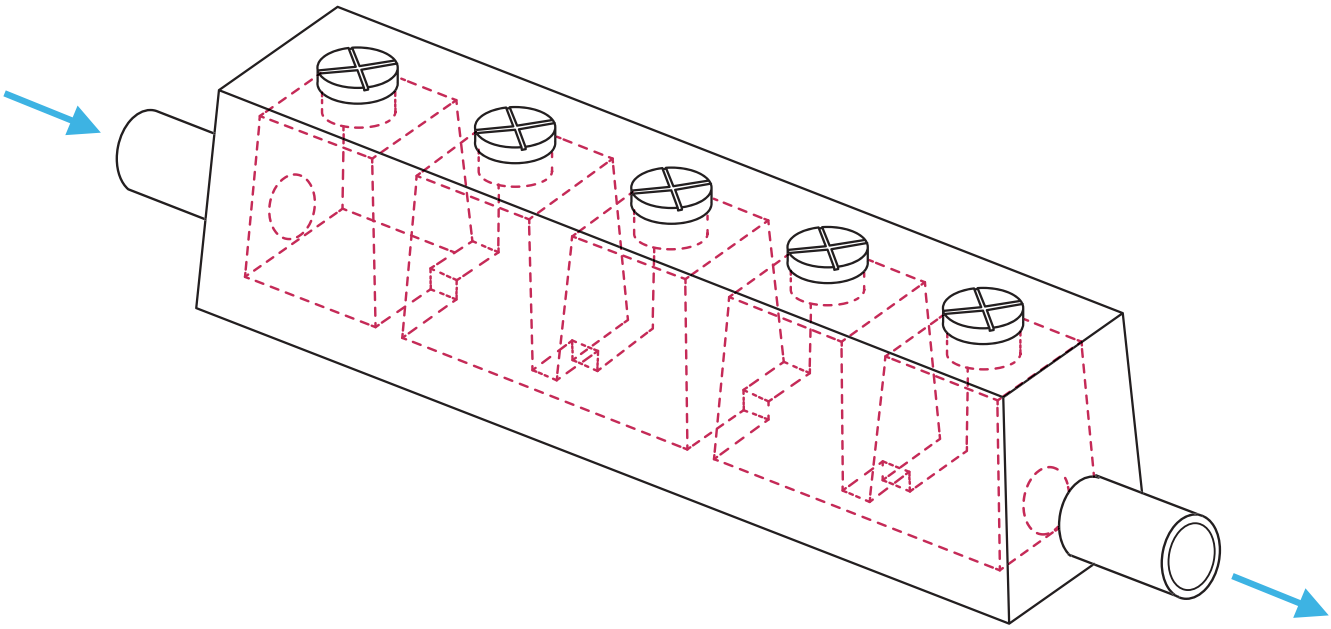
SVC
SINCE 1948
1300 287 782 | svc.com.au
38 JAPADDY ST MORDIALLOC VIC 3195

PHILLIPS

# MC2 Multi-Cell

DETENTION DEVICE



## CONTROL SYSTEMS
FOR STORMWATER

# ON-SITE DETENTION: WHY IS IT NECESSARY?

**Urban sprawl** increases private transport costs, reduces natural resources and generates additional atmospheric pollutants. Higher urban density enhances the cost effectiveness of our existing road, public transport, power, water, sewerage and drainage systems.

Owners seeking to densify and redevelop existing sites for multiple occupancies must consider the need for adequate stormwater drainage.

When a site is redeveloped, the proportion of hard surfaces such as roofs and concrete paving is increased, whilst the proportion of soft, absorbent surfaces such as lawns and gardens is reduced. These changes increase both the quantity and flow rate of stormwater which will drain from the site. In many circumstances, the increased runoff will overload existing municipal drains, causing nuisance flooding on a regular basis.

Two solutions are generally available - replace the existing municipal drains, or install a stormwater detention system on the site. Both options result in direct development costs, but on-site detention allows developers to retain control of the project and keep costs to a minimum.

Due to the nature of the work, replacing existing drainage systems can often be an expensive, messy and lengthy process. If properties drain to the street, the kerb and channel, nature strip and a portion of the pavement will most likely need to be replaced, which results in obvious inconvenience to neighbouring properties. If properties drain to the rear, the prospect of damage to fences, lawns, gardens, trees and outbuildings etc. will also generate a measure of hostility towards the redeveloper.

