Engineer: Kimley-Horn and Associates, Inc.
Kevin S. Gaskey, P.E. *(KS)*
Kimley-Horn and Associates, Inc.
12750 Merit Drive, Suite 1000
Dallas, TX 75251

Date: February 1, 2013

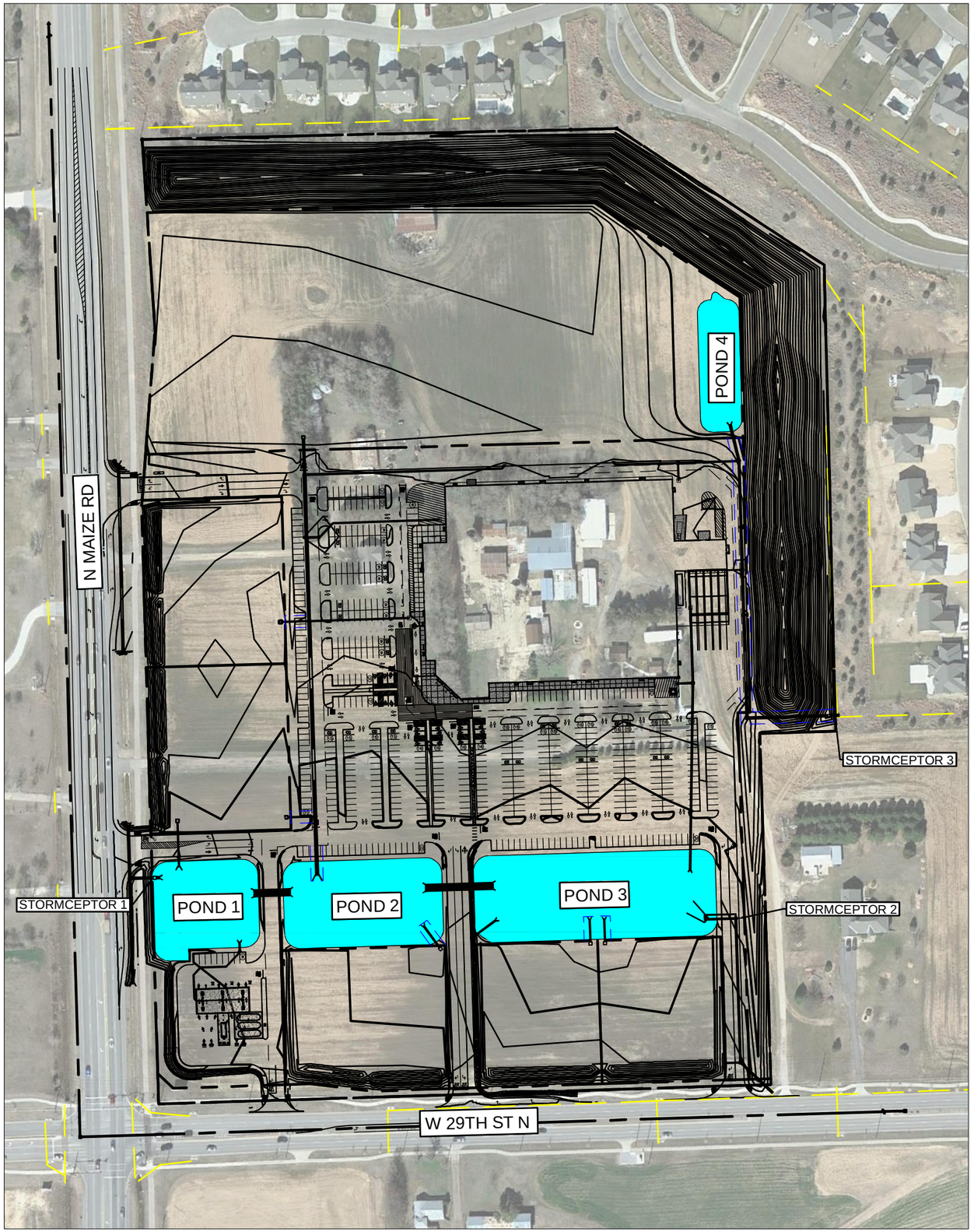
Subj: Operations and Maintenance Plan

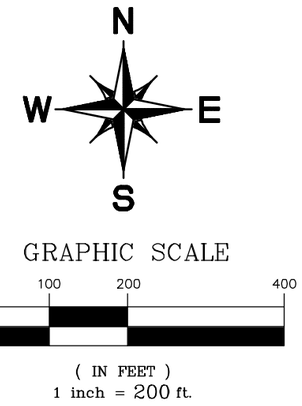
Seven stormwater management facilities, including four dry detention ponds and three Stormceptors manage stormwater onsite. The dry detention ponds provide detention storage in order to reduce proposed condition peak flow to existing conditions compensatory storage and flow. Pond 1 is located along the western boundary of the site, approximately 250 feet north of the intersection of West 29th Street North and North Maize Road, Pond 2 is located approximately 50 feet to the east of Pond 1, and Pond 3 is located along the eastern boundary of the site approximately 80 feet east of Pond 2. Pond 4 is located in the northeastern corner of the site.

An 800 GPM pump is located at the outfall of Pond 3. The pump drains the compensatory storage volume of Ponds 2 and 3. The pump and lift station operation and maintenance manual will be included in the Operations and Maintenance Plan.

Three stormceptors remove 70% of total suspended solids from the stormwater before discharging off site. Stormceptor 1 is located at the outfall of Pond 1 along the western boundary of the site. Stormceptor 2 is located at the outfall of Pond 3 along the southeastern boundary of the site. Stormceptor 3 is located at the outfall of Pond 4 along the eastern boundary of the site. The location of each stormwater management facility is shown on the attached stormwater facility map.

