

Storm Water Pollution Prevention Plan For MO-R100007

June 2008

I. Stormwater Permit and SWPPP

Provisions of the federal clean water act and related state rules and regulations require stormwater permits where construction activities disturb greater than one acre over the life of a project as part of a common plan or sale. MoDOT has a general State Operating Permit, obtained from the Missouri Department of Natural Resources (DNR), which allows road construction activities and the associated land disturbance. The permit stipulates that MoDOT will follow certain erosion control guidelines and install temporary erosion control measures. Locally sponsored federal aid projects that are performed on MoDOT right of way and are using MoDOT's land disturbance permit are required to comply with MoDOT Standard Specifications, and therefore, must follow this Storm Water Pollution Prevention Plan (SWPPP). Cities, counties and other government entities may already possess their own State Operating Permit and, in that case, must comply with their own SWPPP.

In a few rare cases MoDOT may require contractors to obtain their own individual State Operating Permit for land disturbance activities even though the project is being constructed on MoDOT Right of Way. These unique situations will normally be Design/Build projects that are funded by MoDOT, but totally managed by the contractor. MoDOT will coordinate with DNR whenever one of these Design/Build projects commences.

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 storm water discharges associated with the land disturbance activities; comply with the Missouri Water Quality Standards, and ensure compliance with the terms and conditions of the general permit.

The following documents were used in the preparation of this SWPPP:

- **Best Management Practices for Erosion and Sediment Control**, (Report No. FHWA-FLP-94-005) published by the United States Department of Transportation (1995)
- **Storm Water 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 (1992).
- **Protecting Water Quality: A field guide to erosion, sediment and storm water best management practices for development sites in Missouri.**
- **Missouri Standard Specifications for Highway Construction** (2004)
- **Missouri Department of Transportation Engineering Policy Guide** (2007)

- **Missouri Department of Transportation Project Development Manual (2006)**

II. Site Description

Section 4-01.1 of MoDOT's Project Development Manual (PDM) describes the information that is to be included in all plans that are used by contractors to build highways. All highway and bridge projects are constructed from a set of design plans that are generated by MoDOT designers or consultants. The plans show all existing topographic features, buildings, roadways and drainages, as well as right of way limits.

The plans contain sufficient information to be of practical use to contractors and site construction workers to guide the installation of BMPs. A set of final plans is always on location at active MoDOT job sites, usually in the possession of MoDOT's construction inspector or the contractor superintendent.

Contract plans shall include erosion control measures that are sufficient to protect streams, lakes and private land adjacent to MoDOT right of way, and the location of most of these controls will be depicted on the plan sheets. The exact location of the controls that are shown on plan sheets will be determined in the field by the engineer. Temporary erosion control measures shall be coordinated with permanent erosion control measures to assure economical, effective and continuous erosion control. Construction of permanent erosion control measures that may contribute to the control of siltation, shall be accomplished at the earliest practicable time.

III. Drainage Areas

In compliance with the Missouri Clean Water Law (Section 644.051), neither MoDOT nor MoDOT's contractors shall pollute any waters of the state, or place, cause, or permit to be placed any water contaminant in a location where it is reasonably certain to cause pollution of any waters of the state. Also, they shall not discharge water contaminants into any waters of the state, which reduce the quality of these waters below the state's water quality standards. These water quality standards include the following (MO 10 CSR 20-7):

- (a) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
- (b) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses.
- (c) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.
- (d) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life.

(e) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community.

(f) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200–260.247.

MoDOT personnel or contractors hired by MoDOT shall comply with these and any other federal, state, and local laws and regulations controlling pollution of the environment. To ensure that these general criteria are met, the following guidelines will be observed:

- 1) Machinery shall be kept out of the waterway as much as possible.
- 2) Fuel, lubricants, debris and other water contaminants shall not be stored in areas that are subject to contact with water (such as adjacent to stream banks) or where contaminated runoff from the storage areas can enter waters.
- 3) Refueling and maintenance (e.g., oil changing) of machinery shall not take place in, or directly alongside, any water body.
- 4) Clearing of vegetation/trees shall be kept to the minimum required to accomplish the activity.
- 5) Riparian areas and banks shall be restored to a stable condition through recontouring and revegetation of the area, as necessary, as soon as possible (normally within three working days of final contouring).
- 6) Work shall be conducted during low flow whenever possible.
- 7) Wetland areas shall be avoided to the extent practical.
- 8) Work shall conform to all conditions that are part of the USACOE Section 404 permit and the ancillary MDNR Section 401 Water Quality Certification.

