

# OPERATION AND MAINTENANCE MANUAL

## Owner/Applicant

NBPIV Constitution II, LLC.  
401 Edgewater Place, Suite 265  
Wakefield, MA 01880

## 55 CONSTITUTION BOULEVARD

PARCEL ID – 313-059

## FRANKLIN, MASSACHUSETTS

TOWN OF FRANKLIN CONSERVATION COMMISSION

ISSUED: OCTOBER 17, 2024

## **Table of Contents**

<b>0. Introduction.....</b>	<b>i</b>
<b>1. Program Administration .....</b>	<b>ii</b>
<b>2. Responsibility .....</b>	<b>ii</b>
<b>3. Documentation .....</b>	<b>iii</b>
3.1. Maintenance Program and Budget .....	iii
<b>4. Project Overview.....</b>	<b>iii</b>
<b>5. Routine Maintenance Tasks.....</b>	<b>v</b>
5.1. Parking Lot Trash Removal .....	v
5.2. Catch Basins and Manholes.....	v
5.3. Water Quality Units.....	vi
5.4. Outlet Control Structures .....	vi
5.5. Proprietary Media Filter .....	vi
5.6. Flared Ends .....	vii
5.7. Subsurface Infiltration Systems – Stormtech Units.....	vii
5.8. Subsurface Detention Systems – ADS LandMax System .....	vii
5.9. Parking Lot and/or Roadway Sweeping.....	vii
5.10. Winter Maintenance .....	viii
<b>6. Storage, Handling, and Disposal of Bldg Products, Materials, &amp; Wastes .....</b>	<b>ix</b>
6.1.1 Good Housekeeping.....	ix
6.1.2 Fertilizer Selection .....	ix
6.1.2.1 Fertilizer Storage .....	x
6.1.2.2 Fertilizer Application .....	x
6.1.3 Diesel Fuel, Oil, Hydraulic Fluids, Other Petroleum Products, and Other Chemicals .....	x
6.1.3.1 Petroleum Products .....	x
6.1.3.2 Paints, Paint Solvents, and Cleaning Solvents.....	x
6.1.4 Hazardous or Toxic Waste .....	x
6.1.4.1 Hazardous Wastes.....	x
6.1.4.2 Hazardous Substances .....	xi
6.1.4.3 Domestic Waste .....	xi
6.1.5 Sewer .....	xi

6.1.7 Washing of Applicators and Containers used for Paint or Other Materials .....	xii
6.1.8 Other Pollution Prevention Practices.....	xii
6.1.9 Deicing Materials .....	xii
6.1.9.1 Deicing Materials Storage .....	xii
6.1.10 Snow Storage and Disposal.....	xiii
6.1.11 Illicit Discharges to Stormwater Management System.....	xiii
6.1.12 Washing of Equipment and Vehicles .....	xiii
<b>Appendix A: Stormwater Management System Site Plan.....</b>	<b>xiv</b>
<b>Appendix B: Snow Storage Plan.....</b>	<b>xv</b>
<b>Appendix C: Stormwater Management System Maintenance Program Summary Checklist.....</b>	<b>xvi</b>
<b>Appendix D: Stormwater Management System Operation and Maintenance Forms.....</b>	<b>xix</b>
<b>Appendix E: Staff Training.....</b>	<b>xxxii</b>
<b>Appendix F: ADS Stormtech SC-740 Units Design Manual - Inspection and Maintenance.....</b>	<b>xxxiv</b>
<b>Appendix G: ADS LandMax Stormwater Management System Manual - Inspection and Maintenance .....</b>	<b>xxxv</b>
<b>Appendix H: Contech – Jellyfish Filter – Operation &amp; Maintenance Manual .....</b>	<b>xxxvi</b>
<b>Appendix I: Contech – Cascade &amp; CDS® Inspection and Maintenance Guide.....</b>	<b>xxxvii</b>

## **0. Introduction**

Development projects such as the proposed warehouse development at 55 Constitution Boulevard in Franklin, MA are typically constructed with complex stormwater management systems to maintain compliance with a variety of regulations and standards. These systems are often constructed as multi-faceted systems that feature a combination of treatment and conveyance devices, often resulting in a variety of configurations within a single development project. The introduction of new impervious surfaces, landscaped areas (both soft scape and hard scape) and new buildings can impact the receiving waterbodies in many ways. Control and treatment of the resulting runoff from these surfaces is of paramount importance to improving and maintaining the quality of the Commonwealth's waterbodies.

Source control and the installation of green infrastructure and water quality units, often combined with pretreatment measures or followed by vegetated buffer strips and other best management practices, can significantly reduce the non-point pollution discharge from the developed area. The stormwater management system can protect and enhance the stormwater runoff water quality through the removal of sediments and pollutants, and source control significantly reduces the amount of pollutants entering the system. Preventative maintenance of the system will include a comprehensive source reduction program of regular vacuuming and litter removal, prohibitions on the use of pesticides and maintenance of designated waste and recycling areas.

This long-term Stormwater Management System Operations and Maintenance (O&M) Manual, filed with the Town of Franklin, shall be implemented at the warehouse development site to ensure that the stormwater management system functions as designed. The Owner possesses the primary responsibility for overseeing and implementing the O&M plan and assigning a property manager who will be responsible for the proper operation and maintenance of the stormwater structures. In case of the transfer of property ownership, future property owners shall be notified of the presence of the stormwater management system and the requirements for proper implementation of the O&M plan.

It is the intent of this document to provide guidance and detail for the long term inspection and maintenance requirements of the project site to ensure the overall stormwater management system functions as intended for the life of the system. This manual provides basic criteria and schedules for inspection and trigger points for required maintenance. Included in this manual is an overall site plan which identifies the locations of the key components of the stormwater management system and a log for tracking the inspections and maintenance.

## 1. Program Administration

A reliable administrative structure must be established to assure implementation of the maintenance programs described in the foregoing section. Key factors that must be considered in establishing a responsive administrative structure include:

1. Administrative body must be responsible for long-term operation and maintenance of the facilities.
2. Administrative body must have the financial resources to accomplish the inspection and maintenance program over the life of the facility.
3. The administrative body must have a responsible administrator to manage the inspection and maintenance programs.
4. The administrative body must have the staff to accomplish the inspection and maintenance programs, or must have authority to contract for the required services.
5. The administrative body must have a management information system sufficient to file, retain, and retrieve all inspection and maintenance records associated with the inspection and maintenance programs.

If any of the above criteria cannot be met by the entity assigned inspection and maintenance responsibilities, it is likely that the system will fail to meet its water quality objectives at some point during its life. While each of the above criteria may be met by a variety of formats, it is critical to clearly establish the assigned administrative body in a responsible and sustainable manner.

## 2. Responsibility

The purpose of the Stormwater Operations and Maintenance Manual is to ensure the inspection of the system, removal of accumulated sediments, oils and debris, and implementation of corrective action and record keeping activities. The ongoing responsibility is the Owner, its successors and assigns. Adequate maintenance is defined in this document as good working condition.

Contact information is provided below:

### **Responsibility for Operation and Maintenance of 55 Constitution Boulevard Project**

Name: NorthBridge Partners, LLC.  
Address: 401 Edgewater Place, Suite 265  
City, State: Wakefield, MA 01880  
Contact: Dean Atkins  
Telephone: 617.702.1604  
Email: Dean.atkins@northbrigdec.com

\_\_\_\_\_  
Signature

### **3. Documentation**

An Inspection and Maintenance Record Log and Schedule shall be kept by the Owner or Property Manager summarizing inspections, maintenance, repairs and any corrective actions taken. The log will include the date on which each inspection or maintenance task was performed, a description of the inspection findings or maintenance completed, and the name of the inspector or maintenance personnel performing the task. If a maintenance task requires the clean-out of any sediments or debris, the location where the sediment and debris was disposed after removal will be indicated. Inspection and Maintenance Logs shall be kept on file at the property management office.

Upon completion of the quarterly and annual maintenance, the Town of Franklin requires a documentation submittal to the Department of Public Works confirming when maintenance has been satisfactory completed (Section 153-18-B.6)

#### **3.1. Maintenance Program and Budget**

The Owner, Property Manager and maintenance staff shall conduct the Operation and Maintenance program set forth in this document. The Owner or Property Manager will ensure that inspections and record keeping are timely and accurate and that cleaning and maintenance are performed in accordance with the recommended frequency for each stormwater component. Inspection and Maintenance Log Forms (provided herein) shall include the date and amount of the last significant storm event in excess of on (1) inch of rain in a 24-hour period, physical conditions of structures, depth of sediment in structures, evidence of overtopping or debris blockage and maintenance required of each structure. The estimated annual cost of the Maintenance Program is \$7,500 - \$10,000.

A list of the individual inspection/maintenance elements is provided in the table of contents. The guidelines are proposed for initial use with adjustments made as appropriate based upon specific project experience.

### **4. Project Overview**

Key permits issued (or applied for) on the project include:

- Site Plan Review
- Stormwater Management Permit
- Notice of Intent/Order of Conditions
- Building Permit
- NPDES Construction General Permit

The permit applications for the project include the design information for the stormwater system.

The Owner/Operator of the stormwater management system should review these permits for a general description and background of the project, as well as any specific permit conditions or requirements of the project.

The applicant has retained Beals Associates, Inc. for civil engineering for the proposed site design at the 55 Constitution Boulevard Project. Beals Associates, Inc. has prepared the design for the stormwater management facilities for this project and may be contacted at:

Beals Associates, Inc.  
2 Park Plaza, Suite 200  
Boston, Massachusetts 02116  
(617) 242.1120

It is recommended any particular questions on the design intent or similar issues be directed to the designer of the system.

The applicable plans/design documents which apply to the project are:

1. Civil Site Plans/Permit Applications
2. The Erosion Control/Sedimentation Control Plan for the project.
3. The Stormwater Management Plan for the project.
4. O&M Stormwater Maintenance Plan for the project.

A copy of these documents should be retained with the manual.

## 5. Routine Maintenance Tasks

Routine maintenance of lawns and other landscaped areas shall occur as necessary to maintain the property in a neat and orderly fashion. Clippings and/or mulch shall not be washed into the drainage infrastructure.

