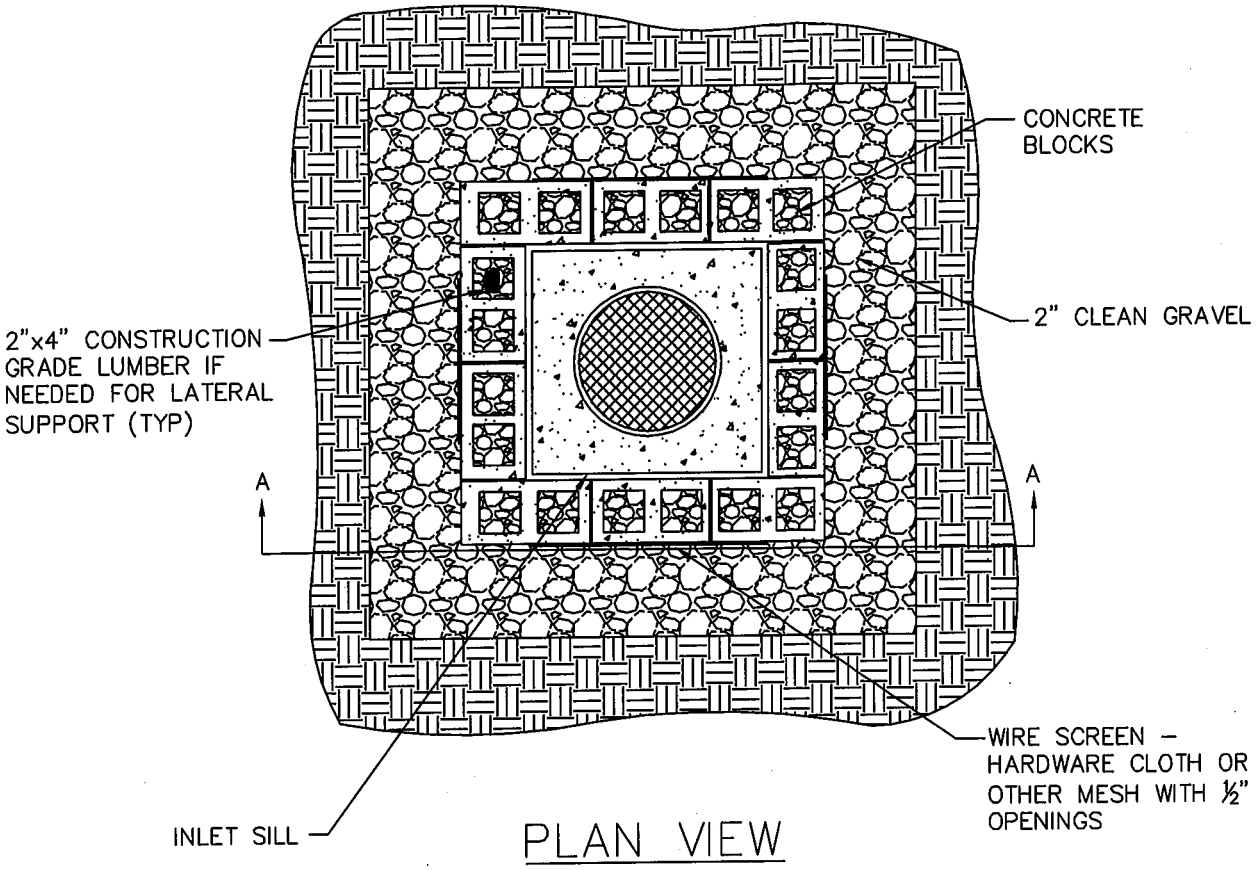
O&M PROCEDURES:

- ✓ Inspect at least every week and after every storm
- ✓ Remove sediment accumulation to keep it at least 8 inches from the top of the blocks
- ✓ Remove trash accumulation at inlet
- ✓ Repair elements to original configuration as needed

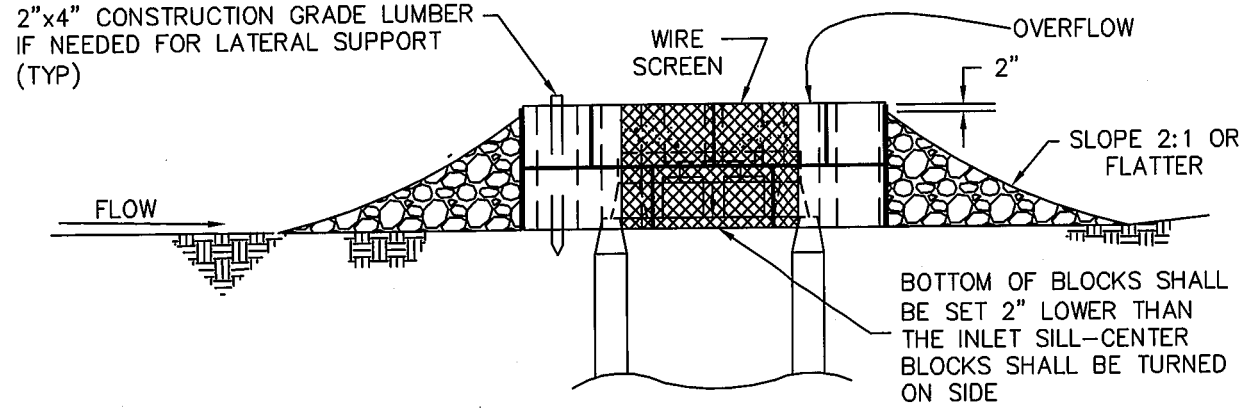
SITE CONDITIONS FOR REMOVAL:

Remove after contributing drainage areas have been adequately stabilized. Restore area to grade and vegetate.

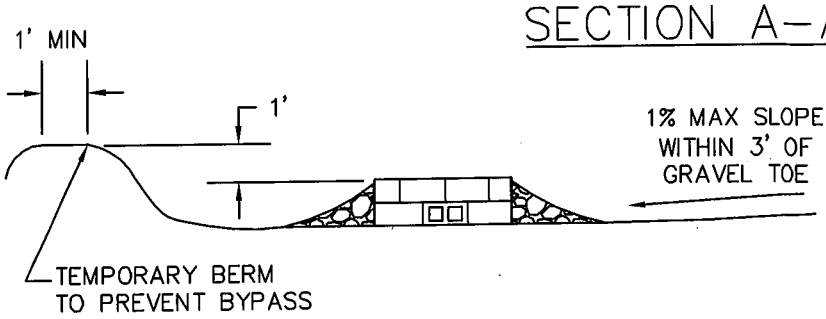
TYPICAL DETAIL: SC-2



PLAN VIEW



SECTION A–A



DOWNSTREAM BERM

DRAWING SC–2

ISSUED	REVISIONS
6–1–03	12–5–03

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL
INLET PROTECTION–
BLOCK AND GRAVEL

Category: SEDIMENT CAPTURE
Use Group: TEMPORARY
ISSUED 6-1-03
REVISED 1-25-06

INLET PROTECTION-FABRIC DROP

PHYSICAL DESCRIPTION:

A woven fabric barrier braced around an area inlet designed to prevent sediment from entering the storm sewer. Shallow temporary ponding during and after rainfall should be expected.

WHERE BMP IS TO BE INSTALLED:

At inlets designed to drain a small gently sloping area with maximum grade of 5%. Overflow capacity is limited on standard area inlets.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow: Shallow sheet flow
Contributing Area: Maximum of 2 cfs flowing to inlet

WHEN BMP IS TO BE INSTALLED:

Immediately after placement of inlet.

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Backfill, compact and uniformly grade area around inlet
- ✓ Construct downstream berm, if required. Rock bags or sand bags may be used to construct berm.
- ✓ Drive posts or wood frame close to inlet sill so overflow will fall directly on the structure and not on unprotected soil
- ✓ Dig trench around inlet for fabric to be buried
- ✓ Cut required length of fabric from one roll to eliminate joints. Fasten fabric tightly around posts/frame to enhance stability.
- ✓ Backfill and compact trench.

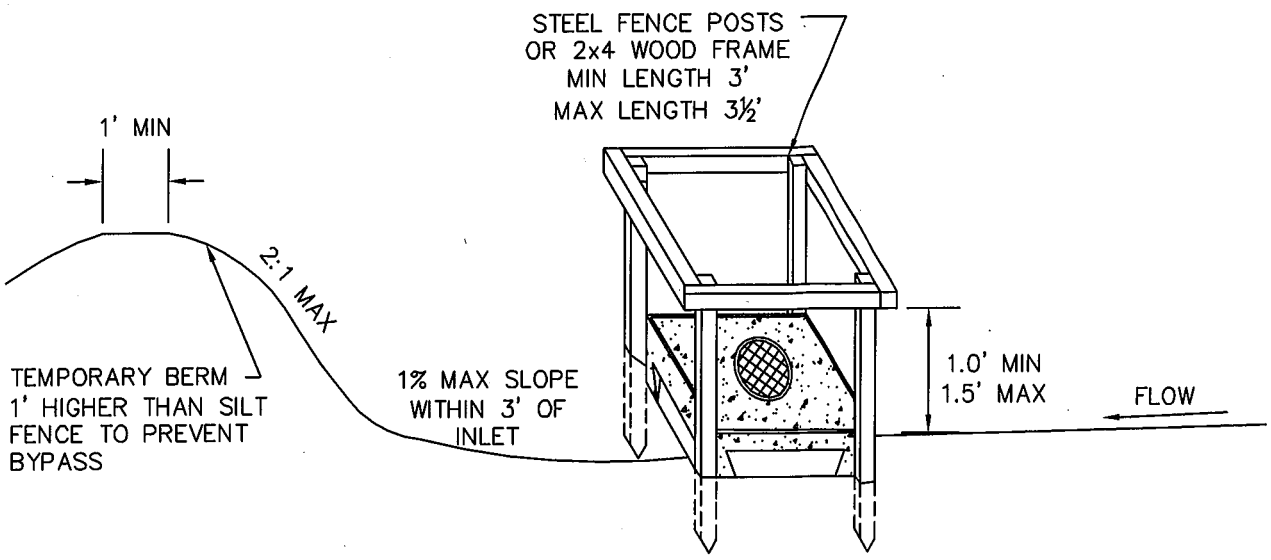
O&M PROCEDURES:

- ✓ Inspect at least every week and after every storm
- ✓ Remove trash accumulation and sediment once it reaches depth of 6" at inlet.
- ✓ Replace loose, torn or clogged fabric
- ✓ Repair any erosion or settlement of temporary berm downstream of inlet

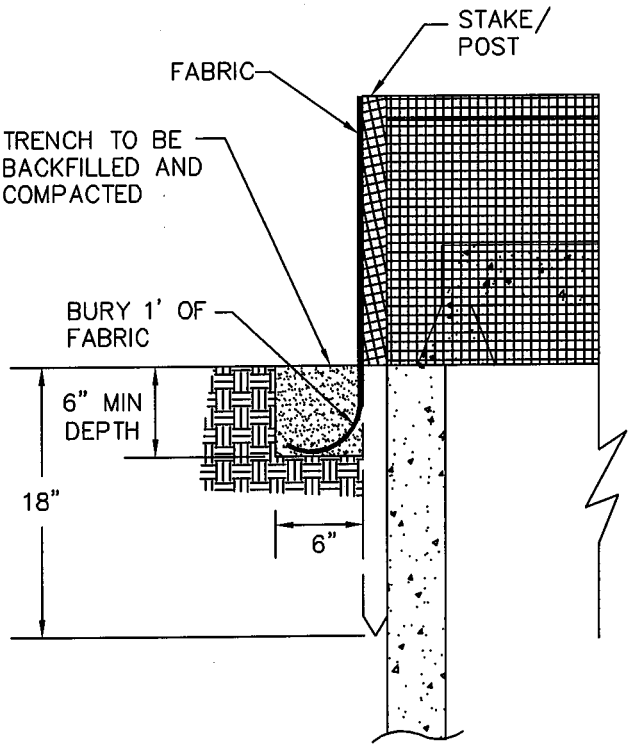
SITE CONDITIONS FOR REMOVAL:

Remove after contributing drainage areas have been adequately stabilized. Restore area to grade and vegetate.

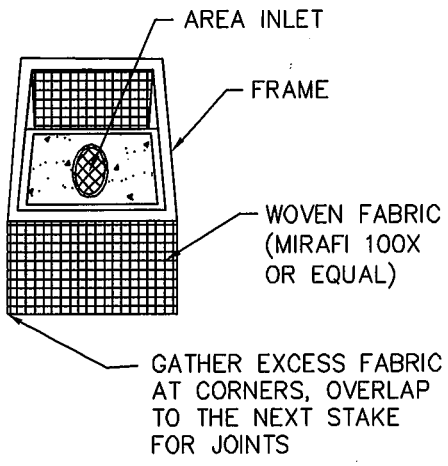
TYPICAL DETAIL: SC-3



PERSPECTIVE



ELEVATION



FABRIC

DRAWING SC-3

ISSUED	REVISIONS
6-1-03	

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL
INLET PROTECTION-
FABRIC DROP

INLET PROTECTION-GRAVEL & WIRE MESH

PHYSICAL DESCRIPTION:

An open graded gravel, wire mesh and woven fabric filter barrier installed along the throat of a curb inlet designed to prevent sediment from entering the storm sewer. The barrier is supported by a wooden frame to provide stability and overflow capacity.

WHERE BMP IS TO BE INSTALLED:

Typically installed on pavement with slopes less than 2% and flows are high.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow: Sheet flow and concentrated flow
Contributing Area: Maximum of 2 acres due to reduction in inlet capacity

WHEN BMP IS TO BE INSTALLED:

One day after pavement is placed.