Section 127 of the MoDOT Engineering Policy Guide provides a detailed explanation of the process that is followed whenever a stream or drainage channel may fall into USACOE jurisdiction.

IV. Temporary Erosion and Sediment Control (*MO Specifications Division 800*)

Temporary water pollution control measures shall be required of all contractors MoDOT hires. The contractor shall exercise best management practices throughout the project to control water pollution. Construction of permanent drainage facilities and other activities, which may contribute to the control of siltation, shall be accomplished at the earliest practicable time. This work shall consist of furnishing, installing, maintaining,

and removing temporary control measures as shown on the plans (see *MoDOT Standard Plans Sect 806.10*) or as ordered by the engineer. The control of water pollution will be accomplished through the use of berms, slope drains, ditch checks, sediment basins, energy dissipaters, seeding and mulching, straw bales, silt fences, and other erosion control devices or methods. Pollutants such as chemicals, fuels, lubricants, bitumens, raw sewage, or other harmful materials shall not be discharged from the project. No work shall be started until the erosion control timetable and methods of operation have been approved.

Temporary erosion control measures shall be coordinated with permanent erosion control measures to assure economical, effective and continuous erosion control. Temporary erosion and sediment controls must be kept in place and maintained until revegetation has occurred to an extent sufficient to prohibit the formation of gullies by runoff.

The engineer shall routinely inspect the condition of erosion controls and shall notify the contractor immediately if any controls are found to be in disrepair or are not functioning at the desired level of effectiveness. Inspections are to be conducted at a frequency of once every seven days or within 48 hours following significant rainfall. Significant rainfall means an event that causes the discharge of runoff off of MoDOT right of way. The inspector will insure that rainfall measurements are made on the job site and routinely monitor weather forecasts. Post-rainfall inspections will commence when rainfall events exceed ½ inch in a 24-hour period. If sediment control devices at outfall locations have overtopped (denoting runoff) an inspection report will be completed. If rainfall is not sufficient to cause runoff, inspection reports may not be completed until next scheduled 7-day inspection. Directives to the contractor shall be noted in the inspector's diary, which shall be available for review by DNR upon request.

Materials required for erosion control measures shall meet the standards of the following *Missouri Standard Specifications for Highway Construction sections*:

	<u>Section</u>
Fertilizer and Lime	801
Straw for Bales	802
Mulching, rates and material	802
Seed	805
Geotextile Fabric	807 & 624

A. Construction Requirements

The engineer may limit the surface area of erodible earth material exposed by clearing and grubbing, or excavation, borrow, and fill operations, and may direct the contractor to provide immediate permanent or temporary erosion control measures to prevent contamination of adjacent streams or other watercourses, wetlands, lakes, ponds, and other water impoundments. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, slope drains, and the use of temporary seeding and mulching, or other erosion control devices or methods as necessary.

The contractor shall be required to incorporate all permanent erosion control measures into the project at the earliest practicable time. Temporary erosion control measures shall be used to correct conditions that develop during construction which were not foreseen during the design stage. Temporary erosion control shall also be used when needed prior to installation of permanent erosion control measures or when needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control measures on the project.

Clearing and grubbing operations shall be scheduled and performed so that grading operations and temporary and permanent erosion control measures will follow immediately thereafter. The surface area of erodible earth material exposed at one time by clearing and grubbing, by excavating, by fill, or by borrow, shall be minimized to prevent runoff. The engineer may limit the total acreage of erodible earth material to be exposed at one time as determined by an analysis of project conditions. In such cases the Engineer will identify specific BMPs and controls that have been, or will be installed in order to exceed the specified maximum disturbed acreage threshold.

The engineer will limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress commensurate with the contractor's ability to keep the finish grading, mulching, seeding, and other erosion control measures current. Should seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be implemented immediately.