Maintenance of the Stormwater Management System shall be in accordance with the Operations and Maintenance Checklist below.

Snow shall be stored in designated areas prior to removal from the site.

Good housekeeping – all areas should be kept free of trash and debris. Any storage of materials and waste products shall be inside or under cover. Fertilizers, herbicides and pesticides, if stored on site, shall be stored properly contained and under cover. Storage of salt or deicing chemicals, if any, shall be on impervious area, covered and protected from runoff.

### 5.1. Parking Lot Trash Removal

The operator of the site has expressed interest and concern regarding the cleanliness and appearance of the property in general as well as provide protection of the adjacent resource areas and riverfront area. In order to maintain the site in a neat and clean manner that is free of windblown debris and trash, the parking lot trash receptacles shall be inspected twice per week and emptied a minimum of once per week. Windblown debris and trash shall be removed from the paved surfaces and along the fence line on a weekly basis. All trash and debris shall be properly disposed of.

The number and location of outdoor trash receptacles shall be monitored on a month to month basis to determine if they have been effectively located and an adequate number of outdoor receptacles are available. In the event it is found that the number or locations are not adequate to serve the needs of the facility, then adjustments shall be made immediately.

### 5.2. Catch Basins and Manholes

Regular maintenance is essential. Deep sump catch basins remain effective at removing pollutants only if they are cleaned out frequently. Once 50% of the sump volume is filled, the catch basin may not be able to retain additional sediment.

Inspect or clean deep sumps at least four times per year and at the end of the foliage and snow removal seasons (January, April, July and October). Sediments must also be removed four times per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin.

Clamshell buckets are typically used to remove sediment; however, vacuum trucks are preferable as they remove more trapped sediment than clamshells. Vacuuming is also a speedier process and is less likely to damage the hood within the deep sump catch basin.

Always consider the safety of the staff cleaning deep sump catch basins.

Cleaning a deep sump catch basin within a road with active traffic or even within a parking lot is dangerous and a police detail may be necessary to safeguard workers.

Although catch basin debris often contains oil and hazardous material such as petroleum hydrocarbons and metals, MassDEP classifies them as solid waste. Unless there is evidence that they have been contaminated by a spill or other means, MassDEP does not routinely require catch basin cleanings to be tested before disposal. Contaminated catch basin cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000, and handled as hazardous waste.

In the absence of evidence of contamination, catch basin cleanings may be taken to a landfill or other facility permitted by MassDEP to accept solid waste, without any prior approval by MassDEP; however, some landfills may require testing before they are accepted.

### 5.3. Water Quality Units

Much like the catch basins, regular maintenance of the water quality units is essential. The maintenance of these units begins immediately at post-construction prior to putting the unit into service. During the first 6-months of operation the unit shall be inspected monthly. During the second half of the first year of operation, the units shall be inspected quarterly in January, April, July and October in order to determine the rate of accumulation of sediment and oils. In subsequent years, the units can be inspected at a frequency determined by the accumulation rate of sediment and oils, but in no cases shall the inspection frequency exceed six months.

Cleaning of the units is required when the sediment has accumulated to 50% of the unit's capacity. The unit shall also be cleaned immediately in the event of a spill.

### 5.4. Outlet Control Structures

Regular inspection and maintenance of outlet control structures is imperative for outlet control structures. Outlet control structures manage the release of stormwater into receiving water bodies, offsite areas, or into downstream stormwater management systems. Outlet control structures typically contain openings that act as the mechanism to control the release of the stormwater. In outlet control structures, the smaller the openings are, the more prone they become to clogging. In these cases, screens are typically added to protect these smaller openings from clogging. Outlet control structures must be inspected monthly. Debris must be removed whenever the openings or screens start to become clogged. Accumulated sediment must be removed whenever the depth of deposits reaches the openings or pipe inverts.

### 5.5. Proprietary Media Filter

Much like the water quality, regular maintenance of the water quality units is essential. The maintenance of these units begins immediately at post-construction prior to putting the system unit into service. Overall, these units shall be inspected and maintained per the manufacturer's recommendations (Contech) as included in the attached owner's manual.

Inspections shall be conducted at a minimum quarterly during the first year of operations to assess the sediment and floatable pollutant accumulation, and to ensure proper functioning of the system. In subsequent years the unit shall be inspected at least once per year or more if additional monitoring is identified during the first year of operation. Inspections shall also be conducted after each major storm event and immediately after an upstream oil, fuel, or other chemical spill.

#### 5.6. Flared Ends

Flared ends should be inspected annually in April of each year to ensure that no debris or sediment is obstructing the flared end. Debris should be immediately cleaned out, and sediment should be removed upon accumulation.

#### 5.7. Subsurface Infiltration Systems – Stormtech Units

See Appendix E for the manufacturer's Inspection and Maintenance Manual.

#### 5.8. Subsurface Detention Systems – ADS LandMax System

See Appendix F for the manufacturer's Inspection and Maintenance Manual.

#### 5.9. Parking Lot and/or Roadway Sweeping

One effective nonstructural source control is street and parking lot sweeping. Many municipalities and some private entities (e.g., commercial shopping areas or office parks) have street sweeping programs. Although intended to provide important nonpoint source pollution control, many street sweeping programs are not effective at capturing the peak sediment loads.

There are three factors in particular that can have a major influence on the effectiveness of a street sweeping program: access, the type of sweeper, and the frequency of sweeping.

Effective sweeping requires access to the areas to be swept. Parked cars impede street sweeping. Studies have shown that up to 95% of the solids on a paved surface accumulate within 40 inches of the curb, regardless of land use. It is essential that applicants or those responsible for stormwater maintenance have the ability to impose parking regulations to facilitate proper sweeping, particularly in densely populated or heavily traveled areas, so that sweepers can get as close to curbs as possible.

A good street sweeping program requires an efficient sweeper. There are three types of sweepers: Mechanical, Regenerative Air, and Vacuum Filter. Each has a different ability to remove TSS.

**Mechanical:** Mechanical sweepers use brooms or rotary brushes to scour the pavement. Although most of the sweepers currently in use in Massachusetts are mechanical sweepers, they are not effective at removing TSS (from 0% to 20% removal). Mechanical sweepers are especially ineffective at picking up fine particles ("fines") (less than 100 microns).

**Regenerative Air:** These sweepers blow air onto the road or parking lot surface, causing fines to rise where they are vacuumed. Regenerative air sweepers may blow fines off the vacuumed portion of the roadway or parking lot, where they contaminate stormwater when it rains.

**Vacuum filter:** These sweepers remove fines along roads. Two general types of vacuum filter sweepers are available - wet and dry. The dry type uses a broom in combination with the vacuum. The wet type uses water for dust suppression. Research indicates vacuum sweepers are highly effective in removing TSS. Regardless of the type chosen, the efficiency of street sweeping is increased when sweepers are operated in tandem.

The frequency of sweeping is a major factor in determining efficiency. Unlike other stormwater treatment practices that function whenever it rains, street sweeping only picks up street dirt when streets and parking lots are actually swept. TSS removal efficiency is determined based on annual loading rates. If a road were swept only once a year with a sweeper that is 100% efficient, it would remove only a small fraction of the annual TSS load.

Street dirt accumulates on roads and parking lots and runs off in response to precipitation. The average interval between precipitation events in Massachusetts is approximately 3 days. Therefore, the hypothetical maximum effectiveness for street dirt removal requires sweeping at least once every 3 days, with a street sweeper with 100% efficiency at removing solids on paved surfaces before they become suspended. Modeling studies by Claytor (1999) in the Pacific Northwest suggest that optimum pollutant removal occurs when surfaces are swept every two weeks.

<b>TSS Removal Credits for Street Sweeping</b>			
<b>TSS Removal Rate</b>	<b>High Efficiency Vacuum Sweeper (Frequency of Sweeping)</b>	<b>Regenerative Air Sweeper (Frequency of Sweeping)</b>	<b>Mechanical Sweeper (Rotary Broom)</b>
10%	Monthly Average, with sweeping scheduled primarily in spring and fall.	Every 2 Weeks Average, with sweeping scheduled primarily in spring and fall.	Weekly Average, with sweeping scheduled primarily in spring and fall.

Sweeping shall be done in accordance with the table above to achieve a 10% TSS Removal rate.

5.10. Winter Maintenance

Ensure structures are not blocked by ice, snow, debris or trash during winter months. Accumulated snow shall be stored in specified snow storage locations which are shown on the Snow Storage Plan included in the Project Plan Set as well as attached to this O&M report.

Since there are no known ways to remove salt from stormwater runoff, the best method is to reduce the amount used. Depending on specific weather conditions, the first priority for treating the paved surfaces will be treatment with pre-wetted salts. Pretreatment of paved surfaces or using pre-wetted salts can reduce applications rates by 50% to 60%. The ownership group, property managers, and snow removal contactors shall monitor and evaluate upcoming snow events and pre-treat the site prior to snow events using pre-wetted salts in order to reduce the amount of salt materials required during or following snow events depending on weather conditions.

The ownership group shall also work with its snow management contractors to manage the application rates and ensure material is not over applied. In order to do this the contractor shall enforce through contract documents to reduce the speed at which vehicles with equipment for de-icing compounds are travelling throughout the development. Reduction in the speed of the vehicles with salt application equipment can reduce the probability of overspreading.

In addition to the speed at which the material is applied the ownership group can also manage the process at which the salt is applied to reduce over application. The ownership group shall be responsible to track and manage the application of salt through the winter months. Data on the salt use and impacts has been noted in research as the most effective way to reduce environmental impacts.

## **6. Storage, Handling, and Disposal of Bldg Products, Materials, & Wastes**

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff. The owner will be responsible for ensuring that these procedures are followed.

