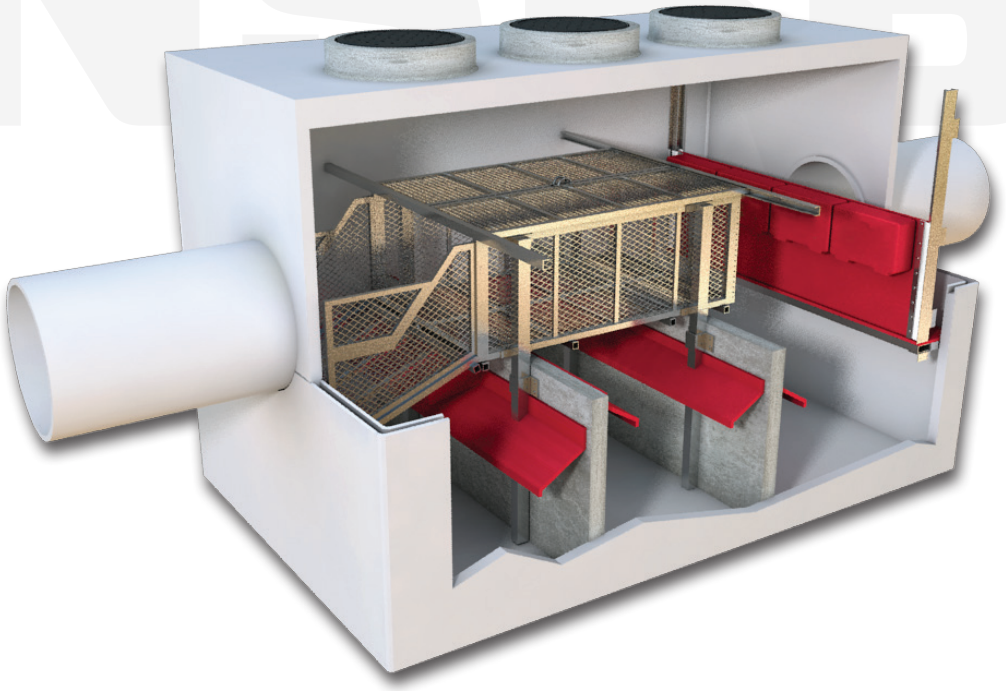
NUTRIENT SEPARATING BAFFLE BOX®

Operation & Maintenance Manual Version 1



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WARNING

Read the Following Information, Instructions and Warnings Before Inspecting, Cleaning or Performing Maintenance on this Stormwater Treatment Device.

This manual is intended to explain the specifics of the Oldcastle Infrastructure Nutrient Separating Baffle Box and to review the aspects of existing regulations and safety procedures. It is the responsibility of all personnel to familiarize themselves with, understand and comply with all applicable local, state and federal laws before attempting to inspect or service this unit.

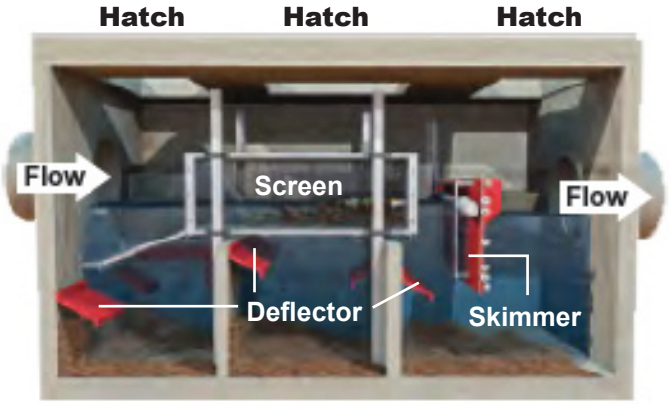
All precautions and procedures in this manual are current at the time of printing but are subject to change based on the development of new processes and procedures. Oldcastle Infrastructure assumes no responsibility and is not accountable for any injuries, fines, penalties or losses that occur involving any procedure in this manual or other unaddressable actions taken.

