

Municipal Separate Storm Sewer System

Operations and Maintenance Program

**Purpose**

Murray State University (MSU) works jointly with the City of Murray and the Kentucky Division of Water (KDOW) to reduce the quantity of stormwater and increase the quality of stormwater runoff. The university is located within US Environmental Protection Agency (EPA) designated urbanized areas; therefore, MSU is required to have a Small Municipal Separate Storm System (MS4) permit. MSU is a co-permittee with the City of Murray Stormwater Department holding Permit Number KYG200000, AI Number 35050 on a MS4 permit with KDOW. As required under the National Pollutant Discharge Elimination System (NPDES) Phase II regulations, MSU is to develop stormwater management programs. This program requires that each MS4 permittee develop an Operations and Maintenance Program that includes an inventory of municipal facilities, maintenance activities, maintenance schedules, and on-going inspection procedures for structural and non-structural Best Management Practices (BMPs).

**University Facilities**

MSU has approximately 70 buildings on the 232-acre main campus located in Murray, Kentucky of Calloway County. The West Farm is approximately 275 acres and is located approximately two miles from campus on College Farm Road. The West Farm consists of an exposition center, a small dairy operation, an equine center, and MSU’s vet lab. The North Farm is approximately 70 acres and consists of a recycling storage building, construction material storage area, and swine farm. MSU’s Hancock Biological Station located approximately 15 miles northwest of Murray, is covered under a separate Groundwater Protection Plan. Murray State University uses the City of Murray POTW for its sewer needs with exception to two septic tanks on the West Farm. Parking lots and other drains on the main campus run to Bee Creek, which flows through and under campus. Murray State has a variety of soil types on campus and much of it has been leveled and filled. Grenada silt loam 1-2% slopes and Brandon silty clay loam, 12-20% slopes are the most predominate on MSU campus. Groundwater depth varies with the season but is generally from 14 to 16 feet. A natural clay hard pan exists at approximately eight (8) feet deep.

The types of university facilities within this area consist of:

* Roads and driveways, not including municipal or state roads,
* Buildings including residential colleges, administrative, academic halls, labs, recreational, etc.,
* Parking lots including pervious and impervious,
* Open space including lawns, athletic fields (natural and artificial turf), wooded areas, etc.,
* Garage maintenance areas including fuel stations,
* Facilities management and grounds shops,
* Recycling and staging area,
* Chemical storage area,
* Cooking facilities,
* Utilities distribution including natural gas, chilled water, electric, telecom, sewer, water
* Stormwater facilities including conveyance and BMPs, and
* Active construction areas and sites.

**Inventory of Municipal Facilities**

* Facilities Management Complex, including
  + Maintenance shops,
  + Grounds shop with pesticide/herbicide storage,
  + Cleaning product storage,
  + Hazardous materials storage,
  + Fueling stations,
* Central Plant
* West Farm
* Wellness Center
* General Services
* Winslow Cafeteria
* Curris Center

**Types of University Operations**

The following activities are performed by MSU and/or contractors that have the potential for generating stormwater pollution:

* Pesticide and herbicide use for research and grounds operations,
* Landscape operations including fertilizers,
* Street and sidewalk sweeping,
* Snow removal and deicing,
* Utility construction, maintenance, and repair,
* Vehicle fueling,
* Vehicle washing and minor maintenance,
* Waste recycling,
* Chemical handling, including lab waste and chlorine storage,
* Inlet/outlet cleaning,
* Storm sewer system maintenance/repairs,
* Building maintenance,
* New construction and land disturbances, and
* Leaf and debris removal.

