

**AGREEMENT FOR
STORM WATER SYSTEM MAINTENANCE**

This Agreement is made on March 1 2016, by Eitel Dahm Properties, LLC, a Michigan limited liability company, of 45550 Dequindre Road, Shelby Township, MI 48305 ("Developer"), and the CITY OF ROCHESTER HILLS (the "City"), whose address is 1000 Rochester Hills Drive, Rochester Hills, MI 48309.

WHEREAS, the Developer owns and proposes to develop the Property described in attached Exhibit A; and

WHEREAS, the proposed development of the Property will alter the natural flow of surface and storm water drainage; and

WHEREAS, Developer has proposed, and the City has approved, a storm water drainage and detention system (the "System") comprised of storm water detention and water quality treatment facilities and devices, storm sewer pipe, catch basins, and manholes for the Property as described and depicted in the Storm Water System Plan attached as Exhibit B; and

WHEREAS, the parties will benefit from the proper operation, use and maintenance of the System and enter into this agreement to provide for the same.

THEREFORE, the parties agree:

1. **Use of the System:**

Components of the System, including any and all water conveyance, detention and water quality treatment facilities and devices, storm sewer pipe, catch basins, and manholes shall be used solely for the purpose of conveying, detaining and treating storm and surface drainage on the property until such time as: (i) The City determines and notifies Developer or Developer's successors, grantees or assigns, in writing, that it is no longer necessary to convey, detain or treat the storm and surface drainage; and (ii) An adequate alternative for conveying, detaining and treating storm and surface drainage has been provided which is acceptable to the City and which includes the granting of any easements to the City or third parties as may be required or necessary for the alternative drainage system.

2. **Maintenance:**

A. Developer shall be responsible for the proper maintenance, repair and replacement of the System and all parties thereof as detailed in the Maintenance Plan attached as Exhibit C.

B. Proper maintenance of the System shall include, but is not limited to: (i) Removing accumulated sediment, trash and debris from the detention system and at inlet pipes; (ii) Maintaining storm sewer and structures; (iii) Controlling the effects of erosion; (iv) Inspection and cleaning of the water quality treatment device; (v) Inspection of inlet and outlet pipes for structural integrity; (vi) Inspection and cleaning of the storm sewer and catch basins upstream from the detention system; and (vii) Any other maintenance that is reasonable and necessary to facilitate and continue the proper operation and use of the System.

3. Action by City:

If, at any time, Developer or Developer's successors, grantees or assigns neglect or fail to properly maintain the System or any part thereof, the City may notify Developer or Developer's successors, grantees or assigns. The notice shall be in writing and shall list and describe maintenance deficiencies and demand that they be corrected within thirty (30) days.

The notice shall further specify a date and place for a hearing to be held at least fourteen (14) days after the date of the notice before the City Council, or such other board or official as the City Council may designate. At the hearing, the City Council (or other designated board or official) may affirm or modify the list and description of maintenance deficiencies and, for good cause shown, may extend the time for the deficiencies to be corrected.

Thereafter, if the maintenance deficiencies are not corrected within the time allowed, the City may undertake the necessary corrective actions, and the City may maintain the System for up to one (1) year. Such maintenance of the System by the City shall not be construed to be a trespass or a taking of the Property, nor shall the City's actions vest in the public any right to enter or use the Property. Thereafter, if Developer or Developer's successors, grantees or assigns do not properly maintain the System, the City may, after providing similar written notice, schedule and hold another hearing to determine whether the City should maintain the System for another year, and subject to a similar notice, hearing and determination in subsequent years.

In the event the City determines an emergency condition caused by or relating to the System threatens the public health, safety or general welfare, the City shall have the right to immediately and without notice enter the Property and undertake appropriate corrective action.

4. Charges

The City shall charge to the current owner of the Property the cost of maintenance or other corrective action undertaken by the City under this agreement, plus a ten percent (10%) administrative fee. If not timely paid, the City may place the charges on the City's tax roll, which charges shall be a lien on the real property and shall be collectable and enforceable in the same manner general property taxes are collected and enforced.