Replacement of the drainage system may sometimes be proposed as a future activity, where the developer is required to contribute to a drainage levy fund. These schemes suffer from a number of disadvantages, as they do not solve immediate problems. Even if there are sufficient funds in hand for the drainage system to be replaced, and the design is able to cater for all future needs, the community is still constrained by the council's timeframe in implementing the new system. Every multiple occupancy thus adds further stormwater overloads to the existing system.

On-site detention prevents the development of these problems and removes the necessity of the community to be saddled with deferred costs. This is particularly important because the assessment of future development densities and costs are speculative issues.

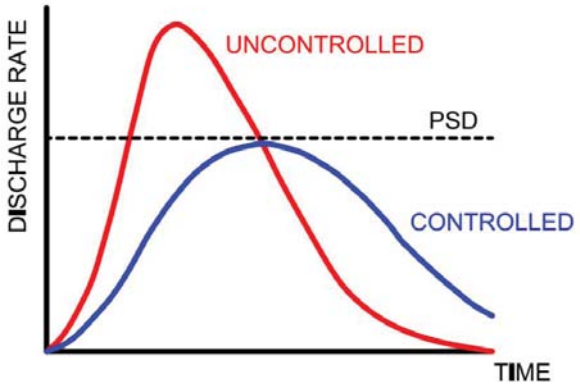
An on-site detention system can be installed as part of the standard construction process. As the developer controls the time and expenditure schedules, the project can be completed and made available for occupancy or disposal at the earliest possible date and at minimum cost.

One of the key factors to a successful redevelopment is ensuring that there is little cause for neighbours to object to any proposals. Keeping the work on-site and free from neighbour involvement is one of the major reasons why on-site detention is an effective solution.

# HOW DETENTION SYSTEMS WORK

**The analysis** of runoff flow rates and storage volumes involves a significant amount of detailed calculations, and should be referred to a hydraulic designer. Despite this, the basic workings of a detention system are relatively simple.

At the onset of a storm, stormwater will commence to discharge from the site. The earliest flow will be from areas nearest the discharge point, but the rate of flow will increase significantly as water from the furthest points of the property reaches the discharge point. As the intensity of the storm approaches its peak, the discharge rate will increase relatively sharply to a maximum. Some time after the peak has passed, the flow rate will start to subside. An example of an uncontrolled flow rate can be seen by the red line in the diagram to the right.




If the highest flow rate will exceed the **permissible site discharge** (PSD) rate indicated by the controlling authority, an on-site detention (OSD) system will need to be installed. The OSD system will temporarily store any excess flow and release it at a controlled lower rate over a longer period of time, as can be seen by the blue line in the diagram above, which demonstrates a lower peak and a longer tail. The system will continue to discharge the collected flow for some time after the storm has passed.

A detention system has two components - a device to control the flow rate of the discharge from the site and storage for the 'excess' stormwater. The storage can be provided underground by large pipes or tanks. Ground level storage is provided by allowing water to pond in a broad but shallow depression in a paved area such as a driveway. Unpaved areas are not recommended.

The **Phillips Multi-Cell system** is the control device which limits the maximum flow rate which will be discharged. The new **MC2 system** consists of a shell which is divided into cells by diaphragms, which are perforated by rectangular slots. These slots are designed to be blockage-free, meaning that users are not required to establish regular maintenance programs. However, surface water must enter the MC2 system through an **approved grate**, which can be supplied by SVC.

The **MC2 system** demonstrates outstanding hydraulic efficiency. A single MC2 unit can control the discharge from any commercial or residential site and is much more compact than previous multi-cell devices, allowing dramatic cost reductions.

Site drainage systems are never designed to provide for all possible storms due to the extremely high costs involved. Your hydraulic designer will arrange a bypass for flows which are in excess of those within the designated storm period. This will allow the water storage to overflow directly into the public drainage system.

The maximum flow rate for the system will be detailed in the hydraulic design specification and is set to ensure that the permissible site discharge specified by the controlling authority will not be exceeded. The flow characteristics of MC2 units are configured in the factory and cannot be adjusted on-site.