The Nutrient Separating Baffle Box performance is based on the procedures being followed in this manual. Non-Compliance with the outlined measures will be the responsibility of the owner.

GENERAL INFORMATION

The Nutrient Separating Baffle Box (NSBB) is a key component of your stormwater management program. To maintain proper operation, maintenance of these units is essential. The NSBB designed and manufactured by Oldcastle Infrastructure contains patented and patent pending technologies to treat and manage stormwater.

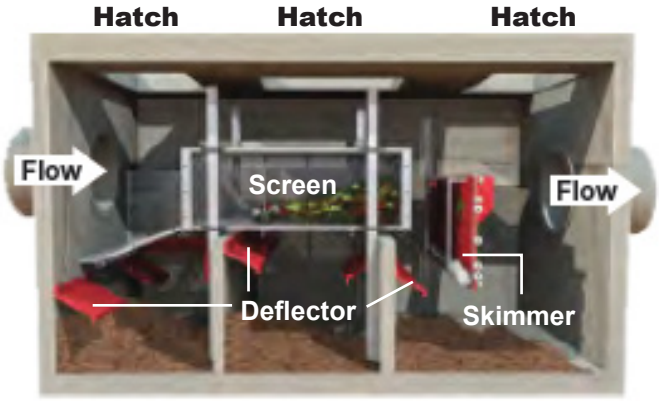
The NSBB is highly effective in capturing Nitrogen, Phosphorus, Total Suspended Solids, organics, trash, oils and grease. Independent testing has shown the NSBB™ is capable of capturing up to 95% of trash, 90% of Total Suspended Solids, 20% of nitrogen and 19% of phosphorus. Local and State regulations may require inspections and cleanings every 90 days. Oldcastle Infrastructure recommends inspections be conducted quarterly for optimal removal efficiency.



Nutrient rich organics and litter are captured in the screen system.

During Storm Event

- Runoff filters through the screen and skimmer leaving pollutants behind. Left over runoff evaporates over time.
- Turbulence defectors prevent captured sediment from becoming resuspended.
- Hydrocarbons collect in front of the skimmer and are absorbed by the StormBoom.



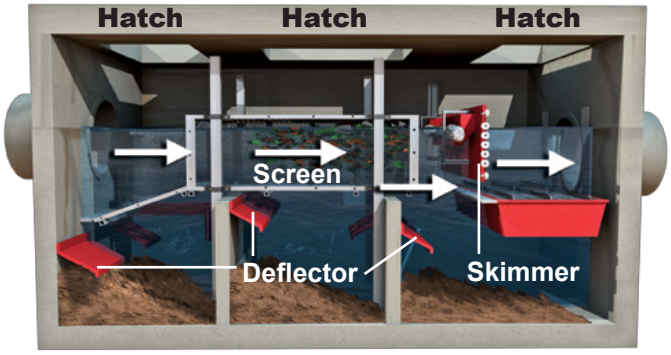
Debris dries out between storm events while pollutants are stored above the static water. As a result, the system does not turn septic.

After Storm Event

- Nutrient pollutant load is not lost to static water and will not be flushed out during the next storm event.
- Separating organic matter from the static water prevents bacterial buildup.

SKIMBOSS FILTER SYSTEM

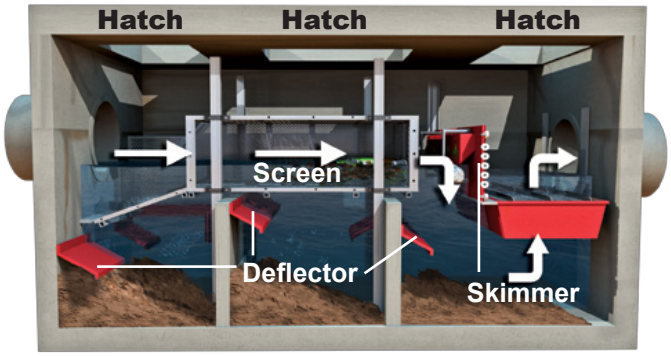
The SkimBoss Filtration System removes dissolved phosphorus and nitrogen from stormwater using Bold & Gold Media. An NSBB with SkimBoss and Bold & Gold can capture up to 79% of TP, 67% of TN and 81% of TSS. The use of Hydro-Variant Technology® lets the SkimBoss Filtration System automatically adjusts to hydraulic grade line with a negligible head loss.