5. Notice:

Any notices required under this agreement shall be sent by certified mail to the address for each party set forth below, or to such other addresses as such party may notify the other parties in writing:

To Eitel Dahm Properties, LLC: 45550 Dequindre Road

Shelby Township, MI 48305

Attention: Eitel Dahm

To the City: City Clerk
City of Rochester Hills
1000 Rochester Hills Drive
Rochester Hills, MI 48309

6. Successors and Assigns:

This agreement shall bind and inure to the benefit of the parties and their respective successors, grantees and assigns. The benefits, burdens, rights, obligations and responsibilities hereunder shall run with the land and shall bind all current and future owners of the Property and any divisions thereof.

7. Recording of Agreement:

This agreement shall be recorded at the Oakland County Register of Deeds.

EITEL DAHM PROPERTIES, LLC
A Michigan Limited Liability Company

By: *Eitel Dahm*
Eitel Dahm, Owner

CITY OF ROCHESTER HILLS

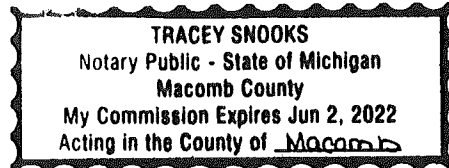
By: _____
Bryan Barnett, Mayor

By: _____
Tina Barton, Clerk

STATE OF MICHIGAN
COUNTY OF _____

This agreement was acknowledged before me on March 1, 2016, by Eitel Dahm, Owner of Eitel Dahm Properties, LLC, a Michigan Limited Liability Company, on behalf of the Company.

Tracey Snooks
_____, Notary Public
MACOMB County, Michigan
My commission expires: 6/2/2022



STATE OF MICHIGAN
COUNTY OF OAKLAND

This agreement was acknowledged before me on _____, by Bryan Barnett, Mayor, and Tina Barton, Clerk, of the City of Rochester Hills, on behalf of the City.

Drafted By:
David Hanoute
CHMP, INC.
5198 Territorial Road
Grand Blanc, MI 48439

_____, Notary Public
_____ County, Michigan

When Recorded Return to: _____ My commission expires: _____

City Clerk
City of Rochester Hills
1000 Rochester Hills Drive
Rochester Hills, MI 48309

