STORMWATER MANAGEMENT

SUTHERLAND SHIRE

ENVIRONMENTAL SPECIFICATION 2025

SUTHERLAND SHIRE

DOCUMENT CONTROL

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Rational: Minor formatting changes. Clarification on conditions for level spreaders, infiltration trenches, building freeboard and connecting to Council's pipe infrastructure. Minor corrections to figures. Edits made to Appendix B.		

Contents

Definitions

Absorption trench - is a trench excavated into the ground for the purpose of storing an initial volume of rainfall before that water seeps into the soil in which the trench is excavated.

Annual exceedance probability (AEP) - is the probability that a flood of a given or larger magnitude will occur within a period of one year. Its reciprocal is equivalent to average recurrence interval (ARI).

Bioretention rain garden (or bio basin) - is a vegetated bed of filter media for the purpose of capturing stormwater runoff for water quality treatment through the filtration of sediment and biological uptake of nutrients.

Bioretention swales (or bioswales) - are deliberately formed surface depressions for the conveyance of stormwater runoff that include a vegetated infiltration trench within the channel invert for the purpose of water quality treatment through the filtration of sediment and biological uptake of nutrients.

Charged System – is a drainage system consisting of sealed stormwater pipes and down pipes that operate under hydraulic pressure.

Coastal wetland - is a wetland identified in the *State Environmental Planning Policy (Resilience and Hazards) 2021* (*Resilience and Hazards SEPP*), previously known as *State Environmental Planning Policy* (*Coastal Management*) *2018* (*Coastal Management SEPP*).

Controlled Activities - has the same meaning as the NRAR Guidelines (*Guidelines for controlled activities on waterfront land, Riparian Corridors*, Natural Resources Access Regulator (NRAR), NSW Department of Industry, 2018)

Discharge control - is a device that stores water and limits the rate of discharge from the development site.

Dispersion trench/Level Spreader - is a trench excavated into the ground for the purpose of dispersing overflows and discharges from stormwater systems.

Easement - is a legal right held by an owner of land or public authority in respect of another land parcel. Easements are commonly created to enable access across other properties, such as for drainage, pipelines, footways, etc.

Exceedances per year (EY) - is a term used for events more frequent than 50% AEP. For example, 2 EY is equivalent to a design event with a 6-month recurrence interval when there is no seasonality in flood occurrence.

Flooding – Flood is a natural occurrence when water covers land that is normally dry. It may result from coastal inundation (excluding tsunamis) or catchment flooding, or a combination of both. Flooding results from relatively high stream flow that overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flowpaths associated with major drainage, and/or coastal inundation resulting from super-elevated sea levels and/or waves overtopping coastline defences excluding tsunami.

Types of catchment flooding include mainstream (also called riverine) and overland flooding:

- Mainstream flooding is a relatively high stream flow which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam.

- Overland flooding is inundation by local runoff on its way to a waterway (rather than overbank discharge from a waterway). Typically, overland flooding is relatively quick to occur and subside (compared to mainstream flooding on rivers).

Coastal inundation includes flooding resulting from elevated ocean and waterway entrance conditions in estuaries and ocean seawater due to storm surge or climate change induced sea level rise. Design oceanic event levels are listed in Council's Stormwater Specification.

Foreshore land – land that exists below the Mean High-Water Mark.

Gravity Fed System – is a drainage system consisting of stormwater piping that provides for discharge to a termination at a level that is lower than all preceding inlet pits.

Impervious area - is an area of impermeable surface (excluding pools and porous paving).

Infiltration - is the practice of discharging stormwater or drainage water to the ground.

Infiltration trench - is a trench excavated into the soil for the purpose of dispersing all stormwater up to the 1% AEP event unless a high-flow spreader is provided. Infiltration trenches will vary in volume depending on the permeability of the parent soil and should be designed by a qualified Civil Engineer based on soil permeability testing.

Major drainage system - is the part of a drainage system that carries relatively large flows. It consists of the system of streams, floodway's, stormwater channels, retarding basins and street pavements. It is generally designed to protect people and indoor property from the effects of a flood with an AEP of 1%.

Method of disposal – The allocated method and location where stormwater discharge from impervious areas is permitted for a property.

Minor drainage system - is the part of a drainage system that carries relatively minor flows. It consists of the system of kerbs, gutters, roadside channels, swales, sumps and underground pipes. It is generally designed to control flows which occur frequently. The design storm event (AEP) for the minor event is outlined in this Chapter and the Stormwater Management Specification.

On-site stormwater detention (OSD) - means a stormwater management practice that limits the rate of discharge from a site using outlet restriction devices. It has the same meaning as outlined in Australian Standard AS/NZS3500.3

On-site stormwater retention - are stormwater management practices where on-site stormwater runoff is captured and retained within the site for re-use or infiltration and is not released to the downstream drainage system.

Overland flow – is defined as any above ground stormwater flow. This includes concentrated and unconcentrated flows. Generally, unconcentrated flows are referred to as "sheet flow".

Overland flow paths - are low lying areas of the local topography along which surface flows are conveyed. This includes natural overland flow paths. See section 2.1: Classification of Overland Flow Paths for additional definitions.

Permeable area - is a surface treatment that allows rainwater to infiltrate to the soil, such as grass, landscaping, gravel, porous pavement and coarse sand.

Permissible site discharge (PSD) - is the maximum rate at which stormwater is permitted to be discharged from a given site area.

Public drainage system - is a drainage system owned and operated by CN or the Hunter Water Corporation.

Riparian Corridor - is a transition zone between the land, also known as the terrestrial environment, and the river or watercourse. It has the same meaning that is used in the Controlled activities – Guidelines for riparian corridors on waterfront land (NSW Department of Planning and Environment, undated).

Riparian Zone - is a transition zone between land and a waterway (creek, watercourse, wetland, estuary or river). They provide ecosystem corridor services and support waterway stability. They help buffer land from erosion impacts during extreme storms. Under the *Water Management Act 2000* and guidelines, riparian zones include both the waterway 'floor' and land beyond the top of the waterway bank (Controlled activities – Guidelines for riparian corridors on waterfront land, NSW Department of Planning and Environment, undated). The top of bank is measured by Digital Terrain Model, site engineering survey or similar.

Runoff - is the portion of rainfall that flows across the ground surface as water.

Sheet flow – is unconcentrated overland flow characterised by wider flow and low depth.

Site drainage line - is a piped drain that conveys stormwater from a development site to the public drainage system.

Stormwater - is the runoff from rainfall events.

Stormwater channel - is a constructed channel with well-defined bed and banks, used to convey stormwater or floodwater.

Stormwater discharge - is the disposal of flows from the site that occur when the capacity of the site stormwater controls is reached and such overflow.

Stormwater harvesting - is the collection, storage and use of stormwater for domestic, industrial, irrigation or other purposes.

Stormwater Management Plan - is a plan that details the proposed use of structural infrastructure and treatment techniques to both improve stormwater quality and mitigate excessive flows and may include dewatering controls as required.

Subsoil drainage system – is a trench filled with granular material and lined with filter material or enhanced by a slotted pipe for the purpose of draining infiltrated groundwater.

Swale - is a deliberately formed surface depression for the storage or conveyance of stormwater runoff. Swales can be lined with rock, turf or other vegetation.

Tailwater - refers to the water level or hydraulic grade line immediately downstream of a hydraulic structure, such as a culvert, storm drain outlet, weir, or detention basin.

Water sensitive urban design (WSUD) - means planning and design of the urban and built form with the incorporation of the total water cycle and recognition of conservation principles and reuse.

Waterfront land - has the same meaning as in the *Water Management Act 2000*.

Key Acronyms

AEP	Annual Exceedance Probability
ARI	Average Recurrence Interval
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
ANZECC	Australia and New Zealand Environment and Conservation Council
AS	Australian Standards
BASIX	Building and Sustainability Index
BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
DCP	Development Control Plan
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EPA	NSW Environment Protection Authority
EPHC	Environment Protection and Heritage Council
EHPG	Environment Protection and Health Protection Guidelines
ESCP	Erosion and Sediment Control Plan
GP	Gross Pollutants
GPT	Gross Pollutant Trap
LEP	Local Environmental Plan
LGA	Local Government Area
NATA	National Association of Testing Authorities
OSD	On-site detention
PSD	Permissible Site Discharge
SSC	Sutherland Shire Council
SEPP	State Environmental Planning Policy
SMES	Stormwater Management Environmental Specification
SS	Suspended Solids
SWMP	Stormwater Management Plan
SQID	Stormwater Quality Improvement Device
TP	Total Phosphorus
TN	Total Nitrogen
TSS	Total Suspended Solids
WAE	Work As Executed
WSUD	Water Sensitive Urban Design

1.0 Introduction

This *Stormwater Management Environmental Specification* (SMES) provides technical guidelines to the community, developers and Council, for matters relating to stormwater management. It contains planning and design controls relating to the management of all aspects of the water cycle. The Specification seeks to ensure the sustainable management of stormwater.

The standards seek to ensure that surplus stormwater is disposed of effectively, without causing nuisance to neighbours or overloading Council's drainage infrastructure, both in terms of volume, quality and velocity of stormwater.

This Specification is not intended to be a standalone document and should be read in conjunction with Sutherland Shire Local Environmental Plan 2015 (SSLEP2015) and relevant provisions of the Sutherland Shire Development Control Plan 2025 (SSDCP2015), specifically Chapter 38 – Stormwater and Groundwater Management. The LEP and DCP can be found on Council's website.

Under *State Environmental Planning Policy – Sustainable Buildings Index 2022* (BASIX), new residential developments are required to meet many State Government targets relating to water reduction, energy efficiency and thermal comfort. As such several areas relating to stormwater management, such as rainwater tanks, are covered by BASIX and should be consulted in conjunction with the following information.

This specification applies to all developments.

1.1 Specification Intent

This specification intends to:

a) Reduce peak flows through Council's drainage system.
b) Provide drainage systems that integrate into Council's existing drainage network with minimal impact on existing users.
c) Minimise the impact of adverse runoff within the property or at any adjacent or downstream properties.
d) Improve the quality of stormwater runoff.
e) Protect and conserve the environment, specifically the receiving waters of catchments.
f) Manage the quality and quantity of water conveyed through the receiving trunk drainage systems and waterways.
g) Preserve and protect the health, amenity and property of residents and the community.
h) Minimise public infrastructure capital and ongoing maintenance costs.
i) Plan, implement and maintain the stormwater system in accordance with the principles of Ecologically Sustainable Development.
j) Ensure that an integrated and consistent approach to water cycle management is achieved by adopting Water Sensitive Urban Design (WSUD) principles.
k) Encourage development of high-quality stormwater management plans that can be quickly assessed.
l) Provide clear understanding of the specifications and documents that must be lodged with the stormwater management plans.

1.2 What Sections Apply to my Development?

To streamline the development application process, different stormwater management requirements are necessary for differing development categories. These categories reflect the development type in relation to size, scope and complexity. The stormwater management guidelines and controls outlined for each development category must be followed.

If a development falls outside these categories, it is recommended that you seek advice from Council before designing your development. It is important that any stormwater requirements are resolved before lodging a development application with Council, including attainment adjoining property owners' agreement for any necessary easements as described in this document.

TABLE 1.2-1: DEVELOPMENT CATEGORY CLASSIFICATION

Category	Explanation	Typical Types of Development
Minor Works	Small scale alterations and additions to existing development.	Sheds, awnings, carports, pergolas and driveways, and alterations to development where the increase in impervious area is no greater than 30m^2 in area.
Category 1	Low scale residential development.	Single dwellings, secondary dwellings and dual occupancies Alterations and additions to residential development where impervious area of 30m^2 or more is proposed.
Category 2	Medium scale residential development.	Development proposals with: 1. Multi dwelling residential developments. 2. Residential subdivision greater than 2 lots.
Category 3	Large scale residential, commercial and industrial development, and all other development.	Development proposals comprising any of the following: 1. All industrial and commercial developments. 2. Residential flat buildings, shop-top housing and mixed-use developments. 3. Childcare Centres, Schools and Medical Facilities. 4. Other large-scale developments to the discretion of Council

The table below provides an overview of the application of this document and is intended to direct the reader to the relevant sections in this document.

TABLE 1.2-2: DEVELOPMENT CATEGORIES AND RELEVANT CONTROLS GUIDE

Development Category	General Requirements	Stormwater Quantity Management	Stormwater Quality Management
Minor Works	Section 2,3 4,6	5.1,5.6	-
Category 1		5.1,5.2,5.3,5.6-5.9	7.2,7.5
Category 2		5.1, 5.2, 5.4, 5.6-5.9	7.3,7.4,7.5
Category 3		5.1, 5.2, 5.5, 5.6-5.9	7.1, 7.2, 7.3,7.4,7.5

1.3 Submission Requirements

Minor Works development (as defined in Table 1.2-1) are required to submit the following information to Council as part of the Development Application:

1. A report from a registered plumber, certifying that the stormwater drainage system (including downpipes) of the existing structure is fully operational and is connected to:
    a. the on-site stormwater drainage system; and/or
    b. kerb; and/or
    c. gutter; and/or
    d. Council's drainage system; and
2. A concept plan showing the connection of the new stormwater drainage system (including roof gutters and downpipes) if any, to the existing site stormwater drainage system in accordance with the current version of AS3500.3.

For all other developments and redevelopments, the following information is required to be submitted as part of the Development Application:

1. A detailed Stormwater Management Plan and design certification which must be prepared by an accredited professional. The following is considered to be acceptable accreditation for the purpose of stormwater design and certification:
    - Professional Civil Engineer (MIEAust) (Engineers Australia)
    - National Engineering Register (NER) in Civil Engineering
    - Registered Engineer with Professionals Australia (RPEng) in Civil Engineering
    - Registered Design Practitioner - Civil Engineering with NSW Government
    - Surveyors Certificate of Accreditation in On-Site Detention and Drainage Design (Institute of Surveyors NSW and the Association of Consulting Surveyors NSW)
    - Stormwater Register (Association of Hydraulic Services Consultants Australia)
    - Accreditation as a certifier under the Environmental Planning and Assessment Act 1979 in the relevant discipline

The design and installation of stormwater drainage systems shall be in accordance with relevant Australian Standards, primarily AZ/NZ3500.3, except as varied by this Specification, DCP Chapter 38 Stormwater and Groundwater Management.

All development applications are required to comply with Council's *Lodgement Requirements: Development Applications and Modifications guideline*.

2.0 General Stormwater Management Provisions

2.1 Classification of Overland Flow Paths

Overland flow path identifies the route by which concentrated stormwater overland flow travels from the upstream end of a catchment to the downstream end. This can be localised flow paths, or major overland flow paths. Overland flow paths are often associated with existing easements. Overland flow paths are not defined by unconcentrated flows (or “sheet flow”).

Nuisance overland flow is considered to be overland stormwater flow with depths less than 100mm during the Major Storm event (see Section 4.1: Design Storm Events, Section 4.2: Overland Flow Paths and Section 4.12: Floor Level Controls). Nuisance overland flow may consist of concentrated and unconcentrated flows.

Overland flooding is identified as:

a. stormwater overland flow depths equal to or greater than 100mm; and
b. as identified in a Council flood study.

Note development on sites where **a** and **b** are present, or site is known to be subject to overland flood risk, are required to comply with Chapter 40 – Environmental Risk.

2.2 Acceptance of Upstream Runoff

To manage adverse impacts and mitigate overland flow risk, all developments are to:

a. Cater for upslope runoff, manage overland flows from areas upstream of their site to prevent stormwater ingress into buildings.
b. Maintain the natural and existing distribution of overland flow paths. No redirection of catchments will be permitted.