### 6.1.1 Good Housekeeping

The following good housekeeping practices will be followed onsite:

1. An effort will be made to store only enough products necessary for the operation of the warehouse.
2. All materials stored onsite will be stored in a neat, orderly manner and, if possible, under a roof or in a containment area. At a minimum, all containers will be stored with their lids on when not in use. Drip pans shall be provided under any and all dispensers.
3. Products will be kept in their original containers with the original manufacturer's label in legible condition.
4. Substances will not be mixed with one another unless recommended by the manufacturer.
5. Whenever possible, all of a product will be used up before disposing of the container.
6. Manufacturer's recommendations for proper use and disposal will be followed.
7. The Contractor's Superintendent will be responsible for daily inspections to ensure proper use and disposal of materials.

### 6.1.2 Fertilizer Selection

It is not currently known if fertilizer will be used. If fertilizer is used it shall be to enhance the ground cover of the facility, not result in adverse water quality impacts. The following guidelines are recommended.

The selection of fertilizer shall be based upon site-specific requirements. Recommendations for the fertilizer will be made upon completion of the project and actual tests of the soil mix. The benefit of the use of a soil mix is the ability of the soil to absorb and store nutrients for subsequent plant growth better than a sandy loam. Should fertilizer be utilized, it should be phosphorous-free or slow-release fertilizers. If practicable, the use of no fertilizers is encouraged.

The soil shall be resampled every three (3) years and the plan adjusted accordingly.

#### 6.1.2.1 Fertilizer Storage

If used, it shall be stored in a weatherproof area with containers protected from damage. Fertilizer from any damaged containers shall be placed in appropriate weatherproof containers.

#### 6.1.2.2 Fertilizer Application

Fertilizer shall be applied with appropriate mechanical equipment properly calibrated to meet the recommended application rates of the soil tests and manufacturer. The Owner or its agents shall instruct personnel on the use of equipment and the proper measurement of the fertilizer.

Personnel assigned to application shall be instructed that over-application of fertilizer is averse to the landscaped areas and environment. Fertilizer shall not be applied to steep slopes, saturated ground, during periods of precipitation, or immediately prior to major rain events.

### 6.1.3 Diesel Fuel, Oil, Hydraulic Fluids, Other Petroleum Products, and Other Chemicals

#### 6.1.3.1 Petroleum Products

All onsite vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers that are clearly labeled. Maximum total aggregate above ground storage capacity (for the total permit area) shall not exceed 1,320 gallons (which includes both bulk and equipment operational storage volumes in fuel tanks greater than 55 gallons). Total aggregate petroleum storage exceeding 1,320 gallons shall require preparation, certification (using a Professional Engineer) and implementation of a Spill Prevention Control and Countermeasures (SPCC) Plan. The SPCC Plan, if needed, will be furnished by the Contractor. Any petroleum storage tanks will be double wall tanks. The location of any fuel tanks and/or equipment storage areas must be identified on the Erosion Control Plan, by the Contractor once the locations have been determined.

#### 6.1.3.2 Paints, Paint Solvents, and Cleaning Solvents

All containers will be tightly sealed and stored when not in use. Excess paint and solvents will not be discharged to the storm sewer system but will be properly disposed of according to manufacturer's instructions or state and federal regulations.

### 6.1.4 Hazardous or Toxic Waste

#### 6.1.4.1 Hazardous Wastes

It is imperative that all Hazardous Waste be properly identified and handled in accordance with all applicable Hazardous Waste Standards, including the storage, transport and disposal of the Hazardous Wastes. There are significant penalties for the improper handling of Hazardous Wastes. It is important that the Site Superintendent seeks appropriate assistance in making the determination of whether a

substance or material is a Hazardous Waste. For example, Hazardous Waste may include certain hazardous substances, as well as pesticides, paints, paint solvents, cleaning solvents, pesticides, contaminated soils, and other materials, substances or chemicals that have been discarded (or are to be discarded) as being out-of-date, contaminated, or otherwise unusable, and can include the containers for those substances; other materials and substances can also be or become Hazardous Wastes, however. The Contractor's Superintendent is also responsible for ensuring that all site personnel are instructed as to these Hazardous Waste requirements and also that the requirements are being followed.

#### 6.1.4.2 Hazardous Substances

These practices will be used to reduce the risks associated with Hazardous Substances. Material Safety Data Sheets (MSDS's) for each product with hazardous properties that is used on the site will be obtained and used for the proper management of potential wastes that may result from these products. An MSDS will be posted in the immediate area where such product is stored and/or used and another copy of each MSDS will be maintained in the job trailer at the Project. Each employee who must handle a Hazardous Substance will be instructed on the use of MSDS sheets and the specific information in the applicable MSDS for the product he/she is using, particularly regarding spill control techniques.

1. Products will be kept in original containers with the original labels in legible condition.
2. Original labels and MSDS's will be procured and used for each product.
3. If surplus product must be disposed manufacturer's and local/state/federal required methods for proper disposal must be followed.

#### 6.1.4.3 Domestic Waste

All waste materials will be collected and stored in an appropriate container and/or securely contained metal dumpster rented from a local waste management company which must be a solid waste management company licensed to do business in the Commonwealth of Massachusetts. The dumpster will comply with all local and state solid waste management regulations.

All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied as necessary. The dumpster will be emptied as necessary or when 95% full, or more often if necessary to prevent over-flow and the trash will be hauled to a landfill approved by the Commonwealth of Massachusetts. No waste materials will be buried on site. All personnel will be instructed regarding the correct procedures for waste disposal.

All waste dumpsters and roll-off containers will be located in an area where the likelihood of the containers contributing to storm water discharges is negligible. Solid waste containers shall be located no less than 50 feet tributary from any storm inlet, drainage way, or surface water. If required, additional BMPs must be implemented, such as gravel bags, wattles, dikes, berms, and fences around the base, to prevent wastes from contributing to storm water discharges.

#### 6.1.5 Sewer

The proposed project will be connected to sewer, and there will be no septic systems on the project site.

### 6.1.7 Washing of Applicators and Containers used for Paint or Other Materials

Excess paint and solvents will not be discharged to the storm sewer system but will be properly disposed of according to manufacturer's instructions or state and federal regulations.

### 6.1.8 Other Pollution Prevention Practices

Any contaminated soils (resulting from spills of Hazardous Substances or Oil or discovered during the operation of the facility) which may result from daily operations will be contained and cleaned up immediately in accordance with the procedures given in the Materials Management Plan and in accordance with applicable state and federal regulations. Contaminated soils which pre-existed operation, but which are discovered by virtue of ongoing operations, shall be reported in the same manner as spills, but with sufficient information to indicate that the discovery of an existing condition is being reported. If there is a release that occurs by virtue of the discovery of existing contamination, this shall be reported as a spill, if it otherwise meets the requirements for a reportable spill.

### 6.1.9 Deicing Materials

Proper storage of deicing materials is paramount to ensure proper protection of public and private drinking water supplies. Uncovered storage of salt is forbidden by Massachusetts General Law Chapter 85 section 7A in areas that would threaten water supplies. Additionally, the Drinking Water Regulations, 310 CMR 22.21(2)(b), restrict deicing chemical storage within wellhead protection areas (Zone I and Zone II) for public water supply wells as follows: “storage of sodium chloride, chemically treated abrasives or other chemicals used for the removal of ice and snow on roads [are prohibited], unless such storage is within a structure designed to prevent the generation and escape of contaminated runoff or leachate.” For drinking water reservoirs, 310 CMR 22.20C prohibits, through local bylaw, uncovered or uncontained storage of road or parking lot de-icing and sanding materials within Zone A at new reservoirs and at those reservoirs increasing their withdrawals under MGL Chapter 21G, the Water Management Act.

#### 6.1.9.1 Deicing Materials Storage

Components of an “environment-friendly” roadway deicing salt storage facility include:

- The right site = a flat site
- Adequate space for salt piles
- Storage on a pad (impervious/paved area)
- Storage under a roof
- Runoff collection/containment

Deicing materials for this project will be stored inside the building.

#### 6.1.10 Snow Storage and Disposal

Finding locations to dispose of collected snow can pose a challenge as roadways, parking lots, and sidewalks are cleared. Public safety is of importance; however, care must be taken to ensure that collected snow, which may be contaminated with road salt, sand, litter, and automotive pollutants such as oil, is disposed of in a manner that will minimize threats to nearby sensitive resource areas.

Snow storage areas have been identified on the Operation and Maintenance Site Plan found in Appendix B. These locations have been carefully planned to ensure that potential contaminants will drain to the stormwater management facilities to provide necessary treatment. Snow shall be stored in unused portions of the parking and paved surface. In the likely event that insufficient areas are available for snow storage, then the owner shall remove snow from the site entirely. In no event shall snow be stored in areas that would drain directly towards resource areas.

#### 6.1.11 Illicit Discharges to Stormwater Management System

The stormwater management system is the system for conveying, treating, and infiltrating stormwater on-site, including stormwater best management practices and any pipes intended to transport stormwater to the groundwater, a surface water, or municipal separate storm sewer system. Illicit discharges to the stormwater management system are discharges that are not entirely comprised of stormwater. Notwithstanding the foregoing, an illicit discharge does not include discharges from the following activities or facilities: firefighting, water line flushing, landscape irrigation, uncontaminated groundwater, potable water sources, foundation drains, air conditioning condensation, footing drains, individual resident car washing, flows from riparian habitats and wetlands, dechlorinated water from swimming pools, water used for street washing and water used to clean residential buildings without detergents.