John Staran
Approved 6/24/16

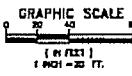
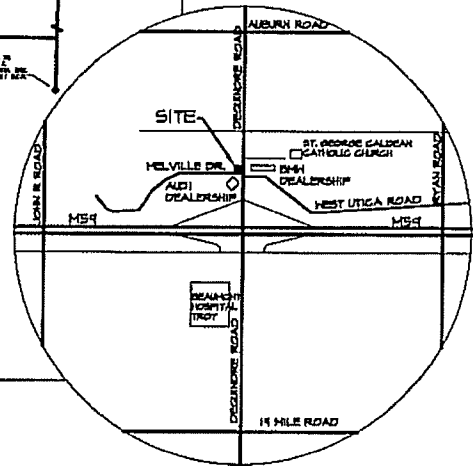
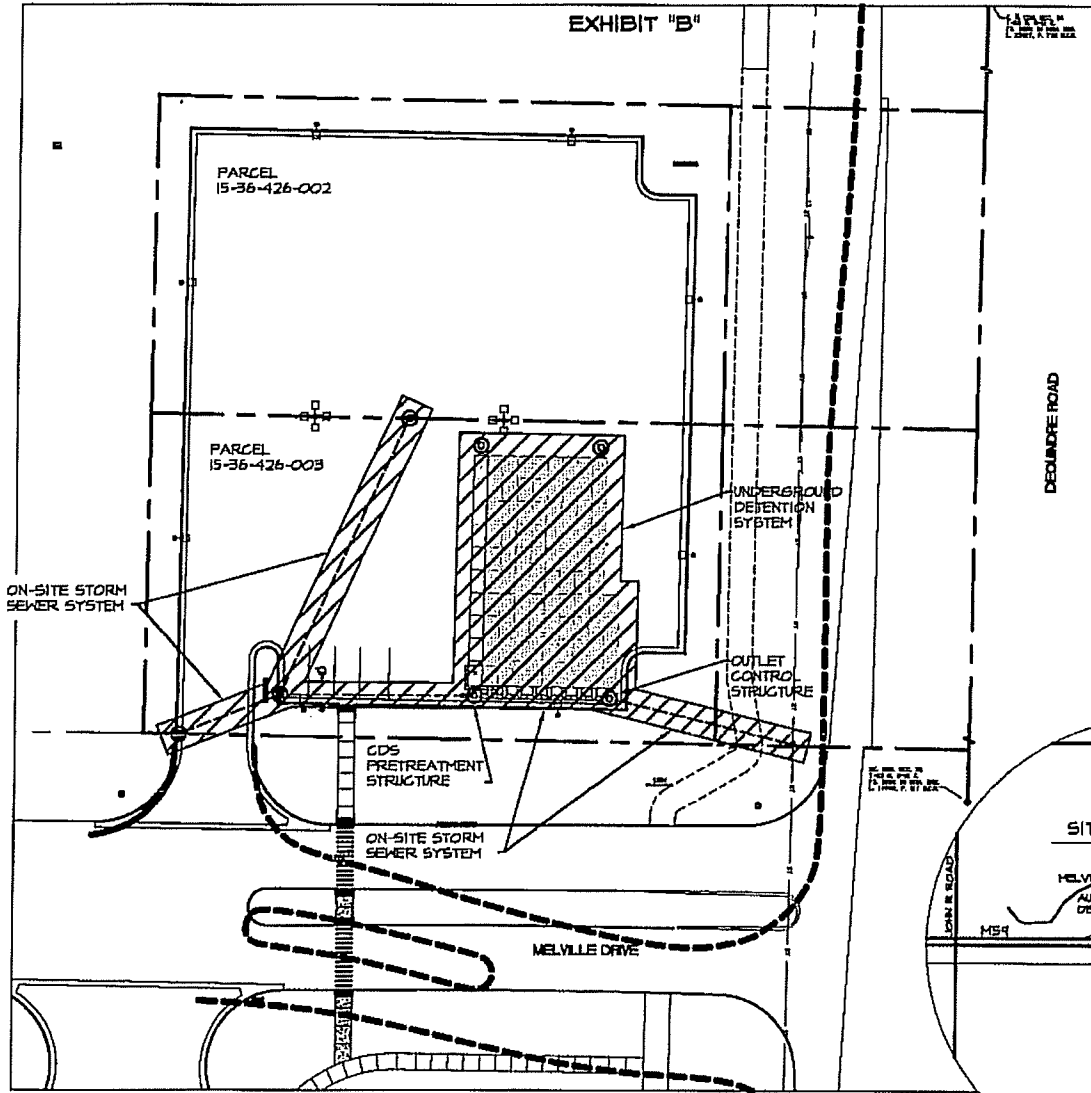
EXHIBIT A

PROPERTY DESCRIPTION Tax Parcel ID #15-36-426-011

T3N, R11E, SEC 36 PART OF SE 1/4 BEG AT PT DIST S 00-51-30 W 1118.88 FT FROM E 1/4 COR, TH S 00-51-30 W 100 FT, TH N 88-57-30 W 260 FT, TH N 00-51-30 E 100 FT, TH S 88-57-30 E 260 FT TO BEG EXC ELY 80 FT TAKEN FOR RD, ALSO BEG AT PT DIST S 00-51-30 W 1218.88 FT FROM E 1/4 COR, TH S 00-51-30 W 100 FT, TH N 88-57-30 W 260 FT, TH N 00-51-30 E 100 FT, TH S 88-57-30 E 260 FT TO BEG EXC ELY 80 FT TAKEN FOR RD 0.83 A 1-5-16 FR 002 & 003