**Related Programs**

MSU has developed policies related to stormwater pollution prevention and good housekeeping. These components include university roads, parking lots, or other paved areas, storm sewer inlets, piping and outfalls; swales, ditches or other storm water conveyance facilities; detention/retention basins or other stormwater management structures. Below are the specific plans:

1. Stormwater Facilities Inspection Policy (Appendix A of this program),
2. Stormwater Facilities Maintenance Policy (Appendix B of this program),
3. Stormwater Management Policy, which includes
   1. Illicit Discharge, Detection and Elimination,
   2. Construction Site Stormwater Runoff Control, and
   3. Post-construction Stormwater Control.

**Training Areas of Responsibility**

The Facilities Management Department is responsible for the overall pollution prevention and good housekeeping policy of MSU. However, because of the size of the campus, the number of employees, and the scope of activities, different people have direct day-to-day responsibility for specific areas including training activities for responsible staff. These are:

* Buildings and Grounds:
  + Landscape maintenance – SSC
  + Snow removal and deicing – SSC
  + Vehicle fueling/Garage – Transportation
  + Recycling – SSC
  + Utility systems and failures– FM Shop Foremen (HVAC, Electrical, Plumbing)
  + Stormwater systems – Director of Facilities Management
  + Chemical storage & disposal – Environmental Safety & Health
  + Spill prevention & cleanup – Environmental Safety & Health
  + New construction activities – Facilities Design & Construction
  + Erosion and sediment control – Facilities Design & Construction, SSC
* Auxiliary Services:
  + Housing – Director of Housing
  + Food Services – Sodexo
* Transportation:
  + Fleet – Transportation Foreman
  + Parking – Parking Manager, MSU Police

**Training**

The Associate Director of Grounds and Custodial will meet with SSC at least annually and report changes and/or updates in MS4 policies and program requirements.

General information posted on the MSU Facilities Management stormwater management website may assist with training efforts.

**Sources of Additional Training Materials**

US EPA NPDES - <https://www.epa.gov/npdes>

US EPA Pollution Prevention and Good Housekeeping - <https://www3.epa.gov/npdes/pubs/fact2-8.pdf>

**Pollutants of Concern**

The tables on the following page provide lists of general facilities and activities, and what potential pollutants may be associated with them.

Potential pollutants likely associated with specific municipal facilities

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Potential Pollutants | | | | | | | | |
| Municipal Facility Activity | Sediment | Nutrients | Trash | Metals | Bacteria | Oil & Grease | Organics | Pesticides | Oxygen Demanding Substances |
| Building and Grounds Maintenance and Repair | X | X | X | X | X | X | X | X | X |
| Parking/Storage Area Maintenance | X | X | X | X | X | X | X |  | X |
| Waste Handling and Disposal | X | X | X | X | X | X | X | X | X |
| Vehicle and Equipment Fueling |  |  | X | X |  | X | X |  |  |
| Vehicle and Equipment Maintenance and Repair |  |  |  | X |  | X | X |  |  |
| Vehicle and Equipment Washing and Steam Cleaning | X | X | X | X |  | X | X |  |  |
| Outdoor Loading and Unloading of Materials | X | X | X | X |  | X | X | X | X |
| Outdoor Container Storage of Liquids |  | X |  | X |  | X | X | X | X |
| Outdoor Storage of Raw Materials | X | X | X |  |  | X | X | X | X |
| Outdoor Process Equipment | X |  | X | X |  | X | X |  |  |
| Overwater Activities |  |  | X | X | X | X | X | X | X |
| Landscape Maintenance | X | X | X |  | X |  |  | X | X |
| *Source: California Stormwater BMP Handbook (*[*http://www.cabmphandbooks.com/*](http://www.cabmphandbooks.com/)*) (slightly modified)* | | | | | | | | | |

