

Chapter 5

Operation, Maintenance, Inspection & Source Control

The operation and maintenance of a stormwater management system and its individual components is as critical to system performance as the design. Also, implementation of source controls is an important aspect of the operation of a site to prevent contaminants from exposure to runoff, thus minimizing the pollutants that need to be treated by the stormwater management system. This Chapter addresses the operation and maintenance considerations of stormwater design, the preparation of an Inspection and Maintenance (I&M) Manual, and the preparation of a Source Control Plan.

Thus, the design process must give serious consideration to maintenance issues to develop stormwater management facilities with realistic maintenance expectations. Proper operation and maintenance will ensure that the stormwater system and individual BMPs will remain effective at removing pollutants as designed and meeting New Hampshire's water quality objectives. Proper maintenance will:

- Maintain the volume of stormwater treated over the long term;
- Sustain the pollutant removal efficiency of the BMP;
- Reduce the risk of re-suspending sediment and other pollutants captured by the BMP;
- Prevent structural deterioration of the BMP and minimize the need for expensive repairs;
- Decrease the potential for failure of the BMP.

Without proper maintenance, BMPs are likely to become functionally impaired or to fail, providing reduced or no treatment of stormwater. Design must consider how facilities will be accessed for inspection and maintenance, what activities are needed to maintain each facility, the frequency these activities must be performed, and who will be responsible for inspection and maintenance. The location and sizing of BMPs must account for these considerations. Also, the site design may require development of easements or deed restrictions to provide for access to perform necessary maintenance and repairs.

In addition, the AoT regulations require the development of an Inspection and Maintenance (I&M) Manual for stormwater management systems, identifying responsible parties for implementing the required maintenance

activities, detailing the activities that are necessary, and documenting the implementation of the activities.

5-1. Operation and Maintenance Issues

The stormwater management system operation and maintenance program should encompass the activities necessary for effective system performance, but should also be realistic. The following are common issues that design of any project should consider when selecting BMPs and developing the I&M Manual:

- Does the responsible party have the authority, as well as the technical and financial resources, to carry out the I&M program?
- Does the owner/responsible party understand how the system functions?
- Does the owner/responsible party understand the maintenance requirements?
- Is there a legal mechanism needed and in-place for a municipality to perform corrective maintenance and back-charge the owner/responsible party?
- Can inspections be easily performed or can the facility be easily observed on a routine basis, so that the responsible party is readily aware of conditions requiring attention?
- Is equipment required for maintenance activity, and if so, is there adequate access?
- Are easements needed for access? Are easements needed for the public to obtain access for corrective action, even if the facility's primary maintenance is under private management?
- Are maintenance schedules adequate, or is the frequency of maintenance too high to be realistic?
- Can cleaning or other routine maintenance be conducted without requiring major renovation of the facility? For example, removal of sediment from an infiltration trench may require reconstructing the trench.
- Have provisions been considered for the proper disposal of waste materials from maintenance activities, including compliance with local, state, and federal regulations?
- Are the proposed maintenance activities consistent with regulatory requirements and obligations?

5-2. Design and Construction Guidelines

The following design and construction guidelines address anticipated maintenance practices:

1. **Provide Pre-Treatment:**

Pre-treatment devices are generally required for each BMP under the AoT regulations.

2. **Sediment Loading/Removal Schedule:**

Pre-treatment devices should be designed to accommodate a minimum of one year's worth of sediment. The estimated annual sediment accumulation should be documented in the project design calculations. Sediment loadings from both pervious and impervious areas must be considered.

For pervious areas, the Revised Universal Soil Loss Equation (RUSLE) recommends to calculate sediment generated from the contributing watershed.

For roadways and parking areas, sand deposits from winter storm applications should be accounted for in the design of the pre-treatment system. This estimate should be based on local practices for the application of sand for ice management. Absent such information, it is recommended to use a rate of 500 lbs/acre for sanding of parking areas and access drives, a sand density of 90 lbs per cubic foot and an assumed minimum frequency of ten sandings per year. Sanding rates and numbers of storms may need to be adjusted based on specific application rates in a community.

3. **Make Maintenance Needs Apparent:**

For some BMP designs (such as ponded forebays, surface ponds or detention basins, and channels), the need for maintenance can be readily apparent from casual observation. Other BMPs, particularly underground structures, require disciplined inspection to monitor the conditions that warrant cleaning or that signal potential failure. The Inspection & Maintenance Manual should clearly define the inspection frequency and the maintenance or failure indicators, so that the party responsible for maintenance is alert to conditions warranting cleaning and repair. This is particularly true for off-line BMPs, where bypasses automatically carry flows around the devices if they are in "failure" condition.

4. **Sediment Marker:**

For BMPs that accumulate sediment, particularly pre-treatment practices, a sediment marker should be provided to enable determination of an accurate and consistent depth of sediment when inspections are performed.

5. Design for Anticipated Pollutants:

Pretreatment devices must be designed to capture anticipated pollutants, such as oil and grease, as well as floating trash. Design should provide for access to remove these materials. I&M Manuals should include directions for the use of appropriate means for removing and disposing of petroleum hydrocarbons and legal disposal of the waste.