INSTALLATION/CONSTRUCTION PROCEDURES:

✓ Construct wood frame to required dimensions and anchor in place
✓ Fasten wire mesh and fabric to frame, taking care to form flush with curb and pavement on both sides of inlet
✓ Place gravel to prevent water from entering the inlet under or around the fabric

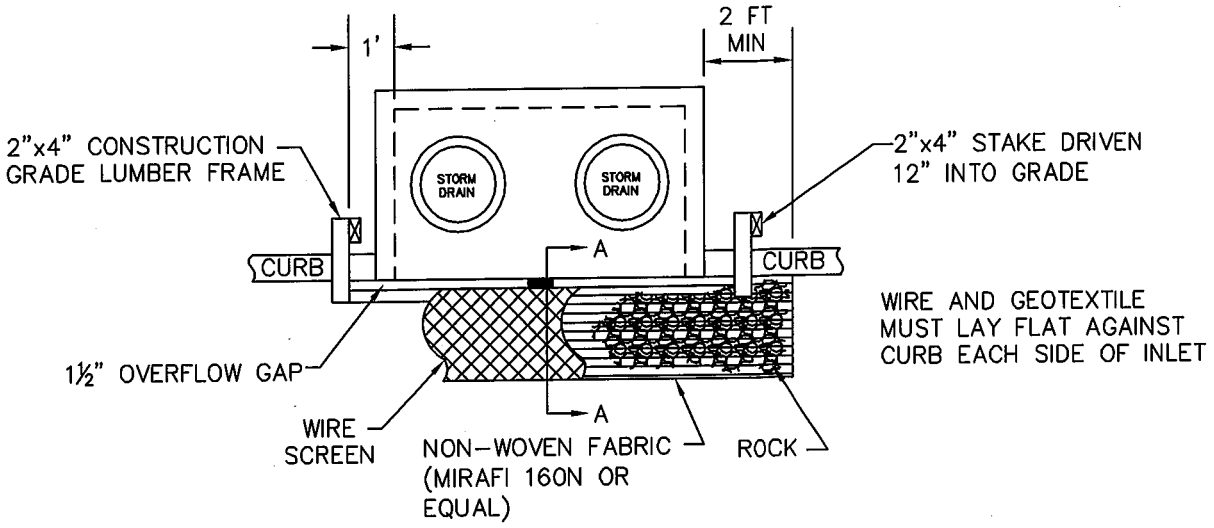
O&M PROCEDURES:

✓ Inspect at least every week and after every storm
✓ Remove sediment accumulation once it is within 3" of the top of the inlet stone
✓ Remove trash accumulation at inlet
✓ Reposition/replace elements to original configuration as needed
✓ Repair inadequate anchoring of frame or fastening of mesh

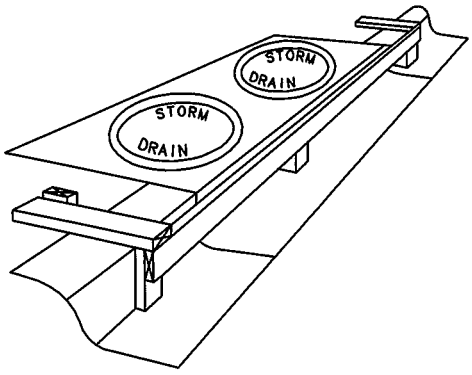
SITE CONDITIONS FOR REMOVAL:

Remove after contributing drainage areas have been adequately stabilized

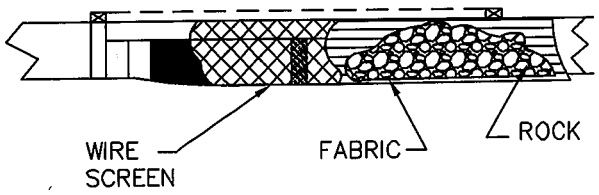
TYPICAL DETAIL: SC-4



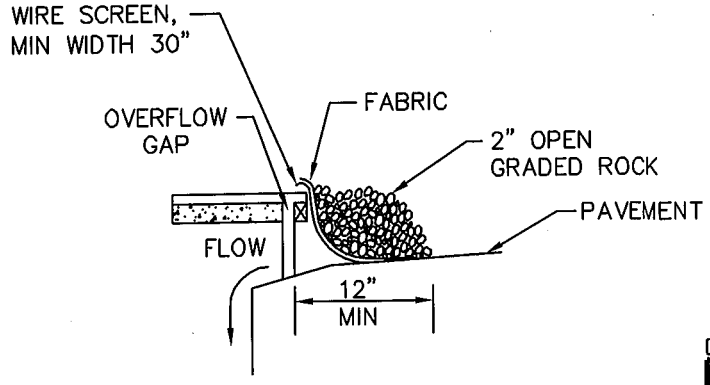
PLAN VIEW



WOODEN FRAME ON VERTICAL CURB



ELEVATION



SECTION A-A

DRAWING SC-4

ISSUED	REVISIONS
6-1-03	12-5-03

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL
INLET PROTECTION-
GRAVEL AND WIRE MESH

Category: SEDIMENT CAPTURE
Use Group: PERMANENT
ISSUED 6-1-03
REVISED 1-25-06

INLET PROTECTION-SOD FILTER

PHYSICAL DESCRIPTION:

A sod barrier installed around an area inlet after the surrounding area has been stabilized. It is designed to slow runoff velocities and remove sediments and other polluntants from the runoff. This final inlet protection measure is an aesthetically pleasing way to treat stormwater.

WHERE BMP IS TO BE INSTALLED:

Around the perimeter of an area inlet

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow: Sheet flow and concentrated flow with velocities less than 5 fps

WHEN BMP IS TO BE INSTALLED:

Near end of construction, after the contributing watershed is stabilized with vegetation.

INSTALLATION/CONSTRUCTION PROCEDURES:

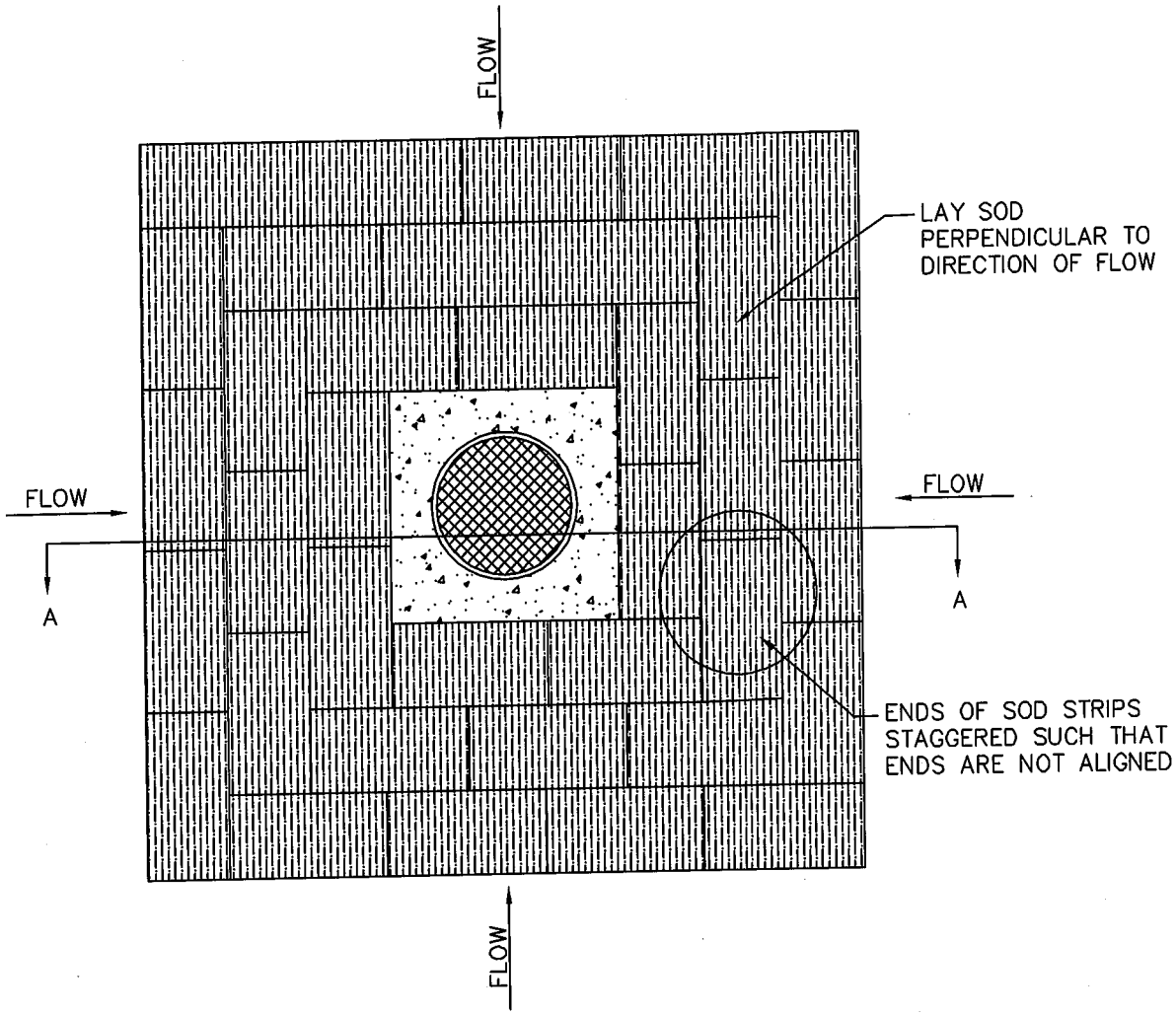
- ✓ Prepare and fertilize soil
- ✓ Lay first row of sod adjacent to inlet perpendicular to the direction of flow. Butt subsequent rows tight against previous rows with strips staggered in brick-like pattern for a distance of at least 4 feet in each direction. Fill minor gaps with good soil and roll entire surface to ensure surface contact.
- ✓ Stake, staple and/or net corners and centers of sod strips as required.
- ✓ Water immediately after installation - enough to soak 4 inches into soil without causing runoff.

O&M PROCEDURES:

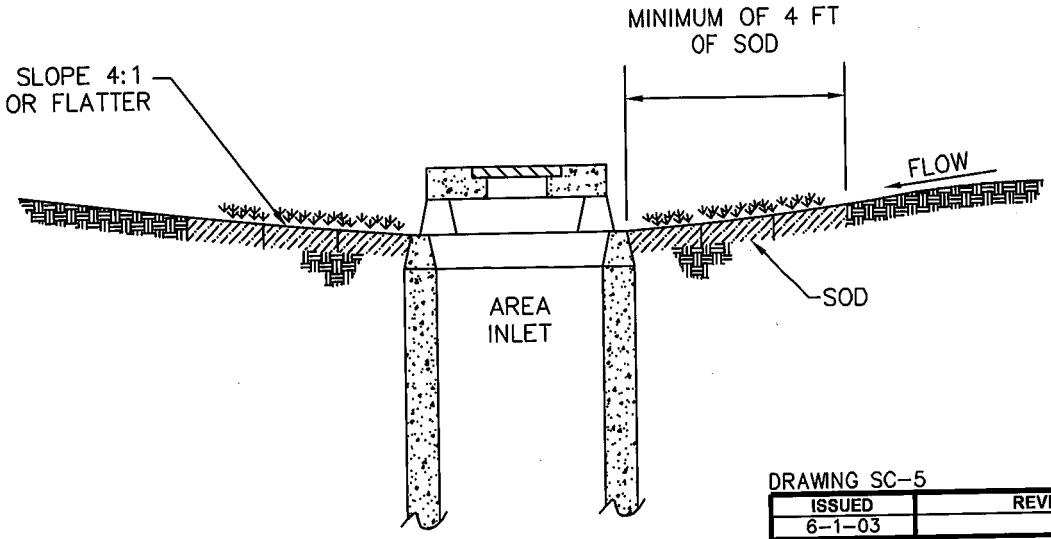
- ✓ Water sod daily for 3 weeks - enough to soak 4 inches into soil without causing runoff
- ✓ Inspect sod at least every week and after every storm
- ✓ Reposition areas of sod that have moved
- ✓ Remove sediment accumulation on sod once it extends within 18" of inlet – replace sod if necessary
- ✓ Repair any eroded areas, replace sod, and stabilize as needed
- ✓ Do not mow until 3 inches of new growth occurs. During the first 4 months do not mow more than 1/3 the grass height.

SITE CONDITIONS FOR REMOVAL: Not Applicable

TYPICAL DETAIL: SC-5



PLAN



SECTION A–A

DRAWING SC-5

ISSUED	REVISIONS
6-1-03	

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL
INLET PROTECTION–
SOD FILTER

Category: SEDIMENT CAPTURE
Use Group: TEMPORARY
ISSUED 6-1-03
REVISED 1-25-06

SEDIMENT BASIN

PHYSICAL DESCRIPTION:

A temporary settling pond designed to slowly release runoff, detaining it long enough to allow most of the sediment to settle out. Sediment basins cannot trap all sediment that enters. Basins should be used in conjunction with additional BMPs, such as temporary seeding, to reduce the total amount of sediment washing into them. Sediment basins may also be designed to be converted to permanent storm water detention basins after site construction has been completed.

WHERE BMP IS TO BE INSTALLED:

Should be located as close to the sediment source as possible. A sediment basin should not be used in areas of continuously running water (live streams) nor areas where failure of the embankment will result in loss of life, damage to homes or structures, or prevent the use of roadways or utilities.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow:	Sheet flow and concentrated flow
Contributing Area:	Maximum 10 acres, as secondary or tertiary BMP
Basin Volume:	Volume of 15 year, 20 minute storm plus silt load of 1800 cf per acre below top of riser
Surface Area to Volume Ratio:	Minimum of 25:1
Length to Width Ratio:	Minimum of 5:1; can be reduced with use of flocculants
Runoff Entry:	Maximize distance from outlet to provide maximum retention time; minimum of 20 feet If needed, install porous baffles to partition the basin into 2-3 cells and increase travel distance
Outlet Pipe:	Sized for 15 year, 20 minute storm when being converted to permanent detention facility

WHEN BMP IS TO BE INSTALLED:

Prior to disturbance of natural vegetation.

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Excavate to length, width, depth and slopes specified on plan
- ✓ Place and compact fill to construct dam to elevation at least 1 foot about crown of outlet pipe
- ✓ Install outlet pipe and compact clayey soil around pipe using hand tampers
- ✓ Install the perforated riser pipe, wrap with fabric, and surround with uniformly graded gravel
- ✓ Install BMP at downstream end of outlet pipe
- ✓ Complete installation of dam to an elevation 10% above design height to allow for settling
- ✓ Grade and stabilize spillway
- ✓ Install lathe or post near outlet of basin. Mark maximum allowable sediment depth as designed.