The distribution of stormwater runoff including flow paths and catchments are to be maintained. Stormwater cannot be redirected to a different downstream location or catchment. Any flows generated from the local upstream catchment are not to be obstructed but rather permitted to drain into the development site. These flows may be channelised and diverted within the subject lot bypassing on-site detention (OSD) as required, provided flows eventuate to the same point of discharge.

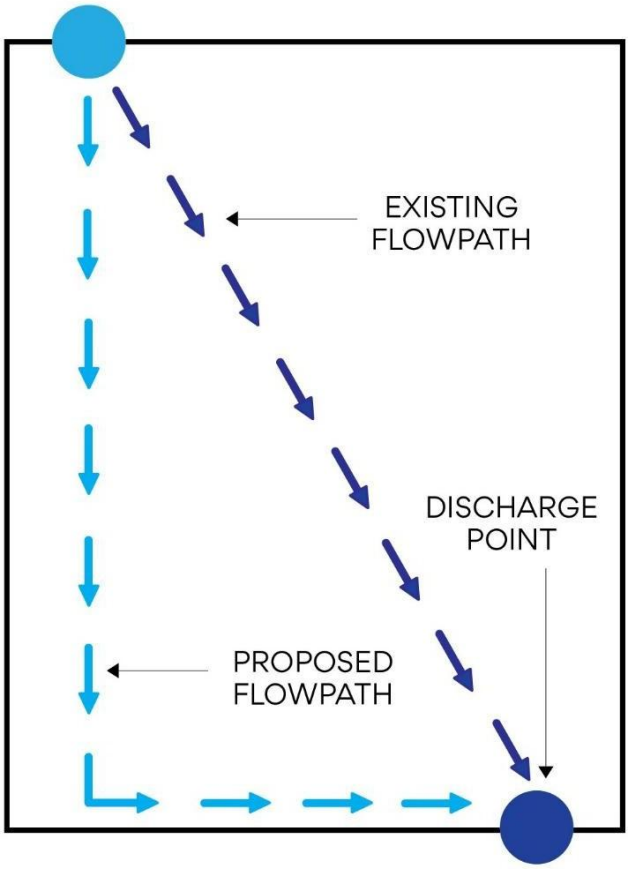


FIGURE 2.2-1: ILLUSTRATION OF POINTS OF DISCHARGE

1. Where known flow paths intersect property boundaries, open form fencing will be required to allow for stormwater flow conveyance.
2. Upstream properties are responsible for control and discharge of stormwater within their property. Problems with natural overland stormwater flow between neighbouring properties are generally a civil matter to be resolved between the respective owners. For more information on private water drainage problems, please visit Council's website here.

3.0 Methods of Stormwater Disposal

Every property is allocated a location to discharge stormwater from their property. All properties are obligated to capture, collect and dispose of stormwater from all hard surfaces, through underground pipes to Council's nominated discharge point to prevent stormwater nuisance to adjoining properties.

All lots have a discharge point which must be utilised as the nominated disposal method for the stormwater management system. The flowchart below generally outlines the appropriate disposal method to be applied in different scenarios.

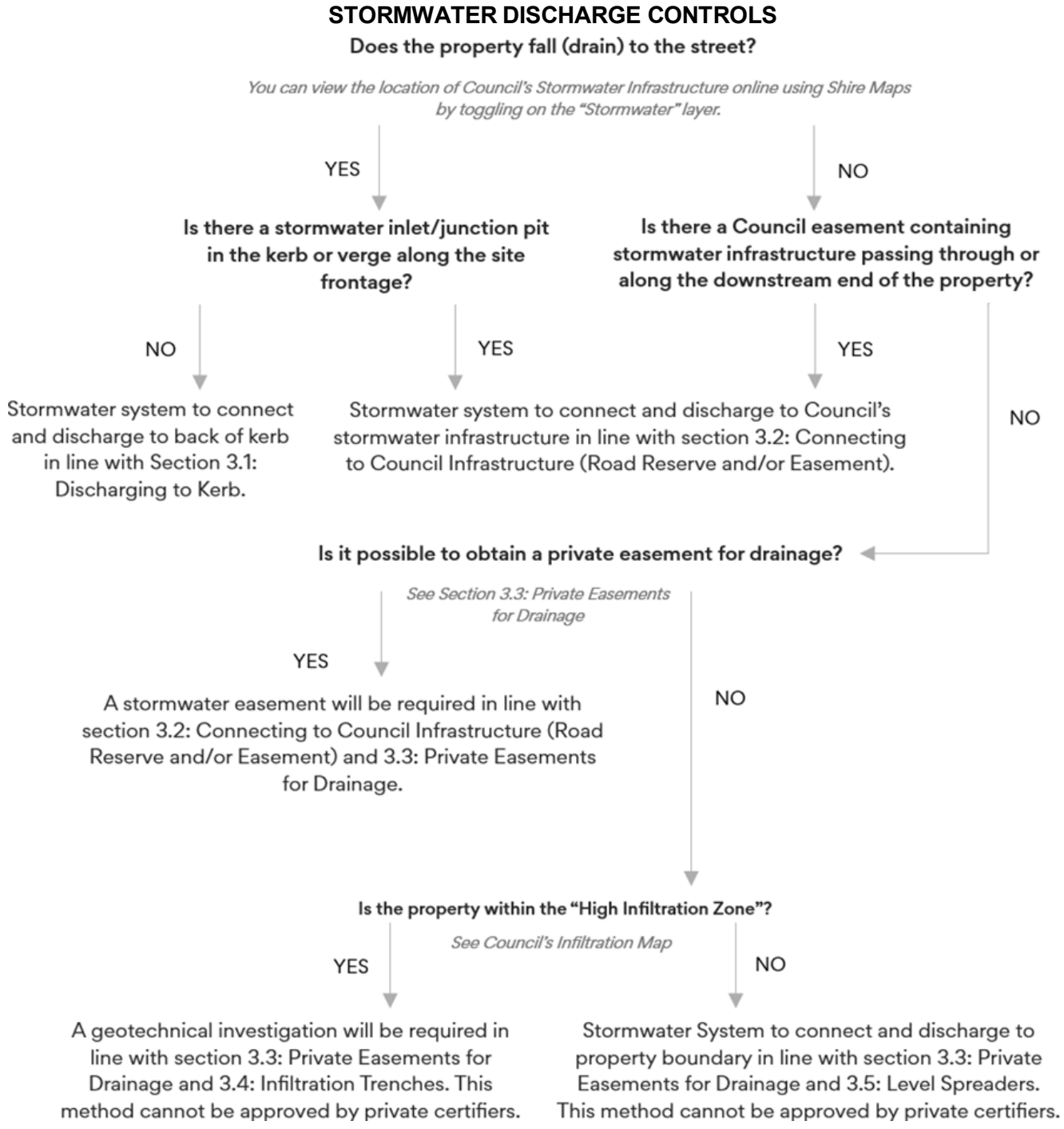


FIGURE 3.0-1: STORMWATER DISCHARGE CONTROLS

1. All developments are to comply with the disposal method that most appropriately applies to their development.
2. A boundary pit is to be installed at the most downstream end of the stormwater network at the site boundary. (Not applicable where cover to in-ground pipes cannot be achieved for back of kerb (BOK) connections).
3. Council may approve a different disposal method other than the one outlined in the above figure if sufficient evidence and justification can be provided. Council will review and assess alternative disposal methods on their merit. It is highly recommended that the stormwater design is resolved prior to lodgement of a development application.
4. **Private certifiers cannot issue approval for alternative discharge methods (infiltration and/or level spreaders).**

The design and construction of the method of stormwater disposal must be in accordance with AS3500.3 except where modified by the following:

3.1 Discharging to Kerb

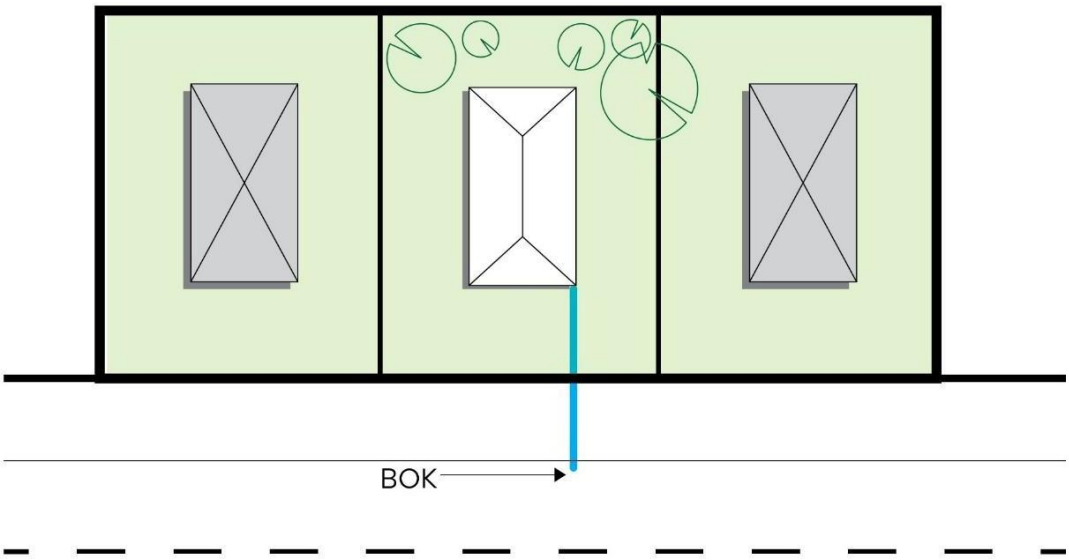


FIGURE 3.1-1: KERB CONNECTION

Kerb connections are permitted where the site falls towards the street and there are no Council owned stormwater pits along the site frontage. Maintenance of kerb connections are the responsibility of the owner.

1. The kerb and gutter connection must be located wholly within the subject property frontage.
2. The kerb and gutter connection must be made perpendicular to the kerb line, or up to 45 degrees in the direction of flow within the gutter. Angled downpipes are not to extend under neighbouring driveways or past the prolongation of the lots boundaries to minimise impact to neighbouring lots.
3. Pipe drainage within all Council land (including roads) is to fall at 1% minimum.
4. Connections to back of kerb must be hot dipped galvanised rectangular hollow section (RHS) designed to convey the minor storm event (as defined in Section 4.1: Design Storm Events).

5. The discharge rate must be less than or equal to 15l/s for the 1% AEP storm event per lot.
6. Kerb connections must be spaced 4m minimum from kerb connections of neighbouring lots where possible to minimise extent of stormwater plume within the road and gutter.
7. For developments where flow rates exceed 15l/s from a single connection, a second RHS discharge point is to be provided per lot. Where dual connections are required at the kerb, a 150mm gap is to be provided between RHS connections.
8. Where a combined flow rate from dual BOK connections exceeds 30l/s, back of kerb discharge is not permitted and discharge from the site is to be connected directly to Council's infrastructure. This may require extending Council's stormwater network to the site boundary at the applicant's expense.
9. Charged systems to the road reserve are not permitted.

3.2 Connecting to Council's Infrastructure (Road Reserve and/or Easement)

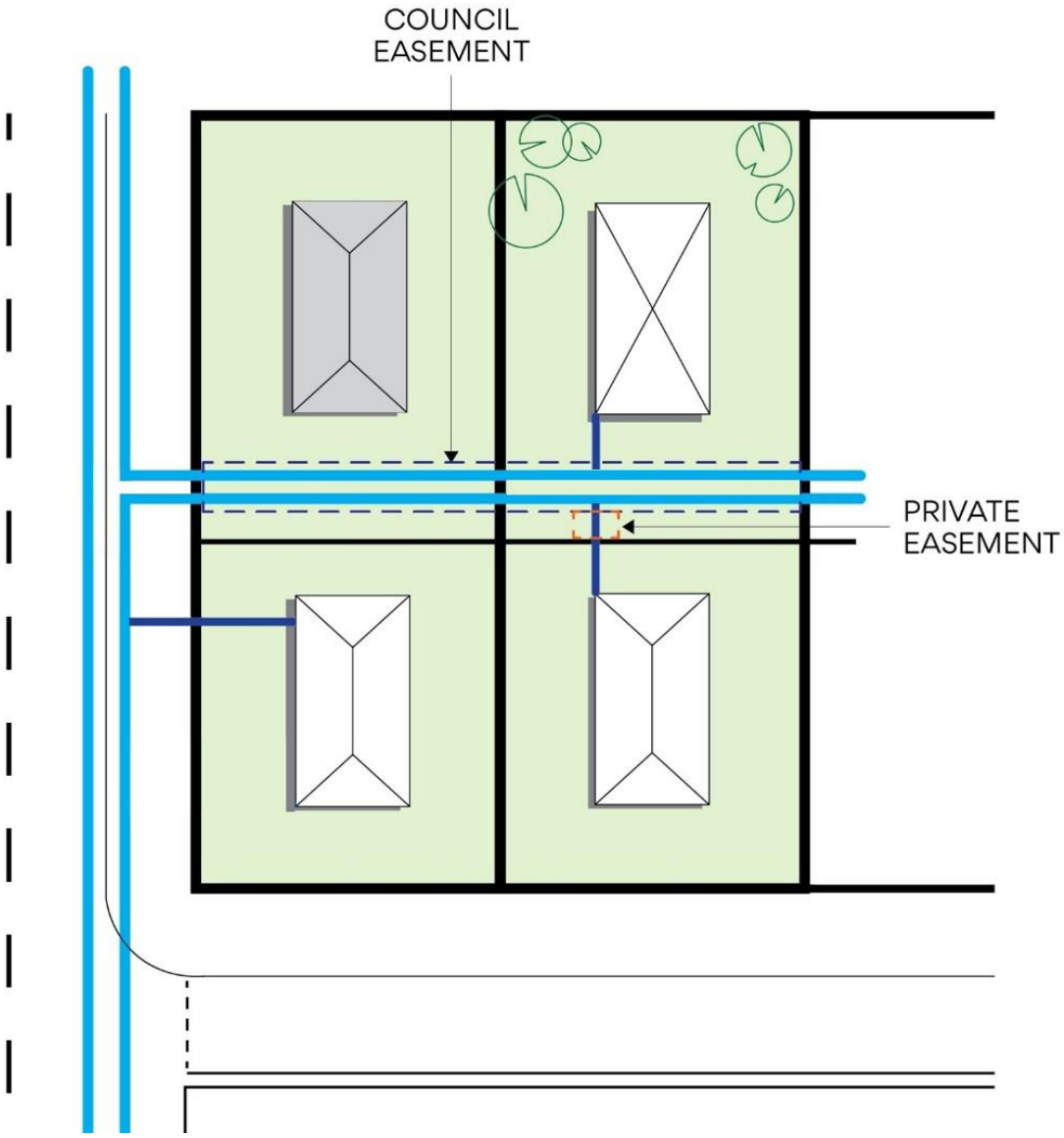


FIGURE 3.2-1: CONNECTING TO COUNCIL INFRASTRUCTURE

1. Connections to Council's infrastructure is permitted where a Council stormwater asset is directly downstream of the site or traverses through the site.
2. The maximum connection to Council's below ground stormwater system is 1 per lot.
3. In situations where Council's drainage system is located within adjacent private property (or Council owned Real Property with a lot and DP), the applicant will need to acquire an easement to allow for the connection between the property boundary and the Council system or easement. The ability to do this should be discussed with Council officers prior to lodgement of a development application.
4. Connections to Council's stormwater assets are to be watertight, sparged and rendered smooth. Invert level of private connection to Council's stormwater pits are to be at least 0.03m higher than downstream pipe invert level.
5. Where required, any extension to Council's existing stormwater infrastructure will be undertaken at the applicant's expense.
6. Direct connection to Council's stormwater pipes will only be permitted when:
    a. The diameter of the connecting pipeline and the diameter of Council's pipeline are in line with the table below

