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COLORADO SPRINGS
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STORMWATER ENTERPRISE

Stormwater Permanent Control Measure Standard Inspection and Maintenance Plan Procedures/Forms

for:

Underground Storage Structure

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Appendix A: Compliance with Permanent Control Measure (PCM) Requirements

All property owners are responsible for ensuring that stormwater PCMs installed on their property or as part of the development are properly maintained, function as designed, and are not modified from original design, to include ensuring proper drainage to the PCM from the development is maintained. Private property owners that own and maintain PCMs are required to enter a maintenance agreement contract with the City of Colorado Springs (the City). Property owners shall be aware of the responsibilities regarding PCM inspection and maintenance (IM) and shall be familiar with the contents of this IM Plan.

Annual Reporting

Verification that PCMs have been properly inspected and maintained by submittal of the IM forms shall be provided to the City on an annual basis. The reporting forms shall be provided to the City no later than (NLT) May 31st of each calendar year. IM forms are located in Appendix C, D and E of this plan.

Inspecting

PCMs must be inspected to ensure that they function as designed. The inspection shall determine any appropriate maintenance required for the facility. All PCMs are required to be inspected a minimum of once per year unless otherwise specified in Appendix F, if provided. Inspections shall follow the inspection guidance found in Appendix B.

Inspection Report

The annual inspection reporting form is located in Appendix C. The reporting form shall be submitted in conjunction with the IM forms no later than May 31st of each calendar year. A copy of all forms shall be retained by the owner for a minimum of 5 years.

Maintaining

PCMs must be properly maintained to ensure that they operate as designed. Routine maintenance can help avoid more costly rehabilitative maintenance.

Maintenance Categories

PCM maintenance programs are separated into three broad categories of work. The categories are separated based upon the magnitude and type of maintenance activities performed. A description of each category follows:

Routine Maintenance

This work consists of scheduled mowing, trash and debris removal, weed control, mosquito treatment, and algae treatment. This includes items such as the removal of debris/material that may be clogging any part of the outlet structure. These activities are normally performed numerous times during the year. This work can be completed without correspondence with the City; however, all work shall be documented on the maintenance form.

Restoration Work

This work consists of small-scale maintenance needed to address operational problems to include but not limited to; concrete repair and riprap repair/replacement. This work does not require prior correspondence with the City; however, all work shall be documented on the maintenance form.

Rehabilitation Work

This work consists of major maintenance needed to address failures within the PCM. This work requires consultation with an engineer and may require construction plans to be submitted for review and approval by the City. These items require prior correspondence with the City in addition to work being documented on the maintenance form.

Verification of Inspection and Maintenance Form Submittal

The PCM Inspection Form provides a record of inspection of the facility. Inspection Forms for each facility type are provided in Appendix D. The PCM Maintenance Form provides a record of maintenance activities and includes general cost information to assist property owners in budgeting for future maintenance. Maintenance Forms for each facility type are provided in Appendix E. Verification of inspections and maintenance of the stormwater facilities shall be provided to the City of Colorado Springs/Stormwater Enterprise on an annual basis NLT May 31st. The property owner and/or property manager shall verify the inspection and maintenance forms by signing the Annual Inspection and Maintenance Submittal Form provided in Appendix C.

Appendix B: Standard Operation Procedure for Inspection and Maintenance of Underground Storage Structure

1. INSPECTING UNDERGROUND STORAGE STRUCTURES

1.1. Underground Storage Structure Components

1.1.1. Underground Storage Structures have components that are designed to serve a particular function. It is critical that each feature is properly inspected to ensure that the overall facility functions as designed. Below is a list and description of the most common features within an Underground Storage Structure and the corresponding inspection items that shall be anticipated:

1.1.2. Inspection Requirement Matrix

Inspection Item / Underground Storage Structure Components	Illicit Discharge	Sediment Accumulation	Standing Water	Structural Condition	Trash & Debris Accumulation
Maintenance Access				X	X
Inspection Port	X	X	X	X	X
Pretreatment	X	X	X	X	X
Detention Vault	X	X	X	X	X
Outlet Structure				X	X

1.2. Maintenance Access

1.2.1. The maintenance access provides access to the major components of the Underground Storage Structure. Access is usually a manhole.

1.2.2. Typical inspection items noted for the maintenance access are:

1.2.2.1. Structural Damage – Structural damage can lead to access issues or may impact PCM functionality.

1.2.2.2. Trash and Debris Accumulation – To prevent a loss in hydraulic performance, trash and debris accumulation must be removed in a timely manner.

1.3. Inspection Port

1.3.1. An Inspection Port provides access to one or more components of the Underground Storage Structure in order to monitor maintenance needs.

1.3.2. Typical inspection items noted when monitoring the Inspection Ports are:

1.3.2.1. Illicit Discharge – Indicators of illicit discharges include sheens, odors, discolored soil, and dead vegetation.

1.3.2.2. Sediment Accumulation – To prevent a loss in hydraulic performance, sediment accumulation must be removed in a timely manner.