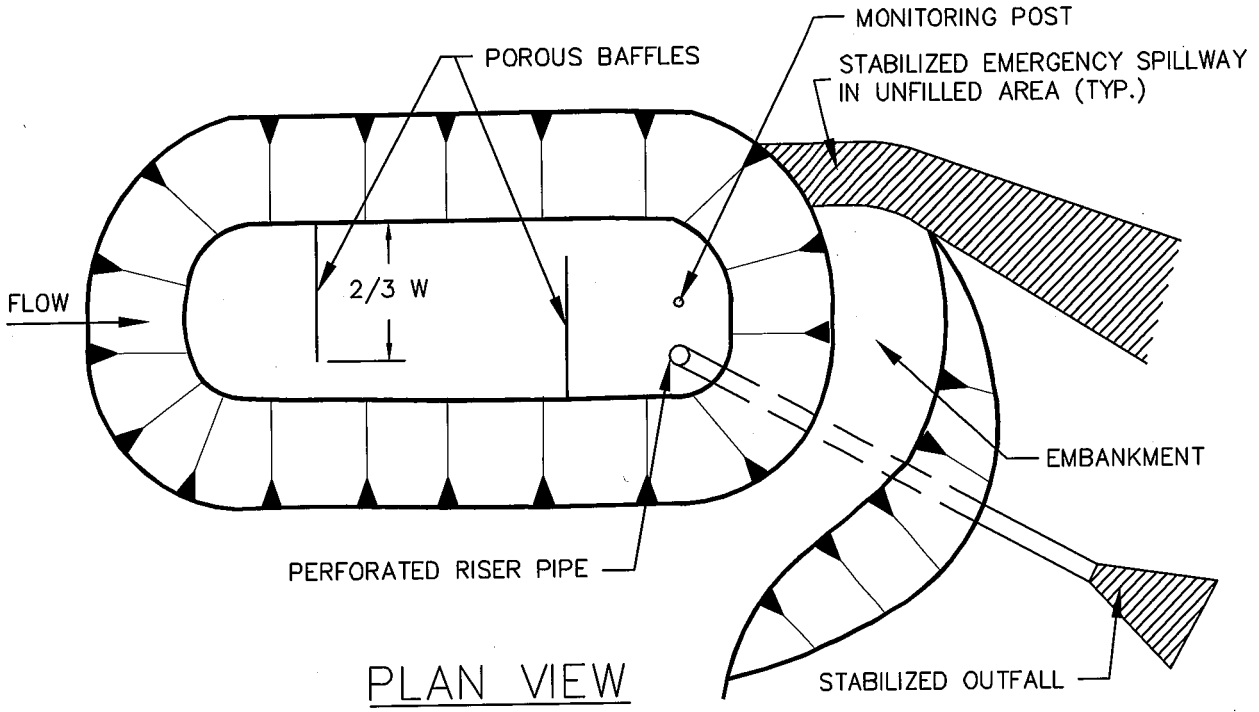
O&M PROCEDURES:

- ✓ Inspect at least every week and after every storm
- ✓ Remove trash accumulation at outlet
- ✓ Remove sediment accumulations once sediment reaches design depth, as indicated on monitoring posts
- ✓ Repair and revegetate any erosion damage on spillway
- ✓ Repair settlement, cracking, piping holes, seepage at embankment
- ✓ Replace gravel around riser if basin does not drain properly

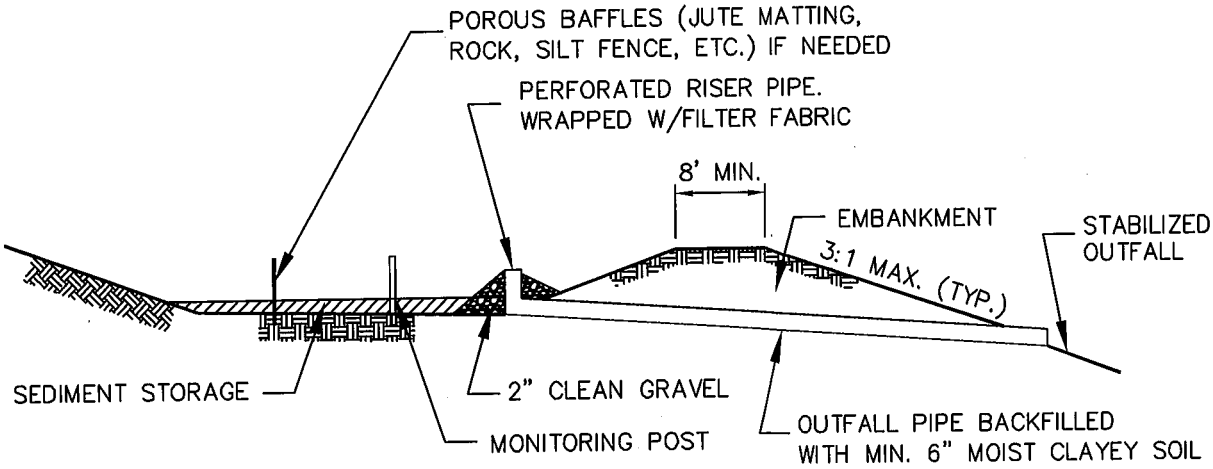
SITE CONDITIONS FOR REMOVAL:

Remove after upstream areas are stabilized with vegetation. Regrade as appropriate and vegetate immediately.

TYPICAL DETAIL: SC-6



PLAN VIEW



PROFILE

GENERAL NOTES:

1. TOP OF RISER PIPE SHOULD BE A MIN. OF 1' BELOW THE TOP OF THE EMBANKMENT AND 6" BELOW THE FLOW LINE OF ANY EMERGENCY SPILLWAY.

2. IF NO EMERGENCY SPILLWAY IS PROPOSED THERE SHALL BE A MINIMUM OF 1.5' OF FREEBOARD.

3. BAFFLE HEIGHT SHOULD BE GREATER THAN TOP OF RISER PIPE AND LESS THAN TOP OF EMBANKMENT.

4. SILT MONITORING POST(S) SHALL BE INSTALLED NEAR OUTLET OF BASIN AND BE MARKED WITH MAXIMUM PERMISSIBLE LEVEL OF SEDIMENT.

DRAWING SC-6

ISSUED	REVISIONS
6-1-03	10-06-05

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL

SEDIMENT BASIN

Category: SEDIMENT CAPTURE
Use Group: TEMPORARY
ISSUED 6-1-03
REVISED 1-25-06

SEDIMENT TRAP

PHYSICAL DESCRIPTION:

A temporary small area of impoundment designed to trap water and allow sediment to settle out. A trap usually consists of an excavated area with a dewatering pipe and spillway outlet stabilized with fabric and riprap. Due to short retention periods, sediment traps do not typically remove fine particles such as silts and clays.

WHERE BMP IS TO BE INSTALLED:

Commonly used at the outlets of BMPs such as storm water diversion devices, channels, temporary slope drains, construction entrances, vehicle wash areas.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow:	Sheet flow and concentrated flow
Contributing Area:	Maximum 5 acres,
Basin Volume:	Silt load of 1800 cf per acre
Length to Width Ratio:	5:1 min.; can be reduced with use of flocculants

WHEN BMP IS TO BE INSTALLED:

Prior to disturbance of natural vegetation

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Excavate to length, width, depth and slopes specified on plan
- ✓ Install dewatering pipe
- ✓ Place and compact fill to construct embankment and spillway
- ✓ Place fabric over dewatering pipe and embankment
- ✓ Install rip-rap on embankment and gravel over dewatering pipe
- ✓ Install lathe or post at each end of basin, and at 20 foot intervals. Mark maximum allowable sediment depth as designed.

O&M PROCEDURES:

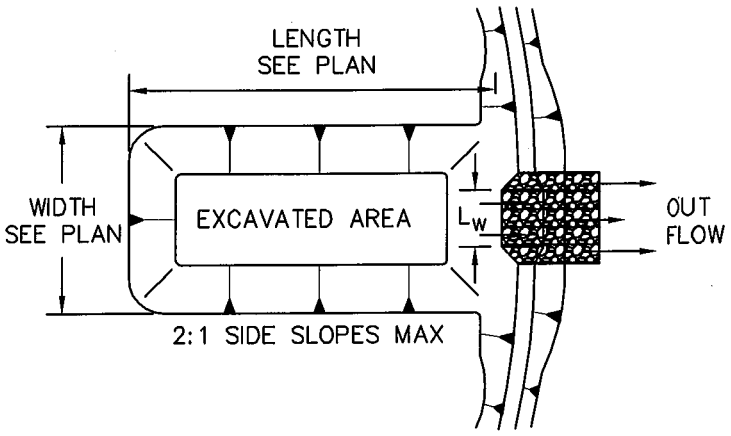
- ✓ Inspect at least every week and after every storm
- ✓ Remove trash accumulation
- ✓ Remove sediment accumulations once sediment reaches design depth, as indicated on monitoring posts
- ✓ Repair and revegetate any erosion damage
- ✓ Repair settlement, cracking, piping holes, or seepage at embankment

SITE CONDITIONS FOR REMOVAL:

Remove after upstream areas are stabilized with vegetation. Regrade as appropriate and vegetate immediately.

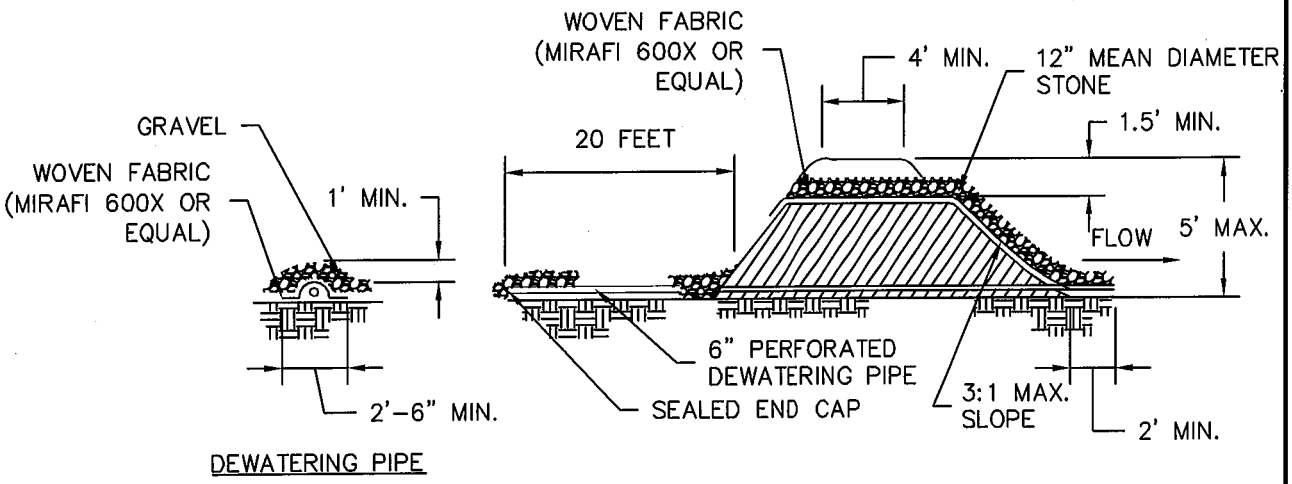
TYPICAL DETAILS:

SC-7.1 Sediment Trap: for use in open areas
SC-7.2 Sediment Trap – Single Cell: for use in line with swales and/or channels
SC-7.3 Sediment Trap – Double Cell: for use in line with swales and/or channels