Attachments
Stormwater Facility Map
Stormwater Facility Inspection and Maintenance Guidance – Conventional Dry Detention Ponds
Conventional Dry Detention Pond Inspection Checklist
Stormceptor System Owners Manual
Rinker Stormceptor Details
Digital Copy





STORMWATER QUALITY SYSTEMS

UNIT	MAKE	MODEL	SIZE
STORMCEPTOR 1	RINKER	STC 2400 PRECAST CONCRETE STORMCEPTER	2400 GALLONS
STORMCEPTOR 2	RINKER	STC 4501 PRECAST CONCRETE STORMCEPTER	450 GALLONS
STORMCEPTOR 3	RINKER	STC 2400 PRECAST CONCRETE STORMCEPTER	2400 GALLONS

NOTES
1. STORMWATER QUALITY UNITS MANUFACTURED AND PROVIDED BY RINKER MATERIALS, 6560 LANGFIELD RD., BLDG. 3, HOUSTON, TX 77092

LEGEND

- PROPOSED CONTOURS
- DRAINAGE EASEMENT
- PROPERTY BOUNDARY
- EXISTING STORM SEWER
- PROPOSED POND

NOTES
1. STORM SEWER INFORMATION OBTAINED FROM CITY OF WICHITA

Kimley-Horn and Associates, Inc.
12750 MERIT DRIVE, SUITE 1000, DALLAS, TX 75251
PHONE: 972-770-1300 FAX: 972-239-3820
WWW.KIMLEY-HORN.COM

STORE # 6275
ADDRESS WILL BE INCLUDED IN O&M PLAN

STORMWATER FACILITY MAP

Scale:	AS SHOWN
Designed by:	BWP
Drawn by:	AWS
Checked by:	AWS
Date:	02/01/2013
Project No.	063362230

SHEET
1

Wichita/Sedgwick County
Stormwater Facility Inspection & Maintenance Guidance
Stormwater (Wet) Ponds

Regular inspection and maintenance is critical to the effective operation of this stormwater management facility so that it can function as designed. In the City of Wichita and Sedgwick County, local regulations (City of Wichita Code Chapter 16.32 and Sedgwick County Resolution 196.10) require that property owners maintain all stormwater facilities on their properties to ensure they are fully functioning to treat and control stormwater runoff, and to document facility inspections and maintenance activities. This documentation must be kept by the property owner and must be made available to Stormwater Management staff upon their request.

This page provides guidance on inspection and maintenance activities that must be performed for stormwater ponds. Some facilities may have more, or less, frequent maintenance needs, depending upon a variety of factors including the occurrence of large storm events, overly wet or dry (i.e., drought) regional hydrologic conditions, and any changes in the land (e.g., development, landscaping, etc.) that drains to the facility.

Inspection Activities	**Suggested Schedule**
• **After several storm events or an extreme storm event, inspect for: bank stability; signs of erosion; and damage to, or clogging of, the inlet/outlet structures and pilot channels.**	**As needed**
• **Inspect for: trash and debris; clogging of the inlet/outlet structures and any pilot channels; excessive erosion; sediment accumulation in the basin, forebay and inlet/outlet structures; tree growth on dam or embankment; the presence of burrowing animals; standing water where there should be none; vigor and density of the grass turf on the basin side slopes and floor; differential settlement; cracking; leakage; and slope stability.**	**Semi-annually**
• **Inspect that the inlet/outlet structures, pipes, sediment forebays, and upstream, downstream, and pilot channels are free of debris and are operational.** • **Check for signs of unhealthy or overpopulation of plants and/or fish (if utilized).** • **Note signs of algal growth or pollution, such as oil sheens, discolored water, or unpleasant odors.** • **Check sediment marker(s) for sediment accumulation in the facility and forebay.** • **Check for proper operation of control gates, valves or other mechanical devices.** • **Note changes to the wet pond or contributing drainage area as such changes may affect pond performance.**	**Annually**
Maintenance Activities	**Suggested Schedule**
• **Clean and remove debris from inlet and outlet structures.** • **Mow side slopes (embankment) and maintenance access. Periodic mowing is only required along maintenance rights-of-way and the embankment. The remaining pond buffer can be managed as a meadow (mowing every other year) or forest.**	**Monthly**
• **If wetland vegetation is included, remove invasive vegetation.**	**Semi-annually**
• **Repair damage to pond, outlet structures, embankments, control gates, valves, or other mechanical devices; repair undercut or eroded areas.** • **Remove pollutants or algal overgrowth as appropriate.**	**As Needed**
• **Perform wetland plant management and harvesting.**	**Annually (if needed)**
• **Remove sediment from the forebay. Sediments excavated from stormwater ponds that do not receive hotspot runoff are not considered toxic or hazardous material and can be safely disposed of by either land application or landfilling. Sediment testing is required prior to sediment disposal when the pond receives discharge from a hotspot land use.**	**5 to 7 years or after 50% of the total forebay capacity has been lost**
• **Monitor sediment accumulations and remove sediment when the pond volume has become reduced significantly or the pond is not providing a healthy habitat for vegetation and fish (if used). Discharges of pond water may be considered an illegal discharge by local ordinances. Care should be exercised during pond drawdowns to prevent downstream discharge of sediments, anaerobic water, or high flows with erosive velocities. Consult the local jurisdiction before draining a stormwater pond.**	**10 to 20 years or after 25% of the permanent pool volume has been lost**

The inspection checklist that is presented on the next page is provided to guide and document inspection and maintenance activities. Please use this checklist or other form(s) of maintenance documentation when and where deemed necessary in order to ensure the long-term proper operation of the stormwater management facility.

