



Stormwater360

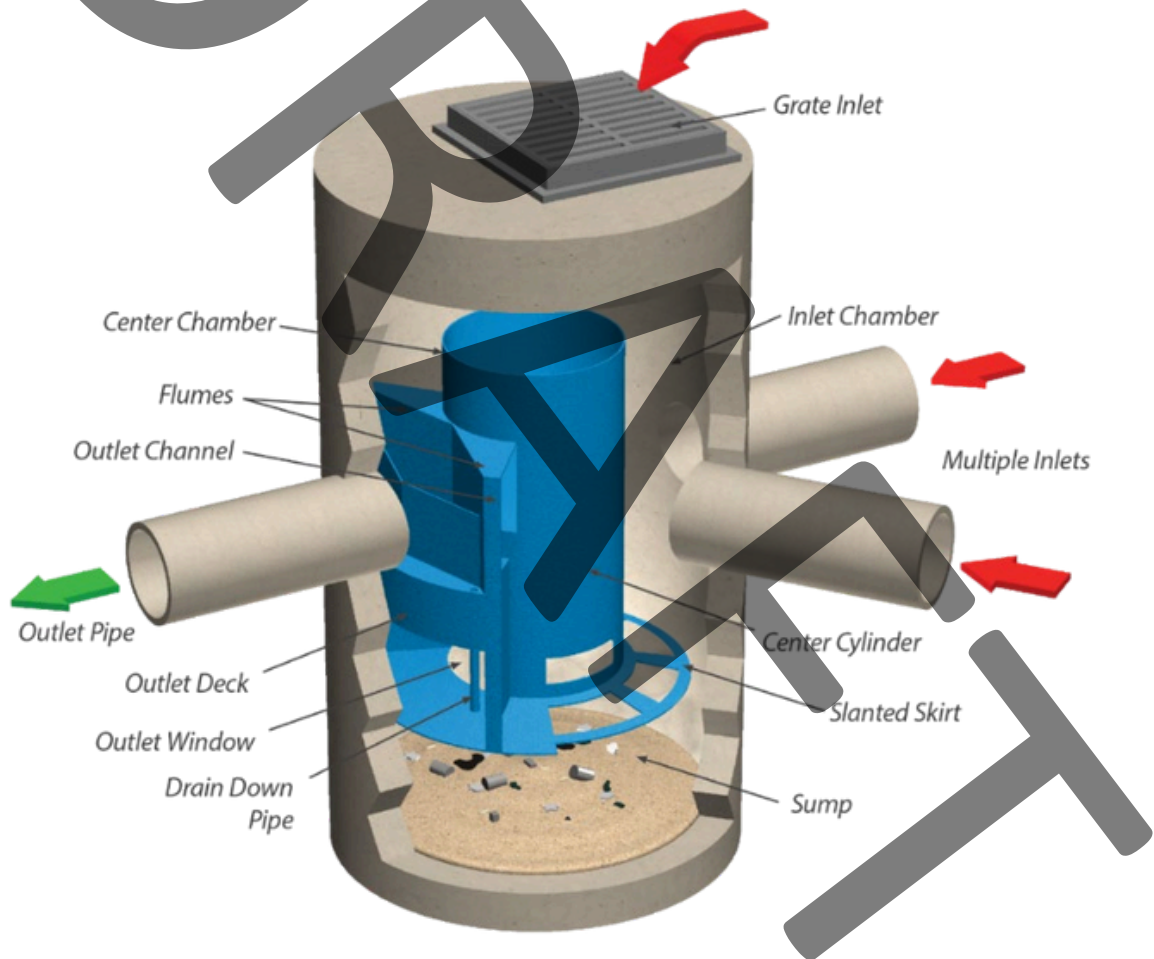
## Cascade Separator™

### Operation, Inspection and Maintenance Guide

DRAFT (for site-specific guidelines email [maintenance@stormwater360.co.nz](mailto:maintenance@stormwater360.co.nz))

## INTRODUCTION

The purpose of this document is to provide device owners, or their representatives, information regarding the operation, inspection and maintenance procedures of the Cascade Separator™ to ensure performance expectations are achieved. Any design concerns or questions please contact Stormwater360 on **0800 STORMWATER**. Please be aware that this document is not intended to be a comprehensive Health & Safety guideline and is not to be used as such. The responsibility of site-specific Health & Safety requirements during operation, inspection and maintenance are that of the device owner and /or their contractors.