# FEATURES AND BENEFITS OF THE MC2 SYSTEM


**The Phillips MC2 Multi-Cell stormwater control device was developed to meet the numerous criteria required in the redevelopment of existing sites.**

**A list of features and benefits is outlined below.**

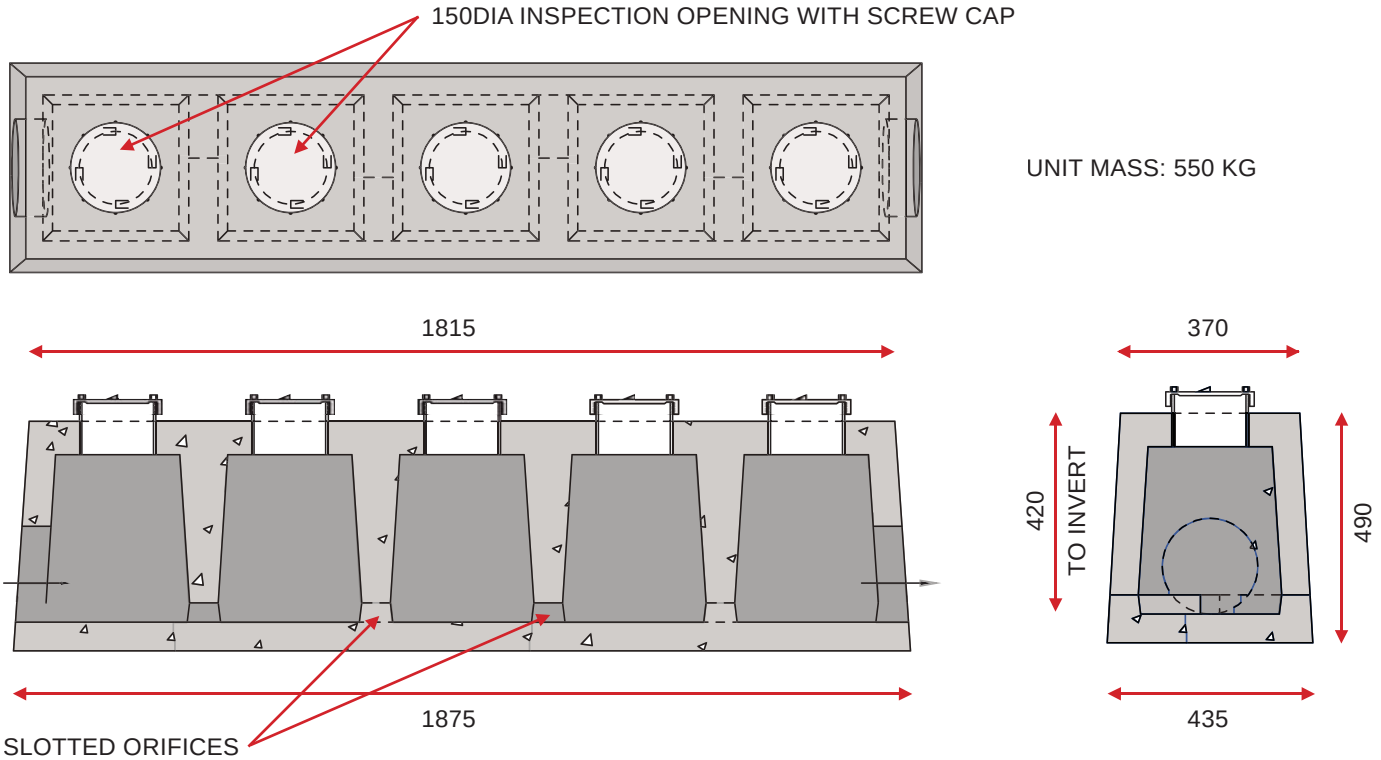
- a practical, durable and economical means of controlling the discharge from on-site storages, performing more reliably and accurately than other devices
- precise outflow control for a wide range of flow rates and inlet heads
- continuously variable head/discharge relationship enables ‘exact’ design solutions
- higher head capabilities permit storage pipes to be laid at self-scouring grades
- installed entirely on the development site with minimal disturbance to neighbours and no interference with the existing municipal drainage system
- no nuisance overflows while work is in progress as the site continues to be drained
- compact, unobtrusive and easy to install; less excavation and pipework and fewer pits are required
- the on-site storage can be remote from the MC2 unit and may be located above, on or below ground level
- the standard design and direct supply from the manufacturer ensures short delivery times
- quality control from orders being individually prepared, and control documentation traces the product through the production and checking prcoesses. The system flow rate is preset in the factory and requires no on-site adjustments
- the use of standard MC2 units simplifies the design process and the permit application process
- interference-proof one-piece units with no loose components
- sustained performance even when not maintained, and no moving parts

## ABOUT THE SUPPLIER

SVC Products Pty Ltd is a manufacturer of quality, innovative precast concrete products and has been in operation since 1948. In 1991, SVC’s in-house engineering and manufacturing team worked to develop and patent the MC2 Multi-Cell in conjunction with the inventor **Dr Donald I. Phillips, Senior Lecturer of Water Engineering at the Swinburne University of Technology**.