Unless otherwise approved, construction operations in rivers, streams, wetlands, and impoundments shall be restricted to those areas which must be entered for the construction of temporary or permanent structures. Rivers, streams, wetlands, and impoundments shall be promptly cleared of all falsework, piling, debris or other obstructions placed therein or caused by the construction operations.

Frequent fording of live streams or wetlands with construction equipment is not permitted. Temporary bridges or other structures shall be used wherever an appreciable number of stream crossings are necessary. All temporary fills and structures placed in streams, wetlands, or impoundments will be removed and the site returned to natural or intended contours prior to completion of construction. Unless otherwise approved, mechanized equipment shall not be operated in live streams except as may be required to construct channel changes and temporary or permanent structures. If a Section 404 permit is applicable for a project, its requirements and/or conditions shall be followed.

Site-specific erosion controls above and beyond MoDOT standard specifications shall be discussed with the contractor at a preconstruction conference. Special conditions may be developed which can include limitations on the amount of surface area that can remain unprotected at one time or special water quality or stream protections requirements.

The location of all local material pits (other than commercially operated sources) and all excess material areas shall be subject to the approval of the engineer (*material in this case refers to soil and rock*). Construction operations shall be conducted and pollution control measures implemented so that erosion will not result in water pollution.

Concrete batch plants that are located on MoDOT right of way will be covered under this General Permit with respect to MDNR and State Operating Permit requirements. However, all other appropriate permits will need to be obtained by the batch plant operators themselves. Operators of concrete batch plants that are located off of MoDOT right of way will be responsible for obtaining all appropriate permits directly from the DNR.

With respect to the State Operating Permit requirements, borrow sites located immediately contiguous with MoDOT right of way or owned by MoDOT are covered by this permit. For borrow activities located not on or not contiguous with MoDOT right of way, the borrow operator will be responsible for obtaining all appropriate permits, including a land disturbance permit directly from the DNR for borrow sites greater than one acre.

In the event of a conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

B. Erosion Control Measures (*MO Specifications - Special Provisions*)

The following Best Management Practices shall be used by contractors to assure that eroded sediment from MoDOT right of way does not move off of MoDOT property and onto adjacent land or into streams and drainage channels.

These practices may be used as stand alone BMPs or may be used in combination with other practices to assure effective erosion control and off site delivery of pollutants. Other practices that are not listed here, or have not been identified or invented at the time of the preparation of this SWPPP, may be used if their performance is equivalent or better than the practices listed below.

1. Temporary Berms

A temporary berm is a temporary ridge of compacted soil, with or without a shallow ditch, constructed at the top of fill slopes or transverse to centerline on fills. The purpose of these ridges is to divert storm runoff from small areas away from steep slopes and direct this water to temporary outlets where the water can be discharged with minimum slope erosion. These ridges are used temporarily at the top of newly constructed slopes to prevent excessive erosion until permanent controls are installed and/or slopes are stabilized. They are also used transverse to grade to divert runoff to stabilized slope drains.

Type A Berms are specified for use at the end of each day's operations on embankments, will be constructed to specified dimensions (see *MoDOT Standard Plans Sect 806.10*) and will be machine compacted with a minimum of one pass over the entire width of the berm with a dozer tread, grader wheel, etc. Type B Berms are specified when embankment operations are shut down over extended periods of time (i.e., winter), will be constructed to specified dimensions (see *MoDOT Standard Plans Sect 806.10*) and

will be machine compacted with a minimum of three passes over the entire width of the berm with a dozer tread, grader wheel, etc. Type C berms are specified at the toes of spill slopes around bridge construction operations and will be constructed to the specified dimension (see *MoDOT Standard Plans Sect 806.10*).

Temporary berms must drain to a compacted outlet at a slope drain. The top width of these berms may be wider and the side slopes flatter on transverse berms to allow equipment to pass over these berms with minimal disruption.

2. Temporary Slope Drains

A temporary slope drain (see *MoDOT Standard Plans Sect 806.10*) is used to carry water down slopes to reduce erosion and consists of stone, concrete or asphalt gutters, half-round pipe, metal pipe, plastic pipe, or flexible rubber pipe. Temporary slope drains are required on fill slopes at approximately 500-foot intervals or as directed by the engineer.