Mike Taunt
Approved 6/27/16

EXHIBIT "B"



 ETEL DAHM PROPERTIES, LLC
STORM SEWER SYSTEM
MAINTENANCE RESPONSIBILITY

LOCATION MAP
KCA


STORM WATER SYSTEM PLAN PRE-OWNED CAR DISPLAY AUDI OF ROCHESTER HILLS 45545 & 45555 DEQUINDRE RD ROCHESTER HILLS, MI 48309	SCALE 1" = 20'	CHMP JOB NO. 14004500	 5198 TERRITORIAL RD GRAND BLANC, MI 48439 (810) 695-5910
	DATE FEB. 11, 2016	DRAWING NO. 1 OF 1	

EXHIBIT 'C'

OPERATION AND MAINTENANCE MANUAL

**PRE-OWNED CAR DISPLAY
AUDI OF ROCHESTER HILLS
STORMWATER MAINTENANCE PLAN
ROCHESTER HILLS, MICHIGAN**

**PROPERTY OWNER:
EITEL DAHM PROPERTIES, LLC
45550 DEQUINDRE ROAD
SHELBY TOWNSHIP, MI 48305
Contact: Mr. Eitel Dahm**

**Prepared by:
CHMP, INC.
5198 Territorial Road
Grand Blanc, MI 48439
Phone: (810) 695-5910
Contact: Kevin Cook, P.E.**

OPERATION AND MAINTENANCE MANUAL

INTRODUCTION:

This manual identifies the ownership, operation and maintenance responsibilities for all storm water management systems including the underground detention system, underground storm sewer system, outlet control structure, and pre-treatment device as incorporated into and detailed on the approved Construction Plans as prepared by CHMP, INC. In order to comply with the local best management practices (BMP) and requirements, this manual should serve as a minimum performance standard. This manual should be retained intact and read in its entirety by all parties responsible for the operations and maintenance of the on-site BMP's.

OWNER:

Mr. Eitel Dahm, Owner
Eitel Dahm Properties, LLC
45550 Dequindre Road
Shelby Township, MI 48305

PROPERTY INFORMATION:

This Operation and Maintenance Manual covers the storm water systems located at the following subject property:

Parcel 15-36-426-002 (45555 DEQUINDRE ROAD)

A parcel of land in the Northeast $\frac{1}{4}$ of the Southeast $\frac{1}{4}$ of section 36, Town 3 North, Range 11 East, Avon Township (now city of Rochester Hills), Oakland County, Michigan, starting at the East $\frac{1}{4}$ post; thence South 0 degrees 51 minutes 30 seconds West 1118.88 feet to the point of beginning; thence South 0 degrees 51 minutes 30 seconds West 100 feet along centerline of Dequindre Road; thence North 88 degrees 57 minutes 30 seconds West 260 feet; thence North 0 degrees 51 minutes 30 seconds East 100 feet; thence South 88 degrees 57 minutes 30 seconds East 260 feet to the point of beginning EXCEPT the Easterly 80 feet taken by the Michigan State Highway Commission as disclosed by instrument recorded in Liber 5576, page 77 Oakland County Records.

Parcel 15-36-246-003 (45545 DEQUINDRE ROAD)

Part of the Northeast $\frac{1}{4}$ of the Southeast $\frac{1}{4}$ of section 36, Town 3 North, Range 11 East, City of Rochester Hills, Oakland County, Michigan, commencing at a point which is 1218.88 feet South 00 degrees 51 minutes 30 seconds West of the East $\frac{1}{4}$ post of said Section 36 and thence extending South 00 degrees 51 minutes 30 seconds West 100.00 feet; thence North 88 degrees 57 minutes 30 seconds West 260.00 feet; thence North 00 degrees 51 minutes 30 seconds East 100.00 feet; thence South 88 degrees 57 minutes 30 seconds East 260.00 feet to the point of beginning, EXCEPT the Easterly 80 feet deeded for road purposes.