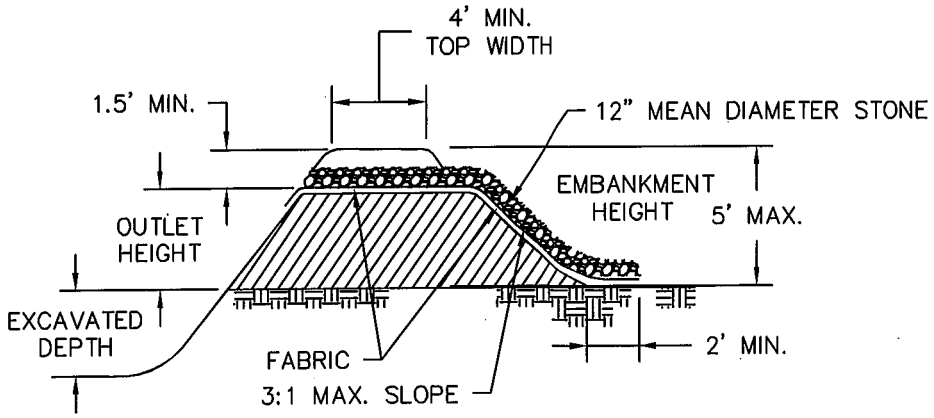


TRIBUTARY AREA (ACRES)	LENGTH OF SPILLWAY WEIR L_W (ft)
0–1.0	4
1.01–2.0	6
2.01–3.0	8
3.01–4.0	10
4.01–5.0	12

PLAN VIEW



OUTLET PROFILE



ALTERNATE OUTLET PROFILE

FOR USE IN OPEN AREAS

DRAWING SC–7.1

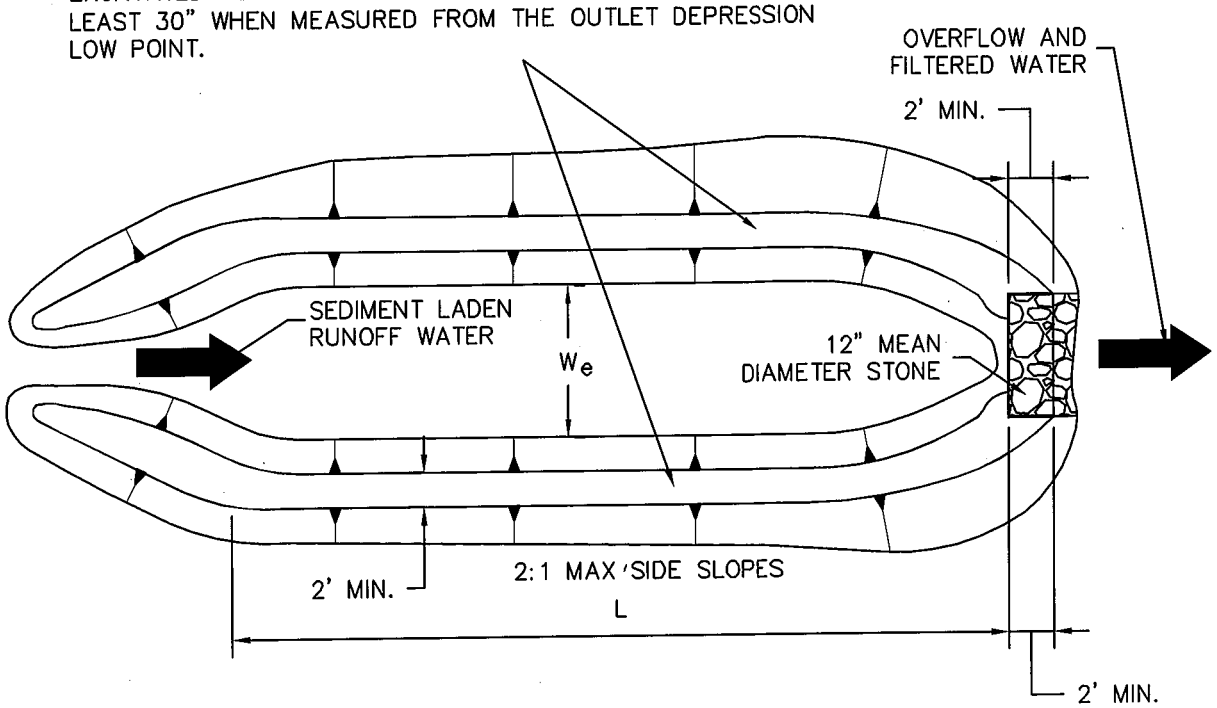
ISSUED	REVISIONS
6–1–03	12–5–03

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

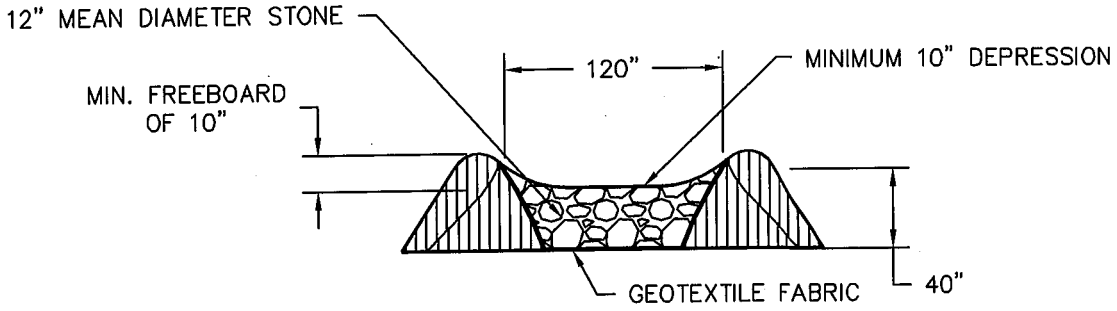
TYPICAL BMP DETAIL

SEDIMENT TRAP

CONTAINMENT BERM CONSTRUCTED FROM BOTTOM MATERIAL EXCAVATED TO CREATE AN AVERAGE POND DEPTH OF AT LEAST 30" WHEN MEASURED FROM THE OUTLET DEPRESSION LOW POINT.



PLAN VIEW



OUTLET VIEW

TRIBUTARY AREA (ACRES)	L (ft)	We (ft)
< 0.5	59	13
0.51–1.0	82	16
1.01–1.5	102	20
1.51–2.0	118	23
2.01–2.5	131	26
2.51–3.0	144	30
3.01–3.5	154	30
3.51–4.0	167	33
4.01–4.5	177	36
4.51–5.0	187	36

FOR USE IN LINE WITH SWALES AND CHANNELS

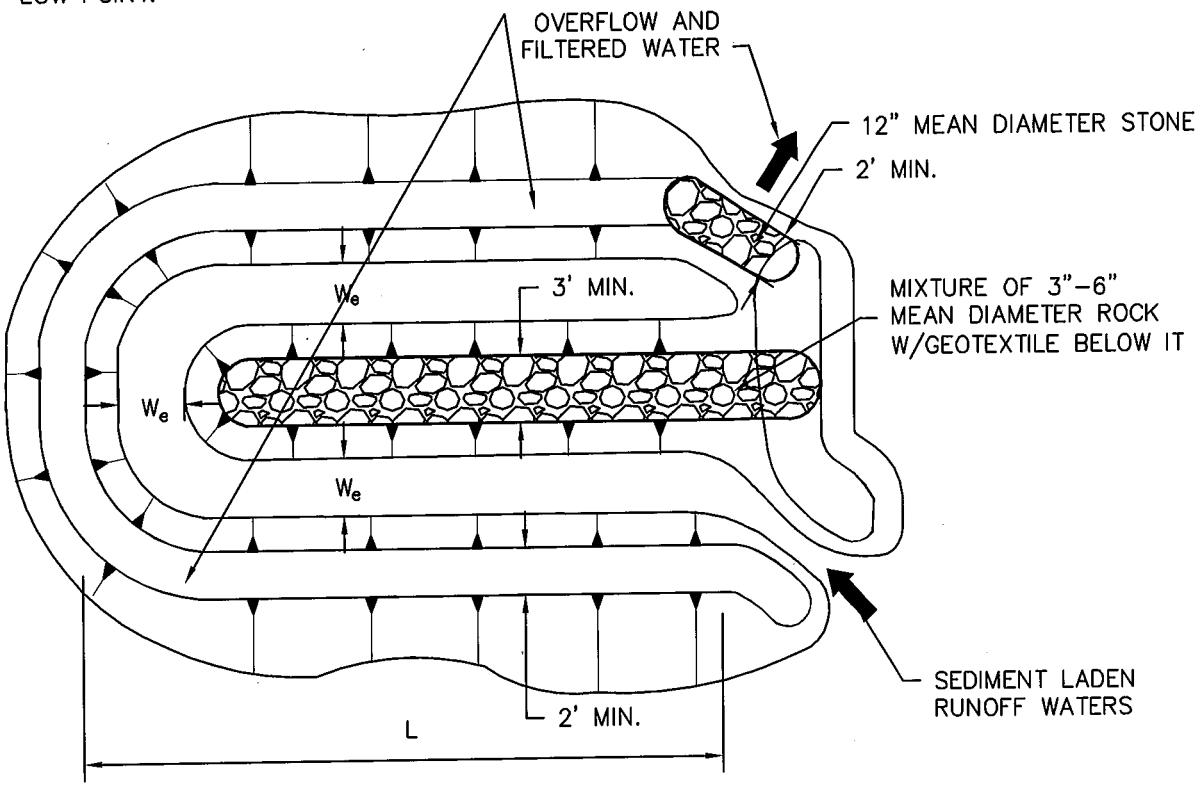
DRAWING SC-7.2

ISSUED	REVISIONS
6-1-03	12-5-03

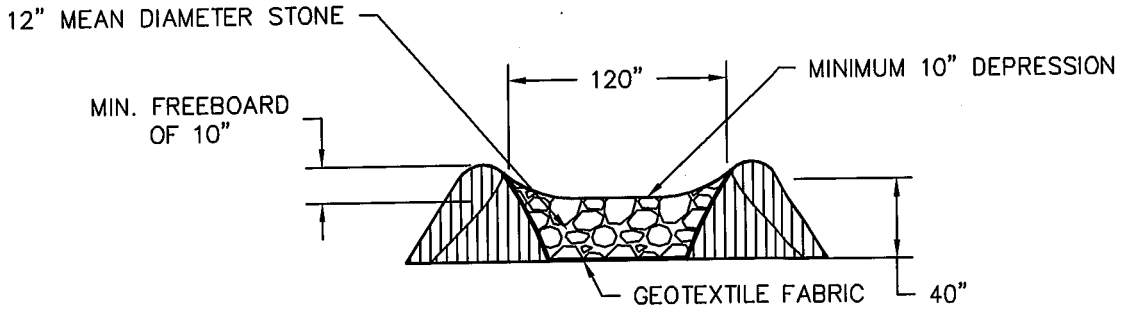
City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL
SEDIMENT TRAP–
SINGLE CHAMBER

CONTAINMENT BERM CONSTRUCTED FROM BOTTOM MATERIAL EXCAVATED TO CREATE AN AVERAGE POND DEPTH OF AT LEAST 30" WHEN MEASURED FROM THE OUTLET DEPRESSION LOW POINT.



PLAN VIEW



OUTLET VIEW

TRIBUTARY AREA (ACRES)	L (ft)	We (ft)
< 0.5	30	7
0.51–1.0	43	10
1.01–1.5	49	10
1.51–2.0	59	13
2.01–2.5	66	13
2.51–3.0	72	13
3.01–3.5	79	16
3.51–4.0	82	16
4.01–4.5	89	16
4.51–5.0	92	20

NOTE: ALL SLOPES–MAX 2:1

FOR USE IN LINE WITH SWALES AND CHANNELS

DRAWING SC-7.3

ISSUED	REVISIONS
6-1-03	12-5-03

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL
SEDIMENT TRAP–
DOUBLE CHAMBER

Category: SEDIMENT CAPTURE
Use Group: TEMPORARY
ISSUED 6-1-03
REVISED 1-25-06

SILT FENCE

PHYSICAL DESCRIPTION:

A fence constructed of woven filter fabric and wire mesh stretched between posts and entrenched in the ground designed to pond stormwater runoff and cause sediment to settle out.

WHERE BMP IS TO BE INSTALLED:

Installed along slopes, at base of slopes, and around perimeter of site as final barrier to sediment being carried off site. Spacing of fence along slopes is relative to slope:

CONDITIONS FOR EFFECTIVE USE OF BMP:

Type of Flow:	Sheet flow only
Contributing Slope Length:	30 foot maximum for 3:1 slopes
	50 foot maximum for slopes between 3:1 and 10:1
	100 foot maximum for slopes under 10%.

WHEN BMP IS TO BE INSTALLED:

Prior to disturbance of natural vegetation and at intervals during construction of fill slopes

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Drive post for fence line
- ✓ Dig trench to required dimensions in front of posts for fabric burial
- ✓ Attach wire mesh to posts
- ✓ Attach fabric to posts, allowing required length below ground level to run fabric along bottom of trench
- ✓ Backfill and compact soil in trench to protect and anchor fabric

Alternate Construction – Install fence by slicing it into ground with specialized equipment
Install posts at reduced spacing indicated on detail

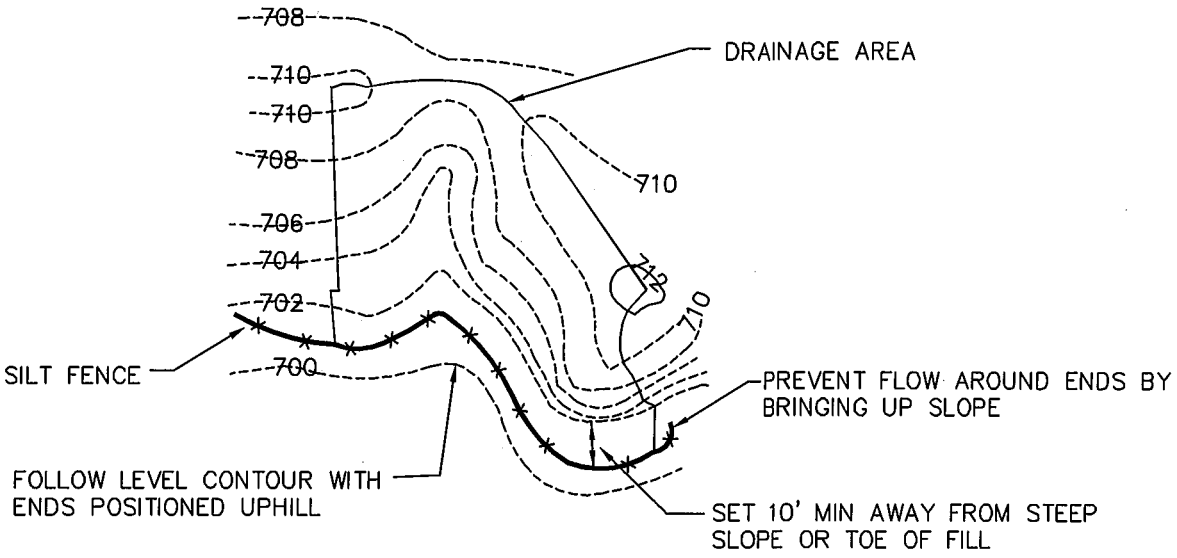
O&M PROCEDURES:

- ✓ Inspect at least every week and after every storm
- ✓ Remove sediment buildup deeper than ½ the fence height or 12", whichever is less
- ✓ Replace torn of clogged fabric; repair loose fabric
- ✓ Repair unstable or broken posts
- ✓ Stabilize any areas susceptible to undermining
- ✓ Extend fence or add additional row(s) of fence if necessary to provide adequate protection

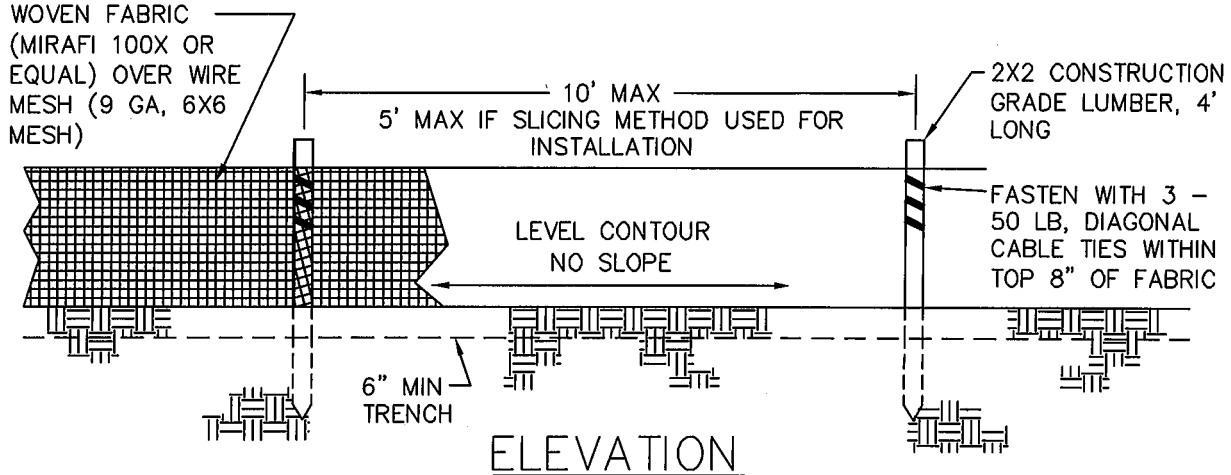
SITE CONDITIONS FOR REMOVAL:

After permanent vegetation of slope is established. Remove fence, regrade trench area and vegetate.

