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**CONTROL SYSTEMS**  
FOR ON-SITE STORMWATER DETENTION

# ON-SITE STORMWATER DETENTION: WHY IS IT NECESSARY?

Amidst today's competitive housing market, there is an increased tendency for sub-divisional development as owners look for ways to capitalise on their land holdings. Houses on large lots are demolished to make way for new townhouses and apartments, allowing for more residents to occupy the same amount of space.

Sub-development of a site adds more hard surfaces such as roofs, paving and driveways. There is also a significant reduction in soft, absorbent surfaces such as lawns and gardens.

These changes result in higher volumes of stormwater runoff, which drains from the site at a faster rate. In many cases, the increased runoff overloads the existing municipal drains, causing nuisance flooding on a regular basis.

To combat the additional surface runoff, there are two options available;

- a) to replace or upgrade the existing municipal drainage system, or
- b) to install an on-site stormwater detention (OSD) system to control the increased discharge rates.

The former option is impractical as it relies on council budget and planned activities. The community is constrained by the council's timeframe in implementing a new drainage system, and every multiple occupancy adds further stormwater overloads. The latter option leaves control in the hands of the developer, and is a cost-effective and convenient solution.

# SO, WHAT'S A STORMWATER DETENTION SYSTEM?

An OSD system controls the flow rate of stormwater that drains from a site during periods of heavy rainfall. Generally, OSD systems consist of a storage component, which holds excess stormwater, and a detention component, which controls the rate of stormwater discharge.

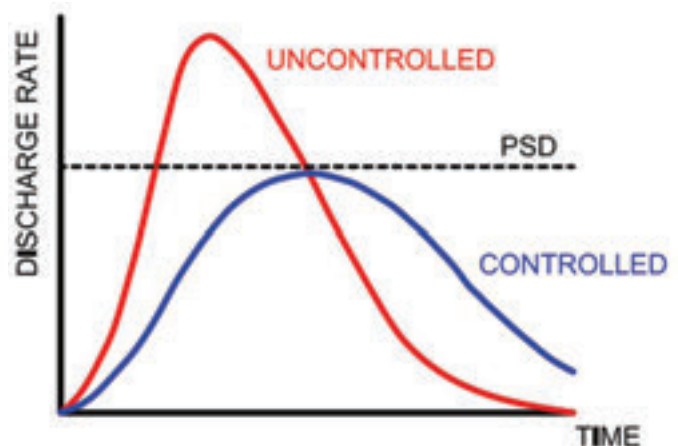
Many councils now require evidence of OSD and drainage planning in the development application process, particularly on sites that may impact downstream properties. Existing council drainage infrastructure is dated, and not designed to cater for the amount of developments now present in dense urban areas. Well-designed OSD systems can limit the peak discharge rate of stormwater to meet the capacity of downstream drainage systems, while sites with little to no on-site detention are prone to flooding on-site or causing flooding further downstream.

Stormwater detention systems can be installed as part of the standard construction process. As the developer controls the time and expenditure schedules, the project can be completed and made available for occupancy or disposal at the earliest possible date and at minimum cost.

## HOW STORMWATER DETENTION SYSTEMS WORK

The analysis of runoff flow rates and required storage volumes involves detailed calculations that should be referred to a hydraulic designer. However, the basic premise of an OSD system is fairly simple.

During a storm, stormwater starts to discharge from a site and into the drainage system. The rate of flow increases significantly as water from the furthest points of the property reaches the discharge point, and the intensity of the storm approaches its peak. Some time after the peak has passed, the flow rate will begin to subside. An example of an uncontrolled stormwater flow rate is represented by the red line in the diagram to the right.



If the highest flow rate during the storm will exceed the permissible site discharge (PSD) rate indicated by the controlling authority, an OSD system is required. The OSD system will temporarily store any excess flow and release it at a controlled lower rate over a longer period of time. This controlled flow rate is represented by the blue line in the diagram above. The OSD system will continue to discharge the collected flow for some time after the storm has passed.