All temporary slope drains will be adequately anchored to the slope to prevent disruption by the force of the water flowing in these drains. The inlet end will be properly constructed to channel water into the temporary drain. The outlet ends will have some means of dissipating the energy of the water to reduce erosion downstream. Unless otherwise specified, all temporary slope drains will be removed when no longer necessary and the site will be restored to match the surroundings.

3. Ditch Checks

There are two types of ditch checks that can be used – Type I and Type II. Type I ditch checks include, but not limited to, silt fence, straw bale, wattle logs and Dura Check Sediment Control Panel[®]. Type II ditch checks include, but are not limited to, rock, sand bag, Triangular Silt Dike[®], and EnviroBerm[®] Porous Sediment Control System.

Type I ditch checks are specified where drainage areas are 3 acres or less, ditch slopes are 10 percent or less and expected ditch flow volumes are small (see *MoDOT Standard Plans Sect 806.10*). Type II ditch checks are specified where drainage areas are 50 acres or less, ditch slopes are 10 percent or less and expected ditch flow volumes are high (see *MoDOT Standard Plans Sect 806.10*). For scenarios that exceed the criteria established above, a combination of Type II ditch checks and erosion control blankets are utilized.

Type I and II ditch checks shall be placed and constructed according to the plans shown in the Standard Plans For Highway Construction, Section 800. In some cases local conditions may dictate some deviation from the dimensions and shape that are shown in the Standard Plans; however, deviations from Standard Plans must still insure that sediment capture is occurring.

Ditch checks shall be checked for sediment accumulation after each significant rainfall. Sediment shall be removed when it reaches one-half of the original height or before. Sediment removal will include removal and disposition in a location where it will not erode into construction areas or watercourses. Regular inspections shall be made to ensure that the center of the check is lower than the edges. This will insure that water overflow will be directed into the middle of the roadway ditch. Erosion caused by high

flows around the edges of the ditch check shall be corrected immediately so as to protect backslopes and inslopes.

4. Rock Dams

A rock dam is an oversized Type II rock ditch check that is installed down grade from a culvert outlet. The size (length and height) of the rock dam depends on the volume of water that flows through the drainage structure, and the width of the drainage channel. Rock dams are not appropriate where impounded sediment and gravel could accumulate inside of the culvert. Also, rock dams are not appropriate in streams that are regulated by the US Army Corps Of Engineers under Section 404 of the Clean Water Act.

As with Type I and Type II ditch checks sediment shall be removed when it reaches one-half of the original height or before. Sediment removal will include removal and disposition in a location where it will not erode into construction areas or watercourses. Regular inspections shall be made to ensure that the center of the rock dam is lower than the outside edges. Erosion caused by high flows around the edges of the rock dam shall be corrected immediately.

5. Energy Dissipaters

An energy dissipater is a physical structure that is intended to reduce the erosive energy that is typically encountered down grade from a pipe or culvert. Erosive energy from intense flows may also be encountered in median ditches or road ditches. Energy dissipation may be accomplished by the installation of large boulders, wood pilings, engineered concrete structures or other means approved by the engineer. Unlike ditch checks and rock dams, energy dissipaters are not intended to impound water and sediment. Energy dissipaters must be constructed in a fashion such that the water that flows through, over or around the structure is equally distributed in the discharge channel and does not exacerbate or cause a resultant erosion problem.

6. Sediment Basin

A sediment basin is an excavated or dammed storage area with rock riprap placed in inlet and outlet areas with defined side slopes (see *MoDOT Standard Plans Sect 806.10*). Sediment basins are constructed to trap and store sediment from erodible areas in order to protect properties and stream channels below the installation from excessive siltation. These structures trap and store sediment that occurs in spite of temporary erosion control measures.

Sediment basins shall be considered when large disturbed areas (greater than ten acres) concentrate flow to one discharge point, and where right of way is available. The area where a sediment basin is to be constructed shall be cleared of vegetation to enable removal of sediment. The inlets of these sediment basins shall be constructed with a wide cross section and minimum grade to prevent turbulence and allow deposition of the soil particles. When the depth of sediment reaches 1/3 of the depth of the structure in any part of the pool, all accumulation shall be removed. Discharges from the basin shall not cause scouring of the receiving area.