Potential pollutants likely associated with municipal activities

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Potential Pollutants | | | | | | | | |
| Municipal Program | Activities | Sediment | Nutrients | Trash | Metals | Bacteria | Oil & Grease | Organics | Pesticides | Oxygen Demanding Substances |
| Road, Street, and Highway Operation & Maintenance | Sweeping and Cleaning | X |  | X | X |  | X |  |  | X |
| Street Repair, Maintenance, Striping, Painting | X |  | X | X |  | X | X |  |  |
| Bridge and Structure Maintenance | X |  | X | X |  | X | X |  |  |
| Plaza, Sidewalk, and Parking Lot Maintenance & Cleaning | Surface Cleaning | X | X |  |  | X | X |  |  | X |
| Graffiti Cleaning | X | X |  | X |  |  | X |  |  |
| Sidewalk Repair | X |  | X |  |  |  |  |  |  |
| Controlling Litter | X |  | X |  | X | X |  |  | X |
| Fountain, Pool, Lake, Lagoon Maintenance | Fountain and Pool Draining |  | X |  |  |  |  | X |  |  |
| Lake and Lagoon Maintenance | X | X | X |  | X |  |  | X | X |
| Landscape Maintenance | Mowing, Trimming, Planting | X | X | X |  | X |  |  | X | X |
| Fertilizer & Pesticide Management | X | X |  |  |  |  |  | X |  |
| Managing Landscape Wastes |  |  | X |  |  |  |  | X | X |
| Erosion Control | X | X |  |  |  |  |  |  |  |
| Drainage System Operation & Maintenance | Inspection and Cleaning of Stormwater Conveyance Structures | X | X | X |  | X |  | X |  | X |
| Controlling Illicit Connections & Discharges | X | X | X | X | X | X | X | X | X |
| Controlling Illegal Dumping | X | X | X | X | X | X | X | X | X |
| Maintenance of Inlet & Outlet Structures | X |  | X | X |  | X |  |  | X |
| Waste Handling & Disposal | Solid Waste Collection |  | X | X | X | X | X | X |  | X |
| Waste Reduction & Recycling |  |  | X | X |  |  |  |  | X |
| Hazardous Waste Collection |  |  | X | X |  | X | X | X |  |
| Controlling Litter |  |  | X | X | X |  | X |  | X |
| Controlling Illegal Dumping | X |  | X |  | X | X |  | X | X |
| Water & Sewer Utility Operation & Maintenance | Water Line Maintenance | X |  |  |  | X | X |  |  |  |
| Sanitary Sewer Maintenance | X |  |  |  | X | X |  |  | X |
| Spill/Leak/Overflow Control, Response & Containment | X | X |  |  | X |  | X |  | X |
| *Source: California Stormwater BMP Handbook (*[*http://www.cabmphandbooks.com/*](http://www.cabmphandbooks.com/)*)* | | | | | | | | | | |

**Appendix A – Stormwater Facility Inspection**

1. Inspections will be conducted to evaluate the performance of stormwater or facilities and to determine the potential or amounts of pollutants, trash, and debris entering and discharging from the stormwater collection system.
2. Inspection frequencies are to be established by the university or it’s designated professional and will depend on the following factors, but are to be no less than once per calendar year: (1) the type, size, and design of the stormwater facility, (2) the size of the drainage area, (3) the amount of impervious cover and, (4) the type of activities that occur within the drainage area. More frequent inspections would be warranted in construction or high vehicle use areas, or in any area that is known or suspected to be at an increased risk for pollution. Severe weather conditions such as heavy rains will usually require follow up inspections to determine the impact to and performance of stormwater facilities.
3. All inspection activities, results, and recommendations are to be documented in writing.
4. The overall condition and cleanliness of university roads and parking lots will be evaluated during routine travel by university staff. Those areas will excessive staining, trash, or sediment are to be investigated or scheduled for cleaning. Appropriate corrective actions are to be considered for any areas exhibiting flooding or poor drainage patterns.
5. All storm sewer inlets/catch basins are to be inspected at least annually to determine the sediment load and overall condition of the structure. Cleaning is required if the depth of deposits is greater than or equal to one-third the depth from the basin bottom to the invert of the lowest pipe or opening into or out of the basin. Catch basins that accumulate deposits quickly are to be inspected more frequently and the drainage area evaluated to determine possible causes. Inlet grates will be inspected for trash or debris that may prevent stormwater from entering the storm sewer system, especially before forecasted heavy rains.
6. Storm sewer easements and right-of-ways are to be inspected at least annually to check for obstructions or any other conditions that might affect the integrity of the system.
7. Storm sewer outfall structures are to be inspected annually to check for structural integrity and erosion potential.
8. University detention/retention basins are to be inspected annually to check for sediment accumulation and overall basin conditions. Sediment exceeding 10%of the designed basin depth requires sediment removal to the original basin shape and depth. The basin is to be inspected for the presence of yard waste or other non-degradable materials. Basin dikes, berms, and spillways are to be examined for structural integrity. The basin outlet structure is to be checked to determine if the trash rack is missing or plugged.
9. Other university stormwater conveyance facilities, such as swales, pipes, and ditches, are to be inspected periodically to check for trash, vegetation, sediment, and erosion conditions.
10. Other types of university stormwater BMP (i.e. wet pond, vegetated swale, infiltration facility, etc.) are to be inspected annually.