1.3.2.3. Standing Water – Improperly draining structures can lead to mosquito and/or algae growth. Routine maintenance is required to prevent standing water.

1.3.2.4. Structural Damage – Structural damage can lead to operational problems with the facility, including loss of hydraulic performance.

1.3.2.5. Trash and Debris Accumulation – To prevent a loss in hydraulic performance, trash and debris accumulation must be removed in a timely manner.

1.4. Pretreatment

1.4.1. The Pretreatment component reduces maintenance and prolongs the lifespan of the Underground Storage Structure by removing trash, debris, organic materials and coarse sediments prior to entering the detention vault(s).

1.4.2. Typical inspection items noted for the Pretreatment component are:

1.4.2.1. Illicit Discharge – Indicators of illicit discharges include sheens, odors, discolored soil, and dead vegetation.

1.4.2.2. Sediment Accumulation – To prevent a loss in hydraulic performance, sediment accumulation must be removed in a timely manner.

1.4.2.3. Standing Water – Improperly draining structures can lead to mosquito and/or algae growth. Routine maintenance is required to prevent standing water.

1.4.2.4. Structural Damage – Structural damage can lead to operational problems with the facility, including loss of hydraulic performance.

1.4.2.5. Trash and Debris Accumulation – To prevent a loss in hydraulic performance, trash and debris accumulation must be removed in a timely manner.

1.5. Detention Vault

1.5.1. The Detention Vault(s) provide the storage capacity to treat the volume required at the site. The detention vaults can be cast concrete or large plastic ridged piping cells.

1.5.2. Typical inspection notes for the Detention Vault(s) are:

1.5.2.1. Illicit Discharge – Indicators of illicit discharges include sheens, odors, discolored soil, and dead vegetation.

1.5.2.2. Sediment Accumulation – To prevent a loss in hydraulic performance, sediment accumulation must be removed in a timely manner.

1.5.2.3. Standing Water – Improperly draining structures can lead to mosquito and/or algae growth. Routine maintenance is required to prevent standing water.

1.5.2.4. Structural Damage – Structural damage can lead to operational problems with the facility, including loss of hydraulic performance.

1.5.2.5. Trash and Debris Accumulation - To prevent a loss in hydraulic performance, trash and debris accumulation must be removed in a timely manner.

1.6. Outlet Structure

1.6.1. The Outlet Structure component drains the Underground Storage Structure as engineered in specified quantities over limited time. This is accomplished by the installation of trash racks and steel orifice plates anchored and sealed within the component to control the stormwater release rates.

1.6.2. Typical inspection items noted for the Outlet Structure are:

1.6.2.1. Structural Damage – Structural damage can lead to operational problems with the facility, including loss of hydraulic performance.

1.6.2.2. Trash and Debris Accumulation – To prevent a loss in hydraulic performance, trash and debris accumulation must be removed in a timely manner.

1.7. Inspection Forms

1.7.1. The Standard Underground Storage Structure Inspection form is located in Appendix D. Inspection forms shall be completed by the person(s) conducting the inspection activities. Each form shall be verified and submitted by the property owner or representative to the City NLT May 31st each year to stormwater.PCMS@coloradosprings.gov or the address located on the submittal form in Appendix B. These inspection forms shall be retained for a minimum of 5 years and made available to the City upon request.

2. MAINTAINING UNDERGROUND STORAGE STRUCTURES

2.1. Maintenance Categories and Activities

2.1.1. A standard Underground Storage Structure Maintenance Program consists of three broad categories of work: Routine, Restoration, and Rehabilitation. Within each category of work, a variety of maintenance activities can be performed. A maintenance activity can be specific to a Bioretention Basin component or general to the overall facility. This section of the SOP explains each of the categories and briefly describes the standard maintenance activities.

2.2. Routine Maintenance

2.2.1. This work consists of scheduled sediment, trash and debris removal. This includes items such as the removal of debris/material that may be clogging any part of the outlet structure. These activities are normally performed numerous times during the year. This work can be completed without correspondence with the City; however, all work shall be documented on the inspection and maintenance forms.

2.3. Restoration Work

2.3.1. This work consists of small-scale maintenance needed to address operational problems to include but not limited to; concrete repair and riprap repair/replacement. This work does not require prior correspondence with the City; however, all work shall be documented on the inspection and maintenance forms.

2.4. Rehabilitation Work

2.4.1. This work consists of major repairs needed to address failures within the PCM. This work requires consultation with an engineer and may require design plans be submitted for review and approval by the City. These items require prior correspondence with the City in addition to work being documented on the inspection and maintenance forms.

