

OSD Design Guidelines

Version 1.1 – August 2015

Document Control

These guidelines may change from time to time and it is recommended that you consult the electronic reference copy at www.casey.vic.gov.au to ensure that you have the current version. Alternatively you may contact the Stormwater Management Team on 03 9705 5200.

Responsible Department – Engineering and Asset Management

Introduction

The City of Casey has an adopted [On-Site Stormwater Detention \(OSD\) Policy](#). The OSD Policy requires control of the rate of stormwater discharge from a development site to prevent any adverse impact on downstream properties. This requirement can apply to all storm events up to and including the 100-year ARI event.

The need for an OSD system is assessed by Council upon receipt of a planning application and will be included as a condition on the planning permit issued by Council. All planning permits issued from May 2015 include the required detention volume and permissible site discharge in the relevant condition. For older permits please contact the Stormwater Management Team before commencing design to obtain the required design parameters.

The design of the OSD system must be to the satisfaction of Council.

The OSD Design Guidelines will assist applicants to design an OSD system in accordance with Council's requirements.

The OSD Design Guidelines should be read with the On-Site Stormwater Detention Policy.

Technical Enquiries

Enquiries regarding site drainage or on-site stormwater detention should be directed to:

- » Stormwater Management Team
Engineering and Asset Management Department
City of Casey
PO Box 1000
Narre Warren VIC 3805
- » Telephone 03 9705 5200

1 – System Elements

The key elements of an On-Site Stormwater Detention (OSD) system are:

- » A runoff collection system consisting of gutters, downpipes, pits and pipes
- » A runoff storage system
- » An outlet structure to control the rate of stormwater discharge from the runoff storage system to the Council drainage network

Each element is discussed further below.

1.1 – Runoff Collection System

The runoff collection system must collect runoff from all pervious and impervious areas and direct it to the runoff storage system.

Surface inlet pits must be fitted with a suitable grate to prevent litter entering the underground drainage system and causing blockages.

Site drainage must be designed in accordance with Australian Standard AS3500.3:2003 National Plumbing and Drainage Code – Stormwater Drainage.

The Relevant Building Surveyor for the development is responsible for approving the design of the site drainage system in accordance with Regulation 610 of the Building Regulations 2006.

1.2 – Runoff Storage System

The runoff storage system is required to temporarily store stormwater runoff during a storm. The runoff storage system must:

- » Provide the storage volume stated in the planning permit
- » Drain within 72 hours to ensure the storage volume is available for a subsequent storm event

The runoff storage system may consist of the following structures (or combination of structures):

- » Below ground tank(s) or pipe(s)
- » Above ground storage in a grassed or landscaped area where the storage volume can be provided with minimal adjustment to ground levels
- » Above ground tank(s) connected to the internal reuse system of a building on the development site
- » Above ground tank(s) fitted with a controlled discharge orifice to maintain an active storage volume within the tank

Each storage system is discussed further below.

1.2.1 – Below Ground Storage System

Below ground storage systems must:

- » Be structurally designed to withstand all service loads and provide a service life of at least 50 years
- » Be located outside the tree protection zone (TPZ) of any trees to be retained
- » Have a minimum soil cover of 300mm in landscaped areas
- » Be fitted with a child proof locking system for the surface grate where the depth of the below ground storage facility exceeds 1,200mm

1.2.2 – Above Ground Storage System

Above ground storage systems must:

- » Not be unsightly or hazardous
- » Be totally impermeable except for infiltration into the ground where soil conditions allow and the system is located at least five metres from any building foundations
- » Have a ponding depth no greater than 200mm in areas where vehicles will be parked or otherwise no greater than 300mm

1.2.3 – Rainwater Tanks

A rainwater storage tank can be credited toward the total volume of the runoff storage system when the tank is:

- » Connected to the dwelling for regular uses such as toilet flushing and clothes washing, or
- » Fitted with a controlled discharge orifice to maintain an active storage volume within the tank

One-third of the total volume of the tank can count toward overall site storage when the tank is connected to the dwelling for reuse.