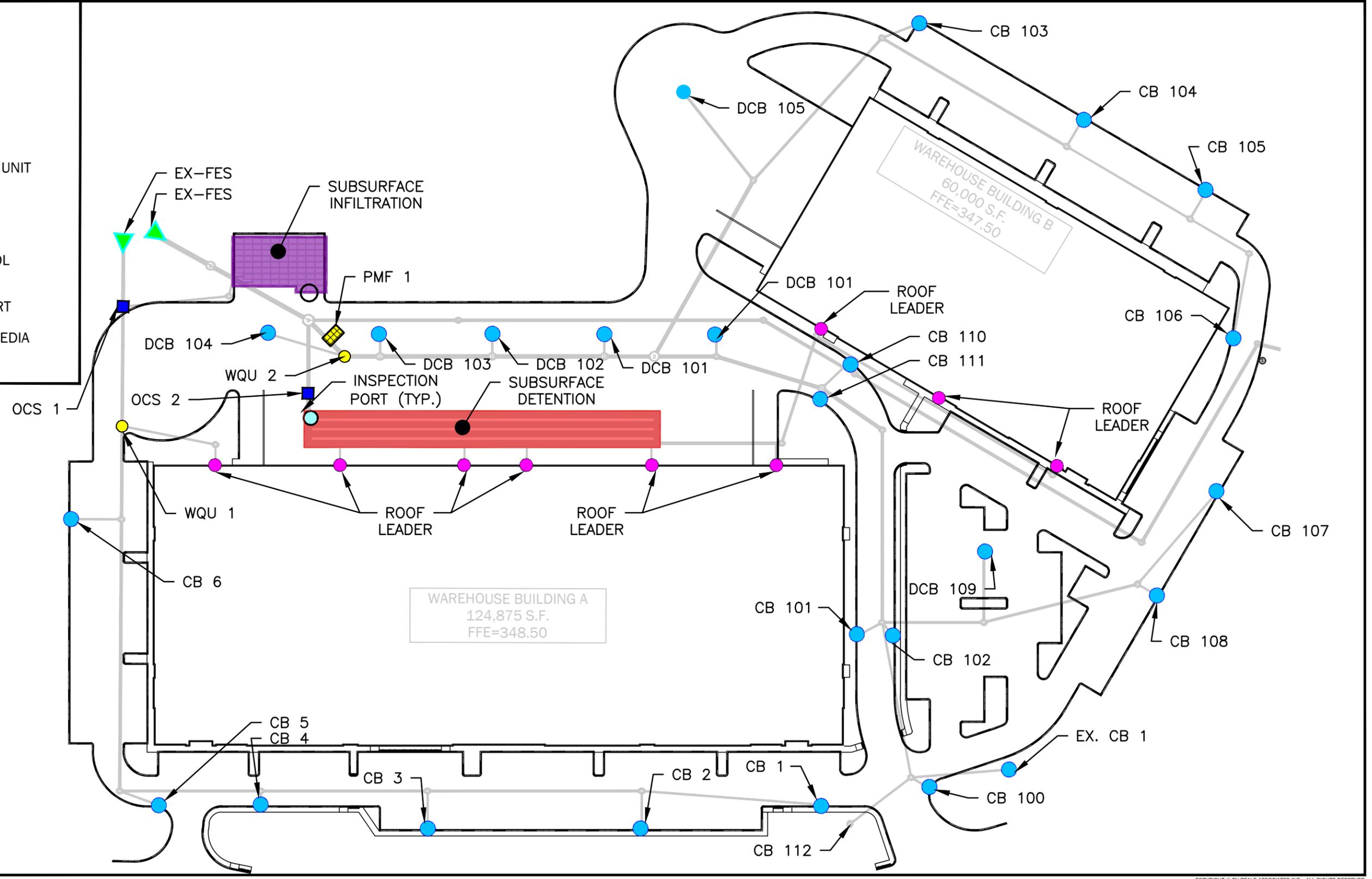
#### 6.1.12 Washing of Equipment and Vehicles

Any and all equipment and vehicle washing will be performed off-site.

## **Appendix A: Stormwater Management System Site Plan**

**LEGEND**

- SUBSURFACE INFILTRATION
- SUBSURFACE DETENTION
- CATCH BASIN
- WATER QUALITY UNIT
- FLARED END
- ROOF DRAIN
- OUTLET CONTROL STRUCTURE
- INSPECTION PORT
- PROPRIETARY MEDIA FILTER



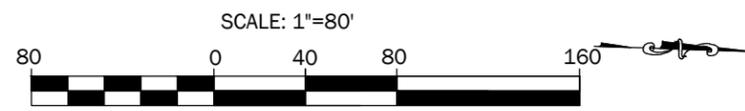
PATH:H:\C-1381 Franklin\Autocad\Design Development\BMP Plan.dwg

COPYRIGHT © BY BEALS ASSOCIATES INC. - ALL RIGHTS RESERVED

**BEALS ASSOCIATES INC.**  
 2 PARK PLAZA SUITE 200 BOSTON, MA 02116  
 PHONE: 617-242-1120  
 •PLANNING •ENGINEERING •PERMITTING •MANAGEMENT

**Applicant**  
 NBPIV Constitution II, LLC

**55 Constitution Boulevard**  
 Franklin, MA



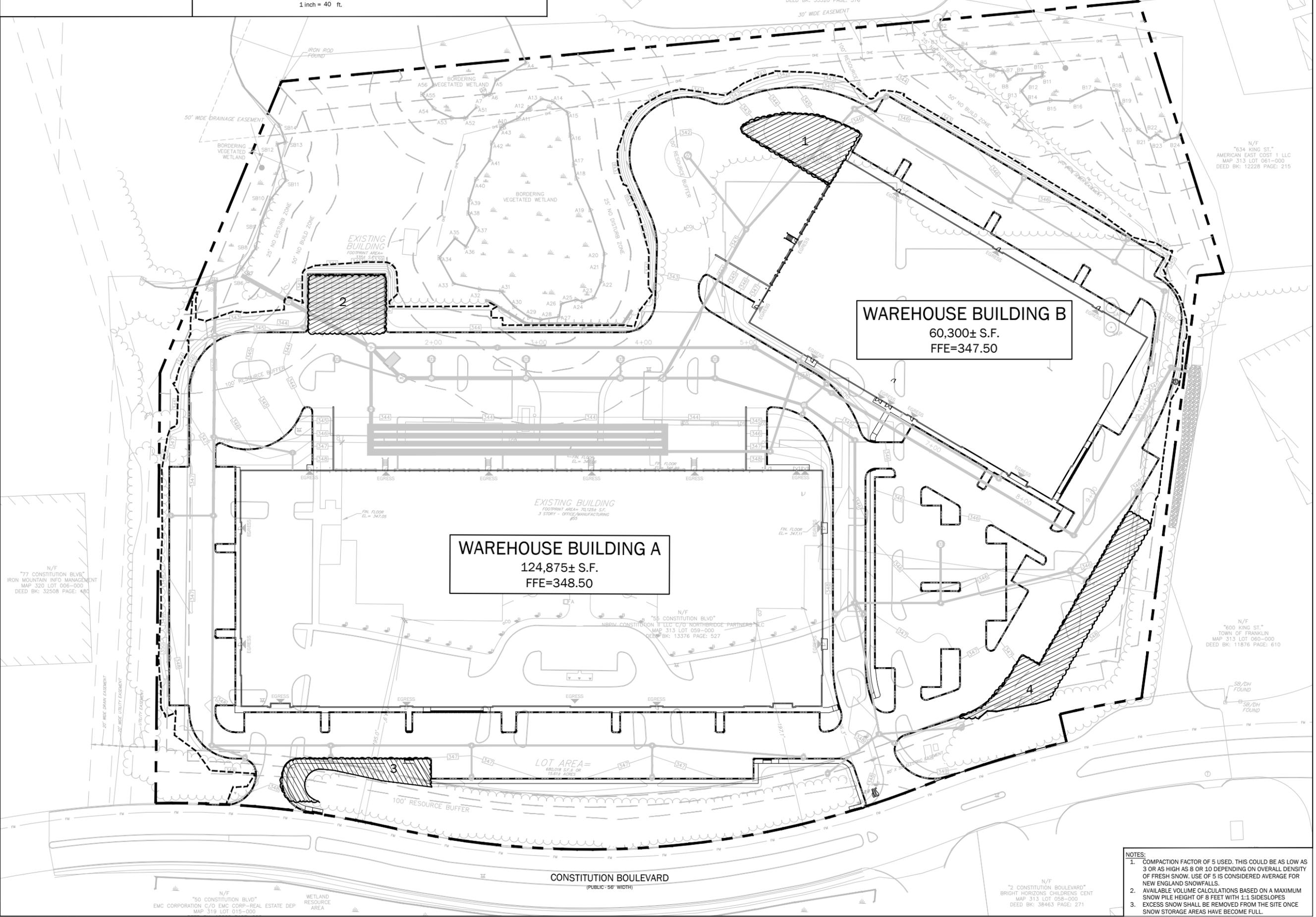
Sheet Title:  
**BMP Plan**

Sheet No:  
**C.1**  
 Date:  
 OCTOBER 10, 2024

## **Appendix B: Snow Storage Plan**

This drawing shall not be used or reproduced in any manner for any purpose without written permission from Beals Associates, Inc.

**SNOW STORAGE:**  
SNOW STORAGE AREAS SHOWN ON THIS PLAN SHALL BE UTILIZED TO THE EXTENT THAT BUILDING OPERATIONS FOR PARKING AND LOADING ARE NOT IMPACTED. IN THE EVENT THAT SNOW STOCKPILING IMPACTS PARKING AND LOADING OPERATIONS, SNOW SHALL BE REMOVED FROM THE PROPERTY WITHIN FIVE DAYS OF THE SNOW EVENT.



**WAREHOUSE BUILDING A**  
124,875± S.F.  
FFE=348.50

**WAREHOUSE BUILDING B**  
60,300± S.F.  
FFE=347.50

- NOTES:**
1. COMPACTION FACTOR OF 5 USED. THIS COULD BE AS LOW AS 3 OR AS HIGH AS 8 OR 10 DEPENDING ON OVERALL DENSITY OF FRESH SNOW. USE OF 5 IS CONSIDERED AVERAGE FOR NEW ENGLAND SNOWFALLS.
  2. AVAILABLE VOLUME CALCULATIONS BASED ON A MAXIMUM SNOW PILE HEIGHT OF 8 FEET WITH 1:1 SIDESLOPES.
  3. EXCESS SNOW SHALL BE REMOVED FROM THE SITE ONCE SNOW STORAGE AREAS HAVE BECOME FULL.