STORMWATER MAINTENANCE EXHIBIT:

Exhibit 'B' of the Storm Water Maintenance Agreement is the Storm Water System Plan which provides a clear presentation of all components of the storm water system. This system is subject to the long-term operation and maintenance responsibilities detailed in this manual. This system includes:

- Storm sewer pipes
- Storm sewer structures (manholes, inlets, catch basins, etc.)
- Underground storm detention (Chambermaxx)
- Outlet control structure
- Pre-Treatment Device (CDS unit)

INSPECTIONS;

The frequency of system inspections outlined in the manual and attached exhibits should be considered the minimum, if no events warrant additional inspections. The frequency of inspections should be fine-tuned over time as system specific conditions are better known and the rate at which certain maintenance operations need to be performed is better understood. Maintenance Inspection Checklists are provided for each of the BMP's in this system. Inspections should be performed by personnel responsible for maintenance and may need to be certified for confined space entry, depending on the component being inspected. Operation of the detention system, outlet control structure, and pre-treatment device may need to be inspected by a practicing civil engineer familiar with their operation.

Records of all routine inspections and any work performed on the system for maintenance, repair or replacement should be maintained by the owner and kept for a minimum of ten (10) years. A copy of all records should be provided to the City of Rochester hills Engineering Division. The records should include this manual, all inspection sheets, approved construction plans and as-built documents, a maintenance log of work performed to the system(s) and contact information for the system inspector, civil engineer, landscape architect, geotechnical engineer and contractor involved with the system.

STORM WATER SYSTEMS MAINTENANCE:

Regular inspection and maintenance of BMP's are necessary if these facilities are to consistently perform up to expectations. Stormwater systems are expected to perform quality and quantity control functions as long as the land use they serve exists. Failure to maintain these systems can create the following adverse impacts:

- Increased pollutants to surrounding surface water features
- Potential loss of life or property resulting from catastrophic failure of the facility
- Aesthetic or nuisance conditions, such as mosquitoes or reduced property values due to a degraded facility appearance.

Most of these impacts can be avoided through proper and timely inspection and maintenance. A major concern associated with these impacts is the general public's expectations related to the quality of life provided, in part, by construction of these systems. Inadequate maintenance means the general public may have a false sense of security. The most common cause of stormwater system failure is the lack of adequate and proper operation, inspection, maintenance and management.

Good design and construction can reduce subsequent maintenance needs and costs, but they cannot eliminate the need for maintenance altogether. Maintenance requires a long-term commitment of time, money, personnel and equipment. Monitoring the overall performance of the stormwater management system is a major aspect of any maintenance program.

The maintenance responsibilities for these systems lie with the current property owner and transfer with the property in perpetuity. If maintenance of the system is not performed, the City of Rochester Hills reserves the right to enter the property and perform all necessary work at the property owner's cost. Refer to the *Agreement for Storm Water System Maintenance* for additional details.

General Maintenance Items:

Parking Lot Sweeping:

Routine sweeping of all paved surfaces provides a more attractive appearance and removes accumulations of sediment and trash that tend to migrate into stormwater management systems during rainfall events. Parking lot sweeping should be performed quarterly or as necessary to limit sediment and trash build-up.

Grass Mowing and Maintenance:

Mowing requirements at a facility should be designed to the specific site conditions, grass types and seasonal variations in climate. Grassed areas require periodic fertilizing, de-thatching and soil conditioning in order to maintain healthy growth. Provisions will need to be made to reseed and reestablish grass cover in areas damaged by sediment accumulation, stormwater flow, erosion, or other causes. Dead turf will need to be replaced after being discovered. Inspection of the grass areas and other landscaping features should be made annually.

Tash and Debris Removal:

Removal of trash and debris from all areas of the property should be performed monthly. Removal of these items will prevent damage to vegetated areas and eliminate their potential to inhibit the operation of any of the stormwater management systems. Sediment, debris and trash that are removed and collected should be disposed of according to local, State and Federal regulations at suitable disposal and/or recycling centers.