Sediment basins shall normally remain in service until all disturbed areas draining into the structure have been satisfactorily stabilized. When use of temporary sediment basins is to be discontinued, all excavations are to be backfilled and properly compacted, fill material removed, and the existing ground restored to its natural or intended condition.

When accumulated sediment and excavated material is removed from individual BMPs, the excavated material shall be disposed of in locations where sediment will not again erode into the construction areas or into natural waterways.

7. Temporary Seeding and Mulching (*MO Specifications Sections 802 & 805*)

This work shall consist of preparing and fertilizing a seedbed, furnishing and sowing of seed, and mulching. The purpose of temporary seeding and mulching is to produce a quick ground cover to reduce erosion in disturbed areas that are expected to be redisturbed at a later date.

Seeding and/or mulching will be a continuous operation on all cut and fill slopes, waste sites, and borrow pits during the construction process. All disturbed areas shall be seeded and mulched when and where necessary to eliminate erosion. Seeding and/or mulching shall be done as soon as possible after completion of the earthwork, not to exceed 14 days, weather permitting.

Temporary mulch placed over temporary seed mixtures shall be applied in accordance with the provisions of Section 802.2.1 of the *Missouri Standard Specifications*. *Fertilizer shall* be applied at the rate specified for permanent seeding. Lime will usually not be required for temporary seeding but will be applied according to governing specifications when a permanent seed mixture is used.

Permanent seeding and mulching following the temporary seeding will be performed according to the *Missouri Standard Specifications Section 805 and will be permitted during the favorable seeding seasons only*.

8. Straw Bales (*MO Specifications Section 802*)

Bales of straw can be used as a means of controlling pollution and erosion. The straw bales obstruct the flow of water allowing deposition of sediment and/or diversion of water. Other foliage may be substituted for straw in accordance with Section 802.2.1 of the *Missouri Standard Specifications*.

This method is typically used at the bottom of embankment slopes to divert runoff from sheet flow and trap sediment, as a ditch check in small ditches and drainage areas, and on the lower side of the cleared areas to catch sediment from sheet flow. When used to trap sediment or divert runoff, the bales must be braced from behind. When used as a ditch check, embedment is required. Straw bales are most effective in areas where there is overland flow (runoff that flows over the surface of the ground as a thin, even layer). It is not effective in areas where there is a large volume of runoff.

The integrity of straw bales must be maintained for as long as they are necessary to contain sediment runoff. All straw bales shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. Any deficiencies shall be immediately corrected. In addition, a daily review of the location of straw bales should be made in areas where construction activities have changed the natural contour and drainage runoff to ensure that the straw bales are properly located for effectiveness. Where deficiencies exist, additional straw bales shall be installed as approved or directed by the engineer.

Sediment deposits shall be removed and disposed of when the deposit approaches one-half the height of the bale or sooner. If required by heavy sediment loading, a second set of straw bales shall be installed as directed by the engineer.

The straw bales shall remain in place until the engineer directs that they be removed. Upon removal, the contractor shall remove and dispose of any excess silt accumulations, grade and dress the area to the satisfaction of the engineer, and establish vegetation on all bare areas.

9. Silt Fence (*MO Specifications Sections 624 & 807*)

Use of a silt fence consists of furnishing, installing, maintaining, and removing a geotextile barrier fence designed to remove suspended particles from water passing through the fence. Materials used for silt fences must meet certain requirements.

There are several construction requirements for silt fences. Fence construction shall be adequate to handle the stress from hydraulic and sediment loading. Geotextile at the bottom of the fence shall be buried. The trench shall be backfilled and the soil compacted over the geotextile. The geotextile shall be spliced together as indicated on the standard drawings (see *MoDOT Standard Plans Sect 806.10*).

As a general rule silt fence should not be used around median inlets.

Post spacing shall not exceed 8 feet for wire support fence installations or 5 feet for self-supported installations. Posts shall be driven a minimum of 24 inches into the ground. Where rock is encountered, posts shall be installed in a manner approved by the engineer. Closer spacing, greater embedment depth and/or wider posts shall be used as necessary in low areas and soft or swampy ground to ensure adequate resistance to applied loads.