2.5. Maintenance Activities are summarized in the table below, and further described in the following sections.

2.6. Maintenance Activity Matrix

Maintenance Activity / Underground Storage Structure Components	Sediment Removal	Standing Water Removal	Structural Repairs	Trash & Debris Removal
Maintenance Access			X	X
Inspection Port	X	X	X	X
Pretreatment	X	X	X	X
Detention Vault	X	X	X	X
Outlet Structure			X	X

2.7. Sediment Removal

2.7.1. Sediment removal is necessary to maintain the original design volume of the PCM and to ensure proper functionality of the infrastructure. Routine sediment removal from the filter media and underdrain can significantly reduce the frequency of major sediment removal activities. Jet-Vac cleaning is normally the best way to remove sediment from the underdrain. If Filter Media becomes clogged due to sediment permeation, full media replacement will be required. Major (restoration/rehabilitation) sediment removal activities may require surveying and consultation with an engineer to ensure design volumes/grades are achieved.

Stormwater sediment removed from PCMs do not meet the State's definition of hazardous waste; however, sediment may be contaminated with a wide array of organic and inorganic pollutants. All removed sediment must be disposed of in accordance with State laws concerning regulated wastes. Sediment removal can be routine maintenance, restoration and/or rehabilitation.

2.7.2. Recommended frequency – Twice annually or as needed, based upon inspections.

2.8. Standing Water Removal

2.8.1. Improperly draining structures can lead to mosquito and/or algae growth. Removal of standing water may be necessary to control mosquitoes and undesirable aquatic vegetation that can create nuisances. Additionally, finding the root cause of the standing water is pertinent in order to prevent future issues. Standing water removal is routine maintenance.

2.8.2. Recommended frequency – As needed, based on inspections.

2.9. Structural Repair

2.9.1. Structural repairs to Underground Storage Structure components may require input from an engineer. Minor displacement of rip-rap and minor concrete repairs can be performed routinely. Major structural damage could impact the functionality of the infrastructure. Structural repairs can be routine maintenance, rehabilitation or restoration.

2.9.2. Recommended frequency – As needed, based on inspections.

2.10. Trash/Debris Removal

2.10.1. Trash and debris must be removed to minimize outlet clogging. Debris can clog the trash rack and orifice plate.

2.10.2. Recommended frequency – Twice annually or as needed.

2.11. Maintenance Forms

2.11.1. The Standard Underground Storage Structure Maintenance Form is located in Appendix D. Each form shall be verified and submitted by the property owner or representative to the City NLT May 31st each year to stormwater.PCMS@coloradosprings.gov or the address located on the submittal form in Appendix C. Inspection forms and maintenance forms shall be retained by the property owner for a minimum of 5 years and made available to the City upon request.

Appendix C: Annual PCM Inspection and Maintenance Submittal Form

(This form to be submitted to City of Colorado Springs prior to May 31 of each year)

Date: _____

To: **City of Colorado Springs/Stormwater Enterprise**
Attn: PCM Program
30 S Nevada Suite 410
Colorado Springs, CO 80903

OR

stormwater.PCMs@coloradosprings.gov

Re: **Verification of Inspection and Maintenance; Submittal of forms**

Property/Subdivision Name: _____

Property Maintenance Agreement Reference No.: _____

Property Address: _____

Contact Name: _____

Contact Email Address: _____

I verify that the required inspections and maintenance have been completed in accordance with the Stormwater PCM Maintenance Agreement and the Inspection and Maintenance Plan associated with the above referenced property.

The required PCM Inspection and Maintenance forms are attached.

_____
Property Owner or Representative

_____
Signature

Appendix D: Underground Storage Structure Inspection Form

Property/Subdivision Name:_____ Date:_____

For each Underground Storage Structure component, please indicate if inspection items are acceptable (A), deficient (D), or not applicable (N/A).

Maintenance Access
___Structural Condition
___Trash and Debris

Inspection Port
___Sediment Accumulation
___Standing Water
___Structural Condition
___Trash and Debris

Pretreatment
___Sediment Accumulation
___Standing Water
___Structural Condition
___Trash and Debris

Detention Vault(s)
___Sediment Accumulation
___Standing Water
___Structural Condition
___Trash and Debris

Outlet Structure
___Structural Condition
___Trash and Debris
___Orifice Clogged

Trash Rack
___Structural Condition
___Trash and Debris
___Clogged

Miscellaneous
___Graffiti/Vandalism
___Structure Modifications
___Other – Explain Below

Inspection notes/additional comments:_____

Appendix E: Underground Storage Structure Maintenance Form

Property/Subdivision Name:_____ Date:_____

Please indicate all maintenance activities performed in the last 12 months.

___Sediment Removal **Date(s) Performed:_____**

___Sediment Removal **Date(s) Performed:_____**

___Trash and Debris Removal **Date(s) Performed:_____**

___Trash and Debris Removal **Date(s) Performed:_____**

___Jet-Vac **Date(s) Performed:_____**

___Jet-Vac **Date(s) Performed:_____**

___Structural Repairs

Location and description of repairs:_____

_____

Date Performed:_____

Location and description of repairs:_____

_____

Date Performed:_____

Location and description of repairs:_____

_____

Date Performed:_____

Location and description of repairs:_____

_____

Date Performed:_____

Maintenance notes/additional comments:_____

_____

_____

_____

_____

_____