Stormwater System Management Items:

The following narratives give an overview of the maintenance requirements of the different components of the stormwater system. The inspection checklists attached to this report offer a more complete listing of what should be inspected, when inspection should occur and the likely frequency of maintenance activities.

Storm Sewer and Structures:

Catch basins, inlets, manholes, outlet control structures, detention pipe and storm sewer pipes should be inspected to check for sediment accumulation and clogging, floatable debris, dead vegetation, etc. The structures and sewers should also be observed during a wet weather event to ensure their proper operation. Accumulated sediment and debris should be removed on an annual basis or as needed based on observed conditions. Structural repairs or maintenance should occur as needed based on observed conditions such as cracks, spalling, joint failure, leakage, misalignment, or settlement of structures. A civil engineer should be retained if problems are thought to exist.

Stormwater Pre-Treatment Devices:

Refer to the attached maintenance manuals from the manufacturer for all inspection and maintenance requirements for the pre-treatment structures.

The following pages include inspection checklists for the various devices and components listed above as well as the manufacturer's manuals for the stormwater pre-treatment structures.

EXHIBIT "C"

STORMWATER MANAGEMENT SYSTEM - PERMANENT MAINTENANCE

DATE / TIME OF INSPECTION: _____

INSPECTOR: _____

**STORMWATER MANAGEMENT SYSTEM
MANAGEMENT TASKS AND SCHEDULE**

POST CONSTRUCTION

MAINTENANCE ACTIVITIES	SYSTEM COMPONENTS		FREQUENCY	COMMENTS
	CATCH BASINS, INLETS, MANHOLES, AND OUTLET CONTROL STRUCTURES	STORM SEWER AND DETENTION PIPES		
MONITORING / INSPECTION				
INSPECT FOR SEDIMENT ACCUMULATION	X	X	ANNUALLY	
INSPECT FOR FLOATABLES, DEAD VEGETATION AND DEBRIS	X	X	ANNUALLY	
INSPECT ALL COMPONENTS DURING WET WEATHER AND COMPARE TO AS-BUILT PLANS	X	X	ANNUALLY	
INSPECT INSIDE OF STRUCTURES AND PIPES FOR CRACKS, SPOOLING, JOINT FAILURES, SETTLEMENT, SAGGING AND MISALIGNMENT	X	X	ANNUALLY	
PREVENTATIVE ACTIONS				
REMOVE ACCUMULATED SEDIMENT	X	X	ANNUALLY OR AS NEEDED	
REMOVE FLOATABLES, DEAD VEGETATION AND DEBRIS	X	X	ANNUALLY OR AS NEEDED	
REMEDIAL ACTIONS				
STRUCTURAL REPAIRS	X	X	AS NEEDED	
MAKE ADJUSTMENTS / REPAIRS TO ASSURE PROPER FUNCTIONING	X	X	AS NEEDED	

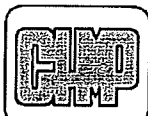
SUMMARY

INSPECTION REMARKS: _____

OVERALL CONDITION OF FACILITY: _____

RECOMMENDED ACTIONS NEEDED: _____

DATES ANY MAINTENANCE HAS TO BE COMPLETED BY: _____

STORM WATER SYSTEM PLAN PRE-OWNED CAR DISPLAY AUDI OF ROCHESTER HILLS 45545 & 45555 DEQUINDRE RD ROCHESTER HILLS, MI 48309	SCALE N/A	CHMP JOB NO. 14004500	 5198 TERRITORIAL RD GRAND BLANC, MI 48434 (810) 695-5910
	DATE FEB. 11, 2016	DRAWING NO. 1 OF 1	

CDS[®] 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.