**Appendix B – Stormwater Facility Maintenance**

1. University roads and parking lots are to be cleaned on a regular basis. Those areas identified by inspections as being more prone to debris should be prioritized and cleaned. Roadway cleaning is necessary after the winter deicing season is over in order to remove accumulated materials. Roadway cleaning may also be necessary under non-deicing conditions when oil spill clean up materials such as sand or oil dry are applied to prevent oil contaminated materials from being washed into the storm sewer system.
2. The storage and application of materials used for roadway deicing or traction control is to be in a manner that reduces the impact to the storm sewer system and the environment. All storage is to be protected from precipitation. Any spillage of materials are to be used in environmentally sensitive or protected areas.
3. Storm sewer inlets/catch basins are to be cleaned when inspections reveal an excessive accumulation of sediment or debris. Storm sewer inlet grates are to also be cleaned when blocked by debris. Structural repairs to any part of the storm sewer inlet/catch basins and storm sewer pipes will be performed as necessary. Excessive debris or sediment in storm sewer pipe is to be removed. Damaged piping is to be replaced.
4. Free flow of water from outfalls is to be maintained by removal of debris and obstructions. Outlet protection/aprons at outfalls are to be maintained or replaced as necessary.
5. Detention basin sediment removal is to occur when the basin is completely dry. Disturbed areas are to be immediately stabilized and re-vegetated. Yard waste or non-degradable waste in a basin is to be removed. Spillways and overflows are to be maintained to allow for uninterrupted flow. Nuisance or exotic/invasive basin vegetation is to be removed. Mowing and/or trimming of vegetation is to occur as needed to sustain the basin and all debris is to be removed. Vegetative basin cover is to be maintained at 95%. Areas of bare or sparse vegetation is to be addressed by soil aerating, conditioning, seeding, and mulching as necessary to restore a proper vegetative cover. Potential mosquito problems from unwanted standing water will be addressed by introduction of mosquito predators or by implementation of a pesticide plan.
6. Any planned herbicide or pesticide application in a basin or any part of the storm sewer collection system is to be reviewed by qualified persons in order to comply with applicable regulations and to prevent adverse water quality impacts. The use of herbicides and pesticides is to be limited as much as possible.
7. Other types of university stormwater BMP (i.e. wet pond, vegetated swale, infiltration facility, etc.) are to be maintained according to guidelines in the Kentucky Best Management Practices (BMPs) for Controlling Erosion, Sediment, and Pollutant Runoff from Construction Sites Manual.
8. Materials recovered from the storm sewer collection or treatment system are to be handled and disposed of in accordance with applicable state and federal waste management regulations.
9. All maintenance activities are to be documented in writing. Pictures are to be taken of various storm sewer system components to document pre- and post- maintenance conditions.