For more information on the maintenance of your stormwater facility, please contact:

City of Wichita Stormwater Management, 455 N. Main 8th floor Wichita KS. 67202, (316) 268-4498
or Sedgwick County Stormwater Management, 1144 S. Seneca Wichita KS. 67213, (316) 383-7901

Wichita/Sedgwick County
Stormwater (Wet) Ponds Inspection Checklist

Project Name: _____ Project #:_____

BMP Name/ID (as shown on the O&M Plan):_____

Refer to the Operations & Maintenance Plan for this property to get the information requested in this box. The Operations and Maintenance Plan for this property is recorded with the Sedgwick County Register of Deeds.

Property Owner Name: _____

Property Address: _____

Owner Phone #:_____ Owner Email Address:_____

Owner Change since last inspection? Y N

Inspection Date/Time:_____

Weather and Site Conditions (last rainfall date, dry/wet soil, etc.):_____

_____

Inspection Items	Condition*	Comments/Corrective Action
***Note - Condition should be marked as Satisfactory (S) or Unsatisfactory (U). An explanation of corrective actions must be provided for all items marked as Unsatisfactory. The completion date of any corrective actions taken must also be documented.**		
Inspect the embankment (the dam/berm that holds water in the pond) and the emergency spillway (the location where water exits the facility in the event that the embankment is overtopped).		
1. Does the vegetation appear to be healthy and adequately covering the embankment to prevent erosion? **Yes = Satisfactory**		
2. Are there signs that soil is eroding (washing away) on/from the embankment? **Yes = Unsatisfactory**		
3. Are there signs of animal burrows in embankment? **Yes = Unsatisfactory**		
4. Are there signs of cracking, sliding and/or bulging of the berm/dam? **Yes = Unsatisfactory**		
5. Are the drains (if any) blocked or malfunctioning? **Yes = Unsatisfactory**		
6. Are there signs of leaks or seeps on the embankment? **Yes = Unsatisfactory**		
7. Are there any obstructions of the emergency spillway(s)? **Yes = Unsatisfactory**		

Wichita/Sedgwick County
Stormwater (Wet) Ponds Inspection Checklist

Inspection Items	Condition*	Comments/Corrective Action
8. Are there signs of erosion (washing away of soil) in or around the emergency spillway? **Yes = Unsatisfactory**		
9. Other (describe)?		
Inspect the inlet and outlet structures and channels – these are the locations/structures where water enters and exits the pond.		
10. Are the inlets and outlets and channels clear of debris and functional? **Yes = Satisfactory**		
11. Are trash racks clear of debris and functional? **Yes = Satisfactory**		
12. Has sediment accumulated at any of the inlet and outlet structures? **Yes = Unsatisfactory**		
13. Does the concrete/masonry appear to be in good condition? **Yes = Satisfactory**		
14. Do the pipes appear to be in good condition? **Yes = Satisfactory**		
15. Is the slide gate (if any) operating properly? **Yes = Satisfactory**		
16. Is the pond drain valve operating properly? **Yes = Satisfactory**		
17. Are there signs of erosion (washing away of soil) in the outlet channels? **Yes = Unsatisfactory**		
18. Other (describe)?		
Inspect the permanent pool – this is the area that stays permanently (or nearly permanently) filled with water.		
19. Is there growth of undesirable vegetation or overgrowth of vegetation? **Yes = Unsatisfactory**		
20. Is the pool visibly polluted (trash, oily sheen, foul or chemical odor, discoloration, foaming, etc.)? **Yes = Unsatisfactory**		

Wichita/Sedgwick County
Stormwater (Wet) Ponds Inspection Checklist

Inspection Items	Condition*	Comments/Corrective Action
21. Are there areas of erosion (soil washing away) on the shoreline? **Yes = Unsatisfactory**		
22. Are there signs of erosion (soil washing away) at the location where water enters the pool? **Yes = Unsatisfactory**		
23. Are the headwalls and endwalls in good condition? **Yes = Satisfactory**		
24. Are other activities (e.g., grading, recreational, etc.) encroaching on the pool area? **Yes = Unsatisfactory**		
25. Is there evidence of sediment accumulation? **Yes = Unsatisfactory**		
Inspect the sediment pre-treatment area (usually a forebay) – the location and type of the pre-treatment area should be indicated on the O&M Plan.		
26. Has sediment accumulated in the pre-treatment area? Note – sediment accumulation would indicate that the pre-treatment area is not working as intended and must be cleaned. **Yes = Unsatisfactory**		
Inspect the dry areas.		
27. Is the vegetation healthy and adequately covering the dry areas to prevent soil erosion? **Yes = Satisfactory**		
28. Is there growth of undesirable vegetation or overgrowth of vegetation? **Yes = Unsatisfactory**		
29. Is there excessive sediment accumulation? **Yes = Unsatisfactory**		
Identify any potential hazards to humans or the environment.		
30. Have there been complaints from residents? **Yes = Unsatisfactory**		
31. Are there any other public hazards that should be noted? **Yes = Unsatisfactory**		

Wichita/Sedgwick County
Stormwater (Wet) Ponds Inspection Checklist

By signing my name below, I certify that the information submitted in this document (and all attachments) is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are penalties for knowingly submitting false information, including the possibility of regulatory violations and associated fines.

Inspected by (Name):_____

Inspected by (Signature):_____

City of Wichita/Sedgwick County
Operations & Maintenance Plan Checklist

Submit completed forms to:
City of Wichita Public Works & Utilities, 455 N. Main 8th Floor, Wichita KS 67202; or
Sedgwick County Stormwater Management, 1144 S. Seneca, Wichita KS 67213.