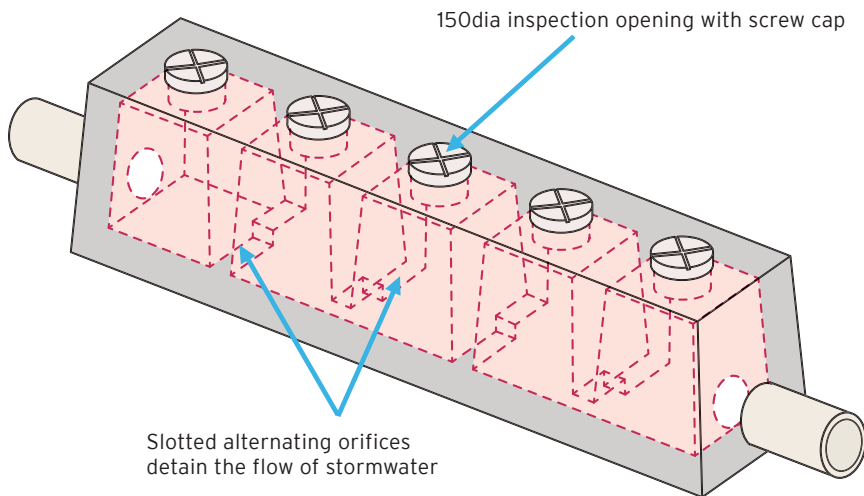
## LOCALLY MANUFACTURED STORMWATER DETENTION SOLUTIONS

SVC offers a range of solutions for customers wishing to implement an on-site stormwater detention system.

All products are manufactured in Melbourne, Australia using locally-sourced materials.

1. **MC2 Multi-Cell Unit**
2. **Variable Control Pit**
3. **Dual Pit System**

# 1. MC2 MULTI-CELL UNIT



An MC2 multi-cell unit.



The base of an MC2 unit, showing the staggered pathway that stormwater would pass through.

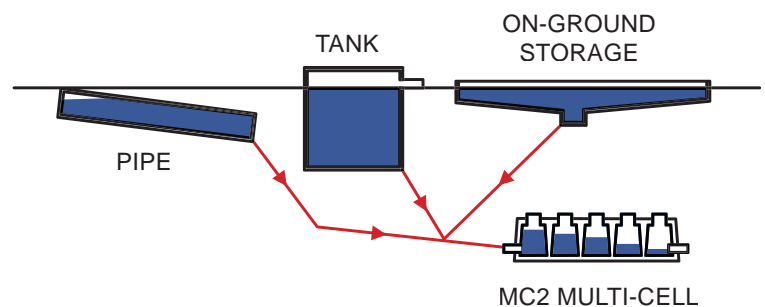
Developed and patented by SVC in conjunction with Swinburne University, the Phillips MC2 Multi-Cell unit is a cost-effective control device that limits the maximum flow rate of stormwater as it discharges from a site.

## HOW IT WORKS

Stormwater enters the MC2 unit and passes through the five internal cells via alternating slotted orifices. This causes enough turbulence to slow down the flow rate, bringing it within the permissible site discharge rate.

Flow characteristics for the MC2 unit are configured at the time of manufacture, where the hydraulic designer must specify the inlet head and required discharge rate. Designed as a 'set-and-forget' solution, the MC2 unit requires low to no maintenance once installation is complete.

The MC2 unit is capable of controlling all surface runoff from residential or commercial sites. In order to prevent blockages of the internal orifices, any surface water entering the MC2 unit should first pass through a stormwater grate to filter out any particles or large debris.