Hydro-Variant Technology adjusts hydraulic grade line.

High Flow Event

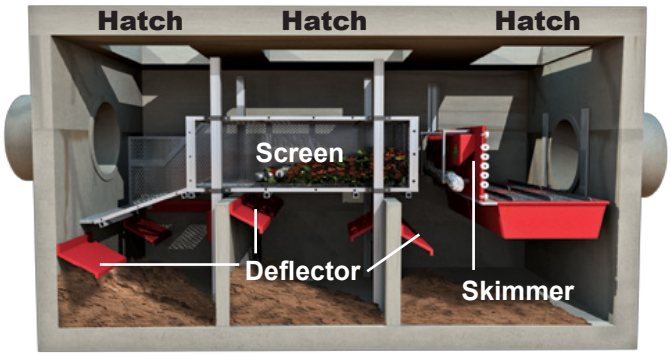
- The SkimBoss floating skimmer adjusts the hydraulic grade line via Hydro-Variant Technology during high flows.
- The system enters a bypass mode to prevent flooding associated with head loss.
- SkimBoss resumes media filtration upon low flow.



The SkimBoss Filter treats water with Bold and Gold Media.

Medium Flow Event

- The SkimBoss Filtration System with Bold and Gold Media treats stormwater by deflecting it under the media vessels via the skimmer and passing through the media.
- Deflected water passes into the Bold and Gold Media effectively reducing nitrogen and phosphorus levels.



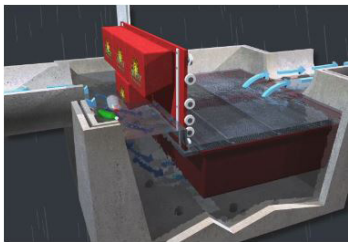
After Storm Event

- Hinged media vessels allow easy hatch access for vacuum truck servicing

BOLD & GOLD INFORMATION

Bold and Gold is a Biosorption Activated Media (BAM) for pollution control to reduce nitrogen and phosphorus in stormwater. When combined with the SkimBoss Filtration System, Bold and Gold combines maximum volume pretreatment without flooding due to head loss. Further benefits of using Bold and Gold Media include:

- Available in various sizes for particular applications
- Up to 448 gpm flow rate / square foot of surface area
- Economical and lower cost than other media
- Made from recycled materials
- Effectively removes up to 95% Total Phosphorus, 75% Total Nitrogen and 95% Total Suspended Solids
- Sustainable: Eco Friendly
- High Surface Area
- No biological toxic effects
- Physical filtration for the removal of solids
- Sorbent surface bonding for the capture of dissolved pollutants
- Biological activity including nutrient based consumption and denitrification



SkimBoss Filtration System with Bold and Gold media filtering stormwater during a storm event.

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INSPECTION INFORMATION

Oldcastle Infrastructure recommends the following guidelines for inspection: After installation and the site has stabilized, post construction inspections should be conducted after every runoff event. To ensure the Nutrient Separating Baffle Box obtains optimal pollutant removal efficiencies, subsequent sediment accumulation inspections should be conducted a minimum of every six (6) months. In the event the sediment accumulation equals or exceeds 80% of the minimum sediment storage volume (Fig 1), then all accumulated sediment must be removed.