Project Name:	Sam's Club				
Total Area of Project:	38.1 **acres**				
Development Type:	Commercial	**Other:**			
Developer Name:	Sam's Club	**Contact:**	Peter Clement	**Phone:**	479-277-6678
Email:	peter.clement@wal-mart.com				
Engineer Name:	Kimley-Horn and Associates, Inc.	**Contact:**	Sarah Williamson	**Phone:**	972-770-3008
Email:	sarah.williamson@Kimley-horn.com				

Directions:

(1) Fill-out this checklist completely and include it with the O&M Plan submittal. Incomplete plans and checklists will not be accepted.

*(2) Indicate whether a plan element is included or not included in the submittal by choosing "**Yes**" or "**No**" from the dropdown list in the **"Element Included?"** column. The question must be answered for every plan element for this checklist to be considered complete. An explanation must be provided for all "No" answers.*

NOTE: THE O&M PLAN IS A DOCUMENT THAT IS INTENDED FOR USE BY THE PROPERTY OWNER (I.E., NOT AN ENGINEER OR LANDSCAPE ARCHITECT) TO GUIDE IN THE INSPECTION AND MAINTENANCE OF SITE STORMWATER MANAGEMENT FACILITIES. IT IS THE IMPORTANT THAT THE O&M PLAN BE WRITTEN IN A MANNER THAT CAN BE UNDERSTOOD BY THE GENERAL PUBLIC. PLEASE CONSIDER THIS WHEN PREPARING THE O&M PLAN.

Operations & Maintenance Plan Checklist

#	Plan Element Description	Element Included?	Explanation/Notes
1.0	**General Information**		
1.1	Digital copy of O&M plan. Include all sheets and submit as a single PDF file.	Yes	
1.2	Hard copy of all O&M Plan sheets.	Yes	
1.3	**Final O&M Plans only**: Digital copy of as-built plan, showing changes from approved designs as redlined items. Include all sheets and submit as a single PDF file.	No	Will be included in final O&M Plan
1.4	Narrative describing the name, location and function of all of the stormwater management facilities located on the property. Each facility must be identified using its proper name (as used in the Wichita/Sedgwick County Stormwater Manual).	Yes	
1.5	An *Inspection and Maintenance Guidance* sheet (8.5x11) for **each** stormwater management facility located on the property. Use guidance sheets provided in Volume 2, Chapter 3 of the Wichita/Sedgwick County Stormwater Manual, suitably modified (if necessary) to describe the required inspection and maintenance activities and the expected schedule/frequency for inspection and maintenance activities.	Yes	
1.6	An *Inspection Checklist* template (8.5x11) for **each** stormwater management facility located on the property. Use inspection templates provided in Volume 2, Chapter 3 the Wichita/Sedgwick County Stormwater Manual.	Yes	
1.7	**Proprietary BMPs only**: BMP inspection and maintenance guidance is not provided in the Wichita/Sedgwick County Stormwater Manual for proprietary BMPs. This information, including a suggested frequency for inspection and maintenance activities must be provided, in accordance with the BMP manufacturer's inspection and maintenance recommendations.	Yes	
2.0	**Stormwater Facility Map**		
2.1	Title block with address of project, phase or addition name, date of O&M plan, name/address of site design engineer/company.	Yes	See attached exhibit.
2.2	Date of completion of construction.	No	Will be included in final O&M Plan
2.3	Identifying label, type (using proper name in accordance with the Wichita/Sedgwick County Stormwater Manual) and location of all stormwater management facilities, with boundary lines for the facilities and all easements/reserves as applicable.	Yes	See attached exhibit.
2.4	Identifying label, type and location of all proprietary stormwater quality systems. Must include commercial name of the device, vendor name/address, manufacturer name, make, model and size details.	Yes	See attached exhibit.
2.5	Identifying label, type and location of all water quality volume reduction areas, with boundary lines for areas and all easements/reserves as applicable.	No	Not applicable.
2.6	Label and location of permanent signage for stormwater management facilities and water quality volume reduction areas located on the property.	No	No proposed signage.
2.7	Scale (horizontal).	Yes	See attached exhibit.

Operations & Maintenance Plan Checklist			
#	**Plan Element Description**	**Element Included?**	**Explanation/Notes**
2.8	Legend key.	Yes	See attached exhibit.
3.0	**Cost Estimates**		
3.1	Estimate(s) of the expected annual cost associated with routine inspection and maintenance of **each and every** stormwater management facility over the expected life of the facility(s).	No	Will be submitted with final O&M Plans.
3.2	Estimate(s) of any non-routine costs associated with expected remedial maintenance (e.g., removal of sediment from a wet pond every 10 to 15 years) of **each and every** stormwater management facility over the expected life of the facility(s).	No	Will be submitted with final O&M Plans.
End of Checklist			

Rinker MATERIALS™

THE STORMCEPTOR® SYSTEM

Owner's Manual

Stormceptor® Owner's Manual Contents

Rev. 3/2006

Thank You!

We want to thank you for selecting the Stormceptor System to use in your efforts in protecting the environment. Stormceptor is one of the most effective and maintenance friendly storm water quality treatment devices available. If you have any questions regarding the operation and maintenance of the Stormceptor System, please call your local Rinker Materials representative, or the Stormceptor Information Line at (800) 909-7763.

1. *Stormceptor Overview*

The Stormceptor System is a water quality device used to remove total suspended solids (TSS) and free oil (TPH) from storm water run-off. Stormceptor takes the place of a conventional manhole or inlet structure within a storm drain system. Rinker Materials manufactures the Stormceptor System with precast concrete components and a fiberglass disc insert. A fiberglass Stormceptor can also be provided for special applications.

The Stormceptor System product line consists of four patented designs:

- The In-Line (Conventional) Stormceptor, available in eight model sizes ranging from 900 to 7200 gallon storage capacity.
- An In-Line (Series) Stormceptor is available in three model sizes ranging from 11,000 to 16,000 gallon storage capacity.
- The Submerged Stormceptor, an in-line system designed for oil and sediment removal in partially submerged pipes, available in all models sizes ranging from 450*i* to 16,000 gallon storage capacity.
- The Inlet Stormceptor is a 450 gallon unit designed for small drainage areas.