The active storage volume of the tank can also count toward the overall site storage when the tank is fitted with a controlled discharge orifice.

Council may reduce the storage volume credited to the rainwater tank in proportion to the amount of roof area that drains to the tank.

1.3 – Flow Control Outlet

The flow control outlet must be located within the boundaries of the lot between the storage system and the Council drainage system. The flow control outlet must not be located within a Council drainage easement.

The outlet must limit the rate of flow to the Council drainage system to the permissible site discharge (PSD) when the OSD storage is full (maximum head).

The outlet must be resistant to blockage and must include a trash grate located upstream of the outlet or sufficient screening on all inlets.

The flow control outlet must use either the SVC MC2 Multicell (or approved equivalent) or an orifice and baffle wall arrangement.

The orifice sizing calculation is detailed below.

1.3.1 – Outlet Control Orifice Sizing

The sizing of the outlet control orifice is based on the following parameters:

Table 1 – Outlet Control Orifice Sizing Parameters

Parameter	Nomenclature (Unit)	Guidance
Orifice diameter	d (millimetres)	Minimum diameter is 50mm
Height difference	H (metres)	Distance from top water level to centre of orifice
Permissible Site Discharge	PSD (litres/sec)	Specified by Council

The required orifice diameter is calculated as follows:

$$d = 21.9 * \sqrt{[PSD / \sqrt{H}]} \quad \text{mm}$$

The minimum orifice diameter is 50mm. An SVC MC2 Multicell unit or approved equivalent must be used for outlet control when the required orifice diameter is found to be less than 50mm.

1.3.2 – Example Orifice Sizing Calculation

The permissible site discharge for a unit development is 8 litres per second.

A 450mm diameter pipe is proposed beneath the driveway to provide runoff storage.

When the runoff storage is full the height difference between the top water level and the centre of the orifice will be 450mm.

Calculate the required orifice diameter to control the rate of discharge:

$$d = 21.9 * \sqrt{[PSD / \sqrt{H}]} \quad \text{mm}$$

$$d = 21.9 * \sqrt{[8 / \sqrt{0.45}]}$$

$$d = 75.63 \quad \text{mm}$$

Adopt **75 mm** orifice

1.4 – Overland Flow

The runoff storage system and flow control outlet structure must be designed to safely convey overflows to an adequate Council overland flow path or drainage system. This requirement may be waived if Council deems that no suitable overland flow path or drainage system is available and the OSD system has been designed to detain the 100 year ARI storm.

2 – OSD Design Checklist

The OSD Design Checklist will assist applicants in meeting Council's requirements first-time. Applicants are encouraged to include the completed checklist with their submission to Council.

The OSD Design Checklist is included at the end of these guidelines.

3 – Certification of Design

The OSD system design must be certified by a qualified Civil Engineer.

4 – Submission and Assessment Procedure

4.1 – Submission Form

Applicants must complete the Submission of Drainage Plans form and submit either two hard copies or a PDF electronic copy of the design plans to Council.

Submissions must be addressed to:

» Stormwater Management Team
Engineering and Asset Management Department
City of Casey
PO Box 1000
Narre Warren VIC 3805

» caseycc@casey.vic.gov.au

4.2 – Assessment

Council will review each application within 10 business days in accordance with our Customer Service Commitment.

4.3 – Direction to Amend Design

If the OSD system design does not satisfy Council's requirements the applicant will be notified and issued with a written direction to amend the design.

The applicant must resubmit the amended design for reassessment.

4.4 – Return of Approved Plans

When the OSD system satisfies Council's requirements the plans will be stamped and one copy will be returned to the applicant.