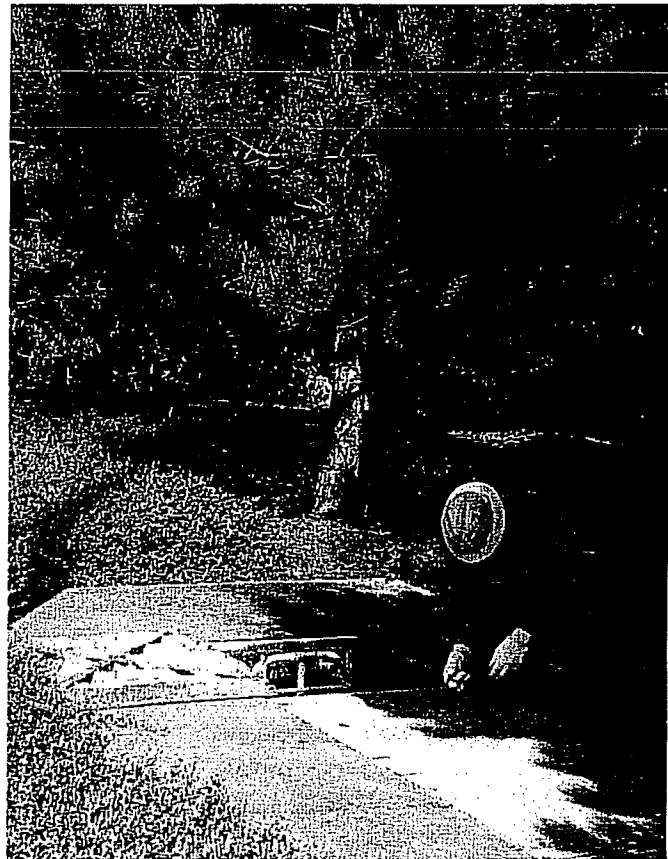
The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be 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	yd3	m3
CDS2015-4	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.5	3.0	0.9	1.3	1.0
CDS2020	5	1.5	3.5	1.1	1.3	1.0
CDS2025	5	1.5	4.0	1.2	1.5	1.0
CDS3020	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

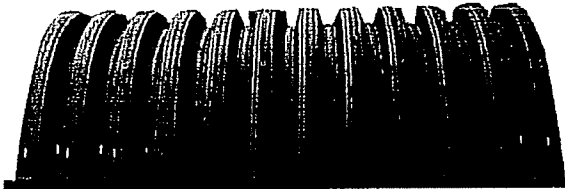
- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.

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The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,674,576; 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.



ChamberMaxx[®] Inspection and Maintenance Guide



CHAMBERMaxx[®]

ChamberMaxx®

Safety

Before entering into any storm sewer or underground retention/detention system check to make sure all OSHA and local safety regulations and guidelines are observed during the maintenance process. Hard hats, safety glasses, steel-toed boots and any other appropriate personal protective equipment shall be worn at all times.

Inspection Frequency

Inspections are recommended at a minimum annually. The first year of operation may require more frequent inspections. Frequency of inspections will vary significantly on the local site conditions. An individual inspection schedule should be established for each site.

Inspections

Inspection is the key to effective maintenance and is easily performed. Inspections may need to be performed more often in the winter months in climates where sanding operations may lead to rapid sediment accumulations, or in equipment washdown areas. It is very useful to keep a record of each inspection. A sample inspection log is included for your use.

The entire treatment train should be inspected and maintained. The treatment train may consist of an upstream sump manhole, manifold system or pre-treatment HDS device. Inspections should start at the upstream device and continue downstream to the discharge orifice if incorporated into the chamber system.

Pre-Treatment Device Inspection

Inspection and maintenance procedures provided by the manufacturer should be followed for pre-treatment systems such as a CDS®, Vortechs®, VortSentry® or VortSentry® HS. Expected pollutants will be floatable trash, sediment and oil and grease. Pre-treatment devices are recommended for all detention/retention devices regardless of type.

Containment Row™ Inspection

The optional Containment Row consists of a diversion concrete manhole with a weir and a drain down orifice, and a row of chambers wrapped in a impermeable 20-mil HDPE liner. The diversion weir directs the first flush flows into the Containment Row of chambers. The majority of sediment will be captured in the Containment Row due to the extended detention time which allows the particles to settle out. Containment Row drains down via an orifice located in the diversion manhole weir allowing the remaining pollutants to be contained. Higher flows overtop (bypass) the weir into the manifold system.