Stormceptor removes free oil and suspended solids from storm water preventing hazardous spills and non-point source pollution from entering downstream lakes and rivers. Rinker Materials and its affiliates market and manufacture the Stormceptor System in the United States and Australia. Several thousand Stormceptor Systems have been installed in various locations throughout North America, Australia and the Caribbean since 1990.

In the Stormceptor, a fiberglass insert separates the treatment chamber from the by-pass chamber. The different insert designs are illustrated in Figures 1 and 2. These designs are easily distinguishable from the surface once the cover has been removed.

There are four versions of the in-line disc insert: single inlet/outlet, multiple inlet, in-line series insert and submerged designs. In the non-submerged "disc" design you will be able to see the inlet pipe, the drop pipe opening to the lower chamber, the weir, a 6" oil inspection/cleanout pipe, a large 24" riser pipe opening offset on the outlet side of the structure, and the outlet pipe from the unit. The weir will be around the 24" outlet pipe on the multiple inlet disc insert and on large diameter pipe applications.

The STC *(*series) Stormceptors consist of two chambers comprised of similar fiberglass inserts. These units also contain a 6" oil/inspection cleanout pipe and 24" outlet riser pipes.

The submerged disc insert has a higher weir and a second inlet drop pipe. In the inlet design you will be able to see an inlet drop pipe and an outlet riser pipe as well as a central oil inspection/cleanout port.

2. *Stormceptor System Operation*

The Stormceptor consists of a lower treatment chamber, which is always full of water, and a by-pass chamber. Storm water flows into the by-pass chamber via the storm sewer pipe or grated inlet (Inlet Stormceptor). Normal flows are diverted by a weir and drop pipe arrangement into a treatment chamber. Water flows up through the submerged outlet pipe based on the head at the inlet weir and is discharged back into the by-pass chamber downstream of the weir. The treated storm water continues down stream via the storm sewer system.

Oil and other liquids with a specific gravity less than water rise in the treatment chamber and become trapped under the fiberglass insert. Sediment will settle to the bottom of the chamber by gravity. The circular design of the treatment chamber is critical to prevent turbulent eddy currents and to promote settling.

During infrequent high flow conditions, storm water will by-pass the weir and be conveyed to the outlet sewer directly. The by-pass is an integral part of the Stormceptor since other oil/grit separators have been noted to scour during high flow conditions (Schueler and Shepp, 1993).

For further details please refer to *The Stormceptor System Technical Manual*.

The key benefits of Stormceptor include:

- Capable of removing more than 80% of the total sediment load when properly applied as a source control for small drainage areas
- Removes free oil from storm water during normal flow conditions
- Will not scour or resuspend trapped pollutants
- Ideal spill control device for commercial and industrial developments
- Vertical orientation facilitates maintenance and inspections
- Small foot print

3. *Identification of Stormceptor*

All In-Line (including Submerged) Stormceptors are provided with their own frame and cover. The cover has the name STORMCEPTOR clearly embossed on it to allow easy identification of the unit. The name Stormceptor is not embossed on the inlet models due to the variability of inlet grates used/approved across North America. You will be able to identify the Inlet Stormceptor by looking into the grate since the insert will be visible.

Once you have located a unit, there still may be a question as to the size of the unit. Comparing the measured depth from the water level (bottom of insert) to the bottom of the tank with Table 1 should help determine the size of the unit.

Table 1. Stormceptor Dimensions*	
Model	**Pipe Invert to Top of Base Slab**
450*i*	60"
900	55"
1200	71"
1800	105"
2400	94"
3600	134"
4800	128"
6000	150"
7200	134"
11000*s*	128"**
13000*s*	150"**
16000*s*	134"**

** Depths are approximate*

*** Depths per structure*

Starting in 1996, a metal serial number tag has been affixed to the fiberglass insert. If the unit does not have a serial number, or if there is any uncertainty regarding the size of the Stormceptor using depth measurements, please contact the Rinker Materials Stormceptor information line at (800) 909-7763 for assistance.

4. ***Stormceptor Maintenance Guidelines***

The performance of all storm water quality measures that rely on sedimentation decreases as they fill with sediment (See Table 2 for Stormceptor capacities). An estimate of performance loss can be made from the relationship between performance and storage volume. Rinker Materials recommends maintenance be performed when the sediment volume in the unit reaches 15% of the total storage. This recommendation is based on several factors:

- Sediment removal is easier when removed on a regular basis (as sediment builds up it compacts and solidifies making maintenance more difficult).
- Development of a routine maintenance interval helps ensure a regular maintenance schedule is followed. Although the frequency of maintenance will depend on site conditions, it is estimated that annual maintenance will be required for most applications; annual maintenance is a routine occurrence which is easy to plan for and remember.
- A minimal performance degradation due to sediment build-up can occur.

In the event of any hazardous material spill, Rinker Materials recommends maintenance be performed immediately. Maintenance should be performed by a licensed liquid waste hauler. You should also notify the appropriate regulatory agencies as required.