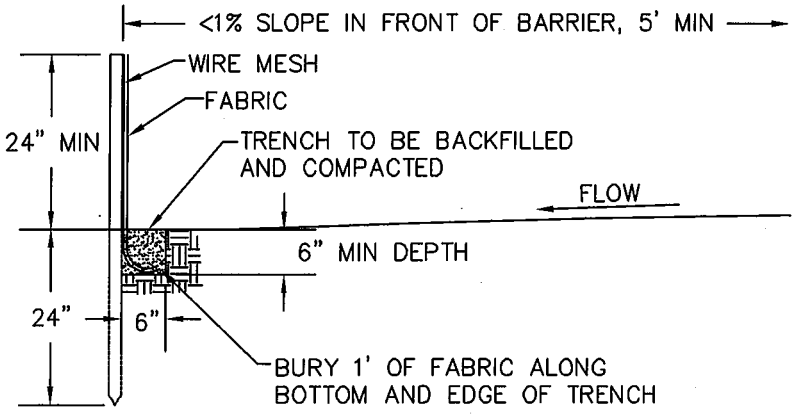
TYPICAL DETAIL: SC-8



PLAN VIEW



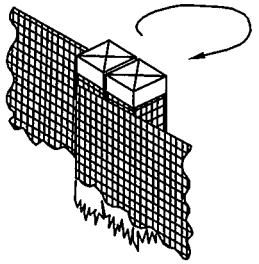
ELEVATION



SECTION

NOTE: IF FABRIC IS INSTALLED BY EQUIPMENT DESIGNED TO SLICE INTO THE GROUND, THE TRENCH IS NOT NEEDED

WRAP GEOTEXTILE AROUND STAKES BEFORE DRIVING



JOINING SECTIONS OF SILT FENCE

DRAWING SC-8

ISSUED	REVISIONS
6-1-03	12-5-03

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL

SILT FENCE

APPENDIX G

TYPICAL TRACKING CONTROL BMPS

BMP	Page
Construction Entrance	TC-1
Construction Parking	TC-2
Construction Road	TC-3
Washdown Station	TC-4

CONSTRUCTION ENTRANCE

PHYSICAL DESCRIPTION:

A stabilized entrance to a construction site designed to minimize the amount of sediment tracked from the site on vehicles and equipment. Stabilization generally consists of aggregate over fabric. Mud and sediment fall off of tires as they travel along the stabilized entrance; however, additional measures in the form of a washdown area should also be included on site. The stabilized entrance also distributes the axle load of vehicles over a larger area; thereby mitigating the rutting impact vehicles normally have on unpaved areas.

WHERE BMP IS TO BE INSTALLED:

At locations where it is safe for construction vehicles and equipment to access existing streets – preferably at location of future streets or drives.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Drainage: Ditches or pipes, if needed, sized for 15 year, 20 minute storm; HGL 6" below surface of entrance

WHEN BMP IS TO BE INSTALLED:

First order of work, along with washdown area, prior to vehicles or equipment accessing unpaved areas.

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Grade and compact area of construction entrance
- ✓ Install culvert under entrance if needed to maintain positive drainage
- ✓ Place fabric and cover with aggregate, forming diversion across entrance if needed to direct runoff away from roadway
- ✓ See Washdown Station BMP for additional steps

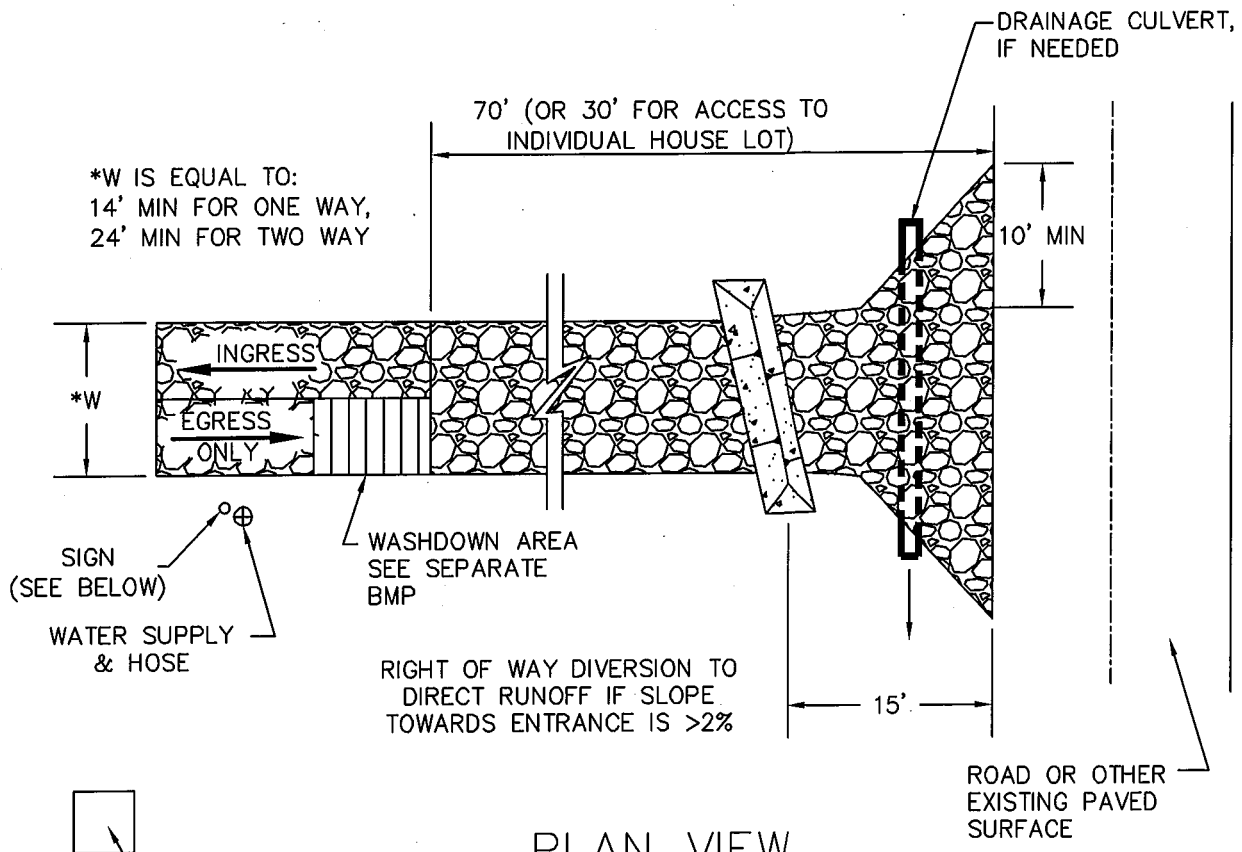
O&M PROCEDURES:

- ✓ Immediately remove any mud or debris tracked onto paved surfaces
- ✓ Remove sediment and clods of dirt from construction entrance continuously
- ✓ Replace rock if necessary to maintain clean surface
- ✓ Repair settled areas

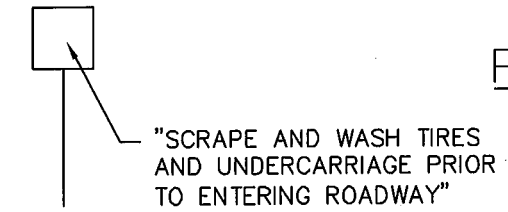
SITE CONDITIONS FOR REMOVAL:

Remove when vehicles and equipment will no longer access unpaved areas

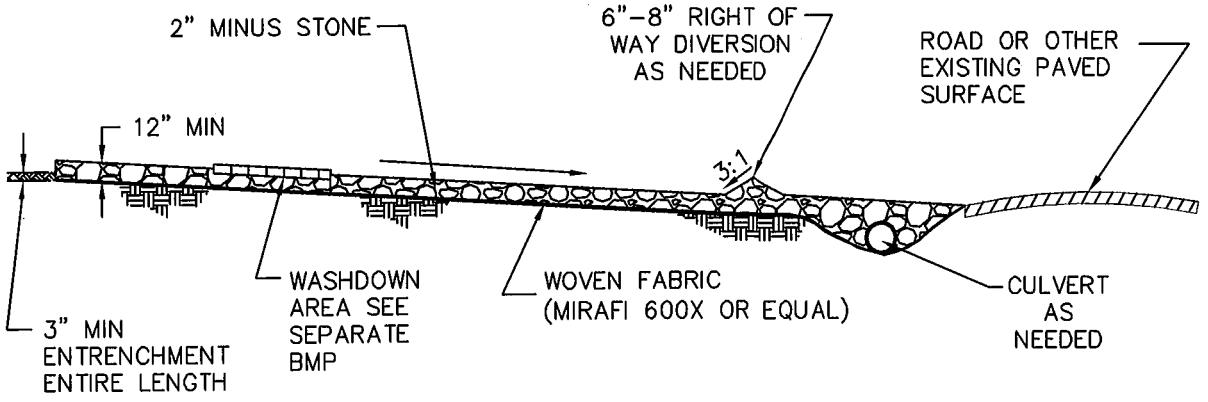
TYPICAL DETAIL: TC-1



PLAN VIEW



SIGN



PROFILE

DRAWING TC-1

ISSUED	REVISIONS
6-1-03	12-5-03

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL
CONSTRUCTION ENTRANCE

CONSTRUCTION PARKING

PHYSICAL DESCRIPTION:

A stabilized pad designed to provide off street parking for construction relate vehicles, eliminate parking on non-surfaced areas, and minimize the amount of sediment tracked from the site. Stabilization generally consists of aggregate over woven fabric. The stabilized pad also distributes the axle load of vehicles over a larger area; thereby mitigating the rutting impact vehicles normally have on unpaved areas.

WHERE BMP IS TO BE INSTALLED:

At locations close to related work zones that have access along continuous paved of stabilized surfaces. Parking may be distributed in clusters and/or relocated with different phases of construction.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Drainage: Ditches or pipes, if needed, sized for 15 year, 20 minute storm; HGL below parking surface
Aggregate size: 2- to 3-inch washed stone
Pad design: Minimum of 12 inches thick and sized to handle anticipated number of employee and visitor vehicles. Plans shall provide provisions for relocation and resizing of parking area(s) as construction phasing requires. See table below for minimum requirements.

Construction Phase	Min. # of Parking Spaces *
Rough Grading	3
Sewer and Street construction	10
Residential Home Construction	10 **
Commercial Bldg. Construction	20

* Parking Space shall be a minimum of 19 feet long and 9 feet wide
** If multiple home builders involved, additional spaces required

Filter Fabric: Woven fabric – Mirafi 600X or equal

WHEN BMP IS TO BE INSTALLED:

Immediately after, or concurrently with, installation of construction entrance and washdown station.

INSTALLATION/CONSTRUCTION PROCEDURES:

✓ Grade and compact area of pad and ditches, if needed
✓ Install culverts if needed to maintain positive drainage
✓ Place fabric and aggregate, and compact
✓ Install signage indicating the designated parking area

O&M PROCEDURES:

✓ Inform drivers of inappropriately parked vehicles that they need to be moved
✓ If necessary to ensure compliance on an ongoing basis, contact employers of violators
✓ Install No Parking signage in areas where vehicles are being parked inappropriately
✓ Remove sediment and clods of dirt continuously
✓ Repair settled areas
✓ Replace rock if necessary to maintain clean surface

SITE CONDITIONS FOR REMOVAL:

Remove/relocate when vehicles can legally park on paved areas without impeding non-construction related traffic.

TYPICAL DETAIL: Not Applicable

CONSTRUCTION ROAD

PHYSICAL DESCRIPTION:

A stabilized pathway providing vehicular access to a remote construction area designed to reduce rutting, tracking of mud in wet weather, and creation of dust in dry weather. The "roadway" can be constructed of aggregate over fabric, asphaltic concrete or portland cement concrete based on the longevity of the project, required performance, and site conditions. Roadways should follow the natural terrain to the extent possible.

WHERE BMP IS TO BE INSTALLED:

On long travel paths on unpaved areas, adjacent to bodies of water, and in areas where poor soil is encountered.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Drainage: Road ditches or pipes, if needed, sized for 15 year, 20 minute storm; HGL 6" below surface of road

WHEN BMP IS TO BE INSTALLED:

First order of work, prior to vehicles or equipment accessing remote areas.