(Fig. 1) NSBB™ HVT Maximum Flow Rates 80% Removal

Unit #	Model	Settling Chamber			Sediment Diameter, um				
		Width, ft.	Length, ft.	Settling Area, ft^2	150	125	100	75	50
					80% Removal Flow Rate, cfs				
1	2-4	2	4	8	0.81	0.67	0.49	0.38	0.19
2	2.5-4	2.5	4	10	1.07	0.89	0.65	0.51	0.25
3	3-6	3	6	18	2.24	1.85	1.35	1.05	0.53
4	3-8	3	8	24	3.21	2.65	1.93	1.51	0.76
5	4-6.5	4	6.5	26	3.55	2.93	2.14	1.67	0.84
6	4-8	4	8	32	4.60	3.80	2.77	2.17	1.08
7	5-10	5	10	50	8.03	6.63	4.84	3.78	1.89
8	5-10.5	5	10.5	52.5	8.54	7.05	5.15	4.02	2.01
9	6-12	6	12	72	12.7	10.47	7.64	5.97	2.99
10	6-13.75	6	13.75	82.5	15.0	12.4	9.05	7.07	3.54
11	7-14	7	14	98	18.6	15.4	11.2	8.77	4.39
12	7-15	7	15	105	20.3	16.8	12.2	9.56	4.79
13	8-12	8	12	96	18.2	15.0	10.9	8.55	4.28
14	8-14	8	14	112	22.0	18.2	13.3	10.4	5.19
15	8-16	8	16	128	26.0	21.5	15.7	12.2	6.13
16	9-18	9	18	162	34.9	28.8	21.0	16.4	8.23
17	10-14	10	14	140	29.1	24.0	17.5	13.7	6.86
18	10-17	10	17	170	37.1	30.6	22.4	17.5	8.75
19	10-20	10	20	200	45.4	37.5	27.4	21.4	10.7
20	11-16	11	16	176	38.7	32.0	23.3	18.2	9.1
21	11-24	11	24	264	64.3	53.1	38.7	30.3	15.2
22	11-26	11	26	286	71.1	58.7	42.8	33.5	16.8
23	11-34	11	34	374	99.4	82.1	59.9	46.8	23.4
24	12-21	12	21	252	60.7	50.1	36.6	28.6	14.3
25	12-24	12	24	288	71.7	59.2	43.2	33.8	16.9

Inspection Procedure

- Inspect the unit from surface.
- Open access points (Manhole / Hatch) and secure properly.
- Visually inspect screen system to determine overall debris accumulation.
- Inspect sediment chambers under screen system.
- Inspect condition of joints and inflow / outflow pipe grout areas.

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INSPECTION CHECKLIST

Inspection Checklist and Maintenance Guidance:
Nutrient Separating Baffle Box

* **To be completed at Time of Inspection or Maintenance.**

Owner Name _____

Location _____

Address _____

Phone _____

Date & Time _____

Site Conditions _____

Inspection Items	Recommended Interval	Comments
Access Openings	Quarterly	
Screen System	Quarterly	
Skimmer	Quarterly	
StormBoom	Quarterly	
Sediment Chambers	Quarterly	
Vault Condition	Quarterly	

1 Inspection items are to determine accessibility into Nutrient Separating Baffle Box.

2 Inspect screen system for debris volume and broken parts.

3 Inspect sediment chambers for estimated quantity.

4 Inspect general condition of vault for any clogged areas.

Maintenance Items	Volume Collected	Date	Comments
Screen System			
Sediment Chambers			

1 Inspection items are to determine accessibility into Nutrient Separating Baffle Box.

2 After cleaning screen system, open bottom doors and vacuum out sediment chambers. (Estimate Volume Collected)

NSBB COMPONENTS

Component Descriptions

The Nutrient Separating Baffle Box is a multi stage, self contained treatment system. Each subsequent component in the system protects prior stages from clogging. These stages include screening, separation and hydrocarbon absorption.

- Screening is provided by a rectangular basket system which is suspended above the static water level of the sedimentation chambers. The screening filter has a storage capacity of several cubic yards depending on the model. The primary function of the basket is to capture gross solids like trash and nutrient rich debris. The screening system contains debris and provides a dry storage state to prevent nutrient leaching and contamination of static water, causing a septic state.

- Sediment Separation is facilitated by three settling chambers each with a capacity of several cubic yards depending on the model. These chambers work to target smaller sediments and particulate metals.

- Absorption is facilitated by the hydrocarbon boom(s), that are either free floating or attached to the influent side of the skimmer. This device removes free floating and emulsified hydrocarbons from water.