Table 2. Stormceptor Capacities			
Model	**Sediment Capacity ft³ (L)**	**Oil Capacity US gal (L)**	**Total Holding Capacity US gal (L)**
450*i*	45 (1276)	86 (326)	470 (1779)
900	75 (2135)	251 (950)	952 (3604)
1200	113 (3202)	251 (950)	1234 (4671)
1800	193 (5470)	251 (950)	1833 (6939)
2400	155 (4387)	840 (3180)	2462 (9320)
3600	323 (9134)	840 (3180)	3715 (14063)
4800	465 (13158)	909 (3441)	5059 (19150)
6000	609 (17235)	909 (3441)	6136 (23227)
7200	726 (20551)	1059 (4009)	7420 (28088)
11000*s*	942 (26687)	2797 (10588)*	11194 (42374)
13000*s*	1230 (34841)	2797 (10588)*	13348 (50528)
16000*s*	1470 (41632)	3055 (11564)*	15918 (60256)

** Total both structures combined*

4.1 *Recommended Maintenance Procedure*

For the "disc" design, oil is removed through the 6" inspection/cleanout pipe and sediment is removed through the 24" diameter outlet riser pipe. Alternatively, oil could be removed from the 24" opening if water is removed from the treatment chamber, lowering the oil level below the drop pipes.

The depth of sediment can be measured from the surface of the Stormceptor with a dipstick tube equipped with a ball valve (Sludge Judge®). It is recommended that maintenance be performed once the sediment depth exceeds the guideline values provided in Table 3 for the reasons noted in Section 4.0 Stormceptor Maintenance Guidelines.

Table 3. Sediment Depths Indicating Required Maintenance	
Model	**Sediment Depth***
450*i*	8" (200 mm)
900	8" (200 mm)
1200	10" (250 mm)
1800	15" (375 mm)
2400	12" (300 mm)
3600	17" (425 mm)
4800	15" (375 mm)
6000	18" (450 mm)
7200	15" (375 mm)
11000*s*	17" (425 mm)**
13000*s*	20" (500 mm)**
16000*s*	17" (425 mm)**

** Depths are approximate*

*** In each structure*

No entry into the unit is required for routine maintenance of the Inlet Stormceptor or the smaller disc insert models of the In-Line Stormceptor. Entry to the level of the disc insert may be required for servicing the larger disc insert models. Any potential obstructions at the inlet can be observed from the surface. The fiberglass insert has been designed as a platform for authorized maintenance personnel in the event that an obstruction needs to be removed.

Typically, maintenance is performed by the Vacuum Service Industry, a well established sector of the service industry that cleans underground tanks, sewers, and catch-basins. Costs to clean a Stormceptor will vary based on the size of the unit and transportation distances. If you need assistance for cleaning a Stormceptor unit, contact your local Rinker Materials representative, or the Stormceptor Information Line at (800) 909-7763.

Figures 1 and 2 will help illustrate the access point for routine maintenance of Stormceptor.

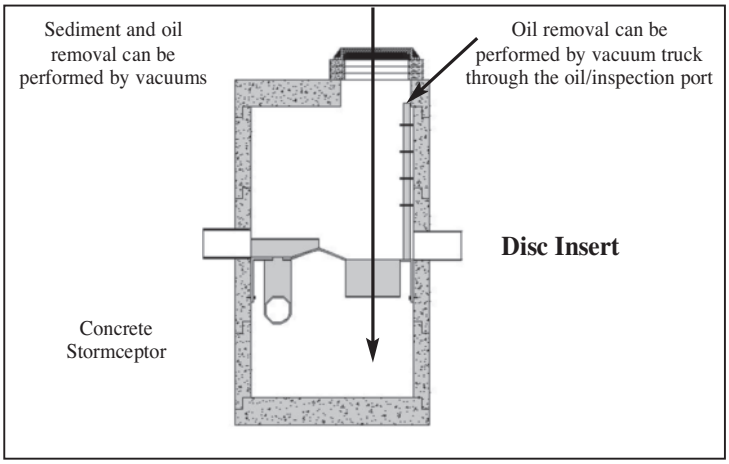


Figure 1 Single Inlet/Outlet "Disc" Insert
In-Line Stormceptor

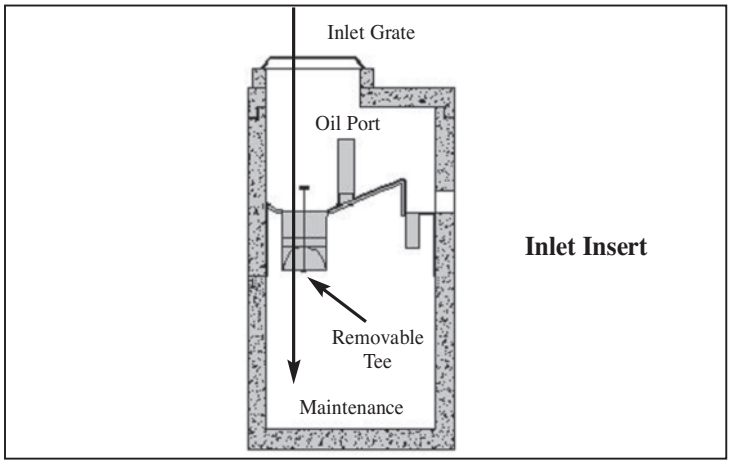


Figure 2 STC 450*i*
Inlet Stormceptor

4.2 *Disposal of Trapped Material from Stormceptor*

The requirements for the disposal of material from Stormceptor are similar to that of any other Best Management Practices (BMP). Local guidelines should be consulted prior to disposal of the separator contents.

In most areas the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste. In some areas, mixing the water with the sediment will create a slurry that can be discharged into a trunk sanitary sewer. In all disposal options, approval from the disposal facility operator/agency is required. Petroleum waste products collected in Stormceptor (oil/chemical/fuel spills) should be removed by a licensed waste management company.

What if I see an oil rainbow or sheen at the Stormceptor outlet?