**BEALS ASSOCIATES, INC.**  
2 PARK PLAZA SUITE 200 BOSTON, MA 02116  
PHONE: 617-252-1120  
FAX: 617-252-1121  
PLANNING - ENGINEERING - PERMITTING - MANAGEMENT

**Owner/Applicant**  
NBPIV Constitution II LLC  
401 Edgewater Place, Suite 205  
Woburn, MA 01880

**NORTHBRIDGE**

**55 Constitution Boulevard**  
Franklin, MA

No.	Reason	Date

Not for Construction  
**Permit Documents**

Designed by: MAM    Checked by: DPH  
Proj. No.: C-1381    Issue Date: 10.17.24  
Drawing Scale: 1"=40'

Sheet Title  
**SNOW STORAGE PLAN**

Sheet Number  
**C123**

Copyright © Beals Associates, Inc. - All Rights Reserved

Not for Construction

## **Appendix C: Stormwater Management System Maintenance Program Summary Checklist**

Stormwater Management System Maintenance Program Summary Checklist						
Item	Commentary	Frequency				
		Weekly	Monthly	Quarterly	Semi-Annually	Annually
Trash Inspection	Ensure receptacles are empty and operable; remove and pick up litter from ground surfaces and fence-line	X				
Catch Basins and Manholes	Inspect for sediment quarterly; inspect at tend of foliage and at end of snowmelt; remove upon accumulation			January April July October		
Water Quality Units	Inspect monthly for first six months; inspect for sediment accumulation quarterly thereafter; inspect immediately after spills		*For 1 <sup>st</sup> 6 months	January April July October		
Outlet Control Structures	Inspect and remove sediment and debris each month.		X			
Proprietary Media Filter	Inspect monthly for first year; inspect for sediment accumulation quarterly thereafter; inspect immediately after spills		*For 1 <sup>st</sup> year	January April July October		
Flared End Sections	Inspected annually to ensure that no debris or sediment is causing obstructions					April
Subsurface Infiltration Systems – Stormtech Chambers	Inspect for accumulated sediment immediately after construction; inspect semi-annually thereafter until an understanding of the site’s characteristics is developed Service Life= > 50 years				April October	

Stormwater Management System Maintenance Program Summary Checklist						
Item	Commentary	Frequency				
		Weekly	Monthly	Quarterly	Semi-Annually	Annually
Subsurface Detention System – ADS LandMax	Inspect for accumulated sediment immediately after construction; inspect annually thereafter until an understanding of the site’s characteristics is developed Service Life= > 50 years					April
Parking Lot Sweeping	Sweep to remove small debris and sediments; large debris shall be removed by hand prior to sweeping actions.	X				
Maintenance of Lawns and other landscaped areas	Mow grass as needed and maintain in good working order. Seed as needed. See sections above for mowing requirements specifically for the pollinator meadow.		X			
Winter Maintenance	Ensure structures are not blocked by ice, snow, debris or trash during winter months.		December January February March			

**Appendix D: Stormwater Management System Operation and Maintenance  
Forms**

























## **Appendix E: Staff Training**

Name	Describe Training	Date Training Completed

**Appendix F: ADS Stormtech SC-740 Units Design Manual -  
Inspection and Maintenance**

## 12.0 Inspection and Maintenance

### 12.1 Isolator Row Plus Inspection

Regular inspection and maintenance are essential to assure a properly functioning stormwater system. Inspection is easily accomplished through the manhole or optional inspection ports of an Isolator Row PLUS. Please follow local and OSHA rules for a confined space entry.

Inspection ports can allow inspection to be accomplished completely from the surface without the need for a confined space entry. Inspection ports provide visual access to the system with the use of a flashlight. A stadia rod may be inserted to determine the depth of sediment. If upon visual inspection it is found that sediment has accumulated to an average depth exceeding 3" (75 mm), cleanout is required.

A StormTech Isolator Row PLUS should initially be inspected immediately after completion of the site's construction. While every effort should be made to prevent sediment from entering the system during construction, it is during this time that excess amounts of sediments are most likely to enter any stormwater system. Inspection and maintenance, if necessary, should be performed prior to passing responsibility over to the site's owner. Once in normal service, a StormTech Isolator Row PLUS should be inspected bi-annually until an understanding of the sites characteristics is developed. The site's maintenance manager can then revise the inspection schedule based on experience or local requirements.

### 12.2 Isolator Row Plus Maintenance

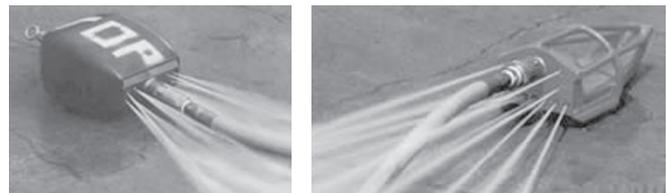
JetVac maintenance is recommended if sediment has been collected to an average depth of 3" (75 mm) inside the Isolator Row PLUS. More frequent maintenance may be required to maintain minimum flow rates through the Isolator Row PLUS. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row PLUS while scouring and suspending sediments. As the nozzle is retrieved, a wave of suspended sediments is flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/ JetVac combination vehicles. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" (1125 mm) are best. StormTech recommends a maximum nozzle pressure of 2000 psi be utilized during cleaning. The JetVac process shall only be performed on StormTech Rows that have ADS PLUS fabric over the foundation stone.



Looking down the Isolator Row PLUS



A typical JetVac truck (This is not a StormTech product.)



Examples of culvert cleaning nozzles appropriate for Isolator Row PLUS maintenance. (These are not StormTech products).

# 12.0 Inspection & Maintenance

## StormTech Isolator Row Plus - Step-by-Step Maintenance Procedures

**Step 1:** Inspect Isolator Row PLUS for sediment

- A) Inspection ports (if present)
  - i. Remove lid from floor box frame
  - ii. Remove cap from inspection riser
  - iii. Using a flashlight and stadia rod, measure depth of sediment
  - iv. If sediment is at, or above, 3" (76 mm) depth proceed to Step 2. If not proceed to Step 3.
- B) All Isolator Plus Rows
  - i. Remove cover from manhole at upstream end of Isolator Row PLUS
  - ii. Using a flashlight, inspect down Isolator Row PLUS through outlet pipe
    - 1. Follow OSHA regulations for confined space entry if entering manhole
    - 2. Mirrors on poles or cameras may be used to avoid a confined space entry
  - iii. If sediment is at or above the lower row of sidewall holes [approximately 3" (76 mm)] proceed to Step 2. If not proceed to Step 3.

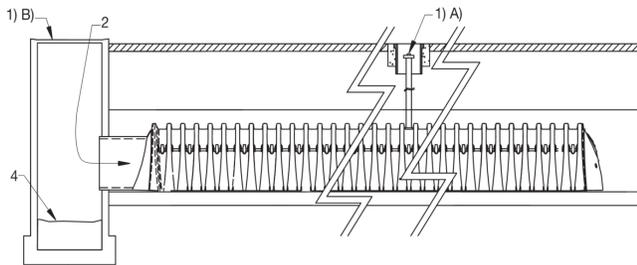
**Step 2:** Clean out Isolator Row PLUS using the JetVac process

- A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45" (1125 mm) or more is preferable
- B) Apply multiple passes of JetVac until backflush water is clean
- C) Vacuum manhole sump as required during jetting

**Step 3:** Replace all caps, lids and covers

**Step 4:** Inspect and clean catch basins and manholes upstream of the StormTech system following local guidelines.

**Figure 18 - StormTech Isolator Row Plus (not to scale)**



## 12.3 Eccentric Pipe Header Inspection

These guidelines do not supercede a pipe manufacturer's recommended I&M procedures. Consult with the manufacturer of the pipe header system for specific I&M procedures. Inspection of the header system should be carried out quarterly. On sites which generate higher levels of sediment more frequent inspections may be necessary. Headers may be accessed through risers, access ports or manholes. Measurement of sediment may be taken with a stadia rod or similar device. Cleanout of sediment should occur when the sediment volume has reduced the storage area by 25% or the depth of sediment has reached approximately 25% of the diameter of the structure.

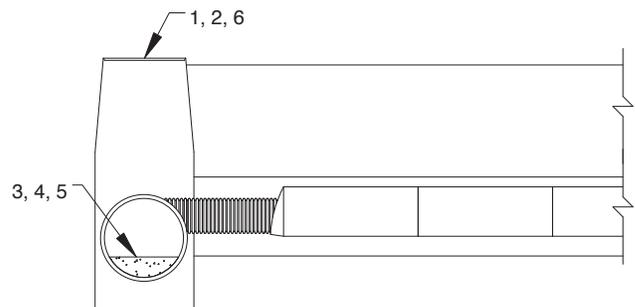
## 12.4 Eccentric Pipe Manifold Maintenance

Cleanout of accumulated material should be accomplished by vacuum pumping the material from the header. Cleanout should be accomplished during dry weather. Care should be taken to avoid flushing sediments out through the outlet pipes and into the chamber rows.

## Eccentric Header Step-by-Step Maintenance Procedures

1. Locate manholes connected to the manifold system
2. Remove grates or covers
3. Using a stadia rod, measure the depth of sediment
4. If sediment is at a depth of about 25% pipe volume or 25% pipe diameter proceed to step 5. If not proceed to step 6.
5. Vacuum pump the sediment. Do not flush sediment out inlet pipes.
6. Replace grates and covers
7. Record depth and date and schedule next inspection

**Figure 19 - Eccentric Manifold Maintenance**



Please contact StormTech's Technical Services Department at 888-892-2894 for a spreadsheet to estimate cleaning intervals.

**Appendix G: ADS LandMax Stormwater Management System  
Manual - Inspection and Maintenance**

# Technical Note

## TN 6.01 Retention/Detention System Maintenance

*This document is provided for informational purposes only and is meant only to be a guide. Individuals using this information should make their own decisions as to suitability of this guideline for their individual projects and adjust accordingly.*

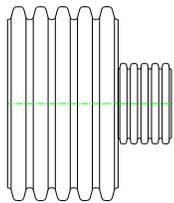
### Introduction

A retention/detention system is comprised of a series of pipes and fittings that form an underground storage area, which retains or detains storm water runoff from a given area. As sediment and debris settle out of the detained stormwater, build up occurs that requires the system to be regularly inspected and cleaned in order for the system to perform as originally designed. The following provides the available fittings and guidelines for inspection and maintenance of an HDPE underground storage system.