TABLE 3.2-1: DIRECT CONNECTION MINIMUM PIPELINE DIMENSIONS

Council's Pipeline	Connecting Pipeline
> Ø375mm but < Ø900mm	≤Ø150mm
≥ Ø900mm	≤Ø225mm

    b. The connecting pipe is made of sewer grade UPVC, and
    c. The connection is to be made in accordance with the figure below:

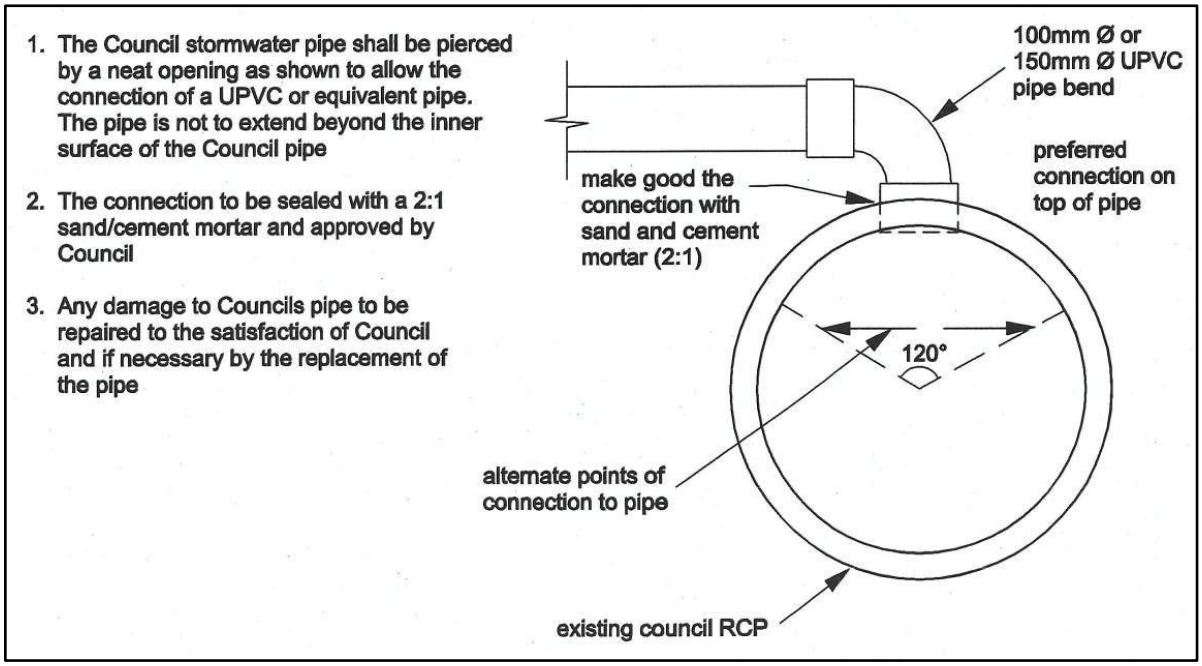


FIGURE 3.2-2: CONNECTING TO COUNCIL INFRASTRUCTURE

    d. The connection is to be watertight, flush and sparged smooth, and
    e. The connection should be made at a 10 to 2 o'clock position on the council pipe, and
    f. Council's pipe is to be core drilled to minimise damage to the pipeline, and

g. Before and after the connection is made to Council's system, closed-circuit television (CCTV) footage and a report on the condition of the system and connection will be required.

7. Where the above (Section 3.2 – Connecting to Council's Infrastructure (Road Reserve and/or Easement), point 6) cannot be achieved, a new junction/inlet pit is to be constructed over the existing Council pipe to facilitate the connection at the applicant's expense. The pit is to be 900 x 900 minimum and designed in line with Council's Public Domain Technical Manual and Standard Drawings. In exceptional circumstances, Council may allow direct connections where Council's pipeline is exceptionally large and sufficient justification is provided by a suitably qualified engineer.

3.3 Private Easements for Drainage

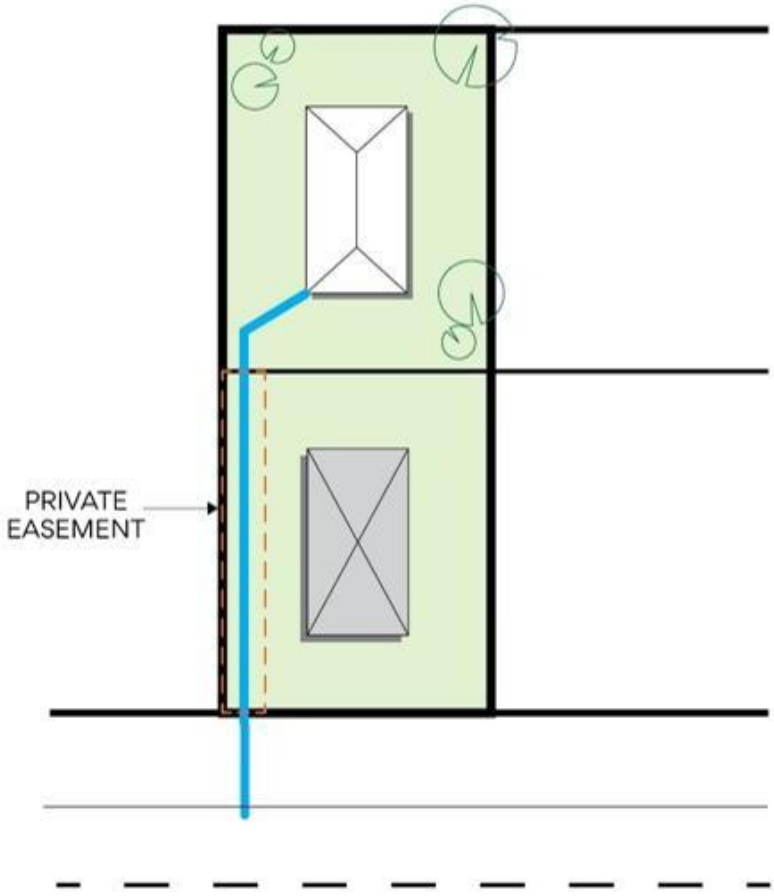


FIGURE 3.3-1: EASEMENT OVER DOWNSTREAM PRIVATE PROPERTY

Properties that fall away from the road can create challenges in managing stormwater drainage. Stormwater must be disposed of in its natural catchment by gravity to a recognised drain or kerb, with Council approval (see Section 3.2: Connecting to Council's Infrastructure (Road Reserve and/or Easement)). Pump-out and charged drainage systems are not permitted (except for basement car parks).

1. For development on lots which fall away from the road, a legally created easement for drainage over downstream properties is required. This includes where proposing to connect to a Council pipe which is located on another property.

2. A genuine effort must be made to obtain support for an easement over downstream properties before lodging a development application (refer to Section 3.3.1: Gaining Support for an Easement).
3. In exceptional cases where the stormwater infrastructure within a potential easement is physically unable to be constructed (e.g. sites constrained by topography, existing vegetation, presence of on-site rock, or absence of existing Council infrastructure downstream), alternatives will be considered where justification is provided in a letter from a suitably qualified civil engineer.

3.3.1 Gaining Support for an Easement

Prior to lodging your Development Application, refer to the steps outlined in **Appendix B** to show that you have made a genuine effort to obtain written support for a drainage easement over downstream properties.

Documentary evidence must be submitted with your Development Application.

Section 88k of the Conveyancing Act 1919 allows for the compulsory acquisition of an easement over land where the easement is reasonably necessary for the effective use or development of adjoining or benefiting land, provided that several statutory criteria set out in the Act are satisfied.

3.3.2 Inter-allotment Drainage Easement Design

Drainage easements are to be designed generally in accordance with Section 4.6: Designing Drainage Systems

In addition, inter-allotment drainage easements must also:

a) Be designed to sufficiently convey all runoff from the development and cater for flows up to and including the 1% AEP storm event.

b) Where the system is proposed through multiple properties, the system shall be designed to cater for any additional flows from these properties that can be potentially directed into the system.

c) Stormwater pits are to be located at the downstream end of the system within the development site and within each downstream property.

Where a proposed drainage easement is over Council owned Real Property (i.e. not a Road Reserve, but a registered Lot and DP), the applicant must submit a Use of Council land application. It is recommended that you contact Council for advice prior to DA lodgement as the application may take extended time to complete.

3.4 Infiltration Trenches

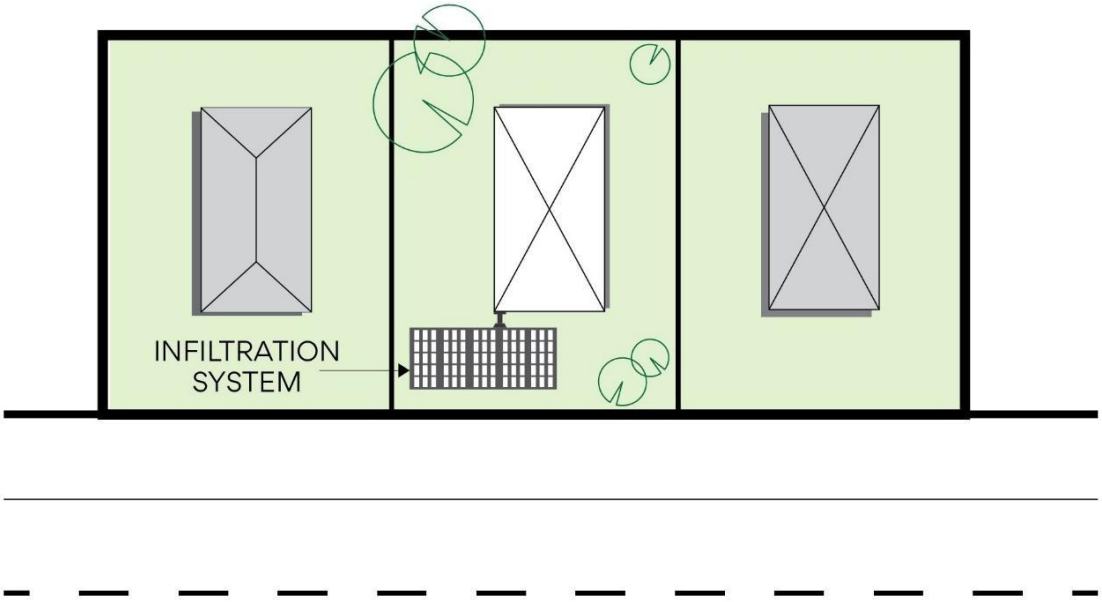


FIGURE 3.4-1: DISCHARGING VIA INFILTRATION TRENCH

Most locations in the Sutherland Shire are not suitable for infiltration and any proposal to construct an infiltration system can only be approved through Council. **Private certifiers cannot issue approval for Infiltration trenches.**

Infiltration trenches will only be accepted where:

1. A genuine effort to obtain an easement as per Section 3.3 Private Easement for Drainage is unsuccessful, and
2. Works are for Category 1 development , and
3. The site is in a "High Infiltration Zone" map, as identified in Council's Soil Infiltration Map.
4. For Dual Occupancy development, infiltration trenches will only be considered where physical construction of a pipeline within a potential easement is not feasible as justified by a suitably qualified engineer.
5. Independent geotechnical investigation is undertaken by a suitably qualified professional to identify:
    a. Soil classification and layer depths,
    b. hydraulic conductivity of the soil (no assumed hydraulic conductivity coefficients will be accepted) using the Falling Head Test or Constant Head Test (report must specify which test was used),
    c. the hydraulic conductivity test must be held at a minimum of four locations at the site of the proposed infiltration system,
    d. the sample soil must be fully saturated when the test is carried out, and
    e. below ground water table level and depth of rock (AHD).

6. A full hydraulic design is undertaken to determine the necessary storage requirements for a range of storm event up to and including the 1% AEP storm event.
7. An additional 20% volume area is to be applied to requirements determined in point 5.
8. Additional volume may be required where the infiltration system is proposed to be filled with gravel like material. Additional volume must equate for void ratio to ensure the system has capacity for all storm events up to and including the 1% AEP storm event.

9. Infiltration systems are to be designed in accordance with Australian Runoff Quality Guidelines (Institution of Engineers) and this specification.
10. A minimum 1m depth of soil required below the base of the infiltration system to rock or the water table.
11. The natural ground slope is not to exceed 10% without further geotechnical investigation.
12. Sediment traps, vegetated filter strips or similar treatment systems are to be installed upstream to reduce sediment inputs and minimise likelihood of clogging.
13. An overflow discharge point is to be designed to allow for maintenance access.
14. Overland stormwater discharge is to be directed to a swale, landscaping or a stormwater drain without affecting adjoining property.
15. Where infiltration systems are proposed within 2m of an existing or proposed dwelling, a qualified engineer must certify suitability of the footings for additional groundwater introduced by the infiltration system.
16. Distance to boundaries given soil infiltration shall comply with table 3.4-1.

TABLE 3.4-1: DISTANCE TO BOUNDARIES GIVEN SOIL TYPE

Soil Type	**Approximate infiltration rates (mm/hr)**	**Distance to Site Boundaries**
Sand	>180	2m
Sandy Clay	36-180	2m
Medium Clay	3.6-36	4m
Highly Reactive Clay	0.36-3.6	Infiltration not permitted
Sandstone	Assumed to be negligible	Infiltration not permitted

3.5 Level Spreaders

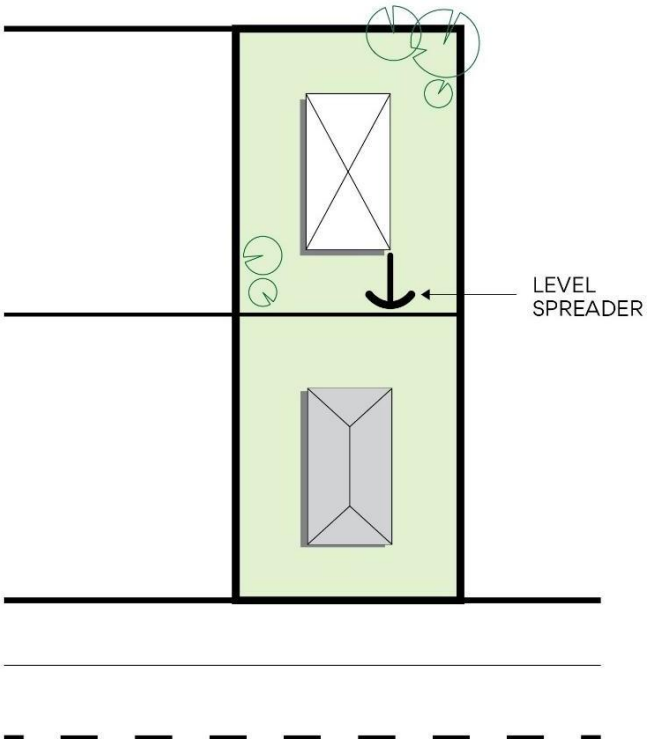


FIGURE 3.5-1: DISCHARGING VIA LEVEL SPREADER

Private certifiers cannot issue approval for stormwater level spreaders/dispersion trenches.

This section applies to development where:

1. A genuine effort to obtain an easement as per Section 3.3 Private Easement for Drainage is unsuccessful, and
2. The works are for Category 1 development, and.
3. Site conditions are not suitable for infiltration, and
4. For Dual Occupancy development, level spreaders will only be considered where physical construction of a pipeline within a potential easement is not feasible as justified in writing by a suitably qualified Civil Engineer

Only in these exceptional circumstances may Council consider alternate options for drainage. In such circumstances the following apply:

1. Any level spreader is designed to limit stormwater discharge to natural conditions (100% pervious site) and velocities limited to 1m/s for the 1% AEP storm event.
2. Appropriate scour protection to be provided downstream of the level spreader to prevent erosion/scour.
3. Spreaders are installed a minimum of 3m off the downstream boundary and any habitable building on the property.
4. Spreaders to be parallel to contours.
5. Spreaders must have concrete casing / surrounds.