With a steady influx of water with high concentrations of oil, a sheen may be noticeable at the Stormceptor outlet. This may occur because a rainbow or sheen can be seen at very small oil concentrations (< 10 ppm). Stormceptor will remove over 95% of all free oil and the appearance of a sheen at the outlet with high influent oil concentrations does not mean that the unit is not working to this level of removal. In addition, if the influent oil is emulsified, the Stormceptor will not be able to remove it. The Stormceptor is designed for free oil removal and not emulsified or dissolved oil conditions.

5.0 *Recommended Safety Procedures*

Rinker Materials strongly recommends that any person who enters a Stormceptor System follow all applicable OSHA regulations for entry in permit required confined spaces, as outlined in 29 CFR 1910.146. A permit required confined space consists of a space that:

- Is large enough and so configured that an employee can bodily enter and perform assigned work.
- Has limited or restricted means for entry and exit.
- Is not designed for continuous employee occupancy.
- Contains or has one of the following:
  - a potential to contain a hazardous atmosphere.
  - a material that has the potential for engulfing an entrant.
  - any other recognized serious safety hazard.

Storm water and wastewater systems fall under OSHA guidelines for a permit required confined space. Failure to follow OSHA guidelines for entry and work in a permit required confined space can result in serious injury or death. Please exercise extreme caution and follow appropriate safety procedures when entering any confined space.

Two square pick holes in the cover vent the Stormceptor, allow for removal of the cover, and provide sampling ports for air quality monitoring before the cover is removed. If you must enter the Stormceptor, please note that if the disc insert inside is wet, it can be slippery.

Recognizing that every work site is different, the responsibility for safety falls on the contractor. The contractor must ensure that all employees and subcontractors follow established safety procedures and OSHA regulations for working in and around permit required confined spaces as well as for any other safety hazard that may be present on that particular site.

6.0 *Stormceptor Monitoring Protocol*

If monitoring of your Stormceptor System is required, we recommend you follow the procedures outlined below by the Rinker Materials Stormceptor office. If you have any questions regarding monitoring please contact the Rinker Materials Stormceptor Product Manager at (800) 909-7763.

6.1 *Pollutants to be Monitored*

Table 4 indicates the pollutants to be monitored during the storm events and the minimum acceptable detection limit for each pollutant to be analyzed. Approved federal or state laboratory analysis methodologies are to be used for the analysis.

The optional metals indicated in Table 4 refer to the Resource Conservation Recovery Act and may be covered by a generic metals scan. Bacteria monitoring will not be required unless explicitly requested elsewhere.

Two sediment samples are to be extracted from the monitored Stormceptor at the end of the study and analyzed for the particle size distribution and water content. A minimum of 8 U.S. sieve sizes should be used to determine the particle size distribution. Sieves that are used must include, but are not limited to 35, 60, 100, 140, 200, 270 and 400. Three clay particle sizes must be analyzed to denote particle sizes between 5 and 25 μm. The particle size distributions should be plotted on a standard grain size distribution graph.

Table 4. Monitoring Pollutants	
Pollutant	**Minimum Detection Limit (MDL)**
Total Suspended Solids (TSS)	5 mg/l
Total Phosphorus (P)	0.02 mg/l
Total Kjeldahl Nitrogen (TKN)	0.1 mg/l
Copper (Cu)	0.001 mg/l
Cadmium (Cd)	0.005 mg/l
Lead (Pb)	0.05 mg/l
Zinc (Zn)	0.01 mg/l
Chromium (Cr)	0.01 mg/l
Total Petroleum Hydrocarbons (TPH)	1 mg/l
Conductivity	0.1 μmho/cm
Fecal Coliform*	1/100 ml
Additional Metals (optional)	
Arsenic (As)	0.005 mg/l
Barium (Ba)	0.01 mg/l
Mercury (Hg)	0.0005 mg/l
Selenium (Se)	0.005 mg/l
Silver (Ag)	0.01 mg/l

* Only if explicitly requested in Terms of Reference

6.2 *Monitoring Methodology*

The following monitoring protocol should be followed to ensure reasonable monitoring results and interpretation:

- Monitoring protocols should conform to **EPA 40 CFR Part 136.**
- The **EPA guideline of 72 hours dry period** prior to a monitoring event should be used. This will ensure that there is sufficient pollutant build-up available for wash-off during the monitored event.
- Flow proportional monitoring must be conducted for the parameters indicated in Table 1. Samples should be analyzed separately for the first flush versus the remainder of the storm event. Monitoring need not extend longer than an 8-hour period after the start of the storm event (composite).
- **Sediment sampling** (measuring the sediment depth in the unit at the beginning and end of the monitoring period) must be conducted. The water content of the sediment layer must be analyzed to determine the dry volume of suspended solids. Sediment depth sampling will indicate the rate of pollution accumulation in the unit, provide confirmation that the unit is not scouring and confirm the flow proportional monitoring results. A mass balance using the sediment sampling should be calculated to validate the flow proportional sampling.

- **Grab sampling** (just taking samples at the inlet and outlet) is an unacceptable methodology for testing the performance of the Stormceptor during wet weather conditions unless it is flow weighted (flow weighted composite sample from numerous grab samples) over the entire storm.
- The oil containment area underneath the insert should be inspected via the vent pipe for dry weather spills capture once a month during the monitoring period since the flow rate of a dry weather spill may not trigger the automated samplers.
- A tipping bucket rain gauge should be installed on-site to record the distribution of storm intensities and rainfall volume during the monitored events.
- Results that are within the laboratory error (both inlet and outlet) or are representative of relatively clean water should be discarded. Typical concentrations of pollutants in storm water are:

TSS	100 mg/L
Total P	0.33 mg/L
TKN	1.50 mg/L
Total Cu	34 μg/L
Total Pb	144 μg/L
Total Zn	160 μg/L

A threshold first flush/composite TSS value of 50 mg/L at the inlet to the Stormceptor should be used as the lower limit of an acceptable storm for reporting event efficiency. Monitoring results where the influent TSS concentration is less than 50 mg/L should only be used in mass load removal calculations over the entire monitoring period with other storms where the influent concentration is greater than 50 mg/L. The results should not be analyzed if the influent TSS concentrations during all monitored storms are less than 50 mg/L. Storms where the influent TSS concentration is less than 10 mg/L should be discarded from all analyses.