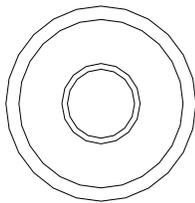
### System Accessories and Fittings

#### Concentric Reducers

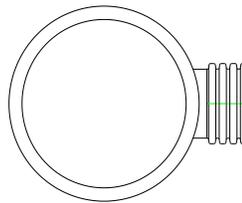
Concentric Reducers are fittings that transition between two pipes, either in line with one another or at perpendicular angles. The centerlines of the two pipes are at the same elevation. When a concentric reducer is used to connect the manifold pipe to the lateral pipes, most debris will be trapped in the manifold pipe.



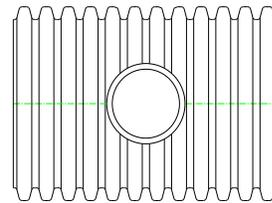
SIDE VIEW



SECTION VIEW



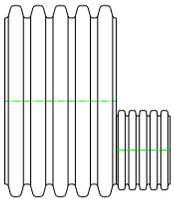
SIDE VIEW



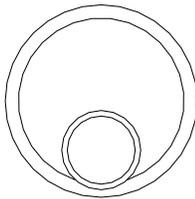
SECTION VIEW

#### Eccentric Reducers

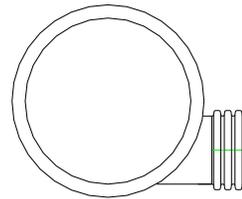
Eccentric Reducers are fittings that transition between two pipes, either in line with one another or at perpendicular angles. The inverts of the two pipes are at the same elevations. When an eccentric reducer is used to connect the manifold pipe to the lateral pipes, most debris will follow the flow of the storm water into the lateral pipes.



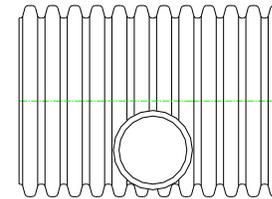
SIDE VIEW



SECTION VIEW



SIDE VIEW



SECTION VIEW

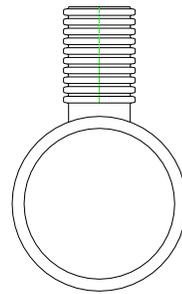
## Riser

Each retention/detention system typically has risers strategically placed for maintenance and inspection of the system. These risers are typically 24" in diameter or larger and are placed on the manifold fittings.

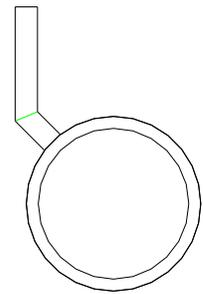
## Cleanouts

Cleanout ports are usually 4-, 6-, or 8-in diameter pipe and are placed on the manifold fittings. They are used for entrance of a pipe from a vacuum truck or a water-jetting device.

For a complete listing of available fittings and components please refer to the *ADS Fittings Manual*.



RISER  
CROSS-SECTION VIEW



CLEANOUT  
CROSS-SECTION VIEW

## Maintenance Overview of a Retention/Detention System

Maintaining a clean and obstruction-free retention/detention system helps to ensure the system performs the intended function of the primary design. Build up of debris may obstruct flow through the laterals in a retention system or block the entranceway of the outlet pipe in a detention system. This may result in ineffective operation or complete failure of the system. Additionally, surrounding areas may potentially run the risk of damage due to flooding or other similar issues.

### Inspection/Maintenance Frequency

All retention/detention systems must be cleaned and maintained. Underground systems may be maintained more cost effectively if these simple guidelines are followed. Inspection should be performed at a minimum of once per year. Cleaning should be done at the discretion of individuals responsible to maintain proper storage and flow. While maintenance can generally be performed year round, it should be scheduled during a relatively dry season.

### Pre-Inspection

A post-installation inspection should be performed to allow the owner to measure the invert prior to accumulation of sediment. This survey will allow the monitoring of sediment build-up without requiring access to the retention/detention system.

The following is the recommended procedure for pre-inspections:

- 1) Locate the riser section or cleanouts of the retention/detention system. The riser will typically be 24" in diameter or larger and the cleanouts are usually 4", 6" or 8" in diameter.
- 2) Remove the lid of the riser or clean outs.
- 3) Insert a measuring device into the opening and make note to a point of reference on the stick or string. (This is done so that sediment build up can be determined in the future without having to enter the system.)

### Inspection/Maintenance

A retention/detention system should be inspected at a minimum of one time a year or after major rain events if necessary.

The following is the recommended procedure to inspect system in service:

- 1) Locate the riser section of the retention/detention system. The riser will typically be 24" in diameter or larger.
- 2) Remove the lid from the riser.
- 3) Measure the sediment buildup at each riser and cleanout location. Only certified confined space entry personnel having appropriate equipment should be permitted to enter the retention/detention System.
- 4) Inspect each manifold, all laterals, and outlet pipes for sediment build up, obstructions, or other problems. Obstructions should be removed at this time.
- 5) If measured sediment build up is between 5% - 20% of the pipe diameter, cleaning should be considered; if sediment build up exceeds 20%, cleaning should be performed at the earliest opportunity. A thorough cleaning of the system (manifolds and laterals) shall be performed by either manual methods or by a vacuum truck.



## **Appendix H: Contech – Jellyfish Filter – Operation & Maintenance Manual**

## Jellyfish<sup>®</sup> Filter Maintenance Guide





## **JELLYFISH® FILTER INSPECTION & MAINTENANCE GUIDE**

Jellyfish units are often just one of many structures in a more comprehensive stormwater drainage and treatment system.

In order for maintenance of the Jellyfish filter to be successful, it is imperative that all other components be properly maintained. The maintenance and repair of upstream facilities should be carried out prior to Jellyfish maintenance activities.

In addition to considering upstream facilities, it is also important to correct any problems identified in the drainage area. Drainage area concerns may include: erosion problems, heavy oil loading, and discharges of inappropriate materials.

### **TABLE OF CONTENTS**

Inspection and Maintenance Overview .....	3
Inspection Procedure.....	3
Maintenance Procedure.....	4
Cartridge Assembly & Cleaning.....	5
Inspection Process .....	7

## 1.0 Inspection and Maintenance Overview

The primary purpose of the Jellyfish® Filter is to capture and remove pollutants from stormwater runoff. As with any filtration system, these pollutants must be removed to maintain the filter's maximum treatment performance. Regular inspection and maintenance are required to insure proper functioning of the system.

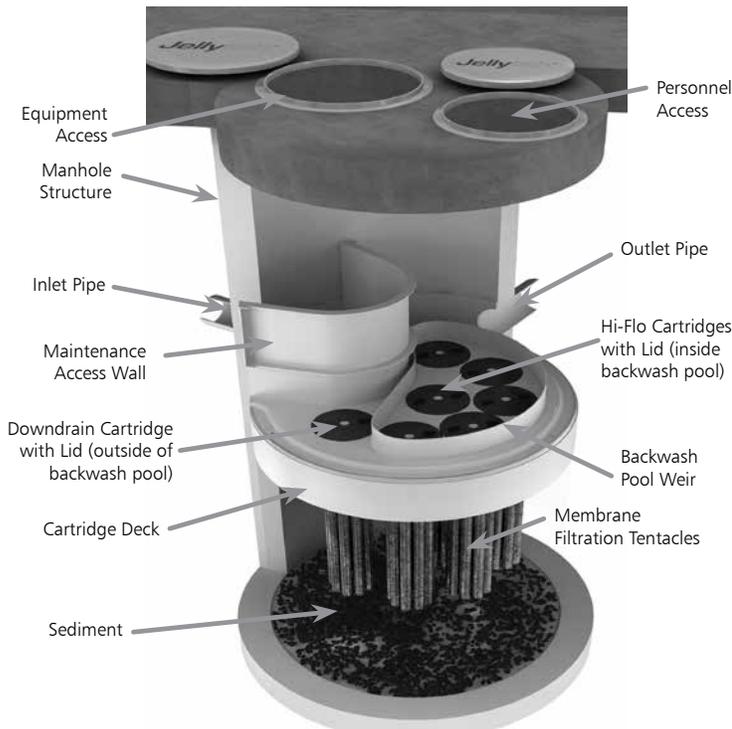
Maintenance frequencies and requirements are site specific and vary depending on pollutant loading. Additional maintenance activities may be required in the event of non-storm event runoff, such as base-flow or seasonal flow, an upstream chemical spill or due to excessive sediment loading from site erosion or extreme runoff events. It is a good practice to inspect the system after major storm events.

Inspection activities are typically conducted from surface observations and include:

- Observe if standing water is present
- Observe if there is any physical damage to the deck or cartridge lids
- Observe the amount of debris in the Maintenance Access Wall (MAW) or inlet bay for vault systems

Maintenance activities include:

- Removal of oil, floatable trash and debris
- Removal of collected sediments
- Rinsing and re-installing the filter cartridges
- Replace filter cartridge tentacles, as needed



Note: Separator Skirt not shown

## 2.0 Inspection Timing

Inspection of the Jellyfish Filter is key in determining the maintenance requirements for, and to develop a history of, the site's pollutant loading characteristics. In general, inspections should be performed at the times indicated below; *or per the approved project stormwater quality documents (if applicable), whichever is more frequent.*

1. A minimum of quarterly inspections during the first year of operation to assess the sediment and floatable pollutant accumulation, and to ensure proper functioning of the system.
2. Inspection frequency in subsequent years is based on the inspection and maintenance plan developed in the first year of operation. Minimum frequency should be once per year.
3. Inspection is recommended after each major storm event.
4. Inspection is required immediately after an upstream oil, fuel or other chemical spill.