6. Council may accept spreaders with zero lot offset to Council reserve and parks where appropriate scour protection is provided to prevent to prevent erosion and scour on Council land.
7. A single spreader must be provided per development, including a single outlet for both dwellings of a dual occupancy. An appropriate easement for drainage must be registered during any subsequent subdivision..

3.6 Outlets to Watercourses and Waterbodies

Where discharging to a suitable natural waterway/creek, watercourse or waterbody erosion protection measures are to be taken.

1. Erosion protection is be achieved through installation of energy dissipation structure, rip rap, outfall apron or other suitably designed solution. The dissipation/rip rap solution must ensure that peak stormwater velocities from the outlet is limited to 2m/s for the 1% AEP storm event.
2. Council reserves the right to request on connection to existing outlets only. New outlets will be considered on a merit basis and only a single outlet will be considered.

3.7 Pump Out Systems

Pump out systems are only permitted for drainage of underground carparks and basements.

1. The pump system must be designed by a suitably qualified practitioner in accordance with the requirements of AS/NZS 3500.3 and this specification.
2. As a minimum, the system must consist of two pumps: a duty and stand by pump. The two pumps are to be designed to work on an alternate bases to ensure that both pumps receive equal usage and neither pump remains continuously idle.
3. Consequences of power/pump failure must be considered when sizing pump out pit storage volume (including head cover).
4. A full hydraulic design is required to determine the necessary storage requirements for a range of events up to and including the 1% AEP and a storm duration of 6 minutes.
5. The system must be fitted with a non-return valve and is to pump to stormwater to a stormwater inlet within the site boundary that will be gravity fed to nominated downstream discharge method.
6. No areas other than the basement driveways are to be connected to the pump out pit. The catchment area draining to the pump out system must be minimised.
7. Seepage water from basement car parks shall not be discharged to the kerb and gutter of a Council roadway unless it can be demonstrated that dry weather flows are not a nuisance. A formal piped connection to Council's stormwater drainage network is required.

4.0 Stormwater Design Requirements

4.1 Design Storm Events

Drainage systems are to be designed for the **Major** and **Minor** Stormwater Events:

Major Stormwater System: An overland flow stormwater system designed to convey extreme stormwater events or in the event of blockage in the minor stormwater system.

Minor Stormwater System: Typically, in-ground stormwater infrastructure designed to handle frequent stormwater events. Minor systems are to be designed with 150mm freeboard.

TABLE 4.1-1: MAJOR AND MINOR STORM EVENT CLASSIFICATIONS

Situation	Minor Event	Major Event
Private, residential, commercial and community developments	5% AEP	1% AEP
Industrial developments, Schools and Medical Facilities	5% AEP	1% AEP
Public owned infrastructure (roads, footpaths, stormwater drainage etc. – excluding Council owned property: i.e., libraries, sports clubs, etc)	5% AEP	1% AEP

4.2 Overland Flow Paths

All developments are to consider how overland flow interacts with their proposed development to ensure appropriate measures are put in place to minimise impacts to downstream land and waterways. Stormwater surcharge and overland flow from upstream council pits and easements are to be considered when designing overland flow paths.

Overland flow paths are to be designed to provide a fail-safe system of drainage for all developments. Overland flow paths are designed to function when the stormwater system fails (due to blockages and stormwater capacity constraints).

1. Overland flow paths are to be designed to convey the 1% AEP storm event assuming all inlet stormwater pits are 50% blocked.
2. Overland flow shall be fully contained within a drainage easement.
3. Overland flow paths shall remain safe for vehicles and pedestrians (including small children) in all storm events up to and including the 1% AEP event.
4. Overland flow paths shall have a minimum 150mm cover for the 1% AEP event.
5. Flows greater than the 1% AEP event may not be diverted away from defined overland flow paths or outside of drainage easements.

4.3 Underground Stormwater Drainage

1. In-grounds stormwater infrastructure (pits and pipes) shall be sized to cater for the run-off capacity of the attached system for the minor storm event expressed in Section 4.1: Design Storm Events.
2. In-ground systems are to have a 150mm minimum freeboard from water level to inlet surface level in inlet pits for the minor storm event.
3. All stormwater inlets (sag pits, on-grade pits and receiving headwalls) are to be designed with a 50% blockage factor.
4. Stormwater drainage shall be designed in accordance with the requirements of AS/NZS 3500.3.

5. The minimum diameter of any pipe used for stormwater drainage shall be 100mm.
6. Stormwater pipes must comply with the following minimum longitudinal grades:

TABLE 4.3-1 MINIMUM LONGITUDINAL PIPE GRADES

Pipe Diameter (mm)	Minimum Gradient (%)
>375	1
≤375	0.5

7. Stormwater pits or cleaning eyes/flush points are to be provided at the following locations where appropriate to provide access and maintenance functions:
   a. At all junctions, changes of gradient, changes of direction and changes in diameter,
   b. flap valves fitted at the downstream ends of subsoil drains, and
   c. directly above any reflux valves, orifice plates and debris screens.
8. In-ground OSD systems must be designed and sized in line with Section 5.0: Stormwater Quantity Management.

4.4 Public Infrastructure: In-ground Stormwater Drainage

1. The minimum pipe size is to be ø450mm or designed for the 5% AEP storm event, whichever is greater.
   a. Council may consider smaller pipe sizes, where a ø450mm pipe is not feasible as justified in writing by a suitably qualified Civil Engineer.
2. The minimum pipe grade is to be 1%.
3. The minimum pipe class shall be Class 3.
4. The pipe material shall be Reinforced Concrete Pipe (RCP)
   a. Fibre reinforced concrete (FRC) or other materials will not be accepted.
5. The minimum pipe cover shall be in accordance with the pipe class, material, manufacturers recommendations and applicable standards.
6. Pipes must not be encased in mass concrete.
7. Kerb inlets shall be a minimum 2.4m in overall length, with 1.8m clear internal opening,
   a. Council may allow smaller pipe sizes, where deemed practical.
8. Standard Council grated kerb inlet pits are required:
   a. Every 30m of length,
   b. at every change in direction along the extended system, where it is appropriate to also collect stormwater,
   c. prior to road intersections.
9. Standard Council junction pits must be 900mm x 900mm minimum.
10. Standard Council junction pits are required:
    a. At every change in direction along the extended system (where inlet pit is not required),
    b. Where a drop pit is required, and a grated kerb inlet pit is not required.
11. All new stormwater pits must be benched, and penetrating stormwater pipes must be cut flush with the wall of the pit.
12. In situ stormwater pits must have a minimum thickness of 150mm and a minimum of SL72 mesh reinforcement with 50mm cover.
13. Stormwater pits greater than 1.2m deep must have step irons.
14. The class of all covers and grates must meet the requirements of AS3996 (Class D minimum).

4.5 Vehicular Crossings Impacting Existing Council Drainage Pits

Where it is proposed to modify an existing vehicle crossing or construct a new vehicle crossing and proposed work requires the alteration or relocation of an existing Council drainage pit, then:

1. The existing inlet capacity to Council's below ground drainage system is to be maintained, and where possible, improved.
2. A standard Council grated pit with a 2.4m overall length extended kerb inlet pit minimum is to be constructed upstream of the proposed vehicle crossing. Proposing kerb inlet pits in front of neighbouring properties will not be supported without the concurrence of the neighbouring property owner.
3. Existing on grade kerb inlet pits affected by the crossing shall be converted into a junction pit. Council will only allow kerb inlet pits to be converted into butterfly or v-grate pits where in-let and storage capacity is not reduced.
4. Newly constructed kerb inlet pits will either:
    a. Be constructed over the existing below ground drainage system if one is present, or
    b. Will require the extension of the existing below ground drainage system.
5. All costs associated with providing the vehicle crossing and altering the stormwater system are to be paid for by the applicant.
6. The distance between the edge of the lintel of any stormwater kerb inlet pit and the wing of any proposed vehicular crossing shall be at least 1m.

4.6 Designing Drainage Easements

1. Easements shall be free of any building encroachments, including eave overhangs and footings. Buildings over drainage easements will not be permitted.
2. Structural zone of influence of proposed development must consider in-ground drainage assets to ensure stormwater pipes are not subjected to any load or force from the structure.
3. Any footing within 2m of a Council easement is to extend to a greater depth than the invert of the Council infrastructure within the easement to ensure no additional load or force is exerted on the infrastructure.
4. At its discretion, Council may allow paving and/or landscaping over an easement or an existing below ground drainage system. Provisions must be made to ensure that below ground infrastructure can be reasonably installed and maintained, and that the overland flow capacity of the easement is not reduced.
5. Full details of any proposed piped system within an easement are to be submitted for Council approval at the DA stage. All works in relation to easements are to be at no cost to Council.
6. No work is to be carried out in the easement until it has:
    a. Been registered with NSW Land Registry Services.
    b. Approval gained from downstream property owner/s. It is the responsibility of the developer/owner to handle any negotiations with other property owners to secure an easement.
    c. A relevant construction certificate has been obtained.

7. Easements are to be sized in accordance with the table below:

TABLE 4.6-1 REQUIRED DRAINAGE EASEMENT WIDTHS

Minimum Easement Widths for Council Owned Stormwater Infrastructure	
Pipe Diameter (mm)	**Minimum Easement widths (m)**
< 1200	3.0m
>1200 to <1500	3.5m
≥1500 or open channels	As specified by Council
Minimum Easement Widths for Private Inter-Allotment Drainage	
Pipe Diameter (mm)	**Minimum Easement widths (m)**
<225	0.9
≥225 to <375	1.5
≥375	2.8
Flow path (no pipe)	Full width of the nominated flow path/floodway plus 300mm (150mm each side of flow path)

8. Larger easements may be required for stormwater drainage pipes with excessive cover or where multiple pipes are proposed.
9. Consideration may be given to the minor reduction of the required easement widths (for sections where the full width of the easement cannot be achieved) where it is demonstrated that the full easement width cannot be obtained and the proposed pipe can reasonably and economically be installed, maintained and replaced appropriately (e.g. provision of shoring wall).

4.7 Statutory Drainage Easements

A statutory drainage easement is a legal right granted by legislation that allows for the drainage of water across a property. In some cases, statutory drainage easements contain Council owned below ground stormwater infrastructure.

Under Section 59A of *the Local Government Act 1993 (NSW),* statutory drainage easements allow Council to maintain public drainage infrastructure that may not be located within a formalised easement, such as pipes and channels on private land.

Properties containing a statutory drainage easement, or Council owned stormwater infrastructure on their land that is not within a formalised easement must comply with the following:

1. The statutory easement is considered to have a width of:

$$Width\ (mm) = Council\ Infrastructure\ Width\ (mm)\ + 150mm + 1{:}1\ Zone\ of\ Influence\ (mm)$$

2. The statutory easement length is equivalent for the length of Council's stormwater infrastructure within the properties.
3. No structure is to be built on top, or within the width of the statutory easement.
4. Structural zone of influence of proposed development must consider in-ground drainage assets to ensure stormwater pipes are not subjected to any load or force from the structure.
5. Consideration may be given to the minor reduction of the required statutory easement widths (for sections where the full width of the easement cannot be achieved) where it is demonstrated that the full easement width cannot be obtained and the in-ground

Council infrastructure can reasonably and economically be installed, maintained and replaced appropriately.

4.8 Modifications to Council's Drainage System and Easements

Any changes to easements accommodating Council's drainage network must be conducted in line with Council's Drainage Easements Policy.

1. Where a development proposes to modify Council's drainage system (inclusive of its extension or realignment), the proposal will be assessed on its merits by Council.
2. The applicant will be responsible for providing sufficient information to demonstrate to Council's satisfaction:
    a. That the proposal is feasible,
    b. Can be built to current standards and specifications,
    c. Will allow for suitable and safe access for inspection and maintenance, and
    d. Will meet the requirements specified in this section.
3. Documentation is to be prepared for Council's review and approval prior to development consent. The documentation must include:
    a. Detailed survey including property boundaries, kerb and gutter, road pavements, driveways, footpaths, buildings and other structures, trees, ground levels, below ground service locations, existing stormwater alignment, pit and pipe sizes, invert levels and any other relevant information. It is likely that the applicant will need to engage a professional service-locating contractor in liaison with the surveyor to meet this requirement.
    b. A full scaled long section of the proposed stormwater pipe, indicating the existing and proposed surface levels, cover to pipe, design invert levels and pipe/pit sizes and if present, service lines in the vicinity. The long section must demonstrate the design's compliance with AS standards and this document for clearance/cover, pipe/pit grate class, invert levels, pipe grade, etc.
    c. The design alignment on plan demonstrating the proposed location of pits. Pipes
    d. Calculations demonstrating the proposed system meets the required design standards specified by Council. Council will typically require that the system's capacity meets or exceeds the 5% AEP.
    e. A minimum pipe size of 450mm is to be installed (in line with Section 4.1: Design Storm Events, and Section 4.4: Public Infrastructure: In-ground Stormwater Drainage).
    f. Council may at its discretion require the system's capacity to be increased above the requirements outlined in point f).
    g. The proposed easement must account for overland flows for storm events greater than the 5% AEP event. The total width of the flow path is to be encapsulated in the proposed drainage easement.
    h. The design must not increase or concentrate flooding on any private property (including the site being developed) or the road reserve. The supporting evidence is to include details and modelling of any surcharge that will occur at the downstream end of the proposed drainage system in cases where the new system has greater capacity than the existing system.
4. Where a statutory drainage easement and associated drainage infrastructure is proposed to be relocated, a formally registered easement must be established and agreed to by Council.

4.9 Piping of Existing Open Drains in Private Residential Properties where Subdivision is Not Involved

Many properties throughout the Shire have Council maintained open drains on their properties. These open drains may be within defined drainage easements or within a statutory easement.

Council may agree to have an open drained piped on the receipt of an application by the owner and at the owner's expense.

Each case is considered on its merits and assessed by Council. The typical factors considered in the assessment of each application include the following:

1. The size and shape of the catchment area contributing to the stormwater run-off at the site.
2. The volume of stormwater run-off at the site.
3. The location of the site within the overall drainage basin in which the catchment area is located.
4. The pipe size needed to cater for the expected run-off.
5. Flooding history and modelling of the site and the hydraulic capacity of the open drain.
6. The general state and condition of the open drain and any hazards to the owner or the public represented by the drain.
7. The costs being borne by Council in maintenance of the open drain and future costs associated with maintaining the proposed piped system.
8. The suitability, in terms of hydraulic efficiency, of piping an isolated section of the drain.
9. The improvement to the value of the property resulting from the piping of the drain.
10. Whether or not Council has or will be granted easement rights over the drain.
11. The advantages to Council of piping the open drain now, rather than at a later date when further development may make access to the site, for construction purposes, difficult or costly.

Where agreement cannot be reached with the property owner and Council, the work is not to proceed.

4.10 Tailwater

Tailwater is the water surface elevation at the downstream outlet of a stormwater network. It directly affects how water behaves upstream and through the stormwater network. For example, high table waters can cause backwater effects, slowing upstream flow and potentially causing nuisance overland flow.

When designing a stormwater system, the following tailwater conditions are to be adopted at the outlet.