- A threshold storm event volume equal to 1.5 times the storage volume of the Stormceptor being monitored should be used as the lower limit of an acceptable storm for monitoring.
- Sampling at the outlet of the Stormceptor should be conducted within the 24" outlet riser pipe to accurately define event performance.
- The personnel monitoring the Stormceptor should record incidental information in a log file. Information such as weather, site conditions, inspection and maintenance information, monitoring equipment failure, etc. provide valuable information that can explain anomalous results.
- Laboratory results of monitored samples should be analyzed within 10 days of being submitted to the lab.
- Weekly inspections of the sampling tubes, flow meter, rain gauge, and quality samplers should be conducted to ensure proper operation of the monitoring equipment. Debris and sediment that collects around the sampling intakes should be cleaned after each event.
- During the installation of automated quality samplers, care should be exercised to ensure that representative samples will be extracted (placement of intakes, ensuring that tubing is not constricted or crimped).
- Sampling should be conducted for a minimum of 6 storms. Ideally 15 storms should be sampled if the budget allows.

Call the Stormceptor Information Line (800-909-7763) for more detailed information and test results.

TECHNICAL INFORMATION:

- Stormceptor CD ROM
- Stormceptor Technical Manual
- Stormceptor Installation Guide
- Stormceptor Brochure

TEST RESULTS:

- STEP Report (Independent Verification)
- University of Coventry Study
- ETV Canada (Federal Verification)
- National Water Research Institute Test
- Westwood, MA Field Monitoring Study
- Edmonton, Canada Field Monitoring Study
- Seattle Field Monitoring
- Como Park, MN Field Monitoring Study
- Florida Atlantic University Submerged Stormceptor Testing
- Oil Removal Field Validation
- Sludge Analyses and Particle Size Analyses

Rinker MATERIALS™

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Toll Free: 800-909-7763
www.rinkerstormceptor.com

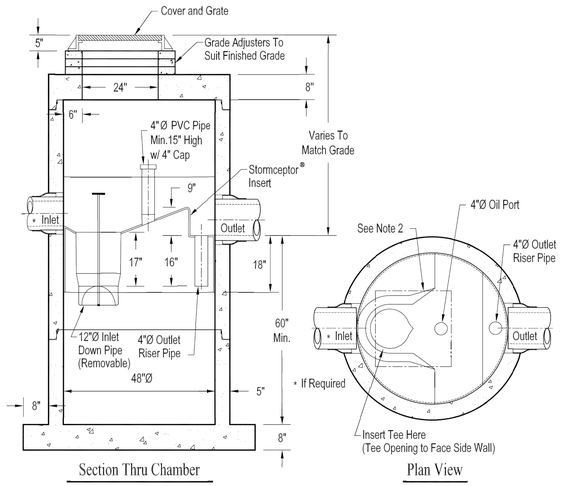
Rev. 3/2006

IMAGES
XREF ABS
XREF
PLOTTED BY SIMONSEN, ANDREW 2/1/2013 10:47 AM
DWG NAME K:\OAK_CIVIL\NO_PROJSAM'S WICHITA KANSAS\DWG\FULL CIVIL\SHEETS\DETENTION OUTFALL.DWG
LAYOUT S-23
PLOT SCALE 1.000000

Rinker MATERIALS

Concrete Pipe Division

STC 450i Precast Concrete Stormceptor®
(450 U.S. Gallon Capacity)



Notes:

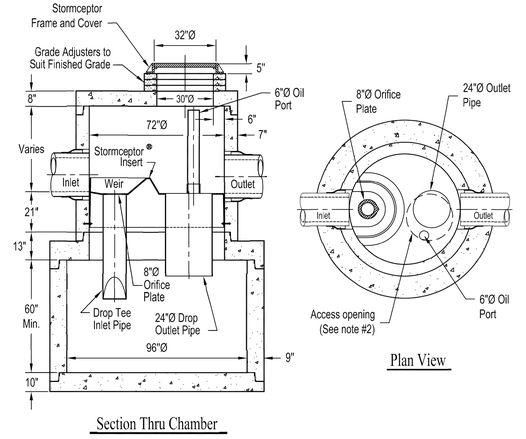
1. The Use Of Flexible Connection is Recommended at The Inlet and Outlet Where Applicable.
2. The Cover Should be Positioned Over The Inlet Drop Pipe and The Oil Port.
3. The Stormceptor System is protected by one or more of the following U.S. Patents: #4985148, #5498331, #5725760, #5753115, #5849181, #6068765, #6371690.
4. Contact a Concrete Pipe Division representative for further details not listed on this drawing.

Rinker 027

Rinker MATERIALS

Concrete Pipe Division

STC 2400 Precast Concrete Stormceptor®
(2400 U.S. Gallon Capacity)



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Rinker 031

No.	Date	Revisions	App.

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PRELIMINARY
FOR REVIEW ONLY
Not for construction or permit purposes.
Kimley-Horn and Associates, Inc.
Engineer KEVIN S. GASKEY
P.E. No. 18257 Date 01/31/2013

STORE # 6275-00
LCR-136-TL
WEST 29TH STREET
WICHITA, KANSAS 67205

RINKER STORMCEPTOR DETAILS

Scale:	AS SHOWN
Designed by:	STW
Drawn by:	STW
Checked by:	KSG
Date:	JANUARY 2013
Project No.	063362220

SHEET
S-23