View of Nutrient Separating Baffle Box and SkimBoss Upflow Filter

REQUIREMENTS & PARTS

Minimum Equipment Requirements

The use of a vacuum truck is required for servicing of the Nutrient Separating Baffle Box. Service crews are recommended to check all local, state and federal guidelines for servicing and disposal of any collected debris and sediments.

Structural Components

The structural components of the NSBB are designed to have a life span of several decades. Structural inspections are not required unless stipulated in guidelines set by the local municipality, state or federal agencies.

Replacement Parts

All interior components are designed and sized to be assembled and removed from the NSBB for servicing or for parts replacement. This can easily be accomplished via the access ports atop the structure. For any replacement parts or further instructions please contact Oldcastle Infrastructure:

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SERVICING SUMMARY

Service Information

Maintenance activities include the removal of captured sediments and debris. Maintenance can be performed from outside the NSBB through access points such as manhole covers or hatches installed in the vault surface above the sediment chambers. During maintenance, the screen system may have either SunGlide™ Sliding Doors or Hinged Doors.

These top doors open to gain access to the debris captured by the screen system. This system also has bottom doors that open to give access to the sediment collected in the settling chambers. A vacuum truck is required for debris and sediment removal. Although not every circumstance can be covered in this manual, a situation may arise where the structure needs to be entered. Servicing does not require specialized tools.

Caution!

Any Service Work done in traffic areas must meet all DOT Roadway Work guidelines and necessary safety procedures.

Warning!

All OSHA confined space requirements must be met while cleaning any of the Nutrient Separating Baffle Box structures.

Service Information

1 Open the access openings (Manhole, Hatch or Grate) on the top of the Baffle Box.

2 Vacuum the debris captured by the screen system to expose the sediment collection chambers.

3 Open the bottom doors to the basket system to expose the sediment collection chambers. These doors have eyebolts to attach the service tool in order to open the bottom doors which hinge off to the side.

4 (Attach vacuum truck water hose to service system quick connector and engage if equipped with HydroSlide®.) Vacuum each sediment chamber until they are empty.

5 After cleaning the sediment chambers close the bottom screen doors of the screen system. Lower or Slide the top doors and assure they lock correctly (if equipped with SunGlide Lids).

6 When all maintenance work is completed, be sure to close the access covers or hatches.

Note

All vacuum servicing of NSBB components can be done with the use of any vacuum truck designed for catch basin cleaning.

When possible, maintenance should be performed from the surface level.

SCREEN MAINTENANCE

Screen Maintenance Procedure

The Nutrient Separating Baffle Box Screen Basket is recommended to be inspected every 6 months and cleaned every 12 months.

1 Remove all manhole covers (or open hatches or grates) to gain access to the screening basket.

2 Remove all trash, litter, debris, organics and sediments captured by the screened basket either manually or with the use of a vacuum truck. The vacuum hose will not damage the screen.

3 Remove vacuum hose and replace manhole covers or hatch doors.

4 Transport all debris, trash, litter, organics and sediments to an approved disposal facility in accordance with local and state requirements.

Nutrient Separating Baffle Box with trash / debris collected inside the screening system basket.

Note

The screen basket must be cleaned before vacuuming each sediment separation chamber.

The bottom of the screen basket is designed with three hinged panels that are lifted vertically to access each separation chamber.

SUNGATE INFORMATION

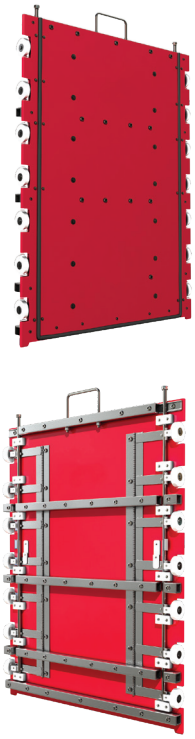
SunGate Flow Control Gate

The SunGate Flow Control Gate is an additional servicing option for your stormwater treatment system. The SunGate is adaptable to fit into the NSBB at the inflow pipe entrance. This gate isolates your system from water flows when necessary service is required.