SVC’s complementary range of stock precast concrete pits and covers, cast iron access covers and galvanised steel grates are compliant with Australian Standards and can be installed to suit an MC2 system. For more information, please contact **sales@svc.com.au**.

# PRODUCT INFORMATION



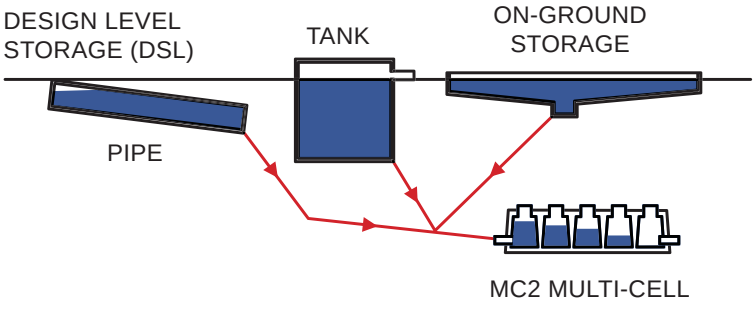

**UNIT SPECIFICATION**
All MC2 units are set up in the factory and branded with a model code number which identifies the flow characteristics of the unit. This configuration cannot be changed on-site. Typical model codes, such as MC2-A12 and MC2-A27 are listed on the **MC2 Performance Charts** on page 6. Designers may use the two charts to identify the MC2 model they require, based on the inlet head and required discharge.

If a performance curve does not pass precisely through the design head/discharge coordinate, designers can provide an exact solution by adjusting the inlet head, i.e. by adopting a lower installed depth.

**INLET HEAD**
MC2 units may be installed with a fall to ensure that systems drain completely, or to follow the slope of a natural or landscaped surface. The fall along the length of the unit should not exceed 20mm or 5% of inlet head, whichever is greater. The inlet head is measured from the surface of the design storage, at design capacity, to the mean invert level of the MC2 unit, i.e. the floor level at the centre of the centre cell.

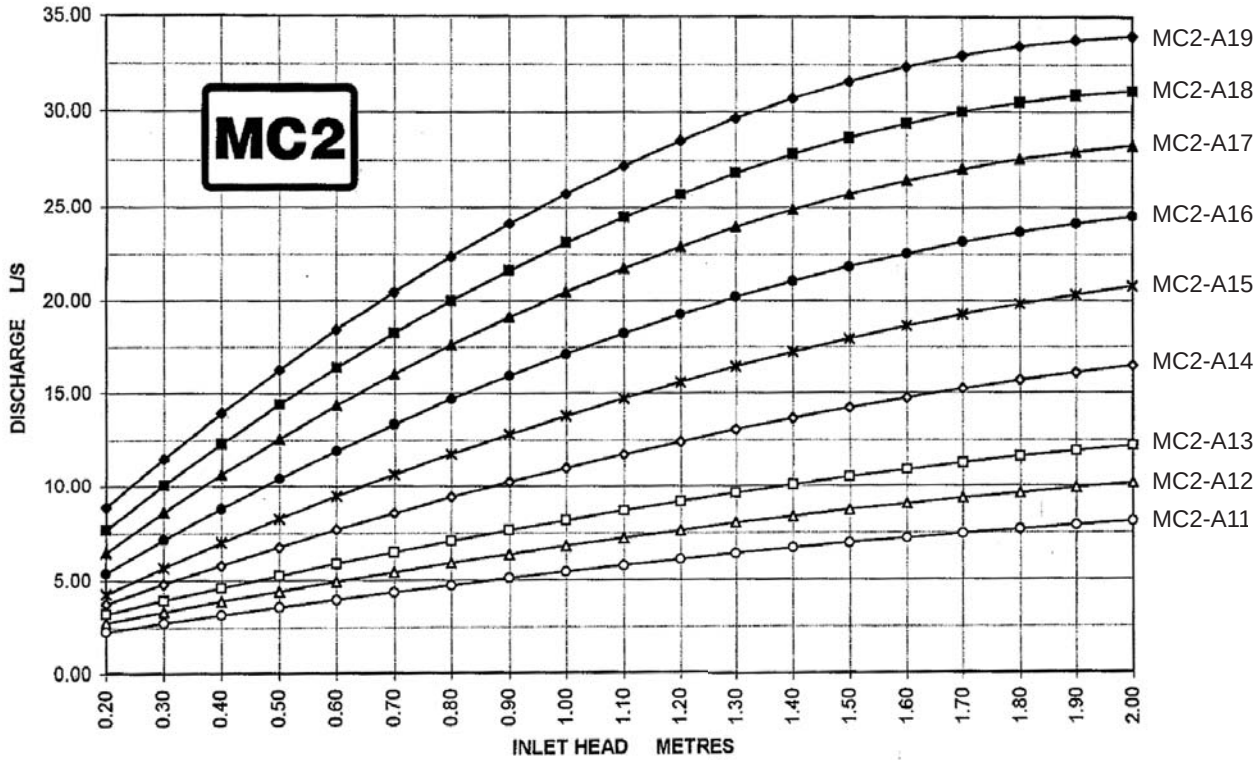
**INLET AND OUTLET**
The standard MC2 configuration includes holes in the end walls to suit 150 dia PVC pipes. Other options are available at extra cost.