Contact City of Casey

03 9705 5200

NRS: 133 677 (for the deaf, hearing or speech impaired)

TIS: 131 450 (Translating and Interpreting Service)

caseycc@casey.vic.gov.au

casey.vic.gov.au

 [facebook.com/CityOfCasey](https://www.facebook.com/CityOfCasey)

 [@CityOfCasey](https://twitter.com/CityOfCasey)

PO Box 1000
Narre Warren VIC 3805

Customer Service Centres

Cranbourne

Cranbourne Park Shopping Centre

Narre Warren

Magid Drive

Narre Warren South

Amberly Park Shopping Centre

City of Casey – OSD Design Checklist

Project Details

Address	
Planning Permit No.	PlnA
Permissible Site Discharge (PSD)	(litres/sec)
Required storage volume	(m ³)

1 – OSD system

Ref	Requirement	Comments	Pass	Fail	NA
1.1	OSD storage volume equals or exceeds required storage volume	Storage = __ m ³			
1.2	Outlet orifice controls rate of discharge to permissible site discharge (PSD) when OSD storage is full (maximum system head)	Outlet Q = __ litres/sec			
1.3	Top level of orifice pit baffle wall is set at or above the maximum (design) water level needed to achieve the required storage volume	Maximum water level = __ m AHD Top of baffle wall level = __ m AHD			
1.4	Storage volume is apportioned between tanks and below ground system according to relative catchment sizes				
1.5	Below ground storage system pipes are not located beneath a habitable building				
1.6	Orifice pit outlet invert level is above the invert level of the property connection to the legal point of discharge (LPD)				
1.7	Safe surcharge location provided if orifice outlet blocked or OSD storage capacity exceeded (desirable but not mandatory if detaining 100 year ARI storm on-site)				
1.8	Finished floor level of dwelling(s) is an absolute minimum of 150mm above surcharge water level				
1.9	Finished surface levels of grated pits upstream of the orifice pit are above the top level of the baffle wall or the finished surface level of the nominated surcharge pit				

2 – General drainage requirements

Ref	Requirement	Comments	Pass	Fail	NA
2.1	<p>Pits are appropriate size for depth to invert:</p> <p>≤600mm 450x450mm</p> <p>≤900mm 600x600mm</p> <p>≤1200mm 600x900mm</p> <p>>1200mm 900x900mm</p>				
2.2	Pits deeper than 900mm are fitted with step irons				
2.3	<p>Pipes have adequate grade:</p> <p>≤150mm 1:100 min.</p> <p>≤225mm 1:200 min.</p> <p>≤300mm 1:250 min.</p> <p>≥375mm 1:300 min.</p>				
2.4	Internal drainage connected to the legal point of stormwater discharge (LPD) via 100mm diameter pipe (residential)				
2.5	Internal drainage connected to the legal point of stormwater discharge (LPD) via 225mm diameter pipe (commercial/industrial)				

3 – Drainage within driveway pavement

Ref	Requirement	Comments	Pass	Fail	NA
3.1	<p>Pits in the driveway pavement are appropriate class for the expected level of vehicle traffic</p> <p>Passenger vehicles: Class C</p> <p>Heavy vehicles: Class D</p>				
3.2	Pipes beneath driveway pavement have absolute minimum 100mm cover from bottom of pavement to top of pipe				

4 – Plan details

Ref	Requirement	Comments	Pass	Fail	NA
4.1	Plans are legible and to a scale of generally no less than 1:200 at A3 or 1:100 at A1				
4.2	Site boundaries, natural surface levels and proposed finished surface levels (spot levels or contours) are shown on the plan				
4.3	Location and size of all existing Council assets shown on the plan				
4.4	Location and finished floor levels of all existing and proposed buildings are shown on the plan				
4.5	Pits are numbered and listed in a pit schedule				
4.6	Pipes are labelled with diameter and gradient				

5 – Proposed Council drainage assets

Ref	Requirement	Comments	Pass	Fail	NA
5.1	The proposed design includes future City of Casey drainage assets				
5.2	All new Council assets reference the appropriate City of Casey or MPA Standard Drawing				
5.3	New pits have a minimum 1 metre offset from vehicles crossovers				
5.4	Long section plan plotted at scale no smaller than 1:500H and 1:50V				
5.5	Long section includes: Pipe diameter, material and class Pipe gradients Actual discharge and pipe capacity Flow velocity Pipe length Invert levels Depth to invert Finished surface levels Existing surface levels				

6 – Notes and comments