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## SECTION A Site Specific Details

This section is to be filled out by the asset owner following installation of the CASCADE SEPARATOR™. For assistance in filling out this form please contact our Maintenance Manager via 0800 STORMWATER.

Please return this completed page, along with 'As Built' drawings via email to [maintenance@stormwater360.co.nz](mailto:maintenance@stormwater360.co.nz).

**Project Name:**

**Project Address:**

**Resource Consent Number:**

**Building Consent Number:**

**Consent/Site Owner:**

**Consent/Site Owner Address:**

**Summary of Installed Devices:**

Stormwater360 Project #	Date Commissioned	Device Model	Estimated Maintenance Frequency (Months)

## SECTION B As Built Drawings

Please attached 'As Built' drawings to this Operation, Inspection and Maintenance guide.

This will provide location details for the Maintenance Team.

Please provide the 'As Built' drawing to the Maintenance Manager at Stormwater360 via email to [maintenance@stormwater360.co.nz](mailto:maintenance@stormwater360.co.nz).

## SECTION C Operation

The CASCADE SEPARATOR™ uses the hydraulic energy of flowing stormwater to operate (driving head and velocity). This enables the flow path in and around the centre chamber to create the two vortices and hence particle settling and separation.

The CASCADE SEPARATOR™ has no other requirement for energy and has no moving internal parts. The device is designed to accommodate a specific flow rate for treatment (Treatment Flow Rate), with the suitable model specified for the site by the Consulting Engineer. Any flow over and above this Treatment Flow Rate is free to bypass over the centre cylinder up to the maximum as per the model specified.

Access to the CASCADE SEPARATOR™ is via a 900 x 900 square Cast Iron Access Cover. The cover lid is held in place with 4 bolts that will require removal prior to lifting. Due to the weight of the lid Stormwater360 recommend the use of an Access Cover lifting tool (Contact Stormwater360 for details of where to purchase). Once the lid is open Stormwater360 recommend barriers be erected around the access point to prevent falling.

Any entry into the CASCADE SEPARATOR™ should be treated as Confined Space work, using only suitably qualified staff.

Apart from the recommend inspections and maintenance as explained below, there is no other requirement to replace any internal components.

## SECTION D Inspection

### General Information:

Inspection is the key to effective maintenance and operation of the CASCADE SEPARATOR™ and is easily carried out. Pollutant transport and deposition may vary throughout the year. Regular inspections will help ensure that the system is only cleaned when required.

At a minimum, inspections should be performed twice per year. Installations should be inspected more frequently where excessive amounts of trash and/or other pollutants are expected.

A visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet chamber, flumes or outlet channel. The inspection should also quantify the accumulation of hydrocarbons, trash and sediment in the system.

Measuring pollutant (sediment) 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 that can be used is provided in the Appendix of this Operation, Inspection & Maintenance Guide.