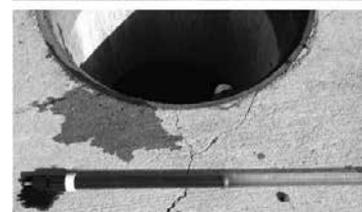
## 3.0 Inspection Procedure

The following procedure is recommended when performing inspections:

1. Provide traffic control measures as necessary.
2. Inspect the MAW or inlet bay for floatable pollutants such as trash, debris, and oil sheen.
3. Measure oil and sediment depth in several locations, by lowering a sediment probe until contact is made with the floor of the structure. Record sediment depth, and presences of any oil layers.
4. Inspect cartridge lids. Missing or damaged cartridge lids to be replaced.
5. Inspect the MAW (where appropriate), cartridge deck and receptacles, and backwash pool weir, for damaged or broken components.

### 3.1 Dry weather inspections

- Inspect the cartridge deck for standing water, and/or sediment on the deck.
- No standing water under normal operating conditions.
- Standing water inside the backwash pool, but not outside the backwash pool indicates, that the filter cartridges need to be rinsed.



Inspection Utilizing Sediment Probe

- Standing water outside the backwash pool is not anticipated and may indicate a backwater condition caused by high water elevation in the receiving water body, or possibly a blockage in downstream infrastructure.
- Any appreciable sediment ( $\geq 1/16''$ ) accumulated on the deck surface should be removed.

### 3.2 Wet weather inspections

- Observe the rate and movement of water in the unit. Note the depth of water above deck elevation within the MAW or inlet bay.
- Less than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges (i.e. cartridges located outside the backwash pool).
- Greater than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges and each of the hi-flo cartridges (i.e. cartridges located inside the backwash pool), and water should be overflowing the backwash pool weir.
- 18 inches or greater and relatively little flow is exiting the cartridge lids and outlet pipe, this condition indicates that the filter cartridges need to be rinsed.

## 4.0 Maintenance Requirements

Required maintenance for the Jellyfish Filter is based upon results of the most recent inspection, historical maintenance records, or the site specific water quality management plan; whichever is more frequent. In general, maintenance requires some combination of the following:

1. Sediment removal for depths reaching 12 inches or greater, or within 3 years of the most recent sediment cleaning, whichever occurs sooner.
2. Floatable trash, debris, and oil removal.
3. Deck cleaned and free from sediment.
4. Filter cartridges rinsed and re-installed as required by the most recent inspection results, or within 12 months of the most recent filter rinsing, whichever occurs sooner.
5. Replace tentacles if rinsing does not restore adequate hydraulic capacity, remove accumulated sediment, or if damaged or missing. It is recommended that tentacles should remain in service no longer than 5 years before replacement.
6. Damaged or missing cartridge deck components must be repaired or replaced as indicated by results of the most recent inspection.
7. The unit must be cleaned out and filter cartridges inspected immediately after an upstream oil, fuel, or chemical spill. Filter cartridge tentacles should be replaced if damaged or compromised by the spill.

## 5.0 Maintenance Procedure

The following procedures are recommended when maintaining the Jellyfish Filter:

1. Provide traffic control measures as necessary.
2. Open all covers and hatches. Use ventilation equipment as required, according to confined space entry procedures.  
**Caution: Dropping objects onto the cartridge deck may cause damage.**

3. Perform Inspection Procedure prior to maintenance activity.
4. To access the cartridge deck for filter cartridge service, descend into the structure and step directly onto the deck. Caution: Do not step onto the maintenance access wall (MAW) or backwash pool weir, as damage may result. Note that the cartridge deck may be slippery.
5. Maximum weight of maintenance crew and equipment on the cartridge deck not to exceed 450 lbs.

### 5.1 Filter Cartridge Removal

1. Remove a cartridge lid.
2. Remove cartridges from the deck using the lifting loops in the cartridge head plate. Rope or a lifting device (available from Contech) should be used. **Caution: Should a snag occur, do not force the cartridge upward as damage to the tentacles may result. Wet cartridges typically weigh between 100 and 125 lbs.**
3. Replace and secure the cartridge lid on the exposed empty receptacle as a safety precaution. Contech does not recommend exposing more than one empty cartridge receptacle at a time.

### 5.2 Filter Cartridge Rinsing

1. Remove all 11 tentacles from the cartridge head plate. Take care not to lose or damage the O-ring seal as well as the plastic threaded nut and connector.



Cartridge Removal & Lifting Device



2. Position tentacles in a container (or over the MAW), with the threaded connector (open end) facing down, so rinse water is flushed through the membrane and captured in the container.
3. Using the Jellyfish rinse tool (available from Contech) or a low-pressure garden hose sprayer, direct water spray onto the tentacle membrane, sweeping from top to bottom along the length of the tentacle. Rinse until all sediment is removed from the membrane. **Caution: Do not use a high pressure sprayer or focused stream of water on the membrane. Excessive water pressure may damage the membrane.**

4. Collected rinse water is typically removed by vacuum hose.
5. Reassemble cartridges as detailed later in this document. Reuse O-rings and nuts, ensuring proper placement on each tentacle.

### 5.3 Sediment and Floatables Extraction

1. Perform vacuum cleaning of the Jellyfish Filter only after filter cartridges have been removed from the system. Access the lower chamber for vacuum cleaning only through the maintenance access wall (MAW) opening. Be careful not to damage the flexible plastic separator skirt that is attached to the underside of the deck on manhole systems. Do not lower the vacuum wand through a cartridge receptacle, as damage to the receptacle will result.
2. Vacuum floatable trash, debris, and oil, from the MAW opening or inlet bay. Alternatively, floatable solids may be removed by a net or skimmer.



Vacuuming Sump Through MAW

3. Pressure wash cartridge deck and receptacles to remove all sediment and debris. Sediment should be rinsed into the sump area. Take care not to flush rinse water into the outlet pipe.
4. Remove water from the sump area. Vacuum or pump equipment should only be introduced through the MAW or inlet bay.
5. Remove the sediment from the bottom of the unit through the MAW or inlet bay opening.



Vacuuming Sump Through MAW

6. For larger diameter Jellyfish Filter manholes ( $\geq 8$ -ft) and some vaults complete sediment removal may be facilitated by removing a cartridge lid from an empty receptacle and inserting a jetting wand (not a vacuum wand) through the receptacle. Use the sprayer to rinse loosened sediment toward the vacuum hose in the MAW opening, being careful not to damage the receptacle.

### 5.4 Filter Cartridge Reinstallation and Replacement

1. Cartridges should be installed after the deck has been cleaned. It is important that the receptacle surfaces be free from grit and debris.
2. Remove cartridge lid from deck and carefully lower the filter cartridge into the receptacle until head plate gasket is seated squarely in receptacle. **Caution: Do not force the cartridge downward; damage may occur.**
3. Replace the cartridge lid and check to see that both male threads are properly seated before rotating approximately 1/3 of a full rotation until firmly seated. Use of an approved rim gasket lubricant may facilitate installation. See next page for additional details.
4. If rinsing is ineffective in removing sediment from the tentacles, or if tentacles are damaged, provisions must be made to replace the spent or damaged tentacles with new tentacles. Contact Contech to order replacement tentacles.

### 5.5 Chemical Spills

**Caution: If a chemical spill has been captured, do not attempt maintenance. Immediately contact the local hazard response agency and contact Contech.**

### 5.6 Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads. Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

# Jellyfish Filter Components & Filter Cartridge Assembly and Installation

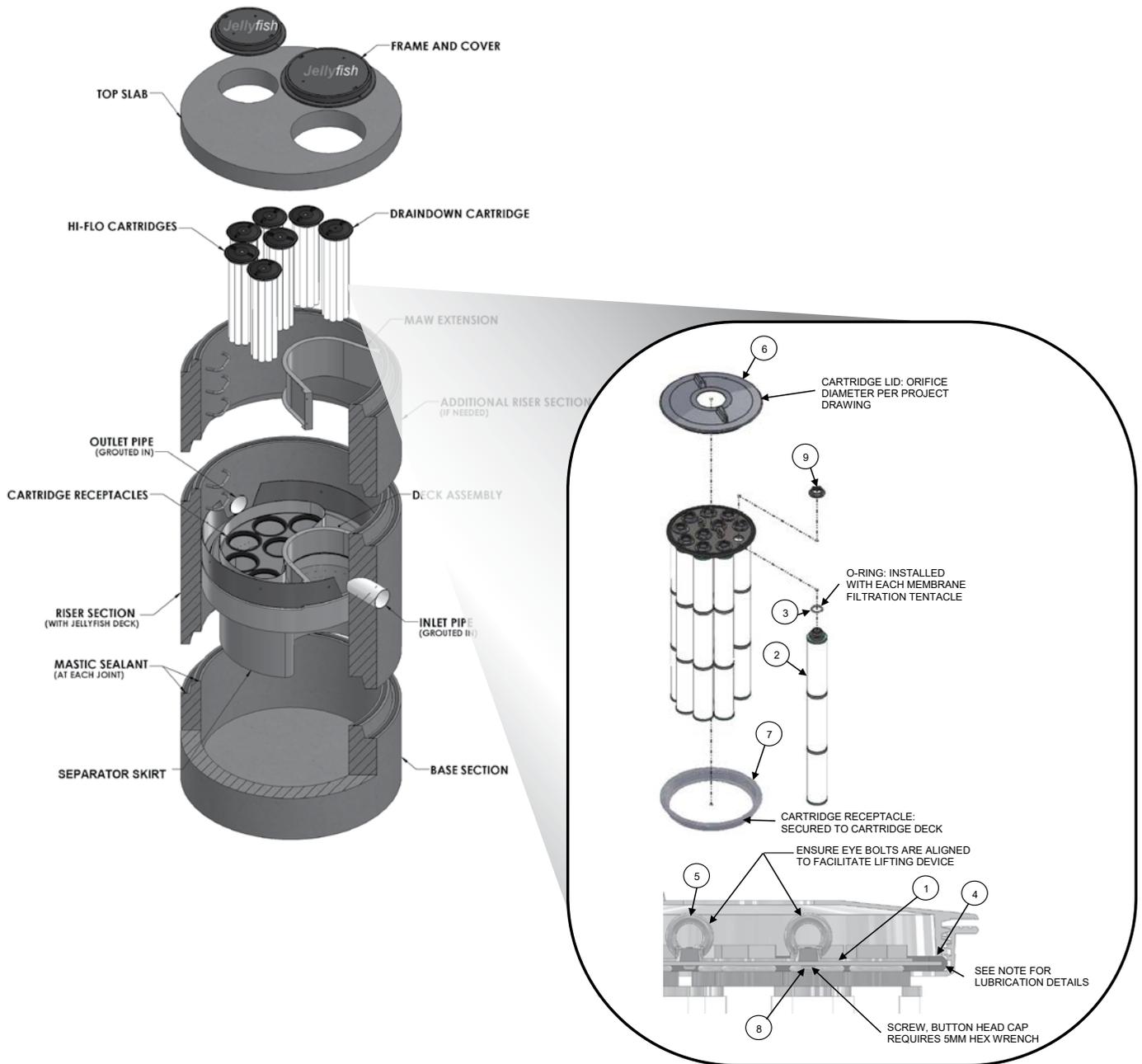


TABLE 1: BOM

ITEM NO.	DESCRIPTION
1	JF HEAD PLATE
2	JF TENTACLE
3	JF O-RING
4	JF HEAD PLATE GASKET
5	JF CARTRIDGE EYELET
6	JF 14IN COVER
7	JF RECEPTACLE
8	BUTTON HEAD CAP SCREW M6X14MM SS
9	JF CARTRIDGE NUT