TABLE 4.10-1: TYPICAL TAILWATER CONDITIONS

Condition	Up to 10 % AEP	Up to 5% AEP	Up to 1% AEP
Discharge to kerb & gutter	Kerb invert or relevant flood level (whichever is higher).	Kerb invert or relevant flood level (whichever is higher).	Top of kerb or relevant flood level (whichever is higher).
Discharge to existing stormwater pit	Obvert level of downstream pipe or relevant flood level (whichever is greater).	150mm below the surface level of the pit or relevant flood level (whichever is greater).	150mm above the surface level of the pit or relevant flood level (whichever is greater).
Discharged into floodplain and/or receiving waters	Flood level at the outlet location for the relevant AEP storm event – see table 4.10.2 below.		
Free outfall/discharge to atmosphere	Pipe invert or relevant flood level (whichever is higher).	Pipe invert or relevant flood level (whichever is higher).	Pipe obvert or relevant flood level (whichever is higher).

Where there is no flood study information available, developments along the foreshore discharging directly to receiving waters are to adopt the following tailwater conditions:

TABLE 4.10-2: ASSUMED TAILWATER CONDITIONS – DISCHARGING DIRECT TO THE FORESHORE

Waterway	10% AEP (m AHD)	5% AEP (m AHD)	1% AEP (m AHD)	PMF (m AHD)
Georges River	1.3	1.5	1.7	1.7
Woronora River	1.3	1.5	1.7	1.7
Port Hacking River	1.3	1.5	1.7	1.7
Bate Bay	1.3	1.5	1.7	1.7
Botany Bay	1.3	1.5	1.7	2.4

4.11 Subsoil Drainage

Sub-soil drainage systems are to be designed and constructed per AS/NZS 3500. Subsoil drains shall be connected to the site drainage system and disposed of in a manner that will not have any adverse impact on adjacent properties. The following controls apply to subsoil drainage systems:

1. Subsoil drains from private development must not discharge directly into Council's stormwater infrastructure.
2. At a minimum, subsoil drains must drain to a surface boundary pit prior to the method of disposal point to minimise the distribution or accrual of sediment in the receiving Council drainage system.
3. Subsoil drainage lines are to be fitted with non-woven geotextile sock and drain must drain at 1% longitudinal grade.
4. Subsoil drainage is to be installed in the following locations:
    a. All landscaping, planters and tree beds proposed adjacent to general pavement areas; and/or
    b. Behind retaining walls.
5. Sealed uPVC pipe must be used where subsoil drainage lines cross beneath pavement areas.
6. In instances where subsoil drainage will affect the groundwater table, the level of drawdown must be contained within the site and not influence neighbouring properties.
7. The subsoil drainage system must be designed to prevent constant discharge of groundwater to the receiving drainage system to avoid nuisance surface seepage.
8. A 3m (minimum) length of ⌀100mm subsoil drainage line with non-woven geotextile surround is to be connected to the upstream side of all stormwater pits. The subsoil drain must be laid along the bottom of stormwater pipe trenches and hydraulically connected to the drainage pit.

4.12 Floor Level Controls

Refer to definitions outlined in Section 2.1: Classification of Overland Flow Paths.

1. For areas with known flooding risk (flow depths greater or equal to 100mm depth), habitable floor levels must be set per the relevant flood study for all properties. Refer to DCP Chapter 40: Environmental Risk for flood and floor level controls.
2. For areas with known risk of sea level rise, floor levels are subject to DCP Chapter 40: Environmental Risk for flood and floor level controls. (See Section 4.16: Sea Level Rise).
3. For all other areas (flow depths less than 100mm depth and no known risk of sea level rise), the habitable floor level must be set to 200mm above the nuisance overland flow depths for the major storm event, or 150mm above the adjacent ground level (where no overland flow is present).

4.13 Subdivision Modelling Assumptions

1. Stormwater drainage design must be provided for all subdivisions works, including details regarding the point of drainage in accordance with Section 3.0: Methods of Stormwater Disposal.
2. In circumstances where a proposed property will drain through a proposed downstream property, a formal easement is to be reflected on the Subdivision Plan and registered at time of subdivision.
3. Stormwater quantity management must be in incorporated into the drainage design as early in the subdivision as possible.
4. Stormwater quality management must be in incorporated into the drainage design as early in the subdivision as possible.
5. When modelling OSD and water quality requirements for subdivisions where a central OSD/Water quality system is proposed, the following impervious areas are to be assumed if unknown:

TABLE 4.13-1: ASSUMED IMPERVIOUS AREAS FOR SUBDIVISION STORMWATER MODELLING

Land Zone	Assumed impervious percentage of each lot
C4 Environmental living	60%
R2 Low Density Residential	65%
R3 Medium Density Residential	70%
R4 High Density residential	70%
E3 Productivity Support	90%
E4 General Industrial	90%

4.14 Dehumidification

1. A formal piped connection to Council's stormwater drainage network is required.
2. Dehumidification from basement car parks shall not be discharged to the kerb and gutter of a Council roadway unless it can be demonstrated that dry weather flows are not a nuisance.

4.15 Storage Areas

1. Above ground storage areas must comply with the requirements outlined in Section 5.7: Above Ground Storage Requirements.
2. Where the discharge is connected to Council's piped system, subsoil drainage around the outlet is to be provided to prevent the ground becoming saturated during prolonged wet weather. Subsoil drainage shall not be provided where the discharge is connected to the kerb and gutter.
3. Where the storage is located in an area where frequent ponding could create maintenance problems or personal inconvenience to property owners, the first 10-20% of the storage should be provided in an area able to tolerate frequent inundation. For example, a paved outdoor area, a small underground tank or a rock garden can be used.
4. Retaining walls must be structurally fit for their purpose, including the hydrostatic loads caused by full storage.

4.16 Sea Level Rise

Refer to Council's Sea Level Rise Policy for more information.

Where development occurs in areas with known sea level rise risk (for example, along the foreshore), the minimum floor level for habitable and non-habitable floor levels are subject to DCP Chapter 40: Environmental Risk Flood and Floor Level Controls.

4.17 Climate Change

Australian Rainfall and Runoff (ARR) has set guidelines on how to account for climate change in stormwater modelling.

To consider the impact of climate change, ARR4.2 requires adjusting rainfall depths and losses by applying a matrix of climate change factors. These factors include climate scenarios (also known as 'Shared Socio-economic Pathways' or SSPs) and the time horizon of interest.

1. When climate change is factored into stormwater models, SSP2-4.5 (Moderate emissions/warning, "middle of the road") or greater must be adopted.
2. An appropriate time horizon that reflects the proposed useful life of the development must be used.
3. The stormwater plans/report must detail all assumptions made, including but not limited to:
    a. SSP scenario used,
    b. assumed useful lifetime horizon,
    c. initial loss and climate change correctional coefficients,
    d. continuing loss and climate change correctional coefficients.

4.18 Minimum Orifice Size

1. To minimise risk of potential blockages, the minimum orifice size to be used in proposed stormwater designs is ø65mm.

5.0 Stormwater Quantity Management

On-site Stormwater Detention (OSD) systems temporarily hold and discharge stormwater at a designed rate to prevent any increase in downstream peak flows resulting from new or redevelopment. The discharge is to be restricted to a rate that can be accommodated by Council's existing stormwater drainage system.

5.1 On-site Stormwater Detention

1. OSD is required for all developments that:
    a. Fall away from the street that do not drain via private easement; and/or
    b. are classified as Category 2 or Category 3 development; and/or
    c. directly connect to Council's stormwater assets (including pit and pipe network).
2. The following developments do not require OSD:
    a. Minor Works development where the proposed increase in impervious area is less than 30m^2 per site, measured relative to that which existed at 1st November 2025.
    b. Swimming pools only, internal fit out or upper-floor additions without any modifications to the building footprint and/or impervious area.
    c. Category 1 developments with a total on-site impervious area of less than 250m^2,
    d. Developments along the foreshore discharging directly to receiving waters.
    e. Developments discharging directly into a tidal waterway or natural creek/channel.
    f. Category 1 developments where over 50% of the development footprint is within the 1% AEP flood extent. Clause 5.1.2.a and 5.1.2.c applies to development outside of the 1% flood extent.
3. Section 5.6: General Design Requirements outlines general design guidelines applicable to all OSD design.

5.2 OSD Calculation Methods

1. OSD calculations shall be undertaken in accordance with the relevant method outlined in:
    a. Section 5.3 - OSD for Category 1 Development (Deemed-to-Comply Solution)
    b. Section 5.4 - OSD for Category 2 Development (Site Storage Rate Method)
    c. Section 5.5 - OSD for Category 3 Development (Permissible Site Discharge Method)
2. Table 1.2-1: Development Category Classification outlines how developments are classified. The applicant must design OSD in line with the requirements outlined for their development category.
3. Category 1 and Category 2 developments may adhere to Category 3 development requirements if preferred.

5.3 OSD for Category 1 Development (Deemed-to-Comply Solution)

1. In lieu of modelling (i.e. Category 3 methodology), a deemed-to-comply OSD storage tank of 4m^3 minimum is to be provided and all downpipes connected (including existing).
2. The OSD storage tank may be in the form of a modified aboveground rainwater tank, as standalone storage per Figure 5.3-1, or a combined storage for both rainwater reuse storage and on-site detention as per Figure 5.3-2.
3. An additional 1m^3 of storage per 100m^2 will be required for all developments with total roof areas greater than 300m^2.
4. The following impervious areas must be connected to the OSD system:
   a. All roof areas, or
   b. all hardstand areas and 80% of the roof area.
5. The deemed-to-comply OSD system is to have a storage height less than 2.5m and be controlled via a ø65mm discharge orifice.
6. An air gap of 200mm at top of the tank, with an appropriately sized overflow must be provided.
7. OSD tanks must be minimum 1m below the gutter.

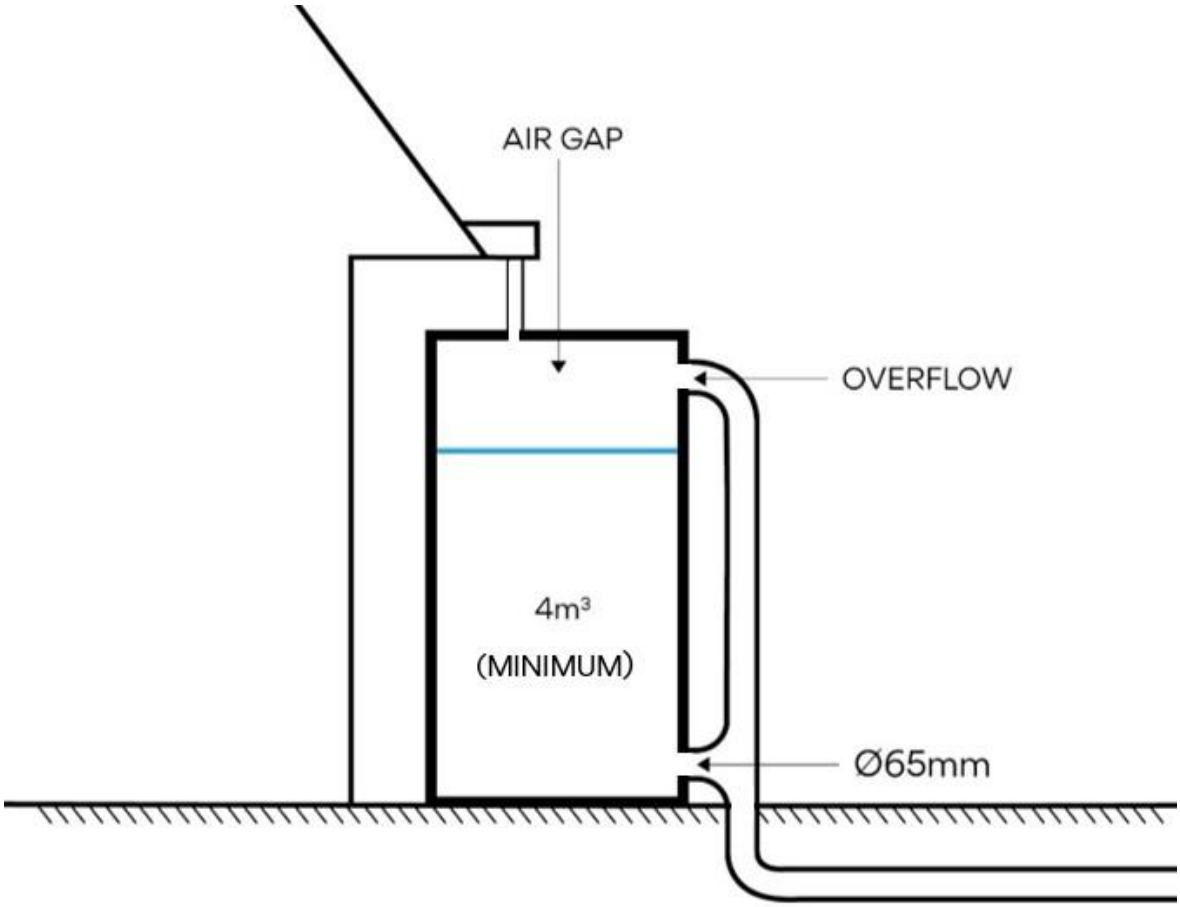


FIGURE 5.3-1: RETROFITTED RAINWATER TANK FOR OSD ILLUSTRATION.

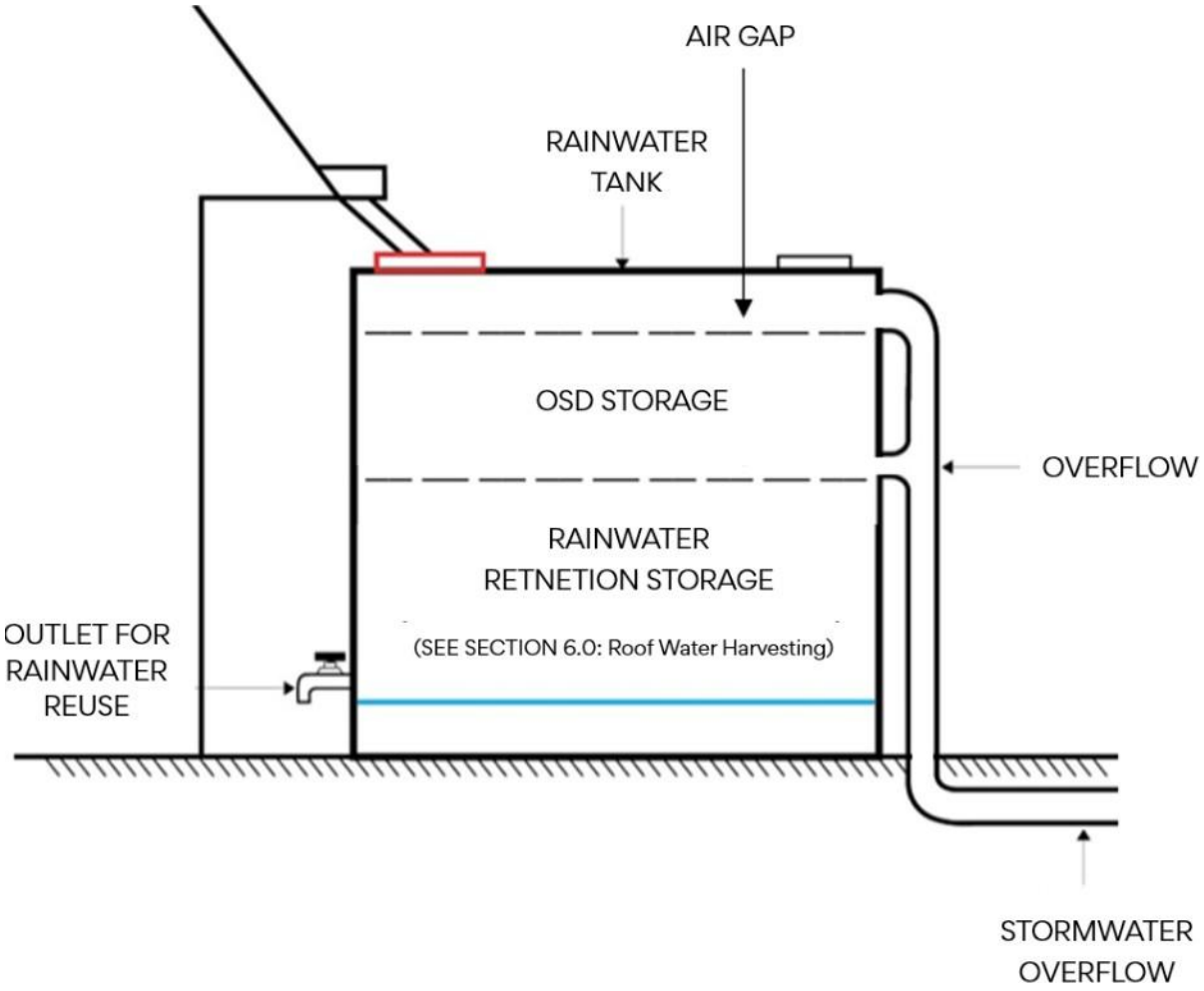


FIGURE 5.3-2: RETROFITTED RAINWATER TANK FOR OSD AND RETENTION ILLUSTRATION.