When support fence is used, the mesh shall be fastened securely to the up-slope side of the post. The mesh shall extend into the trench a minimum of 2 inches and extend a maximum of 36 inches above the original ground surface. When self-supported fence is used, the geotextile shall be securely fastened to fence posts.

When silt fence is used as a perimeter sediment control device it must be maintained for as long as necessary to contain sediment runoff. All silt fences shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. Any deficiencies shall be immediately corrected. In addition, a daily review of the location of silt fences should be made in areas where construction activities have changed the natural contour and drainage runoff to ensure that the silt fences are properly located for

effectiveness. Where deficiencies exist, additional silt fences shall be installed as approved or directed by the engineer.

Sediment deposits shall be removed and disposed of when the deposit approaches one-half the height of the fence or sooner. If required by heavy sediment loading, a second silt fence shall be installed as directed by the engineer.

The silt fence shall remain in place until the engineer directs that it be removed. Upon removal, the contractor shall remove and dispose of any excess silt accumulations, grade and dress the area to the satisfaction of the engineer, and establish vegetation on all bare areas.

10. Temporary Pipe

A temporary pipe is a conduit used temporarily to carry water under a haul road, silt fence, etc. It is used to convey normal and expected high flows at temporary stream crossings, preventing the contractor's equipment from coming in direct contact with the water when crossing active streams or intermittent streams created during heavy rainfalls. All temporary pipe shall be installed in the same manner as permanent pipe is installed on the project to assure that the water does not cause erosion around the pipe. Material to backfill the pipe should be placed in six-inch lifts and mechanically compacted, although a compaction test is not required.

C. Additional Temporary Erosion and Sediment Control

1. Surface Roughening

Surface roughening is a temporary erosion control best management practice that is intended to aid in the establishment of vegetative cover with seed, to reduce runoff velocity and increase infiltration, and to reduce erosion and provide for sediment trapping. This practice is intended for areas which have been cleared and grubbed and are awaiting application of temporary or permanent seed, or installation of other structural controls such as ditch checks, rock dams, or sediment basins. The practice is not intended to serve as a stand-alone best management practice and is only to be used as a short-term (2-3 weeks), sequential practice as the grading and seeding proceeds.

2. Mulching and Crimping

Application of mulch without seed may be used as a temporary best management practice if approved by the engineer. This practice is most applicable in late fall or early winter when grass seed would have little or no opportunity to germinate. Straw mulch should be applied with a mulch blower or by hand and must be anchored (crimped) immediately after spreading to prevent windblow. Application rates will vary based on the percent slope.

3. Brush Piles

Brush piles are considered to be a temporary BMP that is effective during clearing and grubbing operations. Tree tops, limbs, stumps and other vegetation, when placed in a

drainage swale, can effectively impound gravel, soil and other eroded materials that otherwise may be carried off of MoDOT right of way during runoff periods. To be effective, brush piles should be compressed by clearing equipment at the time of installation. Like other BMPs, brush piles should be inspected following heavy rains to insure that they are functioning as intended. If the brush pile is intended to serve as a semi-permanent structure for an extended period of time beyond the clearing and grubbing stage, clean out and maintenance equivalent to that required for Type 1 and Type 2 ditch checks is required.

V. Disturbed Areas

Project plans that are discussed in Section II, Site Description, will identify those areas that will be cleared and graded as part of the highway development project. Areas that are not to be disturbed are also shown on project plans. Such areas are also staked in the field.

Seeding and/or mulching will be a continuous operation on all cut and fill slopes, waste sites, and borrow pits during the construction process. All disturbed areas shall be seeded and mulched when and where necessary to eliminate erosion. Seeding and/or mulching shall be done as soon as possible after completion of the earthwork and preparation of the seedbed, not to exceed 14 days, weather permitting.

VI. Installation

The contractor shall be required to incorporate all permanent erosion control measures into the project at the earliest practicable time. Temporary erosion control measures shall be used to correct conditions that develop during construction which were not foreseen during the design stage. Temporary erosion control shall also be used when needed prior to installation of permanent erosion control measures or when needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control measures on the project.