**SYSTEM PROTECTION**
When an MC2 is required to accept stormwater from an open storage, it should be protected by a grate with a maximum slot size of 100x20. Similar protection should be provided whenever it is anticipated that significantly-sized debris may find its way into the discharge system.

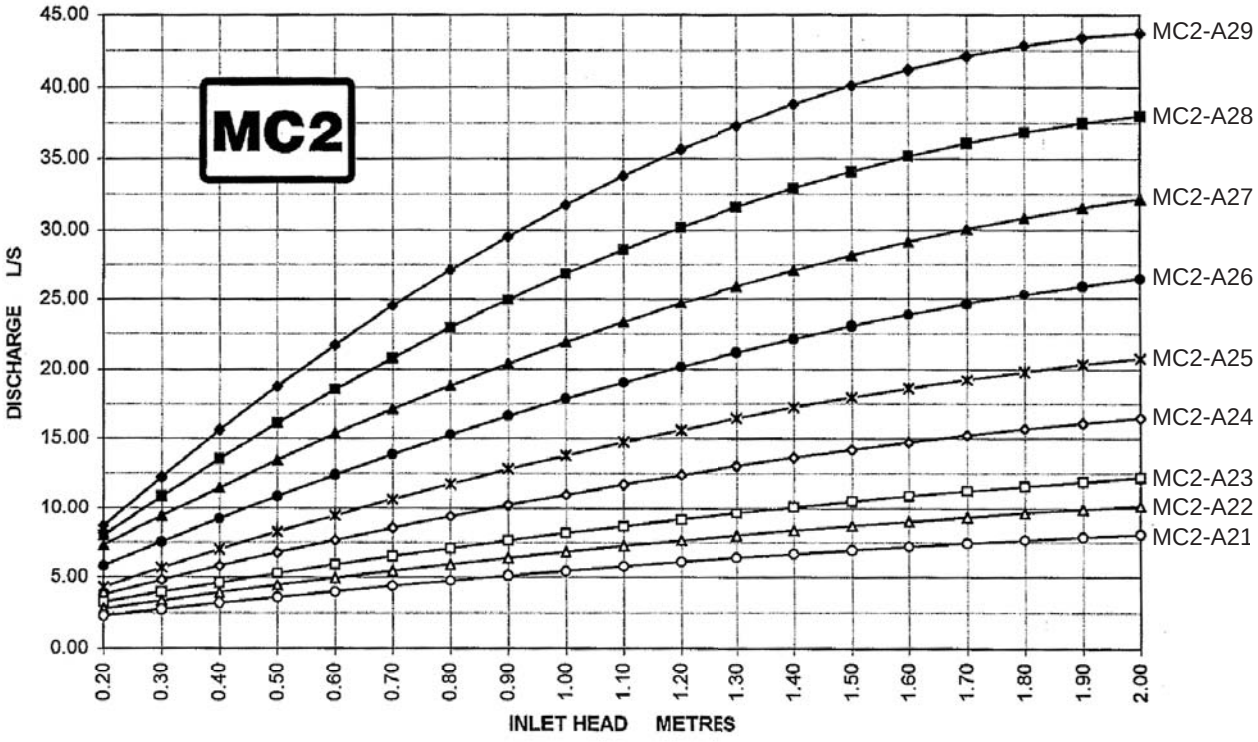


# MC2 PERFORMANCE CHARTS

## 150 DIAMETER OUTLET




## 225 DIAMETER OUTLET



# FREQUENTLY ASKED QUESTIONS

## MAINTENANCE

**How frequently should I inspect the MC2 unit?**
The MC2 was designed to be a maintenance-free, 'set and forget' product. The sewer quality PVC inspection openings cast into the top surface provide access to the individual cells, but just like openings in a sewer line, they are only provided in case they are ever needed. Smaller litter and silt will flush through the MC2. To prevent the entry of larger litter, keep grates in place on all pits that receive surface water.

**How can you tell if the MC2 is blocked without opening the inspection openings?**
Designers should ensure that system overflows are visible. If an installation is used as a waste disposal unit or abused in some other way, a visible overflow during modest storms will alert occupiers to the problem.

## LOCATING THE MC2

**What is the best position for the MC2?**
The OSD system will be most cost-effective if the MC2 controls all runoff from the site. This generally requires the MC2 to be located just inside the property boundary. If the MC2 is located under a garden bed or lawn area, the unit will be protected from wheel loads and the inspection openings will be readily accessible.

## RESTRICTED SITES

**My site is very restricted. Can I locate the MC2 under a concrete driveway?**
We generally recommend that the MC2 be sited in a garden area, even though it is most unlikely that you will ever need to open the inspection openings to gain access to the cells. If you need to place the MC2 in a concrete driveway, consolidate the backfill around the MC2 and reinforce the driveway slab to distribute the wheel loads.