TABLE 2: APPROVED GASKET LUBRICANTS

PART NO.	MFR	DESCRIPTION
78713	LA-CO	LUBRI-JOINT
40501	HERCULES	DUCK BUTTER
30600	OATEY	PIPE LUBRICANT
PSLUBXL1Q	PROSELECT	PIPE JOINT LUBRICANT

## NOTES:

### Head Plate Gasket Installation:

Install Head Plate Gasket (Item 4) onto the Head Plate (Item 1) and liberally apply a lubricant from Table 2: Approved Gasket Lubricants onto the gasket where it contacts the Receptacle (Item 7) and Cartridge Lid (Item 6). Follow Lubricant manufacturer's instructions.

### Lid Assembly:

Rotate Cartridge Lid counter-clockwise until both male threads drop down and properly seat. Then rotate Cartridge Lid clockwise approximately one-third of a full rotation until Cartridge Lid is firmly secured, creating a watertight seal.

## Jellyfish Filter Inspection and Maintenance Log

Owner:		Jellyfish Model No:	
Location:		GPS Coordinates:	
Land Use:	Commercial:	Industrial:	Service Station:
	Roadway/Highway:	Airport:	Residential:

Date/Time:						
Inspector:						
Maintenance Contractor:						
Visible Oil Present: (Y/N)						
Oil Quantity Removed:						
Floatable Debris Present: (Y/N)						
Floatable Debris Removed: (Y/N)						
Water Depth in Backwash Pool						
Draindown Cartridges externally rinsed and recommissioned: (Y/N)						
New tentacles put on Draindown Cartridges: (Y/N)						
Hi-Flo Cartridges externally rinsed and recommissioned: (Y/N)						
New tentacles put on Hi-Flo Cartridges: (Y/N)						
Sediment Depth Measured: (Y/N)						
Sediment Depth (inches or mm):						
Sediment Removed: (Y/N)						
Cartridge Lids intact: (Y/N)						
Observed Damage:						
Comments:						



#### Support

- Drawings and specifications are available at [www.conteches.com/jellyfish](http://www.conteches.com/jellyfish).
- Site-specific design support is available from Contech Engineered Solutions.
- Find a Certified Maintenance Provider at [www.conteches.com/ccmp](http://www.conteches.com/ccmp)

**Jellyfish**<sup>®</sup>

**CONTECH**<sup>®</sup>  
ENGINEERED SOLUTIONS

800.338.1122

[www.ContechES.com](http://www.ContechES.com)

© 2021 Contech Engineered Solutions LLC, a QUIKRETE Company

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, wastewater treatment and earth stabilization products. For information on other Contech segment offerings, visit [ContechES.com](http://ContechES.com) or call 800.338.1122

NOTHING IN THIS CATALOG SHOULD BE CONSTRUED AS A WARRANTY. APPLICATIONS SUGGESTED HEREIN ARE DESCRIBED ONLY TO HELP READERS MAKE THEIR OWN EVALUATIONS AND DECISIONS, AND ARE NEITHER GUARANTEES NOR WARRANTIES OF SUITABILITY FOR ANY APPLICATION. CONTECH MAKES NO WARRANTY WHATSOEVER, EXPRESS OR IMPLIED, RELATED TO THE APPLICATIONS, MATERIALS, COATINGS, OR PRODUCTS DISCUSSED HEREIN. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND ALL IMPLIED WARRANTIES OF FITNESS FOR ANY PARTICULAR PURPOSE ARE DISCLAIMED BY CONTECH. SEE CONTECH'S CONDITIONS OF SALE (AVAILABLE AT [WWW.CONTECHES.COM/COS](http://WWW.CONTECHES.COM/COS)) FOR MORE INFORMATION.

## **Appendix I: Contech – Cascade & CDS® Inspection and Maintenance Guide**

## CDS<sup>®</sup> Inspection and Maintenance Guide

---



## Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

## Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allow both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine whether the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

## Cleaning

Cleaning of a CDS system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.



CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y <sup>3</sup>	m <sup>3</sup>
CDS1515	3	0.9	3.0	0.9	0.5	0.4
CDS2015	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.3	3.0	0.9	1.3	1.0
CDS2020	5	1.3	3.5	1.1	1.3	1.0
CDS2025	5	1.3	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3025	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities



**Support**

- Drawings and specifications are available at [www.contechstormwater.com](http://www.contechstormwater.com).
- Site-specific design support is available from our engineers.

©2017 Contech Engineered Solutions LLC, a QUIKRETE Company

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, earth stabilization and wastewater treatment products. For information, visit [www.ContechES.com](http://www.ContechES.com) or call 800.338.1122

NOTHING IN THIS CATALOG SHOULD BE CONSTRUED AS AN EXPRESSED WARRANTY OR AN IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. SEE THE CONTECH STANDARD CONDITION OF SALES (VIEWABLE AT [WWW.CONTECHES.COM/COS](http://WWW.CONTECHES.COM/COS)) FOR MORE INFORMATION.

The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; 7,517,450 related foreign patents or other patents pending.



## Cascade Separator<sup>®</sup> Inspection and Maintenance Guide



## Maintenance

The Cascade Separator® system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects sediment and debris will depend upon on-site activities and site pollutant characteristics. For example, unstable soils or heavy winter sanding will cause the sediment storage sump to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

## Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall). However, more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment wash-down areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

A visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet chamber, flumes or outlet channel. The inspection should also quantify the accumulation of hydrocarbons, trash and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided in this Inspection and Maintenance Guide.

Access to the Cascade Separator unit is typically achieved through one manhole access cover. The opening allows for inspection and cleanout of the center chamber (cylinder) and sediment storage sump, as well as inspection of the inlet chamber and slanted skirt. For large units, multiple manhole covers allow access to the chambers and sump.

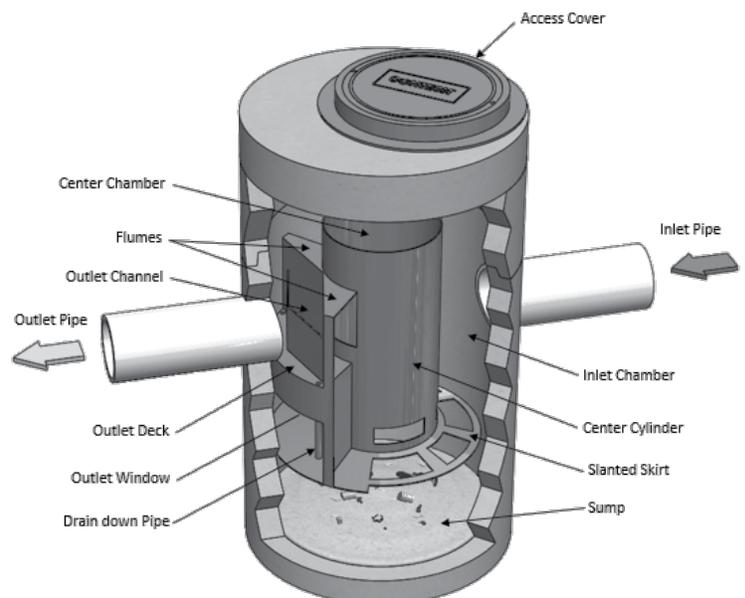
The Cascade Separator system should be cleaned before the level of sediment in the sump reaches the maximum sediment depth and/or when an appreciable level of hydrocarbons and trash has accumulated. If sorbent material is used, it must be replaced when significant discoloration has occurred. Performance may be impacted when maximum sediment storage capacity is exceeded. Contech recommends maintaining the system when sediment level reaches 50% of maximum storage volume. The level of sediment is easily determined by measuring the distance from the system outlet invert (standing water level) to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the chart in this document to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the maximum sediment storage.

## Cleaning

Cleaning of a Cascade Separator system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole cover and insert the vacuum tube down through the center chamber and into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The areas outside the center chamber and the slanted skirt should also be washed off if pollutant build-up exists in these areas.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. Then the system should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and to ensure proper safety precautions. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the Cascade Separator system must be done in accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal. If any components are damaged, replacement parts can be ordered from the manufacturer.



## Cascade Separator® Maintenance Indicators and Sediment Storage Capacities

Model Number	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	y <sup>3</sup>	m <sup>3</sup>
CS-3	3	0.9	1.5	0.5	0.4	0.3
CS-4	4	1.2	2.5	0.8	0.7	0.5
CS-5	5	1.3	3	0.9	1.1	0.8
CS-6	6	1.8	3.5	1	1.6	1.2
CS-8	8	2.4	4.8	1.4	2.8	2.1
CS-10	10	3.0	6.2	1.9	4.4	3.3
CS-12	12	3.6	7.5	2.3	6.3	4.8

Note: The information in the chart is for standard units. Units may have been designed with non-standard sediment storage depth.



A Cascade Separator unit can be easily cleaned in less than 30 minutes.



A vacuum truck excavates pollutants from the systems.