6. Accessibility:

All devices must be designed and located to be easily accessible for inspection and for the necessary equipment for maintenance. Formal access must be provided, and may require easements.

5-3. Inspection and Maintenance (I&M) Manual

A formal operation and maintenance plan for a stormwater system will assist the party responsible for maintenance in understanding how the system functions and the maintenance activities needed to maintain that function. Such a plan clearly identifies inspection activities, schedules, record keeping requirements, and contingency measures for ensuring the long-term integrity of the stormwater management facilities. Typically, such a plan identifies each BMP used on the site and its specific maintenance activities and schedules.

The AoT regulations (Env-Wq 1500) require the long term maintenance of stormwater practices, and stipulate the establishment of a mechanism to provide for ongoing inspections and maintenance. Such a mechanism includes the preparation of an Inspection and Maintenance (I&M) Manual. This manual must include, at a minimum, the following:

1. The names of the responsible parties who will implement the required reporting, inspection, and maintenance activities identified in the I&M manual;
2. The frequency of inspections;
3. An inspection checklist to be used during each inspection;
4. An inspection and maintenance log to document each inspection and maintenance activity;
5. A deicing log to track the amount and type of deicing materials applied to the site;

6. A plan showing the locations of all the stormwater practices described in the I&M manual; and
7. Actions to be taken if any invasive species begin to grow in the stormwater management practices.

All record keeping required by the I&M manual shall be maintained by the responsible parties, and any transfer of responsibility for I&M activities or transfer in ownership shall be documented to the DES in writing.

5-4. Source Control Plan

Source control consists of measures to prevent pollutants from coming into contact with stormwater runoff. Project planning and design should consider measures to minimize or prevent the release of pollutants so they are not available for mobilization by runoff. Source control measures typically address the management of industrial materials and other substances that could be sources of pollutants; management of lawn care and landscaping activities, particularly with respect to the storage and use of fertilizers, herbicides, and pesticides; pavement sweeping and cleaning; and snow and ice management.

Project I&M Plans should include provisions for source controls appropriate to the type and scale of the project. Alternatively, for projects with “high load areas” or other projects posing potential greater risk for pollutant exposure to stormwater, a separate source control plan may be warranted. The NH Alteration of Terrain regulations require submittal of a source control plan for any high-load area and any commercial parking area with over 1,000 trip ends per day (as determined with reference to Trip Generation, published by Institute of Transportation Engineers, Washington , D.C., 7th Edition, 2003).

“High-load areas” typically include:

- land uses or activities in which regulated substances are exposed to rainfall or runoff (with the exception of areas where the only regulated substance exposed to rainfall or runoff is road salt that has been applied for deicing of pavement on the site; or
- Any land use or activity that typically generates higher concentrations of hydrocarbons, metals, or suspended solids than are found in typical stormwater runoff, including but not limited to the following:
 - Industrial facilities subject to the NPDES Multi-Sector General Permit, not including areas where industrial activities do not occur, such as at office buildings and their associated parking facilities or in drainage areas at the facility where a certification of no exposure pursuant to 40 CFR §122.26(g) will always be possible;
 - Petroleum storage facilities;

- o Petroleum dispensing facilities;
- o Vehicle fueling facilities;
- o Vehicle service, maintenance and equipment cleaning facilities;
- o Fleet storage areas;
- o Public works storage areas;
- o Road salt storage and handling facilities;
- o Commercial nurseries;
- o Non-residential facilities having uncoated metal roofs with a slope flatter than 20%;
- o Facilities with outdoor storage, loading, or unloading of hazardous substances, regardless of the primary use of the facility; and
- o Facilities subject to chemical inventory under Section 312 of the Superfund Amendments and Reauthorization Act of 1986 (SARA).

The source control plan should be developed to minimize the volume of stormwater coming into contact with regulated substances, and segregate relatively clean stormwater from stormwater with a potentially higher concentration of pollutants. The plan should address the following:

1. Identification of the party responsible for the implementation and periodic update of the plan. This should include names and contact information for the owner of the facility, the persons (if other than the owner) designated for supervising the implementation of the plan; and persons comprising the “chain of command” for contact during an emergency condition;
2. An overview of how source controls, including structural or operational management practices, will prevent or minimize the amount of regulated substances from mixing with clean stormwater;
3. A list of regulated substances expected to be present on the site in quantities of 5 gallons or more;
4. The location(s) of groundwater protection areas, if any, within 1,000 feet of the site perimeter;
5. A plan depicting the drainage area with exposed regulated substances and the location of stormwater practices or discharge points serving those areas;

6. The locations and containment methods to be employed for storage of regulated substances;
7. A plan depicting the locations where regulated substances will be handled, including the storage, loading and unloading, transportation, or conveyance of any raw material, intermediate product, finished product, by-product, or waste product;
8. A plan showing the locations of snow storage areas;
9. A description of spill prevention and control or containment measures;
10. A program of training to familiarize employees with the plan and to ensure its implementation;
11. Provisions for regular internal review, evaluation, and periodic update of the plan.