- The SunGate is available in several varieties and pipe sizes including custom sizes.
- Easy to deploy and remove for maintenance, even under full hydraulic load.
- SunGate is highly durable, constructed of marine grade fiberglass and steel.

Servicing with SunGate

1. Slide SunGate Flow Control Gate into place at inflow pipe by hand or using included tools.
2. Using wrench or included tool; twist cam bolts to the right to lock in place and create a water tight seal.
3. Service NSBB vault, screen basket and sediment chambers via vacuum truck.
4. When servicing of NSBB is complete, open the SunGate hatch to equalize water pressure.
5. Using wrench or included tool; twist cam bolts to the left to release water tight seal.
6. Slide out SunGate with included tool or pull SunGate out if using wheeled version. (Wheeled SunGate can be used under full hydraulic load)



SunGate easily slides in and out of place under full hydraulic load.

CHAMBER MAINTENANCE

Separation Chamber Maintenance Procedure

The Nutrient Separating Baffle Box Hydrodynamic Separation Chambers are recommended to be inspected every six (6) months and cleaned every twelve (12) months.

Open lower screen panels to remove sediments via vacuum truck.

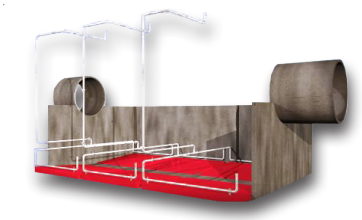
1 Remove all manhole covers (or open hatches or grates) to gain access to the separation chambers.

2 Lower vacuum truck hose into the first separation chamber through the screening basket closest to the inflow pipe. Pressure washing may be needed to remove compacted sediments. (If not equipped with the HydroSlide system)

3 Repeat this process in each separation chamber.

4 Remove vacuum hose and lower hinged panels of screening basket back to a horizontal position.

Separation Chamber Service with HydroSlide



HydroSlide system installed into each sediment chamber.

1 Remove all manhole covers (or open hatches or grates) to gain access to the separation chambers.

2 Lower vacuum truck hose through the screening basket and into the first separation chamber, closest to the inflow pipe.

3 Attach the vacuum truck water supply hose onto the HydroSlide service system quick connector.

4 Start the HydroSlide system using the vacuum truck hose while operating the vacuum line. Debris will be quickly and easily flushed toward the vacuum line and removed. Repeat for each chamber.

5 Remove vacuum line and disconnect truck water supply hose. Repeat steps 3 – 5 for each chamber.

6 Remove vacuum hose and close the bottom screen system doors. Lower / Slide (if equipped with SunGlide Lids) and lock doors.

HydroSlide quick connector with vacuum truck water supply hose attached for sediment removal.

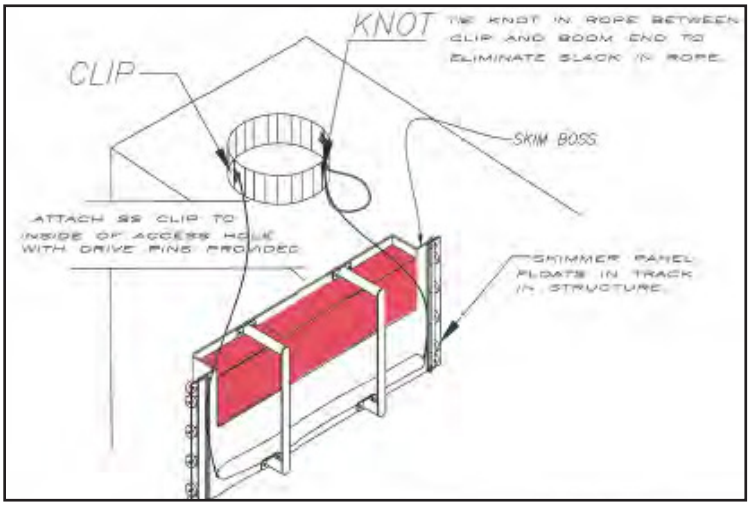
STORMBOOM INFORMATION

General Specification Information

StormBooms provide sufficient contact time, at rated flows, of passing contaminate water. The material composition will capture and retain all hydrocarbons that are absorbed into the physical structure. The composition material of the boom is made of proprietary polymer based beads that are contained within booms or pouches. Such pouches are made of 100% polyester netted fabric with sieve openings and an open area ratio of about 67%.