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Grade and compact area of construction road and if needed, adjacent road ditches
- ✓ Install culvert under road if needed to maintain positive drainage
- ✓ Place and compact roadway materials
- ✓ Vegetate road ditches

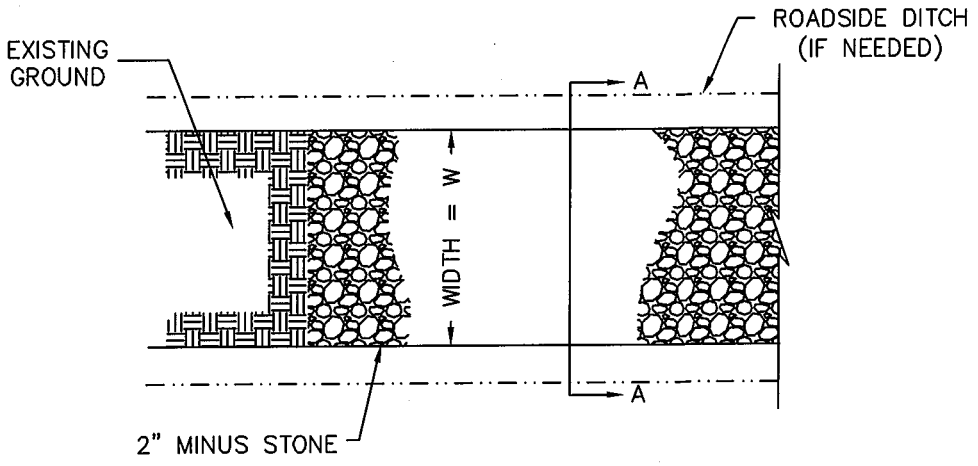
O&M PROCEDURES:

- ✓ Remove sediment and clods of dirt from road daily
- ✓ Remove sediment from road ditches after they
- ✓ Repair settled areas
- ✓ Replace rock if necessary to maintain clean surface
- ✓ Remove sediment from road ditch once it is within 6" of top of road surface

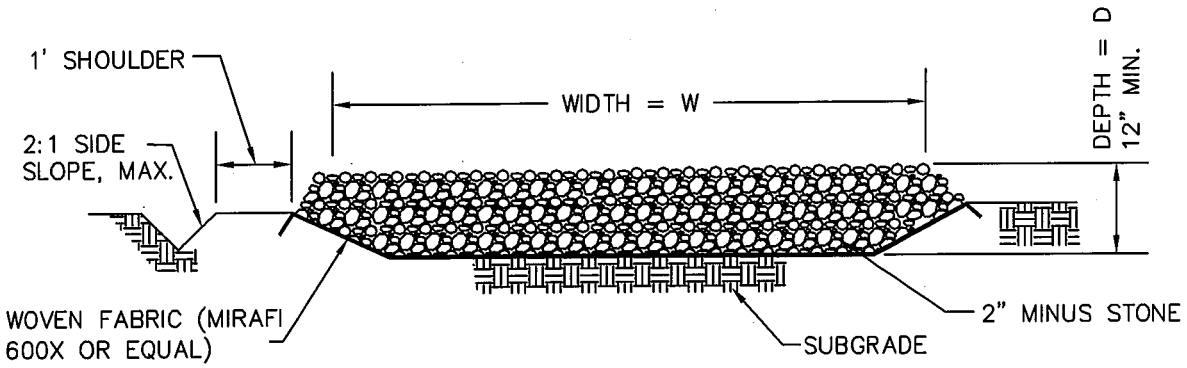
SITE CONDITIONS FOR REMOVAL:

Remove when vehicles and equipment will no longer access remote areas; regrade area and vegetate

TYPICAL DETAIL: TC-3



PLAN VIEW



SECTION A–A

NOTES:

1. SEE PLANS FOR CONSTRUCTION ROAD LOCATION, D AND W DIMENSIONS.

2. MINIMUM WIDTH IS 14 FEET FOR ONE–WAY TRAFFIC AND 24 FEET FOR TWO–WAY TRAFFIC. TWO–WAY TRAFFIC WIDTHS SHALL BE INCREASED A MINIMUM OF 4 FEET FOR TRAILER TRAFFIC. DEPENDING ON THE TYPE OF VEHICLE OR EQUIPMENT, SPEED, LOADS, CLIMATIC AND OTHER CONDITIONS UNDER WHICH VEHICLES AND EQUIPMENT OPERATE AN INCREASE IN THE MINIMUM WIDTHS MAY BE REQUIRED.

3. ROADWAY SHALL FOLLOW THE CONTOUR OF THE NATURAL TERRAIN TO THE EXTENT POSSIBLE.

4. GRADE ROAD AND DITCHES TO PROVIDE POSITIVE DRAINAGE AND PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.

5. ASPHALTIC CONCRETE OR PORTLAND CEMENT CONCRETE MAY BE REQUIRED FOR LONG TERM PROJECTS OR UNSTABLE SOILS.

DRAWING TC–3

ISSUED	REVISIONS
6–1–03	12–5–03

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL

CONSTRUCTION ROAD

WASHDOWN STATION

PHYSICAL DESCRIPTION:

An area located at construction entrances designed to wash sediment from the tires and undercarriage of exiting vehicles and prevent sediment from being tracked onto existing roadways.

WHERE BMP IS TO BE INSTALLED:

Across or immediately adjacent to exit paths from unpaved construction sites.

CONDITIONS FOR EFFECTIVE USE OF BMP:

Drainage: Downstream BMP sized to treat dirty runoff from washdown station

WHEN BMP IS TO BE INSTALLED:

First order of work, along with construction entrance, prior to vehicles or equipment accessing unpaved areas.

INSTALLATION/CONSTRUCTION PROCEDURES:

- ✓ Grade and compact area for drainage under washdown pad
- ✓ Install steel-ribbed plate on frame or other support to allow a 2" drain space
- ✓ Grade and vegetate downstream BMP (v-ditch shown on detail)
- ✓ Install water supply and hose
- ✓ Post sign in advance of station indicating that all exiting vehicles and equipment must use station prior to exiting site

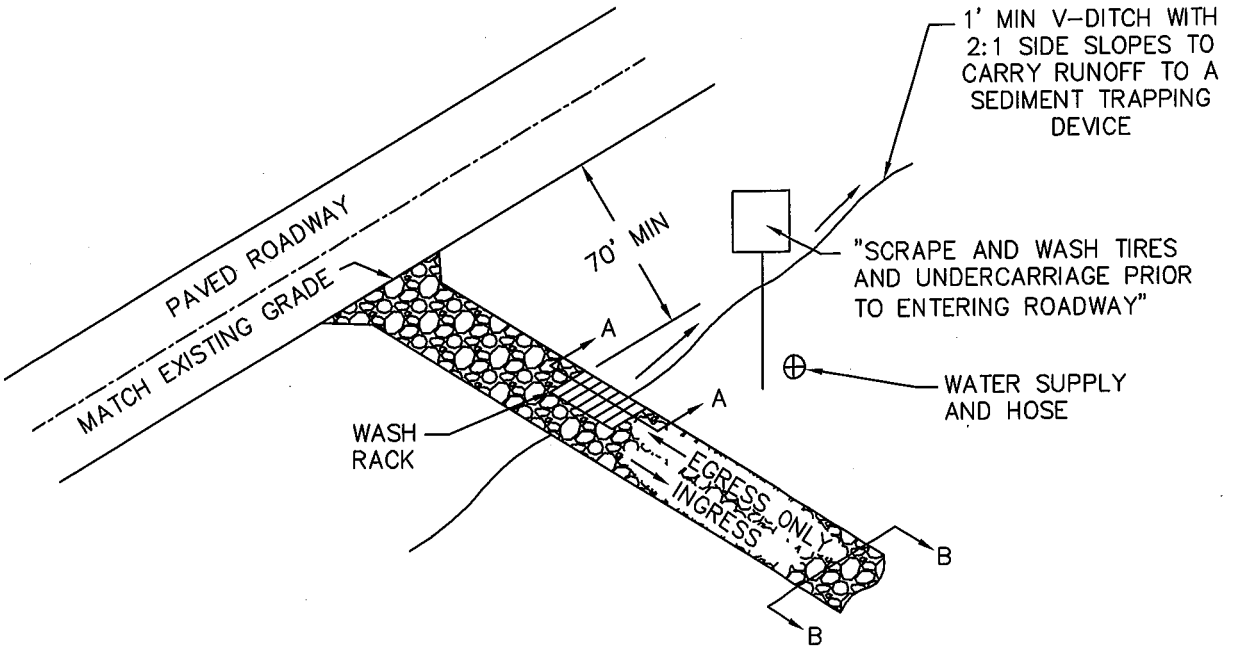
O&M PROCEDURES:

- ✓ Remove sediment daily
- ✓ Repair settled areas
- ✓ Replace rock if necessary to maintain clean surface

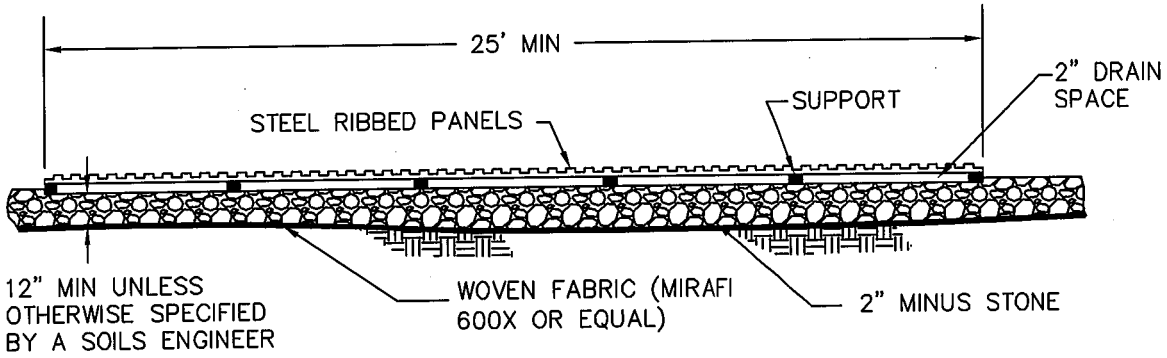
SITE CONDITIONS FOR REMOVAL:

Remove when vehicles and equipment will no longer access unpaved areas

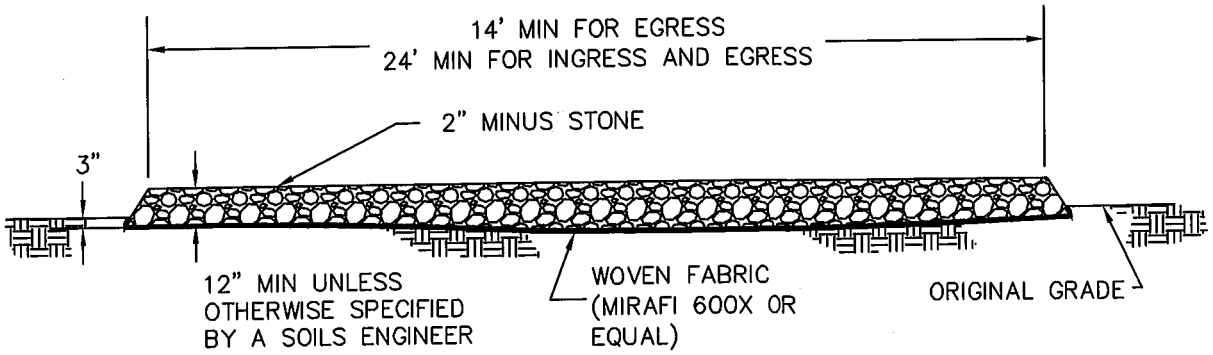
TYPICAL DETAIL: TC-4



PLAN VIEW



SECTION A-A



SECTION B-B

DRAWING TC-4

ISSUED	REVISIONS
6-1-03	12-5-03

City of Chesterfield
Department of Public Works
Chesterfield, Missouri

TYPICAL BMP DETAIL

WASHDOWN STATION

APPENDIX H

STORMWATER MANAGEMENT PRODUCTS MATRIX

STORMWATER MANAGEMENT PRODUCTS
TYPICAL USE MATRIX

	EROSION CONTROL										RUNOFF MANAGEMENT											SEDIMENT CAPTURE					TRACKING CONTROL			
PRODUCT	Bonded Fiber Matrix	Dust Control	Erosion Control Blankets	Mulching	Rock Outlet	Seeding	Sodding	Soil Binder	Streambank Protection	Temporary Stream Crossing	Check Dam	Diversion-Ridge & Channel	Diversion-Storm Sewer	Gradient Terrace	Stabilized Channel	Gravel Bags	Level Spreader	Surface Roughening	Temporary Slope Drain	Filter Strip	Inlet Protection	Sediment Basin	Sediment Trap	Silt Barrier	Construction Entrance/Road	Construction Parking	Washdown Station	Non-sediment Pollution Control
A - Jacks				X				X																					
Armater				X				X	X					X															
Armorflex				X				X	X																				
Armorloc				X				X						X															
Beaver Dam																				X									
Biostarch, chitosan flocculant																					X								
Conlock				X				X						X															
Curlex & Recyclex			X					X						X															
Dandy Bag																				X									
Econofence																							X						
Enkamat			X					X						X															
Fiber Log								X		X	X								X				X						
Filter Fence																				X									
Floc Log																					X	X							
Gabions, Reno Mattress								X																					
Georidge										X	X								X	X			X						
Geoweb				X				X	X					X															
Grasspave2					X																								
Greenfix			X					X						X															
Gutterbuddy																				X									
Hydropave								X						X															
Landlok Erosion Control Blankets			X					X						X															
Mirafi Geotextiles																							X						
Miramat			X					X						X															

STORMWATER MANAGEMENT PRODUCTS
TYPICAL USE MATRIX

PRODUCT	EROSION CONTROL										RUNOFF MANAGEMENT											SEDIMENT CAPTURE					TRACKING CONTROL			
	Bonded Fiber Matrix	Dust Control	Erosion Control Blankets	Mulching	Rock Outlet	Seeding	Sodding	Soil Binder	Streambank Protection	Temporary Stream Crossing	Check Dam	Diversion-Ridge & Channel	Diversion-Storm Sewer	Gradient Terrace	Stabilized Channel	Gravel Bags	Level Spreader	Surface Roughening	Temporary Slope Drain	Filter Strip	Inlet Protection	Sediment Basin	Sediment Trap	Silt Barrier	Construction Entrance/Road	Construction Parking	Washdown Station	Non-sediment Pollution Control
North American Green		X						X						X															
Profile - Straw Netting		X																											
Propex Fabrics																							X	X					
Sediment Log										X				X									X						
Sediment Stop										X				X									X						
Sediment Strip		X																					X						
Seed Aide				X		X																							
Silt Saver																				X									
Silt Stop								X																					
Silt Trap		X																											
Silva-Blend				X																									
Silva-Fiber				X																									
Slopetame2		X				X																							
Soil Guard	X																												
Spray Mat	X																												
SuperGro																													
Tenax Geosynthetics		X						X	X					X															
TerraCell					X			X	X					X															
TerraJute		X						X						X															
Terra-Mulch	X																												
Tommy Silt Fence Installer																							X						
Triangular Silt Dike											X	X							X				X						
True Dam																				X									
Vantage Strip																				X									