5.4 OSD for Category 2 Development (Site Storage Rate Method)

1. Category 2 developments are required to provide a minimum site storage rate of 2m^3 of on-site detention (OSD) per dwelling or as outlined in equation 1, whichever is greater:

EQUATION 1.0

$$Storage\ (m^3) = Depth\ (mm) * Impervious\ Area\ (m^2)$$

Where depth is defined as the figure below (expressed in Equation 1.1):

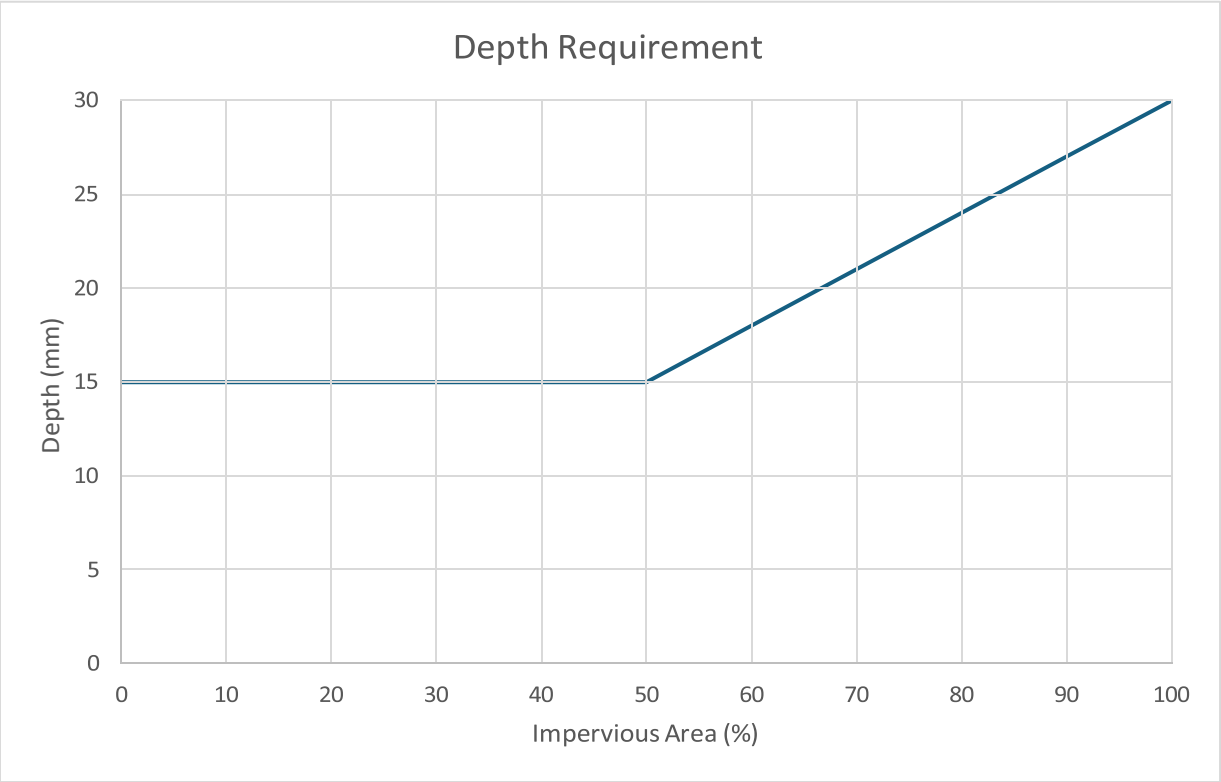


FIGURE 5.4-1: DEPTH (MM) VS IMPERVIOUS AREA (%)

EQUATION 1.1:

$$Depth\ (mm) = \begin{cases} 15 & if\ Impervious\ Area\ \leq 50\ \% \\ 0.3 * Impervious\ Area\ (\%) & if\ Impervious\ Area\ > 50\% \end{cases}$$

2. Storage is to be rounded up to the nearest decimal.
3. Where underground storage is not possible, and site constraints limit opportunity for above ground storage, retrofitted rainwater tanks may be used for OSD provided:
   a. All roof areas are connected to the OSD system/s.
   b. The calculated deem-to-comply storage area is to be oversized by 20% to offset impervious area bypass.
   c. Stormwater from bypassing impervious area must be managed to minimise nuisance overland flow to neighbouring lots.
4. The maximum depth/height for deemed-to-comply Category 2 OSD tanks is to be 2.5m.
5. Where detention is required, an orifice must be placed at the base of the detention storage to control flows for the major and minor stormwater event. Orifices are to be sized as follows:

TABLE 5.4-1: CATEGORY 2 OSD CONTROLS

	Control	Emergency Control
	An orifice (or pipe) must be place at the base of the detention portion of the tank to control flows for the minor stormwater event.	An orifice or weir is to be installed above the storage area of the tank to control stormwater in the event of surcharge.
OSD up to 25m^3	Ø100mm orifice	Ø150mm orifice overflow and 200mm airgap.
OSD greater than 25m^3	ø150mm orifice	Ø150mm orifice overflow (above ground refitted rainwater tank storage) or a weir with minimum 0.5m length (below ground OSD or on ground storage) and 200mm airgap.

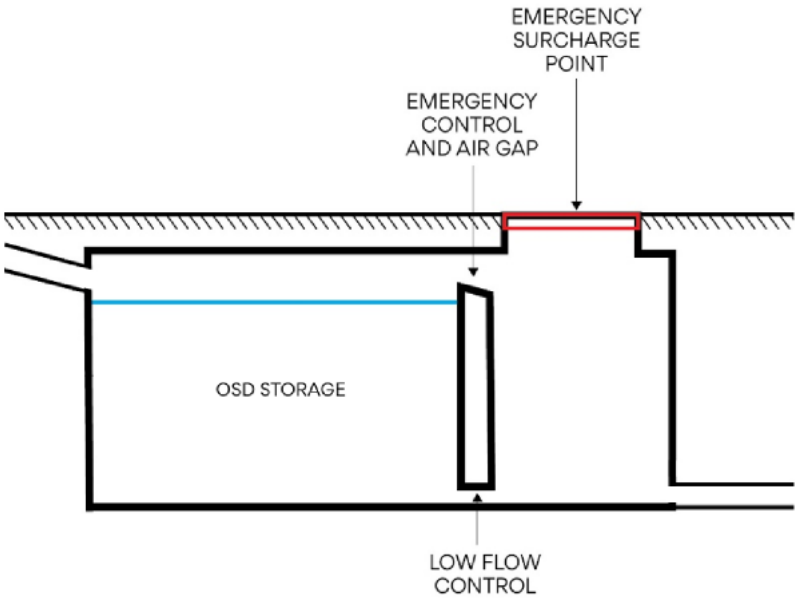


FIGURE 5.4-2: STORMWATER ILLUSTRATION FOR BELOW GROUND OSD.

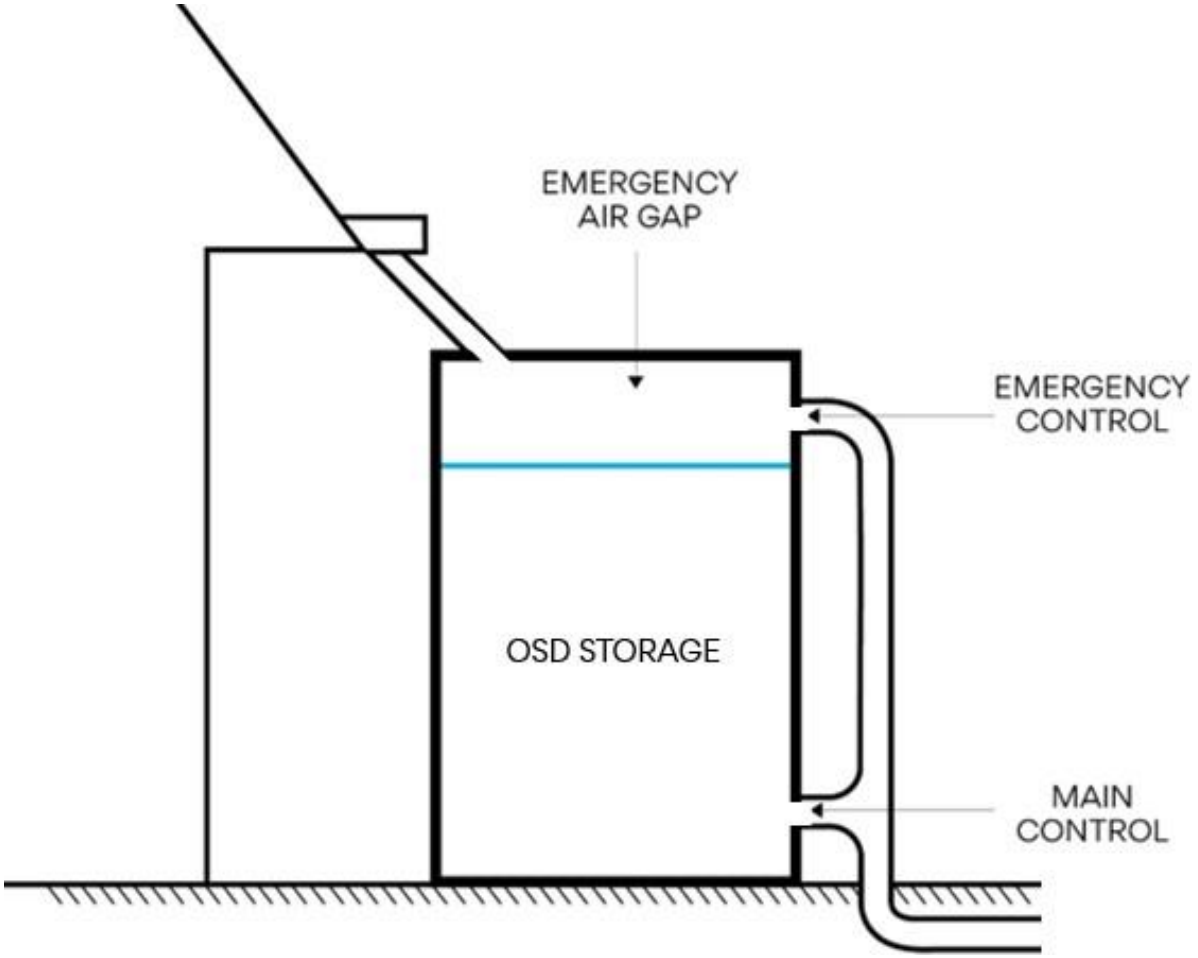


FIGURE5.4-3: STORMWATER ILLUSTRATION FOR ABOVE GROUND OSD.

5.4.1 Examples of OSD Controls for Category 2 Development

Example 1:

An owner would like to knock down their dwelling and subdivide their lot into 3 lots.

- Development Site Total Area: 1820m^2 (606.7m^2 per lot)
- Proposed Impervious Area: 1274m^2 (424.7m^2 per lot)

Using figure 5.4-1 above, it can be determined that the depth requirement for a site with 70% Impervious area percentage is 21mm.

Equation 1 can now be used to determine detention area required for this development:

$$Storage\ (m^3) = Depth\ (mm) * Impervious\ Area\ (m^2)$$

$$Storage = 21mm * 1274m^2$$

$$Storage = 0.021m * 1274m^2$$

$$Storage\ = 26.75m^3$$

$$Storage\ = \frac{26.8m^3}{3\ lots} = 8.93m^3 = {9m^3}/{lot}$$

In this example, the subdivision is required to provide a combines OSD storage of 26.8m^3 (Council's preferred method), or 9m^3 per lot.

Example 2:

A developer would like to build 19 new townhouse residential dwellings.

- Development Site Total Area: 2700m^2
- Proposed Impervious Area: 1998m^2
- Impervious Area Percentage: 74%

Using table 3.2.2 above, it can be determined that the depth requirement for a site with 74% Impervious area percentage is 22.2mm.

Equation 1 can now be used to determine detention area required for this development:

$$Storage\ (m^3) = Depth\ (mm) * Impervious\ Area\ (m^2)$$

$$Storage = 22.2mm * 1998m^2$$

$$Storage = 0.0222m * 1998m^2$$

$$Storage\ = 44.36m^3$$

Or

$$Storage\ = \frac{44.4m^3}{19\ dwellings} = {2.3m^3}/{dwelling}$$

In this case, a combined storage of 44.4m^3 (Council's preferred method) or 2.3m^3 per dwelling of OSD is required for the site.

5.5 OSD for Category 3 Development (Permissible Site Discharge Method)

1. Detention systems shall be designed to ensure post development flows do not exceed natural conditions for the 20%,10%, 5% and 1% AEP storm events. Natural conditions are considered to consist of a 100% pervious site.
2. Category 3 developments will be required to undertake hydrologic and hydraulic assessments to demonstrate that runoff regimes are satisfied in accordance with the requirements of Council's DCP and this Specification.
3. OSD calculations are to be undertaken in accordance with the latest version of Australian Rainfall and Runoff (ARR) guidelines and using modelling software such as Watercom's DRAINS.
4. Appropriate climate change correctional factors are to be applied in line with the latest ARR guidelines and Section 4.17: Climate Change.
5. When DRAINS modelling is utilised:
    a. Relevant model inputs (rainfall data, storm losses, pre-burst, temporal patterns etc) are to be sourced from ARR Data Hub and BOM IFD websites.
    b. The Initial Loss / Continuing Loss (IL/CL) hydrological model is to be used, with the following storm loss corrections:
        i. Pervious Area Initial Loss (mm) correction factor of 0.7x is used, and
        ii. Pervious Area Continuing Loss (mm/hr) correction factor of 0.4x is used.
    c. The model must run storm durations from 5 minutes to 2 hours.
    d. The DRAINS data and result shall be presented in a professional format.
    e. The model shall be submitted to Council for assessment.
    f. If any modelling submitted to Council requires updates or corrections, it must be undertaken at no cost to Council.