The Containment Row will typically be located in the first row of chambers connected to the diversion manhole. Inspection can be done through accessing the diversion manhole and

visually inspecting the Containment Row through the inlet pipe. Inspection ports throughout the system can be used for visual observation and measurement of sediment accumulation using a stadia rod. When the depth of sediment accumulates over 4-inch (102 mm), cleanout is recommended.

Manifold System Inspection

The main manifold pipe can be inspected from the diversion manhole upstream. When a quarter of the pipe volume has been filled with sediment the header system should be maintained.

Visual Inspection

Maintenance or further investigation may be required if any of the following conditions exist:

- Evidence of an unusual amount of silt and soil build-up on the surface.
- Clogged outlet drainpipe.
- System does not drain to the elevation of the lowest pipe in dry conditions.
- Evidence of potholes or sinkholes

Maintenance

Underground stormwater retention/detention systems 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 rather than the size or configuration of the system. If accumulated silt is interfering with the operation of the detention system (i.e.: blocking outlet pipes or deposits significantly reduce the storage capacity of the system) it should be removed.

It is easiest to maintain a system when there is no flow entering. For this reason, cleanout should be scheduled during dry weather.

It is important to block the orifice in the Containment Row diversion manhole weir prior to maintenance to limit the potential for pollutants to be flushed downstream.

A vacuum truck or other similar devices can be used to remove sediment from the treatment train. Starting upstream, maintain manholes with sumps and any pre-treatment devices (following manufacturer recommended procedures). Once maintenance is complete, replace all caps, lids and covers. It is important to document maintenance events on the Inspection and Maintenance Log.

Header System Maintenance:

If maintenance is required, use a high pressure nozzle with rear facing jets to wash the sediments and debris into the diversion manhole. Use the vacuum hose stinger nozzle to remove the washed sediments from the sump of the diversion manhole. It is important to not flush sediments into the chamber system during the maintenance process.

Containment Row™ Maintenance

If maintenance is required, a JetVac truck utilizing a high pressure nozzle (sledge dredging tool) with rear facing jets will be required. Insert the nozzle from the diversion manhole into the Containment Row through the inlet pipe. Turn the water feed hose on and feed the supply hose until the nozzle has reached the end of the Containment Row. Withdraw the nozzle slowly.

The tool will backflush the Containment Row forcing debris into the diversion manhole sump. Use the stringer vacuum hose to remove the sediments and debris from the sump of the diversion manhole. Multiple passes may be required to fully cleanout the Containment Row. Vacuum out the diversion manhole and remove all debris that may be clogging the drain down orifice. See Figure 1.

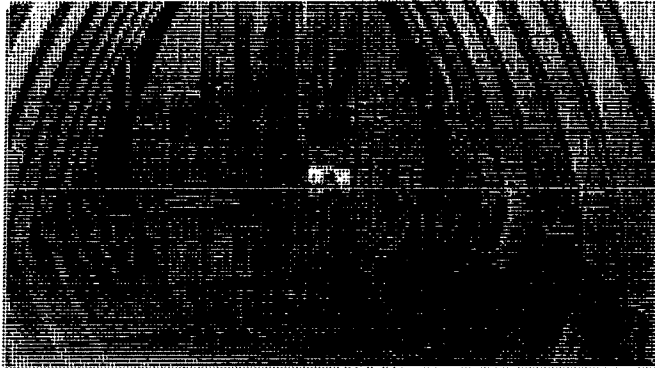


Figure 1— Containment Row shown with high pressure cleaning nozzle

Inspection & Maintenance Log Sample Template

ChamberMaxx		Location:		
Date	Depth of Sediment	Accumulated Trash	Name of Inspector	Maintenance Performed/Notes

CHAMBERMaxx

Support

- Drawings and specifications are available at www.ContechES.com.
- Site-specific support is available from our engineers.

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