APPENDIX I

GRADING PERMIT CHECKLIST

City of Chesterfield

GRADING PERMIT CHECKLIST

PROJECT: _____

_____

Note: The "ADD/REVISE" column must be blank, or issues resolved, in order for a Grading Permit to be issued

GENERAL REQUIREMENTS

	MEETS STD.	ADD/ REVISE	N/A	COMMENTS
1. Application filled out and signed by applicant	____	____	____	_____
2. Insurance certificate for work on City R/W (see Pg. 9)	____	____	____	_____
3. Inspection fees paid	____	____	____	_____
4. Deposit Agreement and Surety ($1,500 min.) If $10,000 or less then surety must be in cash/check.	____	____	____	_____
5. Downstream Impoundment Preconstruction Survey	____	____	____	_____
6. Downstream Impoundment Preconstruction Bond	____	____	____	_____
7. General conformance with approved SP/SDP/PP	____	____	____	_____
8. Dept. of PPWP approval RE: Tree Preservation Ord.	____	____	____	_____
NOTE: APPROVED TREE PRESERVATION PLAN TO BE INCLUDED IN SET OF GRADING PLANS				
9. Tree Preservation Surety	____	____	____	_____
10. Geotechnical report	____	____	____	_____
11. Special Inspector req'd for SWPPP inspections	____	____	____	_____
A. Special Inspector certified by St. Louis County	____	____	____	_____
12. Floodplain Development Permit/Application	____	____	____	_____
A. Engineer signed, sealed & dated application	____	____	____	_____
B. COE 404 permit or waiver	____	____	____	_____
C. MoDNR 401 permit	____	____	____	_____
D. LOMR submitted	____	____	____	_____
E. Lowest floor 1' above 100-yr flood	____	____	____	_____
Elevation Certificate required after construction of structure(s) **[☐]YES** **[☐]NO** (check one)				
13. Estimated start date for the work	____	____	____	_____
14. Location of borrow or fill site	____	____	____	_____
15. Grading permit for borrow or fill site	____	____	____	_____
16. Haul route	____	____	____	_____
A. Pavement repair bond for City streets	____	____	____	_____
B. Video record of City streets along haul route	____	____	____	_____

Additional Comments

For office use only:

Submittal Date: _____ Reviewed by: _____ Date: _____

Submittal Date: _____ Reviewed by: _____ Date: _____

Submittal Date: _____ Reviewed by: _____ Date: _____

City of Chesterfield

GRADING PERMIT CHECKLIST

PROJECT: _____

_____

Note: The "ADD/REVISE" column must be blank, or issues resolved, in order for a Grading Permit to be issued

GENERAL PRINCIPLES OF STORMWATER POLLUTION PREVENTION

Be advised, these are not general notes to be included on the plans; these are the guidelines used to determine the adequacy of the proposed Stormwater Pollution Prevention Plan (SWPPP).

1. Protect the Land Surface (minimize erosion) and Protect Existing Facilities
   Clearing minimized. Clearing/Grubbing/grading scheduled/phased to minimize bare soil areas and time of exposure. Stormwater diverted away from the bare soil and steep slopes. Drainage ways stabilized. Existing stormwater facilities and water ways protected.

2. Sequence of Work
   Key sediment control measures installed prior to clearing/grading. Clearing/Grading sequence coordinated with the installation of erosion/sediment control measures to most effectively control **erosion**. Exposed areas protected ASAP.

3. Keep Runoff Velocities Low
   Natural vegetation preserved where possible. BMPs that shorten or "break" flows utilized to reduce flow velocities.

4. Capture Sediment on the Site as Final Measure
   Stormwater conveyed to stable outlet and water detained in intermediate sediment traps and sediment basin before leaving site. Silt barriers installed at borders of disturbed area and where water flows onto streets. Secondary levels of protection by utilizing multiple devices are more desirable than single large sediment basins.

5. Non-Sediment Pollution Prevention
   Construction site wastes managed, plans for spill prevention and control, personnel aware of requirements.

NOTE: All requirements of the SWPPP, including details, should be addressed on separate plan sheet(s) within the set of Grading Plans, unless a separate SWPPP document is provided. A separate SWPPP may be required for complex or large sites.

	YES	NO
SWPPP required as a formal document separate from the Grading Plans	☐	☐

Additional Comments

City of Chesterfield

GRADING PERMIT CHECKLIST

PROJECT: _____

_____

Note: The "ADD/REVISE" column must be blank, or issues resolved, in order for a Grading Permit to be issued

GENERAL REQUIREMENTS OF THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

	MEETS STD.	ADD/ REVISE	N/A	COMMENTS
Item 1 only required if SWPPP is stand alone document				
1. Site Description	____	____	____	_____
A. Owner's name, address & phone #	____	____	____	_____
B. Developer's name, address & phone #	____	____	____	_____
C. Engineer's name, address & phone #	____	____	____	_____
D. Engineer's seal, signature & date (ALL PAGES)	____	____	____	_____
E. Property address	____	____	____	_____
F. Location map	____	____	____	_____
G. Site area (Acres)	____	____	____	_____
H. Site benchmark based on USGS datum	____	____	____	_____
2. Description of Best Management Practices (BMPs)	____	____	____	_____
(Sample details are available for reference. Straw bales are not to be used in the City of Chesterfield.)				
A. Location of BMP installation	____	____	____	_____
B. Physical description/detail of BMP	____	____	____	_____
C. BMP installation/construction procedures	____	____	____	_____
D. O&M procedures for each BMP	____	____	____	_____
3. Erosion and sediment control plans	____	____	____	_____
A. Property Owner/Developer's certification				
1. Executed certification stating the following: *"The Property Owner/Developer hereby certifies that he is familiar with the SWPPP and assumes full responsibility for the performance and maintenance of the SWPPP as stated on the approved plans. He will ensure that all contractors understand and are familiar with the SWPPP for the site and that each contractor agrees to implement and protect elements of the SWPPP as they relate to his work. The Property Owner's/Developer's onsite representative shall be responsible for the performance and maintenance of the SWPPP. In addition, the undersigned Owner/Developer assures that all City property or roads will be adequately protected."*	____	____	____	_____
2. Developer's contact person and phone #	____	____	____	_____
3. Emergency contact and phone #	____	____	____	_____

Additional Comments

City of Chesterfield

GRADING PERMIT CHECKLIST

PROJECT: _____

_____

Note: The "ADD/REVISE" column must be blank, or issues resolved, in order for a Grading Permit to be issued

GENERAL REQUIREMENTS OF THE SWPPP (CONT.)

	MEETS STD.	ADD/ REVISE	N/A	COMMENTS
B. Key map dividing site into labeled Work Areas	____	____	____	_____
C. Overall sequencing of the work by Work Area Including estimated duration	____	____	____	_____
1. Clearing	____	____	____	_____
2. Rough grading	____	____	____	_____
3. Construction of public improvements - Roads, sewers, retaining walls, & utilities	____	____	____	_____
4. Final grading	____	____	____	_____
5. Landscaping	____	____	____	_____
D. Individual Work Area plan(s)	____	____	____	_____
1. Delineation of area to be disturbed	____	____	____	_____
2. Estimated grading quantity per Work Area	____	____	____	_____
3. Itemized list construction activities per Work Area	____	____	____	_____
4. Sequence of BMPs to be installed or removed	____	____	____	_____
5. Drainage plan designed to safely handle surface water, during the 15-yr, 20-min. storm including drainage area listing an A, P.I., Q for each area	____	____	____	_____
6. Location utilities within 50' of area to be disturbed	____	____	____	_____
7. Contours (2' interval max.)	____	____	____	_____
i. Existing grades	____	____	____	_____
ii. Interim grades	____	____	____	_____
iii. Final grades	____	____	____	_____
8. 100 year floodplain and floodway delineated	____	____	____	_____
9. Note describing soil preparation and revegetation of finished grade	____	____	____	_____
10. Plan for handling sediment removed during maintenance of BMPs	____	____	____	_____

Additional Comments

City of Chesterfield

GRADING PERMIT CHECKLIST

PROJECT: _____

_____

Note: The "ADD/REVISE" column must be blank, or issues resolved, in order for a Grading Permit to be issued

GENERAL REQUIREMENTS OF THE SWPPP (CONT.)

	MEETS STD.	ADD/ REVISE	N/A	COMMENTS
D. Individual Work Area plan(s) (cont.)				
11. Unvegetated open channels, runoff velocity ≤ 2 fps	____	____	____	_____
12. Stabilized channels, runoff velocity 2–5 fps.	____	____	____	_____
13. Adjoining sites protected	____	____	____	_____
14. Runoff from upstream sites diverted appropriately	____	____	____	_____
15. Improvements located 25' from natural watercourse	____	____	____	_____
E. Overall drainage plan incorporating overflows etc. to safely handle a 25% increase in peak flow from the 15-yr, 20-min. storm. No adverse impact to downstream properties.	____	____	____	_____
F. Work plan for typical lot during residential construction	____	____	____	_____
G. Surplus erosion & siltation control devices for emergency repair – required quantities summarized by phase (Minimum of 10% of concurrent phase quantities)	____	____	____	_____
H. Location and present status of any previously permitted grading operations on the property	____	____	____	_____
I. Construction entrances depicted	____	____	____	_____
J. Construction parking depicted & minimum number of parking spaces provided (based on development; see BMP detail)	____	____	____	_____
K. Construction washdown areas depicted	____	____	____	_____
L. Proposed truck and equipment access ways to/within the work site	____	____	____	_____
M. Location of any downstream impoundments which could be affected by the proposed grading	____	____	____	_____
N. Plan for responding to any loss of sediment off-site	____	____	____	_____
O. Non-sediment pollution control				
1. Waste Management BMPs	____	____	____	_____
2. Hazmat BMPs	____	____	____	_____
3. Spill prevention and control BMPs	____	____	____	_____
4. Temporary Sanitary Facilities	____	____	____	_____

Additional Comments

City of Chesterfield

GRADING PERMIT CHECKLIST

PROJECT: _____

Note: The "ADD/REVISE" column must be blank, or issues resolved, in order for a Grading Permit to be issued

GENERAL NOTES TO BE ADDRESSED BY THE SWPPP

The following notes present requirements that should be included as part of the SWPPP. However, the requirements given for the BMPs may exceed the requirements below. Duplicate or conflicting notes shall be avoided.

	MEETS STD.	ADD/ REVISE	N/A
1. Erosion and siltation control shall be installed prior to any grading and be maintained throughout the project until adequate vegetative growth insures no further erosion of the soil and work is acceptable to the owner and/or controlling regulatory agency.	____	____	____
2. At least once every week and after every rainfall event of 0.25 inches or more, erosion and siltation control devices shall be inspected for damage and amount of sedimentation accumulated and corrective actions taken. Reports of these inspections and corrective actions shall be prepared on the forms provided by the City and submitted to the Department of Planning, Public Works and Parks within 5 days of the date of the inspection.	____	____	____
3. Temporary siltation control measures (structural) shall be maintained until vegetative cover is established at a sufficient density to provide erosion control on the site.	____	____	____
4. Where natural vegetation is removed during grading, vegetation shall be reestablished as soon as possible in such a density as to prevent erosion.	____	____	____
5. When grading operations are completed or will be suspended for more than 5 days in any area, the disturbed area shall be seeded or otherwise stabilized to significantly reduce the erodibility of the soil. Protective measures may include a combination of seeding, sodding, mulching or other suitable means to protect the ground surface from erosion.	____	____	____
6. If cut and fill operations occur during a season not favorable for immediate establishment of permanent ground cover, a fast germinating annual such as rye grasses or sudan grasses shall be utilized to retard erosion, if adequate stormwater detention and erosion control devices have not been established.	____	____	____
7. All finished grades (areas not to be disturbed by future improvement) in excess of 20% slopes (5:1) shall be mulched and tacked at the rate of 100 pounds per 1,000 square feet when seeded as soon as possible after final placement.	____	____	____
8. Storm water pipes, outlets and channels shall be protected by silt barriers and kept free of waste and silt at all times prior to final surface stabilization and/or paving.	____	____	____

Additional Comments

City of Chesterfield

GRADING PERMIT CHECKLIST

PROJECT: _____

_____

Note: The "ADD/REVISE" column must be blank, or issues resolved, in order for a Grading Permit to be issued.

CLEARING/GRADING PLAN REQUIREMENTS

	MEETS STD.	ADD/ REVISE	N/A	COMMENTS
1. Topographic plan showing existing and proposed contours of the site and adjoining off-site strips based on U.S.G.S. datum.	____	____	____	_____
2. Plan showing the location of the clearing/grading, structures, retaining walls, etc.	____	____	____	_____
3. Site address	____	____	____	_____
4. Vicinity map	____	____	____	_____
5. Registered P.E.'s seal, signature & date	____	____	____	_____
6. Owner's name, address & phone #	____	____	____	_____
7. Developer's name, address & phone #	____	____	____	_____
8. Engineer's name, address & phone #	____	____	____	_____
9. Geotechnical engineer's Statement of Compliance with seal, signature and date	____	____	____	_____
10. North arrow and graphic scale	____	____	____	_____
11. Benchmarks				
A. Based on U.S.G.S. datum	____	____	____	_____
B. Temporary 'Site' benchmark	____	____	____	_____
12. Existing trees to be saved and/or removed indicated	____	____	____	_____
A. Limits from approved Tree Preservation Plan shown	____	____	____	_____
B. Corresponds w/ Site Development Plan/Prelim. Plat	____	____	____	_____
13. Natural Watercourse Protection	____	____	____	_____
A. Top of Bank delineated	____	____	____	_____
B. Buffer Area Delineated **50' from Top of Bank for Bonhomme, Caulks and Creve Coeur Creeks - 25' for all others (blue line on USGS Quad Map)**	____	____	____	_____
14. Total area of site (acres)	____	____	____	_____
15. Estimated area to be disturbed (acres)	____	____	____	_____
16. Estimated tree area to be cleared (acres)	____	____	____	_____
17. Grading quantities	____	____	____	_____
18. Finish floor elevations of existing buildings	____	____	____	_____
19. 100 Year floodplain and floodway delineated	____	____	____	_____
20. Slopes to be no steeper than 3:1	____	____	____	_____
21. Off-site grading easement (show on plan and provide actual agreement) **{NOTIFY PROPERTY OWNER PRIOR TO STARTING WORK}**	____	____	____	_____
22. Positive drainage provided (2% min. slope in grassed swales, 1% min. slope other grassed areas)	____	____	____	_____
23. Call out swales on top of retaining walls. **NO IMPLIED APPROVAL OF WALL CONSTRUCTION. ZONING AUTHORIZATION REQUIRED FROM DEPARTMENT**	____	____	____	_____

City of Chesterfield

GRADING PERMIT CHECKLIST

PROJECT: _____

Note: The "ADD/REVISE" column must be blank, or issues resolved, in order for a Grading Permit to be issued

CLEARING/GRADING PLAN REQUIREMENTS (CONT.)