The boom and netting material are durable and have an expected life of 5 plus years. StormBooms have been proven to absorb up to 180% of its weight within a 300 second contact time. However, the physical increase in size of the boom beads is not more than 50%. StormBooms capture an array of hydrocarbons including oils, grease, gasoline, diesel and PAHs.

The Hydrocarbon Skimmer Panel is located below the rear top access opening in the Nutrient Separating Baffle Box. The skimmer panel may be a reinforced fiberglass flat panel, a fiberglass molded panel or a SkimBoss floating skimmer. Hydrocarbon booms are designed to fit inside the panel which has an expanded metal screen face. There is an oval hole at the top of the panel for inserting or removing the hydrocarbon boom. Each boom is equipped with rope ends to secure the boom in place after it has been inserted into the skimmer panel.



SkimBoss floating skimmer with hydrocarbon boom attached with rope to SS Eye Strap ready for replacement.

Note

StormBooms are single booms for vaults up to 6’ wide and are doubled in length to accommodate wider vault systems.

STORMBOOM MAINTENANCE

StormBoom Installation Procedure

The Nutrient Separating Baffle Box StormBoom is recommended to be inspected every 6 months and cleaned every 12 months.

1 Thread one rope end in one of the top panel holes.

2 Each end of the rope will be on opposite ends of the panel and will be brought up to the rear access opening in the top of the box.

3 Attach rope ends to SS Eye Straps which are fastened to the inside of the rear access hole in the concrete.

4 The bottom of the hydrocarbon boom should look slightly “U” shaped and rest 6” from the bottom of the skimmer panel.

5 Double knot the rope ends to eliminate any slack.

StormBoom Replacement Procedure

1 Remove manhole cover (or open hatch / grate) closest to the outflow to access the StormBoom.

2 Inspect the boom in the skimmer system for oil accumulation. Booms should be replaced once discolored or are close to 1 year of service.

3 The StormBoom has ropes attached to each end that are secured to eyelets adjacent to the access cover.

4 Attach a rope on the end of the new boom to a rope on the end of the old boom and pull to remove. As the old boom is removed, the new boom moves into position.

5 Gather enough excess slack to allow the boom to freely float on the surface of the water at the static level.

6 Attach the rope ends of the new boom to the eyelets adjacent to the access cover.

POST SERVICING PROTOCOL

After completing inspection or maintenance, the service operator should prepare a record of service. The record should include maintenance activities performed, amount and description of debris collected and system condition.

- The owner will retain the service / inspection record for a minimum of five (5) years from the date of maintenance, or in accordance to specified EPA / DEP requirements.
- All records should be made available to the governing municipalities for inspection upon request at any time.
- Transport all debris, trash, litter, organics and sediments to an approved facility for disposal in accordance with local and state requirements.

Nutrient Separating Baffle Box with collected trash, organics and debris inside the screened basket system ready for disposal.

WARRANTY

Warranty Information

Oldcastle Infrastructure products are engineered and manufactured with the intent of being a permanent part of the infrastructure. Oldcastle Infrastructure warranties its products to be free from manufacturing defects for a period of 5 years from the purchase date.

In the event a warranty claim is made and determined to be valid, Oldcastle Infrastructure will replace or repair the product at their own discretion. Warranty claims must be submitted, evaluated and approved by Oldcastle Infrastructure for the claim to be determined valid. All warranty work must be authorized by Oldcastle Infrastructure prior to work beginning not covered by this warranty. There are no warranties expressed or implied other than what is specified herein. Abusive treatment, neglect or improper use of the Nutrient Separating Baffle Box will not be covered by this warranty.

CONTACT INFORMATION

General Inquires

For additional information concerning installation, general usage, maintenance products, warranties or replacement parts please contact:

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Visit our website for in depth information on all of our products!