5.6 General Design Requirements

1. The invert of the on-site detention storage must be above the adopted tailwater level at the outlet (in accordance with Section 4.10: Tailwater) unless it can be clearly demonstrated using DRAINS modelling that peak discharge from the system does not coincide with the timing of peak floodwaters. A non-return valve must be installed where the outlet invert is below the respective tailwater level.
2. The system is to be protected by a Restriction on Use of Land and Positive Covenant, requiring the owners to carry out periodical maintenance. An example OSD system Positive Covenant and Restriction on Use of Land template is included in **Appendix C.**
3. OSD systems must generally be located as close as possible to the lowest point of the site and be designed to maximise the catchment draining to the OSD facility (including all piped and surface stormwater runoff from all pervious areas of the site).
4. The OSD catchment must limit bypass, capturing as much of the lot as possible and delineated on plan.
5. In such case that upslope runoff and/or overland flow is unable to bypass the OSD system, the OSD storage must be sized to cater for the relevant additional inflow.
6. The location and design of the OSD system must not increase nuisance overland flow or negatively affect the structural integrity, aesthetic value or functionality of adjacent properties.
7. All OSD systems must be located entirely within the property boundary, and independent of any building walls designed to service other structures.
8. Any stormwater overflow from the gutters of proposed buildings shall be collected by inlet pits on the ground and/or drained via major overland flow paths into the OSD system. Where this is not possible, the gutter and downpipe system shall be designed to convey the 1% AEP storm event to the OSD system.

9. The invert of the OSD storage must be wholly above the 1% AEP flood flow level at the outlet.
10. A single, centralised OSD system must be provided for multi-dwelling developments or greater and wholly contained within one Torrens Title lot.
11. All OSD systems for multi-unit and commercial developments preferred in common areas (not in private courtyards, etc).
12. Where an orifice is used to control discharge from the OSD system, a screened stainless steel or galvanised mesh screen must be with a lifting handle (maxi-mesh RH3030 or equivalent) must be fitted to the outlet to minimise risk of blockage.
13. A weir, spillway or overflow outlet is to be provided in all OSD systems as part of the operation of the system to cater for system failure or extreme storm events. Additionally, where the surcharge point is external at ground level, a formal surcharge flow path (maximum 200mm deep) must be provided with suitable armour/rip rap as required.
14. All surface inlet pits / drains upstream of the system must be designed to prevent surcharge when the OSD storage is full.
15. A maintenance schedule is to be prepared and submitted with the construction certificate plans. The maintenance schedule shall include description and location of all OSD components, an outline of the required works, how and when these will be performed, and who will be carrying out these maintenance works.
16. Each on-site stormwater detention systems shall be indicated on site by fixing a marker plate or sign in a prominent position. This place is to be of minimum size 150mm x 100mm and is to be made of non-corrosive metal or 4mm thick plastic. It is to be fixed on the OSD facility, to the nearest permanent surface or erected on a galvanised iron pole located in a prominent position. The wording on the marker plate is to be:

> *This is an **On-Site Stormwater Storage System** required by the Sutherland Shire Council.*
>
> *It is an offence to reduce the volume of the tank or basin or interfere with the orifice that controls the outflow.*
>
> *The base of the outlet control and debris screen must be cleaned of debris and sediment on a regular basis by the owner/occupier.*
>
> *This plate must not be removed.*

5.7 Above Ground Storage Requirements

Above ground OSD basins must have a minimum 2% fall in the direction of the outlet control.

5.7.1 Above ground storage in hardstand areas for car parking and pedestrian access:

1. Storage in car parking area or driveways shall ensure the gradients of vehicle access complying with the criteria set out in AS/NZS 2890.
2. Any shaping of pedestrian accessible areas shall comply with the gradients as stated in AS1428 and Building Code of Australia.
3. Stored water shall not inundate gardens or areas with bare soil, mulch or the like around parking or other hardstand areas. These areas should be above the storage top water level or protected by concrete kerbing or other robust treatment capable of withstanding vehicle impact.
4. OSD ponding within car parking must be wholly stored within the aisle. No ponding of water will be accepted within the parking spaces.
5. A clear pedestrian route must be provided to/from all parking spaces where OSD is provided within the aisles.
6. Maximum ponding depth within the car parking aisles must be no greater than 200mm.
7. On-ground OSD systems (not including retrofitted rainwater tanks) are to be upsized by 20% to allow for storage loss from leaves / debris.

5.7.2 Above ground storage in landscaped areas:

1. Landscaped storage areas must be within common property.
2. The design should be undertaken in consultation with the landscape designer to ensure that the plans are not in conflict.
3. Where landscaped areas are to be used, the required volume shall be increased to accommodate any potential mature planting within the basin. The additional volume shall be provided as outlined below:

TABLE 5.7.2-1: ADDITIONAL VOLUMES REQUIRED

Design Storage Volume	Additional Volume Required
$5m^3$ or less	50%
Between $5m^3$ and $25m^3$	25%
Greater than $25m^3$	15%

4. Careful consideration must be given to types of planting and landscaping treatment within the basin, to ensure the area can be readily maintained and the storage volume is not reduced over time.
5. Landscaping shall be designed so as not to generate large amounts of debris or other material likely to cause stormwater pollution. Treatments such as wood chips / mulch or bare soil, and the like are not permitted within the storage area.
6. Vertical sides near driveways or pedestrian areas must be appropriately protected using fencing, kerb, edging or landscaping to minimise hazard to pedestrians and vehicles.
7. Suitable access must be provided for maintenance purposes which may include ramps or accessible gradients.
8. Maximum ponding depth within landscaped areas must be no greater than 300mm within the property's front setback, or 500mm elsewhere.
9. Consideration must be given to the likelihood of access by children in rainfall events and the subsequent need for fencing or other controls.
10. Where ponding depths are 300mm or greater, safety fencing and a warning sign must be installed.

11. Where fencing is required, it must be childproof pool type fencing including a self-closing gate.
12. Subsoil drainage must be installed in landscaped storage areas to prevent the area remaining saturated during wet weather.
13. Any buildings forming the walls of the above ground storage must be adequately waterproofed to prevent water entering the sub-floor area.
14. Any retaining walls surrounding the above ground storage, including spillway, must be in watertight concrete or masonry construction (timber construction is not permitted) and structurally adequate to accommodate hydrostatic loading from full storage.
15. The design of above ground tanks must consider appearance and urban design issues. Above ground tanks must comply with the same engineering criteria as below ground tanks. Particular attention should be given to access for inspection and maintenance.

5.8 OSD Below Ground Storage Requirements

1. Storage tanks are not permitted under habitable floors or any building slabs.
2. Storage tanks must not be penetrated by any site services such as water, sewer, electricity, gas, etc.
3. The tank must have a minimum depth of 900mm to facilitate access for maintenance and cleaning. Consideration may be given to reduce the depth of the tank up to 750mm subject to the assessment and approval from Council.
4. A minimum of two grated access points (900mm x 900mm) must be provided on opposite sides of the tank to facilitate ventilation; one must be located over the discharge control pit / screen for maintenance and cleaning.
5. Larger tanks may require additional grates to provide adequate ventilation.
6. The spacing between each access grates must comply with AS2865.
7. All access points must be fitted with a minimum of 900mm x 900mm removable or hinged heavy duty grate.
8. Step irons must be provided to all access points at 300mm centres to allow for comfortable access where depths exceed 1.2m.
9. Grates must be fitted with appropriate locking mechanisms to prevent ingress by children and non-authorised persons.
10. For safety, all maintenance access to pits must conform to current Australian Standards and regulations for confined spaces. It is the responsibility of the designer to ensure compliance with these requirements and other requirements associated with Work Health and Safety.
11. The location of the tank and inspection access must consider safety of persons undertaking maintenance and inspections. Access points should be located away from driveways or heavily trafficked areas wherever possible. Suitable warning signage must be installed for confined spaces.
12. The floor of the storage tank shall be graded at a minimum of 1% longitudinally and laterally to the outlet to ensure free and complete dewatering of the system.
13. The tank must be constructed using reinforced concrete or masonry.
14. The top water level in an underground OSD system during the 1% AEP storm event must be at least 150mm lower than the soffit.
15. The tank must be certified by an appropriately qualified and experienced engineer for structural adequacy against appropriate live and dead loads, earth loads, traffic, internal hydrostatic loads as well as external hydrostatic loads (buoyancy).

5.9 Emergency Overflow

Consideration must be given to emergency overflow from the OSD storage structure in the case of the drainage system failing because of blockage or during storm events exceeding the 1% AEP. The following shall be complied with:

1. A minimum 900mm x 900mm overflow pit and an emergency overflow weir shall be incorporated into the OSD design to collect emergency overflow. The overflow pit shall be directly connected to the outlet pipe connections in:
    a. the kerb; and/or
    b. the gutter; and/or
    c. Council piped drainage system, or
    d. inter-allotment drainage system.
2. Emergency overflow from the weir shall be designed to ensure no adverse impact on adjoining properties or the road verge. The top of the emergency overflow weir shall be minimum 100mm below the top of wall level.
3. Any overland flow path resulted from the emergency overflow shall be sized to convey the full 1% AEP flow from the site to the approved point of discharge in a safe and controlled manner, without concentrating flows or having adverse impacts onto the adjoining properties. Any proposed emergency overland flow paths shall be indicated on the design plans.

For sites that do not drain directly to a street frontage, the following additional requirements shall be met:

4. The outlet pipe system shall be sized to convey the 1% AEP flow from the site to the street drainage system. Where this is not possible or the point of connection does not have sufficient capacity to convey the 1% AEP flow, an overland flow path shall be provided within the drainage easement. This includes shaping the surfaces to direct flows in a safe and controlled manner to an approved discharge point.

6.0 Roof Water Harvesting

Maximising collection of rainwater for non-potable use is strongly encouraged for all development. Reuse of stormwater does not negate the need for OSD, and a rainwater tank storage used for reuse cannot be used to offset the required OSD volume, unless the requirements of Section 6.3: Reuse Demand Offset are met.

Roof water harvesting systems keep the rainwater on site (retained) to be reused again for such things as:

- Toilet flushing water; and/or
- laundry washing water; and/or
- outdoor water uses such as garden watering and car washing; and/or
- topping up and/or filling up pools and spas, and
- as specified by BASIX.

Maximising the use of rainwater reduces the water level inside the tank to capture the greatest amount of water possible at the time of a rainfall event and reduces overflow from the rainwater tank to the stormwater system.

6.1 Minimum Requirements

1. **BASIX Certificate Requirements** – Rainwater re-use shall be provided in accordance with BASIX Certificate requirements.
2. **Rainwater Re-use** – Part of BASIX requires the installation of rainwater re-use facilities. The volume of storage required depends on the size of the dwelling, the number of amenities and other site factors.

6.2 Installation Requirements

Any rainwater tank to be installed in the Shire must comply with the following installation requirements:

1. Must not collect water from a source other than roofs on a building or a water supply service pipe.
2. All rainwater tanks must be installed in accordance with the manufacturer's recommendations, and in accordance with relevant Australian standards.
3. Roof water shall not be sourced from roofs coated with lead or bitumen-based paints, or from asbestos-cement roofs.
4. Be fitted with a first flush device, being a device that causes initial runoff to bypass the tank to prevent potential contaminants from entering the tank.
5. If supply is supplemented with a top up system by interconnection with a reticulated water system, backflow prevention must be provided in accordance with the relevant Australian Standards.
6. The tank must be enclosed, and inlets screened, to prevent the entry of foreign matter and to prevent mosquito breeding.
7. Tank overflow must be connected to a stormwater drain such that it does not cause nuisance to neighbouring properties.
8. All fixtures connected to the supply system are marked "rainwater".
9. Above ground tanks shall not require excavation of more than 1m from natural ground level to be installed.
10. All roof water pipe designs shall ensure that an overflow point located lower than the gutters is provided to ensure that flooding of eaves from gutters overflowing does not occur.
11. The tank shall be located at least 0.5m from any property boundary.

12. Pumps are to be screened or covered to avoid noise nuisance to neighbouring properties.
13. Above ground rainwater tanks may be retrofitted to encapsulate both rainwater reuse and OSD as illustrated below.

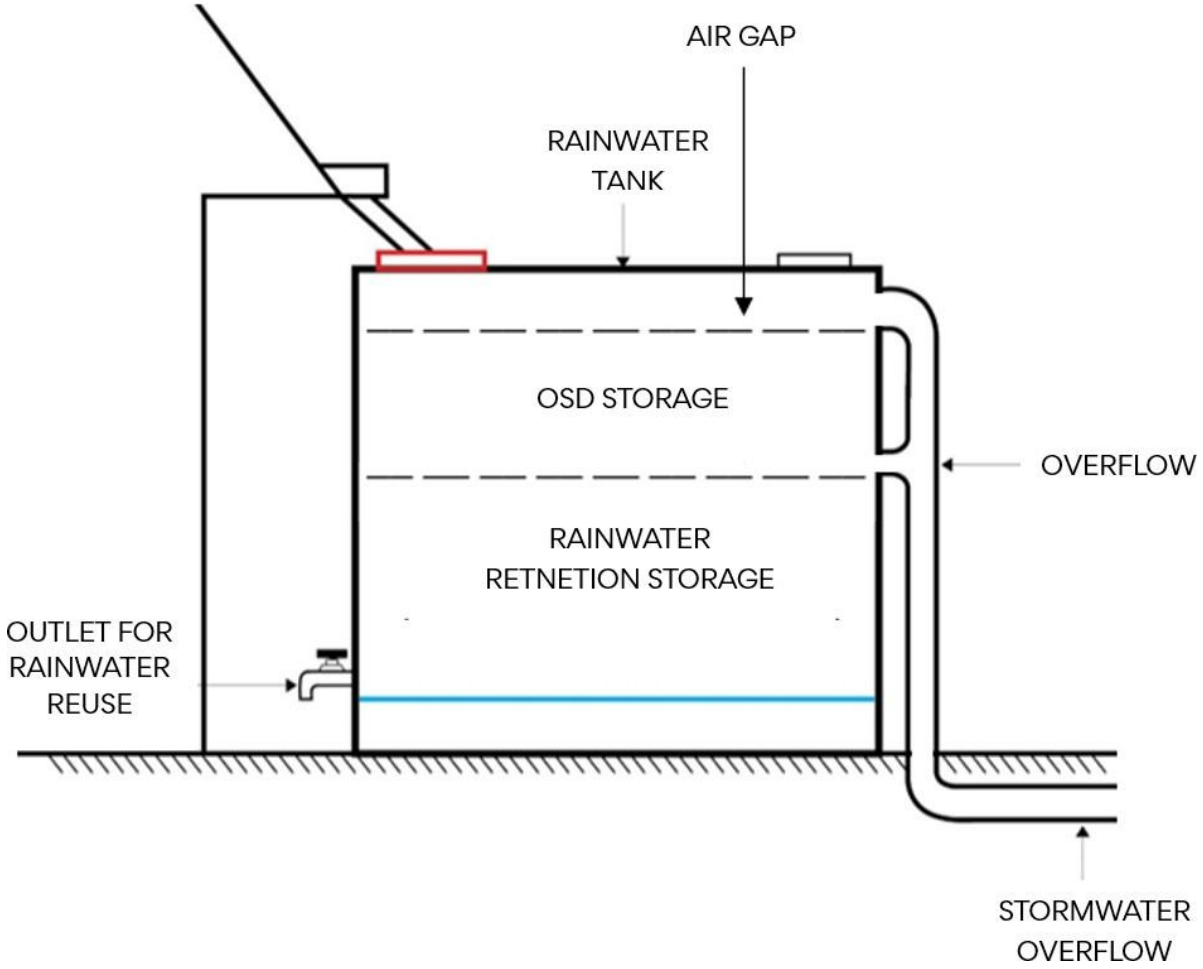


FIGURE 6.2-1: ILLUSTRATION FOR COMBINED ABOVE GROUND OSD AND RAINWATER HARVESTING.