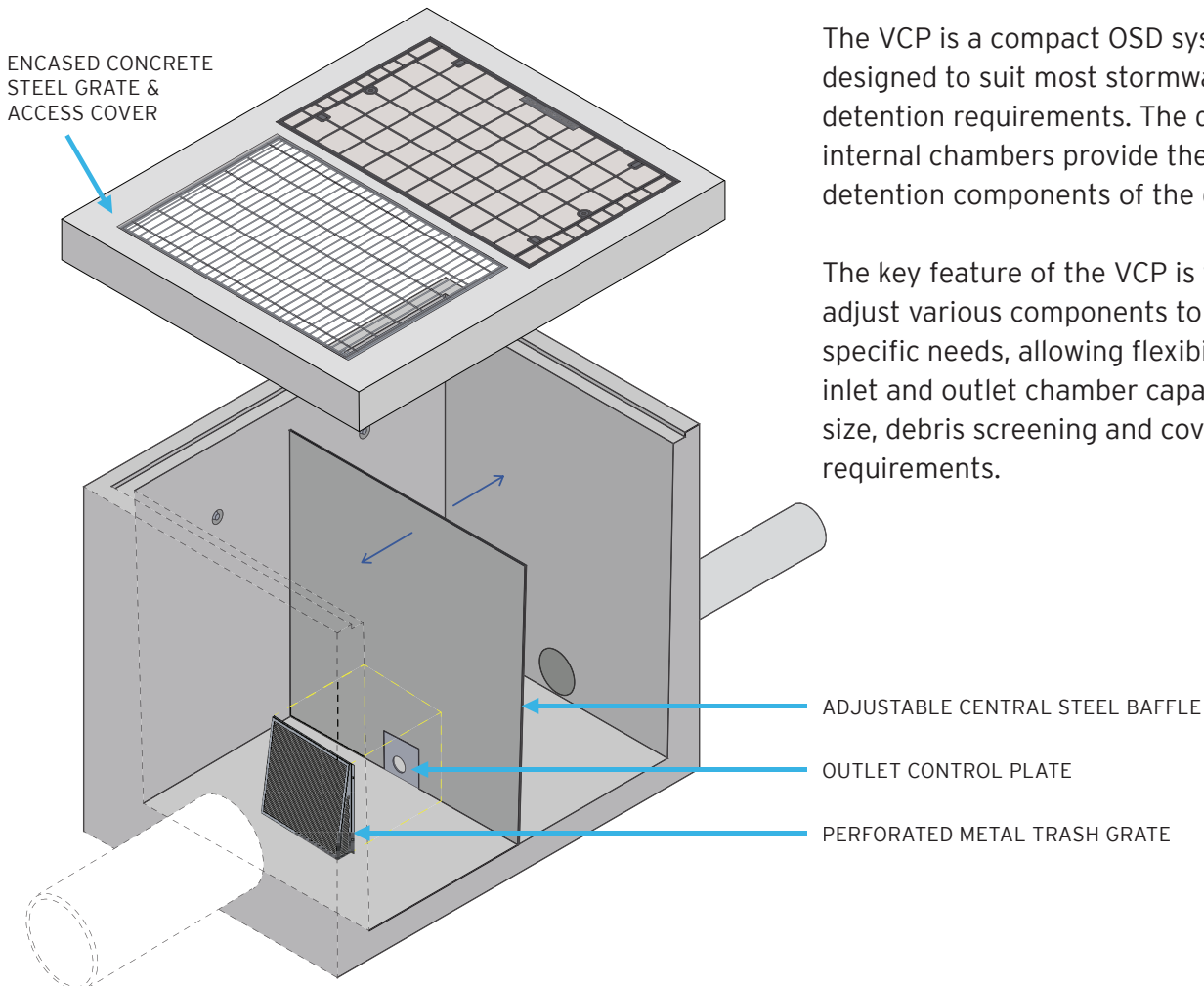


The MC2 unit includes holes in its end walls to suit 150dia or 225dia PVC pipes.

For more information, please refer to the [MC2 Multi-Cell Brochure](#) by SVC.

## 2. VARIABLE CONTROL PIT

SVC's dual-chamber Variable Control Pit (VCP) provides a flexible and cost-effective method to control stormwater outflow from increased density developments.



The VCP is a compact OSD system designed to suit most stormwater detention requirements. The device's two internal chambers provide the storage and detention components of the design.

The key feature of the VCP is the ability to adjust various components to suit site-specific needs, allowing flexibility over inlet and outlet chamber capacity, orifice size, debris screening and cover load requirements.

### UNIT CONFIGURATION OPTIONS

**Sizing options** - the Variable Control Pit is available in **1200x900 at 5 depths ranging from 700-1100H**

**Central galvanised steel baffle** - the adjustable position of the central baffle allows engineers to set the inlet & outlet chamber capacities. The baffle is fitted prior to delivery, saving time for the contractor.