### Trigger Points for Maintenance:

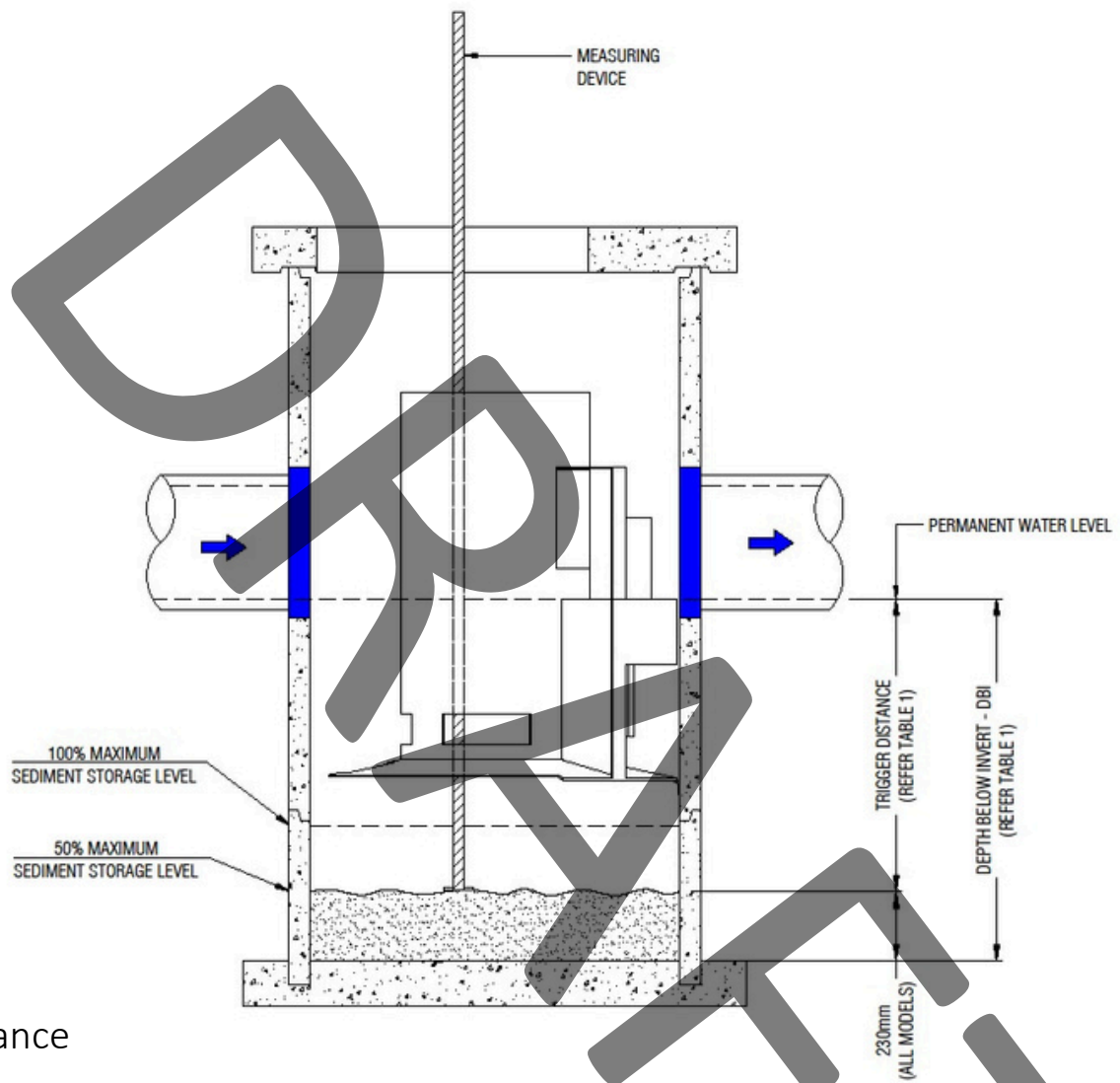
As mention earlier the inspection process will determine if maintenance is required by measuring the accumulation of sediment, trash and hydrocarbons. Performance may be impacted when maximum sediment storage capacity is exceeded.

For floatable pollutants and hydrocarbons accumulating on the top of the water surface visual assessment is the best method used. If a large amount of trash is visible OR a thick layer of hydrocarbon is present, then maintenance would be required.

For sediment levels contained the sump of the device Stormwater360 recommends maintaining the system when sediment level reaches 50% of maximum storage volume (refer Table 1 and Diagram 1 below for trigger measurements).

The level of sediment is easily determined by measuring the distance from the system outlet invert (Permanent Water Level) to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile.

Diagram 1:



## Maintenance

Table 1:

Model	Diameter	Depth below invert (DBI)	50% storage (height from bottom)	TRIGGER DISTANCE
CS-4	DN1200	1200mm	230mm	<b>970mm</b>
CS-5	DN1500	1400mm	230mm	<b>1170mm</b>
CS-6	DN1800	1550mm	230mm	<b>1320mm</b>
CS-8	DN2550	1905mm	230mm	<b>1675mm</b>
CS-10	DN3000	2500mm	230mm	<b>2270mm</b>
CS-12	DN3600	2900mm	230mm	<b>2670mm</b>

## SECTION E Maintenance

When the 'Trigger Distance' as per the above is reached then maintenance is required to be carried out as per the below methodology.

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

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

If there appears to be large amounts of Trash and debris (floatables) present, these can be simply netted out.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and to ensure proper safety precautions. Confined space entry procedures need to be followed if physical access is required.

Disposal of all material removed from the Cascade Separator system must be done in accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal. If any components are damaged during maintenance, please contact Stormwater360 to arrange replacement or repair.



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



A vacuum truck removes pollutants from the system



## Cascade Separator™ Inspection & Maintenance Log

Cascade Model:		Location:			Device Owner:
Date:	Contracting Company:	Perm Water Level to Top of Sediment:	Trigger Distance for Model:	Floatables Layer Thickness:	Maintenance Performed and / or Comments:

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