Clearing and grubbing operations shall be scheduled and performed so that grading operations and temporary and permanent erosion control measures will follow immediately thereafter. The surface area of erodible earth material exposed at one time by clearing and grubbing, by excavating, by fill, or by borrow, shall be minimized to prevent runoff. The engineer may limit the total acreage of erodible earth material to be exposed at one time as determined by an analysis of project conditions. In such cases the Engineer will identify specific BMPs and controls that have been, or will be installed in order to exceed the specified maximum disturbed acreage threshold.

The engineer will limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress commensurate with the contractor's ability to keep the finish grading, mulching, seeding, and other erosion control measures current. Should seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be implemented immediately.

VII. Dewatering

Dewatering of pits or excavations associated with pier construction shall be discussed at the preconstruction conference.

Standard Specifications (107.10.2) require a dike or barrier to be placed between the excavation and the stream to prevent sediment from reaching the watercourse. The structural BMPs that are identified in IV.B. are usually sufficient to remove sediment and drill cuttings prior to discharge of return water. Land application of the pumped water is a viable option when percolation into the subsurface results; however, caution shall be used to insure that the pit water discharge does not cause the formation of gullies in cases where pumping exceeds percolation.

With the possible exception of drilled shafts in large rivers such as the Missouri or Mississippi, return water shall not be discharged without treatment by BMPs approved by the Engineer. The amount of return water that is pumped and subsequently discharged shall be recorded in the inspector's diary and expressed as gallons per minute for the duration of the pumping activity.

VIII. Amending/Updating the Project Plans

Erosion control plans are prepared by MoDOT designers and/or consultants and will show the final structural erosion controls that are envisioned upon completion of final grading. These plans usually will not be changed unless directed by the Engineer. Interim erosion control measures at the start of the project shall be amended and updated as appropriate during the term of the land disturbance activity. The Engineer shall require modifications to the erosion controls whenever the;

- Design of the construction project has changed in a fashion that could impact the quality of storm water discharges;
- MoDOT inspections indicate deficiencies in individual BMPs;
- MDNR notifies MoDOT of erosion control deficiencies on site;
- Erosion controls are determined to be ineffective in significantly minimizing or controlling erosion and sedimentation;
- MDNR determines violations of Water Quality Standards have occurred.

IX. Site Inspection Reports

The Resident Engineer is responsible for evaluating the contractor's erosion control devices and must insure that weekly inspections are performed, as well as inspections following any rainfall event that could cause migration of eroded soil off of the site. Copies of the inspection reports are provided to the contractor, and deficiencies are to be corrected within seven calendar days.

MoDOT performs environmental compliance training to Resident Engineers, construction inspectors and other field staff to insure that erosion control inspections are being conducted in a consistent fashion statewide. The individual who performs the training is organizationally located in MoDOT's Environmental Section and does not have supervisory authority over the construction personnel who perform inspections. However, the same individual who performs training has the responsibility of performing statewide audits of construction sites to ensure that SWPPPs are being followed to the extent that off-site contamination does not occur. The individual usually will visit every construction site at least twice per year and meet with MoDOT resident engineers, inspectors or contractors to evaluate the land disturbance elements of the project and to insure consistency of inspections. In cases where deficiencies are identified, the Resident Engineer has the responsibility to see that the deficiencies are corrected.

X. Diamond Grinding

Although diamond grinding is not a land disturbance activity, the fine material that is removed from the driving surface will become suspended in discharge water and has the potential to contaminate nearby streams if not sufficiently managed. The following shall be considered the minimum requirements for performing this work within the project limits in addition to Section 622.

The contractor shall submit to the Engineer for approval in writing prior to the pre-construction meeting, the best management practices (BMP's) to be used to protect the environment, including the method of disposal whether on right of way or off-site.

The preferred BMP for slurry management is land application on MoDOT right of way. When slurry is dispersed on the right of way, BMP's shall be installed to keep slurry residue from entering drainage structures, from entering any waterways and from leaving the right of way.

Prior to starting work, slurry or residue "no discharge zones" will be identified by the Engineer with respect to the contractor's approved BMP and residue disposal plan.

The Engineer may suspend operations during periods of rainfall or during freezing temperatures.