Additional Comments (cont.)

MANDATORY NOTES

(The following notes are required regardless of the SWPPP)

	MEETS STD.	ADD/ REVISE
1. Notify the City of Chesterfield Department of Planning, Public Works & Parks (636-537-4761) 48 hours prior to the commencement of grading and/or prior to the commencement of construction.	____	____
2. Parking on non-surfaced areas is prohibited in order to eliminate the condition whereby mud from construction and employee vehicles is tracked onto the pavement causing hazardous roadway and driving conditions.	____	____
3. The streets surrounding this development and any street used for construction access thereto shall be kept free from mud and construction debris and shall be cleaned throughout the day.	____	____
4. All fills placed under proposed storm and sanitary sewer lines and/or paved areas, including trench backfills within and off the road right-of-way, shall be compacted to 90% of maximum density as determined by the "Modified AASHTO T-180Compaction Test" (ASTM D-1557) for the entire depth of the fill. Compacted granular backfill is required in all trench excavation within the street right-of-way and under all paved areas. All tests shall be performed under the direction of and verified by a soils engineer concurrent with grading and backfilling operations.	____	____
5. Soft soils from the bottom and banks of any existing or former pond sites or tributaries or any sediment basins or traps shall not be placed in proposed public right-of-way locations or in any storm sewer location.	____	____
6. All trash and debris on-site, either existing or from construction, must be removed and properly disposed of off-site.	____	____
7. Debris and foundation material from any existing on-site building or structure which is scheduled to be razed for this development must be properly disposed of off-site.	____	____
8. Any wells, cisterns and/or springs, which may exist on this property, should be located and sealed in a manner acceptable to the City of Chesterfield and the MoDNR.	____	____
9. All excavations, grading or filling shall have a finished grade not to exceed a 3:1 slope (33%), unless specifically approved otherwise.	____	____
10. No excavation shall be made so close to the property line as to endanger any adjoining property of any public or private street without supporting and protecting such public or private street or property from settling, cracking or other damage.	____	____
11. All lots shall be seeded and mulched or sodded before an occupancy permit shall be issued except that a temporary occupancy permit may be issued by the City of Chesterfield Department of Planning, Public Works and Parks in cases of undue hardship because of unfavorable ground conditions. If the lot is to be seeded and mulched, it shall be done in a manner that meets or exceeds the requirements of the City's "Sediment & Erosion Control Guidelines."	____	____

City of Chesterfield

GRADING PERMIT CHECKLIST

PROJECT: _____

_____

Note: The "ADD/REVISE" column must be blank, or issues resolved, in order for a Grading Permit to be issued

INSURANCE REQUIREMENTS FOR WORK ON CITY RIGHT OF WAY

	MEETS STD.	ADD/ REVISE	N/A
A **certificate of insurance** stating the **"City of Chesterfield is an additional insured"** is required for work on City right of way. Indication of the City of Chesterfield as a "certificate holder" will not suffice.	____	____	____
The Contractor and his Subcontractors shall procure and maintain throughout theduration of work on City right of way, insurance of the types and minimum amounts as stated below:			
1. Worker's Compensation in full compliance with statutory requirements of Federal and State of Missouri Law and Employers' Liability coverage in the minimum amount of $500,000.00	____	____	
2. Comprehensive General Liability	____	____	
Bodily Injury, Including Death $ 500,000 each person	____	____	
$2,500,000 each occurrence	____	____	
Property Damage $2,500,000 each occurrence	____	____	
$2,500,000 aggregate	____	____	
3. Comprehensive Automobile Liability	____	____	
Bodily Injury, Including Death $ 500,000 each person	____	____	
$2,500,000 each occurrence	____	____	
Property Damage $2,500,000 each accident	____	____	

Additional Comments

APPENDIX J

GENERAL GUIDELINES FOR SWPPP INSPECTION REQUIREMENTS

SWPPP INSPECTION REQUIREMENTS

Without inspection and maintenance of siltation/erosion control measures, erosion and siltation control measures will not remain effective for long periods of time. Without proper training of inspection staff and effective records of results of inspections, it is difficult to determine what maintenance is required.

The inspector needs to fully understand the SWPPP. The SWPPP is more than just words and symbols on a piece of paper; it is a blueprint for contractors to follow. The inspector must know the implementation schedules, know where and when BMPs are to be installed, know what BMPs are to be maintained or eliminated, and fully understand the limitations of BMPs.

The contractor needs to be informed by the inspector of any noncompliance or violation issues. It is recommended that the inspector meet at least weekly with the contractor(s) to avoid problems that might lead to noncompliance issues. Also, the inspector must be cognizant of his/her responsibilities relative identifying where modifications to the SWPPP are needed and recognize when it is necessary to involve owners, designers and regulatory personnel in modifications to the SWPPP or concerns about the operation of the SWPPP. Open and regular communication with all companies and agencies is essential.

The inspector also needs to be aware of appropriate contacts regarding maintenance of BMPs or other concerns. At some points of the project, the developer's land development personnel may be the sole contact; at other stages of construction, it may be necessary to communicate with personnel responsible for building construction.

General inspection guidelines follow to provide some additional guidance to the inspector. These guidelines are provided as a tool for the inspector's use and do not attempt to address all items that can be included on a specific SWPPP. The importance of reporting the results of inspections and follow up with appropriate personnel cannot be stressed enough. See Appendix K for a sample form of the Inspector's Report on the Storm Water Pollution Prevention Plan.

GENERAL SWPPP INSPECTION REQUIREMENTS

The inspector is responsible for:

Inspecting the site to ensure proper installation, operation and maintenance of BMPs;
Performing inspections weekly and w/in 24 hours of rainfall in excess of 0.25 inches
Determining the overall effectiveness of the SWPPP;
Determining the need for additional control measures;
Promptly notifying the permittee and the site contractors responsible for operation and maintenance of BMPs of the deficiencies found during an inspection.
Notifying the permittee, site contractors and the City immediately of any situation requiring immediate action
Noting corrective actions taken
Forwarding report of inspections to Department of Public Works within 5 days of inspection

The inspector should have detailed knowledge about the site specific SWPPP, particularly:

The location and type of control measures;
The construction requirements for the control measures;
Spill prevention and cleanup measures;
Inspection and maintenance record keeping requirements.

The inspector should determine the following from the inspection:

The effectiveness of each BMP;
The maintenance that needs to be performed on the BMP;
The need for revisions to the SWPPP.

GENERAL ITEMS TO INSPECT

BMPs installed in timely fashion
BMPs installed/performing correctly
Any damage to BMP noted
Has maintenance been performed
Is the BMP still effective
Phasing being followed
Note areas where grading activities have started/stopped
Areas stabilized within 5 days of work being halted
Removal of BMPs that are no longer required
Evaluate need for revision to SWPPP

AREAS TO INSPECT

All disturbed areas
All recently stabilized areas
All locations where an erosion/silt control device is installed
Off-site areas/outfall points – including adjacent roadways
Operational storm sewer inlets
Material storage areas
Trash collection areas
Concrete washout areas
Temporary toilets on site

TYPICAL BMP INSPECTION ITEMS – REFER TO SITE SWPPP FOR ADDITIONAL ITEMS

BMP	INSTALLATION	MAINTENANCE
CONSTRUCTION ENTRANCE	Dimensions correct Proper sized rock used	Repair/replacement of sediment covered rock Removal of sediment on adjacent streets
EROSION CONTROL BLANKETS	Slope seeded prior to blanket installation Material installed meets spec Blanket undamaged Blanket in intimate contact with the ground Properly stapled Secured at top of slope by approved method	Repair/replacement of damaged blanket Repair of eroded ground under blanket Reseeding of damaged areas Secure blanket to prevent undermining
FILTER BAG	Filter bag draining properly No tears or damage to the filter bag Discharged to secondary BMP	Removal of accumulated sediment Repairs to damaged parts of the bag Removal of the bag
MULCHING	Coverage 80 – 100%	Replace/reapply deteriorated or spotty mulch Anchor to ground by crimping or tackifier if needed
RISER PIPE OUTLET STRUCTURE	Correct size rock used Top of riser pipe below the spillway & clear	Removal of sediment above clean out level Repair/replacement of rock
ROCK BARRIER CHECK STRUCTURE	Correct rock size used Spacing between structures correct Secured to prevent water flow underneath Ends high enough so no flow around ends Depression in the structure for overflow	Repair of replacement of structure Removal of sediment above clean out level Repair of eroded ground/channel
SEDIMENT TRAPS	Outflow restricted to riprap area Structure capturing runoff Dimensions of trap correct Dimensions of outlet correct Inflow higher than the outflow Containment berms stabilized	Removal of any sediment above cleanout level Repair of damaged riprap Repair of containment berms
SEEDING	Surface properly prepared (grading & fertilizing) Seed mixture meets spec Area watered thoroughly	Regrade and reseed damaged areas Weed control if needed Area watered regularly
SILT FENCE	Location correct Stakes on downstream side of fabric Fabric secured in the ground Fabric secured to posts Fabric intercepting water flow	Repair/replacement of material not upright or intact Removal of sediment Removal of fence material
SLOPE DRAIN	Earthen berm intact Spacing of the drains correct Water flowing into drainpipe Water discharging to stabilized area Pipe secured to the hillside	Repair breached sections of earthen berm Repair/reinforce protection at end pipe Repair or replacement of the slope drain
SURFACE SKIMMER	Proper connection to outfall pipe Trash screen installed and operating	Removal of debris on trash screen Repair/replacement of damaged floating unit Repair/replacement of damaged connector
TRIANGULAR SILT DIKE	Overlapped per manufacturer specs Properly stapled Secured to prevent water flow under fabric Ends high enough so no flow around ends	Repair and replacement of structures Removal of sediment Repair of eroded ground Removal of structures
TRM IN A CHANNEL	Channel seeded prior to blanket installation Material installed meets spec TRM undamaged TRM in intimate contact with the ground Properly stapled Secured at top of slope by approved method	Repair/replacement of damaged material Repair of eroded ground under TRM Reseeding of damaged areas Secure blanket to prevent undermining

APPENDIX K

SAMPLE FORM FOR SPECIAL INSPECTOR'S REPORT ON SWPPP

SPECIAL INSPECTOR'S REPORT
STORM WATER POLLUTION PREVENTION PLAN
☐ WEEKLY INSPECTION ☐ STORM EVENT

Project/Site Name: _____

City Grading Permit No. or Development No.: _____

Inspected By: _____ (INDIVIDUAL) **Inspection Date(s):** _____

_____ (COMPANY) **Inspector's Phone #:** _____

Fax #: _____ **E-mail:** _____

Check those items that are applicable to this phase of construction.
Note: Inspector may refer to SWPPP Inspection Checklist Appendix for general guidance on inspection requirements.

ITEMS OF CONCERN	INSPECTION RESULTS
☐ Sediment leaving the project site.	☐ Site in accordance with SWPPP and operating properly. ☐ Correction of deficiencies required. See attached comments/descriptions Deficiencies from last report: ☐ Corrected ☐ Not Corrected – See attachment
☐ Mud tracked onto roadways by vehicles exiting the site. Installation, maintenance and protection of vehicle wash down areas.	☐ Site in accordance with SWPPP and operating properly ☐ Correction of deficiencies required. See attached comments/descriptions Deficiencies from last report: ☐ Corrected ☐ Not Corrected – See attachment
☐ BMPs installed in accordance with the approved plans/permit conditions.	☐ Site in accordance with SWPPP and operating properly ☐ Correction of deficiencies required. See attached comments/descriptions Deficiencies from last report: ☐ Corrected ☐ Not Corrected – See attachment
☐ BMPs maintained in accordance with the approved plans/permit conditions.	☐ Site in accordance with SWPPP and operating properly ☐ Correction of deficiencies required. See attached comments/descriptions Deficiencies from last report: ☐ Corrected ☐ Not Corrected – See attachment
☐ Grading/construction activities proceeding in general accordance with the approved plans.	☐ Site in accordance with SWPPP and operating properly ☐ Correction of deficiencies required. See attached comments/descriptions Deficiencies from last report: ☐ Corrected ☐ Not Corrected – See attachment
☐ Stabilization (temporary or permanent) of areas that have been or are to be inactive for > 5 days	☐ Site in accordance with SWPPP and operating properly ☐ Correction of deficiencies required. See attached comments/descriptions Deficiencies from last report: ☐ Corrected ☐ Not Corrected – See attachment

General Performance of the SWPPP: ☐ Good ☐ Fair ☐ Poor Modifications Needed to SWPPP?: ☐ Yes ☐ No

☐ Attached is information on areas where construction activities have permanently or temporarily stopped and further comments/descriptions of deficiencies, special problems or concerns.

It is my professional opinion that the grading and other construction activities being conducted, except as specifically identified above and attached, are in compliance with the approved plans and Chapter 31, Article 04, Section 11, Grading Permits, of the City Code.

_____ _____
Signature of Inspector Date

cc: Jobsite
Planning and Development Services Division, 690 Chesterfield Parkway West, Chesterfield, Missouri 63017-0760
Submit signed copy of report no later than 5 days following the inspection.

SPECIAL INSPECTOR'S REPORT (cont.)
STORM WATER POLLUTION PREVENTION PLAN

☐ WEEKLY INSPECTION ☐ STORM EVENT

Project/Site Name: _____ Inspection Date(s): _____

Location(s) Where Work has stopped: _____

_____

_____

Location of deficiencies/concerns, corrective actions necessary and the party(ies) notified.

LOCATION	ACTION NEEDED	NOTIFIED

Additional comments: _____

_____

_____

_____

_____
Signature of Inspector

_____
Date

Rev 12/18/2015