**Outlet control plate** - four orifice sizes are available, ranging from 70mm to 150mm dia.

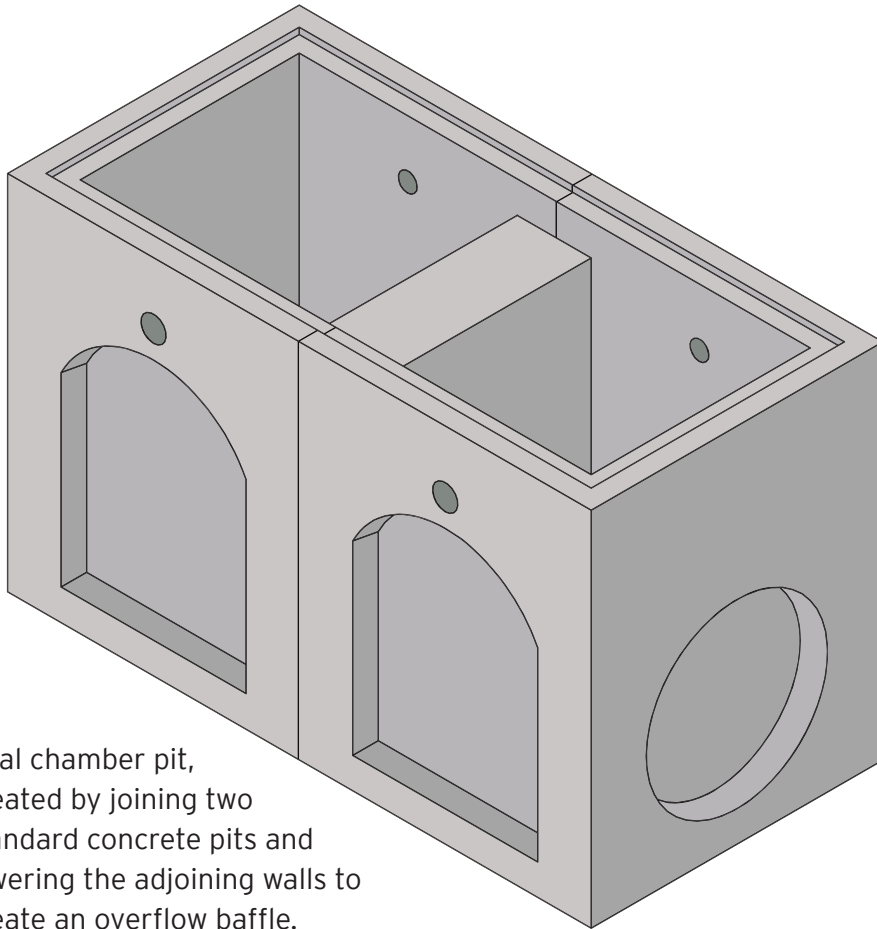
**Perforated metal trash grate** - a single-piece folded metal screen is installed over the control plate in the inlet chamber, available in two sizes for filtration of small particles (8mm) or mid-sized debris (20mm).

**Covers to suit Load Classes B and C** - VCP covers are made from solid precast concrete with a 900x600 lift-out forgebar steel grate over the inlet chamber and a 900x450 cast iron infill cover providing access to the outlet chamber.

Design configuration requirements are to be specified at the time of order.

### 3. DUAL PIT SYSTEM

SVC's standard precast concrete pits can be configured with minor modifications at the time of install to create an on-site stormwater detention system.



Dual chamber pit, created by joining two standard concrete pits and lowering the adjoining walls to create an overflow baffle.

Images: Melbourne Plumbing & Gasfitting



Before and after: On-site adjustments to two stock pits results in the creation of a dual chamber overflow system.



Image: Melbourne Plumbing & Gasfitting

#### AVAILABLE OPTIONS

##### Stock pits with knockouts

Standard SVC pits are manufactured with knockouts on each wall for easy installation of inlet and outlet pipes.

##### Customised stock pits

Standard-sized pits can be manufactured without knockouts and with holes positioned at specific locations.

##### Popular stock pit sizes:

600 x 600 x 900 / 900 x 600 x 900 / 900 x 600 x 1200

Additional stock sizes are available upon request.

# CONTROL SYSTEMS

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