**Should I provide access to the inspection openings if the MC2 is buried under a concrete slab?**
Yes. We recommend that you provide circular covers over the first and last inspection openings. The covers may be similar to those used in service stations to provide access to their underground tanks. The location of the intermediate openings should be scribed into the surface of the concrete and a circular 'soft spot' should be built into the concrete to allow the concrete to be broken out easily but neatly. The likelihood of wheel loads will need to be considered.

**What if I want to place the MC2 in a gravel driveway?**
In a gravel driveway, the MC2 should have a minimum of 600mm cover to protect it from wheel loads. When this is not possible, place a protective layer of reinforced concrete between the MC2 and the surface gravel. Alternatively, if the driveway is very narrow, it may be feasible to place the MC2 along the centreline of the driveway.

## SHALLOW INSTALLATIONS

**My site discharges to the kerb and channel and I can't bury the MC2.**
Let it poke above the natural surface, but hide it in a landscape feature! Build a grassed mound of soil over it, or build a brick surround as a planter box and plant flowers on top of it.

## DEEP INSTALLATIONS - EXTENDING THE INSPECTION OPENINGS

**Should I extend the inspection openings to surface level if the MC2 is very deep in the ground?**
It's your choice, but sewer inspection openings are generally not raised to surface level. If you really want to enable inspection without digging, consider extending only the first and last inspection openings.

## INSTALLATION

**Which end should point downstream?**
The MC2 is symmetrical. Either end can point upstream or downstream.

**How do I adjust the MC2?**
The product is designed to be tamper-proof and cannot be adjusted. All units are configured during manufacture so that no on-site adjustments are required.

**How do I move the MC2 into position?**
The MC2 is generally delivered on a crane truck. If the truck can safely stand close to a prepared hole, our driver will lift it into position. Otherwise, the driver will place it on the ground. The two lifting eyes cast into the top surface enable drainers to move the 550kg unit into position.

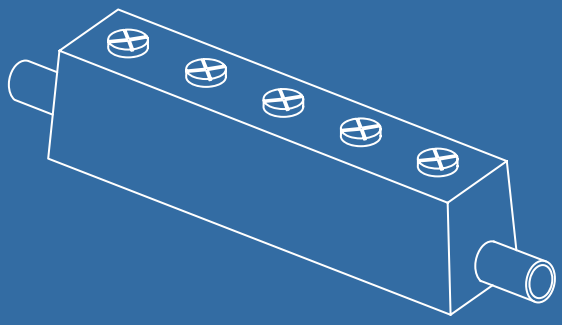
PHILLIPS

# MC2 Multi-Cell

DETENTION DEVICE

# CONTROL SYSTEMS
## FOR STORMWATER





SVC

SINCE 1948

**1300 287 782 | svc.com.au**

38 JAPADDY ST MORDIALLOC VIC 3195