6.3 Reuse Demand Offset

1. Category 1 and Category 2 developments are not permitted to offset OSD through rainwater retention systems.
2. Category 3 developments may subtract effective roof area from their proposed impervious area for their post stormwater quantity model (e.g. DRAINS) calculations if:
    a. It can be demonstrated through eWater MUSIC modelling that the connected rainwater tank meets 80% of the reuse demand.
    b. Eves and gutters connected to the rainwater tank be designed to convey flows up to and including the 1% AEP storm event.
    c. Only roof areas connected to the rainwater reuse tank are subtracted from impervious area stormwater quantity model calculations.
3. Reuse demand must be determined by:
    a. *MUSIC Modelling Guidelines (2018)* by WaterByDesign,
    b. *NSW MUSIC Modelling Guidelines* (2015) by BMT WBM,
    c. The manufacturers specifications, or
    d. Known demand due to anticipated operational activities (i.e., fleet car wash schedule etc). Known demand reuse must be demonstrated through appropriate documentation.

7.0 Stormwater Quality Management

Stormwater tends to pick up pollutants and carry them through Council's stormwater infrastructure downstream. These pollutants have a drastic impact on our environment and waterways.

Stormwater runoff in the Shire discharges into a range of environment types which have high ecological and recreational value, including:

- Ocean swimming beaches
- Tidal bays
- Aquatic Reserves and key fish habitats
- National Parks and nature reserves
- Littoral rainforests and coastal wetlands
- Major river systems such as the Georges and Port Hacking Rivers

Council highly values these environments and endeavours to promote Water Sensitive Urban Design (WSUD) through all capital works projects and development activities.

WSUD aims to ensure that developments are designed, built and maintained in a manner that minimises negative changes to the water cycle. WSUD often involves the incorporation of Stormwater Quality Improvement Devices (SQID) such as technologies, proprietary products and intelligent landscape design to reduce pollutant loads to downstream environments.

Centralised water quality measures for development sites at the scale of multi-dwellings is preferred.

Stormwater quality treatment trains are to be facilitated as early in the subdivision as possible and not deferred to future applications.

7.1 Water Quality Calculation Methods and Deemed-to-Comply Solutions

1. Water Quality calculations shall be undertaken in accordance with the relevant method outlined in:
    a. Section 7.2 – Category 1 Developments
    b. Section 7.3 – Category 2 and Category 3 Developments
    c. Section 7.4 – Stormwater Quality Improvement Devices (SQID)
    d. Section 7.5 – Erosion and Sediment Controls

2. Table 1.2-1: Development Category Classification outlines how developments are classified. The applicant must design water quality solutions in line with the requirements outlined for their development category.
3. Category 1 developments may adhere to Category 2 and Category 3 development requirements if it better accommodates for development constrains.

7.2 Category 1 Developments

1. In lieu of modelling (i.e. Category 2 and Category 3 methodology), a deemed-to-comply litter trap must be installed in the downstream boundary pit of the proposed design.
2. First flush devices must be installed on all rainwater tanks and retrofitted rainwater OSD tanks.

7.3 Category 2 and Category 3 Developments

1. All applicable developments must achieve a minimum of:

TABLE 7.3-1: WATER QUALITY REDUCTION TARGETS

Pollutant	Annual Reduction Targets
Total Suspended Solids (TSS)	85%
Total Nitrogen (TN)	45%
Total Phosphorous (TP)	65%
Total Gross Pollutants (TGP)	90%

2. At Council's discretion, a further 100% reduction in hydrocarbons may be required of developments proposing fuel/chemical storage or handling (for example petrol service stations and mechanic workshops).
3. Designers implementing WSUD and SQIDs should use the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software and completed in accordance with one of the following documents:
    a. *Using MUSIC in Sydney Drinking Water Catchment* (published by WaterNSW, 2019),
    b. *MUSIC Modelling Guidelines* (Published by WaterByDesign, 2018)
    c. *NSW MUSIC Modelling Guidelines* (published by BMT for NSW Local Land Services, 2015)
4. Stormwater treatment measures must be located and configured to maximise the impervious area treated.
5. Devices are to be located within the property boundary.
6. The treatment train must be designed to treat stormwater runoff volume up to the 3-month ARI storm event without bypass.
7. Stormwater treatment measures must be able to bypass flows that are more than the design discharge in a controlled manner and are engineered to connect to suitable downstream discharge points with negligible concentrated flows resulting from overtopping or blockage of the device.
8. Council preference is the use of green infrastructure and intelligent landscape design as opposed to proprietary treatment devices.
9. A maintenance schedule shall be provided to Council and a "Positive Covenant" and "Restriction on the Use of Land" must be created to ensure the on-going maintenance of all SQID elements. Sutherland Shire Council must be nominated as the authority to vary or modify any Restriction and Positive Covenant.
10. It will be the responsibility of the owner/occupier to undertake all maintenance works associated with SQID and WSUD elements.

7.4 Stormwater Quality Improvement Devices (SQID)

Guidance on suitable SQID for managing stormwater pollutants is summarised in the table below:

TABLE 7.4-1: STORMWATER POLLUTANTS TARGETED BY SQID MEASURES

SQID	Stormwater Pollutants							
	Gross Pollutants	Coarse Sediment	Total Suspended Solids	Heavy Metals	Total Phosphorus	Total Nitrogen	Runoff Volumes	Runoff Flow Rates
Rainwater Tank								
Pit Insert								
Gross Pollutant Trap								
Trash Rack								
Vegetated Filter Strip								
Vegetated Swale								
Permeable Paving								
Sand Filter								
Tree Pit Filter								
Raingarden								
Biofiltration Swale								
Infiltration Measure								
Retention Basin								
Constructed Wetland								
Biofiltration Basin								
Proprietary Device*								

	Potential to intercept and retain a minor portion of the stormwater pollutant
	Targeted stormwater pollutants
	These pollutants shall be captured in advance of this SQID by including either a pre-treatment measure, forebay or sacrificial zone in the treatment series.

* It is the responsibility of the applicant to ensure that the selected Proprietary Device adequately treats the intended pollutant source.

7.4.1 Biofiltration Measures

Biofiltration is Council's preferred treatment approach for removal of fine sediments and nutrients including nitrogen and phosphorus. Biofiltration measures have an extended detention storage, biofilter media, plants and drainage system. Submerged zones are an option in biofiltration measures where there are concerns about sustaining plants through dry periods.

Biofiltration measures can be provided at a range of scales including:

- Tree pit filters
- Raingardens
- Biofiltration swales
- Biofiltration basin

Biofiltration is considered an acceptable stormwater quality treatment measure when:

1. The biofiltration design is located and configured appropriately.
2. The base of the biofiltration is no greater than 2.5%.
3. Where topography exceeds 2.5% slope (i.e., for bioretention swales), spreaders and rock check dams will be required to ensure biofiltration measures adequately pond runoff for treatment.
4. Biofiltration measures must generally have a maximum internal batter slope of 4(h):1(v) around one side of the extended detention storage where maintenance access is to be provided.
5. If planted with appropriate species, 3(h):1(v) embankments on other non-accessible internal extended detention batters are acceptable.
6. Proposed batter slope may be considered when modelling the surface area of proposed biofiltration measures. The modelled surface area represents the average of the biofilter area and area inundated at the maximum extended detention depth.
7. External batters must have a shallower gradient with defined and structurally protected areas provided to manage overflows – particularly in larger basins.
8. The sides of the biofilter media must be lined in sandy soils to prevent stormwater from passing laterally out of the biofilter.
9. Extended ponding depths located in road reserves must comply with the Austroads specifications, Australian Standards and TfNSW supplements.
10. Biofilter plants must be selected considering the likely frequency of wetting. Plants located closer to inlets must be appropriate for frequent wetting, while plants located further from inlets must have the ability to survive extended dray or low flow periods.
11. Biofiltration measures must only be proposed in location where a minimum 1m clearance is available from the groundwater table to the base of the biofilter media drainage layer.
12. Biofilter media design saturated hydraulic conductivity (Ksat) must be within 100 to 300mm/hr to support long term growth of biofilter plants.
13. The biofilter must be modelled with a saturated hydraulic conductivity equivalent to 50% of the design saturated hydraulic conductivity to allow for potential blockage over the lifecycle of the measure.
14. The adopted starting orthophosphate content in the filter media for all models must not be less than 40mg/kg.
15. Filter media depth (not including gravel drainage layer) must be between 0.2m and 0.4m.
16. Extended detention included in the proposed biofiltration system can be used as part of OSD calculations. Where appropriate, the biofiltration system and OSD system can be combined into one WSUD unit.

17. Where OSD and biofiltration is combined, appropriate mitigation strategies need to be taken into consideration. i.e., physical barriers to prevent child access, dense planting and storage volume, high sediment loads associated with infrequent storm events and strategies to prevent vegetation/litter blockage of outlets.

Grassed Swales:

1. Grassed swales modelled as part of the water quality treatment train must not exceed a gradient of 5%.
2. Grassed swales must be trapezoidal or curvilinear in profile to avoid flow concentrations at the base of the swale. Triangular shaped swales should be avoided as concentrated flow at the base of the swale can lead to insufficient water quality treatment and scouring – generating sediment.

7.4.2 Proprietary Stormwater Treatment Devices

Proprietary stormwater treatment devices are designed target and treat specific stormwater pollutants.

1. Proprietary stormwater treatment devices must be modelled in accordance with the manufacturer's specifications.
2. Appropriate considerations must be made for the installation and regular maintenance of proprietary devices – this includes but is not limited to minimum chamber heights and access pits for maintenance and device replacement.
3. Devices must not have inlets less than Ø100mm to minimise regular blockage from organic debris and litter.

7.4.3 Rainwater Tanks

Rainwater tanks must be designed in accordance with Section 6: Roof Water Harvesting.

7.5 Erosion and Sediment Controls

This section is to be read in conjunction with Council's Environmental Site Management Specification.

Erosion and sedimentation control measures are to be installed and maintained until construction activities have been completed and the site is fully stabilised.

Depending on the extent of disturbed area, one of the following plans to manage sediment and erosion must be submitted with the development application:

1. Basic Control Plan – Category 1 Developments:
    i. Council requires at least a hand marked up plan of proposed works and control measures.
    ii. Basic erosion and sediment controls in accordance with the "Blue Book" (Landcom, 2004) and Council's Environmental Site Management Specification – Section 4 (Erosion and Sediment Control Measures).
2. Environmental Site Management Plan – Category 2 and 3 Developments:
    a. An Environmental Site Management Plan (ESMP) is required for Category 2 and Category 3 developments.
    b. The purpose of an ESMP is to demonstrate that erosion and sediment control, site and pedestrian safety and traffic control during the construction process has been considered and appropriate measures have been determined to prevent any adverse impacts.

c. An ESMP must be prepared for approval and executed in accordance with the "Blue Book" and Council's Environmental Site Management Specification.
d. The ESMP must detail all necessary erosion and sediment control best management practices, such as location and general diagrammatic representations of installation/application.
e. Location and engineering details with supporting design calculations for all necessary sediment basins. Where appropriate, this must include soil testing to determine the type of basin required and whether flocculation will be required.
f. Where applicable, diversion of runoff from upslope lands around the disturbed areas must be maintained.
g. A copy of the ESMP must be always kept on the site and be provided to Council Officers on request.

3. Additional controls for all development:
   a. Wastewater cannot be discharged to the stormwater system unless it is visually free from grease, oil, solids and unnatural discolouration and free from saleable matter under the *Protection of the Environment Operations Act 1997*.
   b. Sediment laden runoff from excavations must be pumped to an adequately sized sediment basin and treated before discharge – in line with the recommendations outlined in the "Blue Book".
   c. Where non-compliant water is to be pumped from a site, a Trade Waste permit must be obtained from Sydney Water to dispose of it to the sewer.

8.0 Seepage Water, Dewatering and Groundwater Management

This section is to be read in conjunction with Sutherland Shire's Environment Site Management Specification.

Seepage water is slow moving water that slowly makes its way through porous materials such as soil or rock. This natural process occurs due to differences in pressure or gravity, allowing water to move through cracks, joints or pores. Seepage can occur in various directions – vertically, horizontally or a combination of both – depending on the surrounding conditions.

Dewatering is the process of removing groundwater from soil to lower the level of the water table in the area.

Groundwater is water that exists beneath the surface of the property in underground streams and aquifers.

8.1 Seepage

1. Sub-soil drainage (from site seepage, planter boxes etc.) must not be discharged directly or indirectly to Council's street kerb and gutter.
2. Sub-soil drainage or seepage water must be restricted from entering all below ground structures with habitable or non-habitable floor spaces and the stormwater drainage system (inclusive of stormwater pits, pipes and / or kerb and gutter), by waterproofing and tanking.

Refer to Section 4.11: Subsoil Drainage for additional sub-soil drainage controls.

8.2 Dewatering

Visit relevant State Authority website for further information regarding dewatering and State requirements.

Temporary dewatering involves the removal of groundwater from the site to enable construction works to be undertaken, including the removal of accumulated water from any hole, excavation or sediment trap on a construction site.

Excavations can fill with stormwater or groundwater. These often must be emptied before work can continue.

Under the *Protection of the Environment Operations Act 1997,* owner-builders, builders and landscapers are responsible and accountable for preventing sediment and construction wastewater from leaving building sites.

Permanent dewatering involves the continual removal of groundwater from the site after construction works have been completed.

8.2.1 Information Requirements

If a proposal involves temporary or permanent dewatering, then approval from the relevant NSW Government department will need to be obtained and the considered an integrated development.

The following information must be supplied to Council for all dewatering proposals:

1. The proposed method of construction.
2. The method of dewatering, e.g. pumping from the excavation or a battery of spearpoints around the perimeter of the development site.

3. A plan to scale showing accurately the location of the works in relation to portion and property and boundaries.
4. Cross section showing the level of existing water table level and the proposed groundwater level table during dewatering.
5. An estimate of the total volume of groundwater to be pumped from the site and the instantaneous pumping rate (l/s) and operation duration.
6. Prediction of the impacts of the extraction on any licensed groundwater users or groundwater dependant ecosystems.
7. An assessment of the quality of the groundwater including advice on the presence of any contaminants testing in a NATA registered laboratory.
8. Treatment/screening.
9. Identify method of disposal. **Note: Water must not be discharged directly to a kerb and gutter.**
10. Geotechnical report identifying risks of off-site impact as a result of proposed dewatering, i.e., cracks in surrounding buildings or infrastructure as a result of differential sediment compaction and surface settlement following pumping.
11. Hydrogeological and/or geotechnical report prepared for the development site in support of the Development Application and application for a bore licence.

Once the above has been reviewed by Council and deemed satisfactory, conditional approval must be granted by the relevant State Authority.

8.2.2 Dewatering Options

1. Tanker Truck:

Water pumped into a tanker truck must be disposed of at an EPA-licensed waste facility. You must retain all receipts and documentation and provide them to Council officers if requested.

2. Council's stormwater network:

If water is to be pumped into the stormwater network, it MUST be filtered. The water to be discharged must also meet the following criteria:

1. The concentration of suspended solids in the accumulated water must not exceed 50mg/L.
2. The pH of the water must be between 6.5 and 8.5.
3. The water must contain no visible oil or grease.
4. The water must not contain any substance known to be toxic to aquatic life.
5. A copy of the sample test results for pH and suspended solids from a NATA-accredited laboratory must be provided to Council upon request.

Council may place additional requirements as part of development consent.

8.3 Groundwater Management

Groundwater is a potential alternative water source provided it is utilised in a safe and sustainable manner. However, groundwater can be readily contaminated from a variety of sources in urban areas.

It is recommended that groundwater investigations including sampling and testing be undertaken by a suitably qualified professional. Investigation requirements include:

1. Consult local soils (including Acid Sulphate Soils) and geology maps.

2. Undertake a visual historical areal photographic analysis to determine past and present land use, noting any significant land use changes (i.e., industry) that may have an effect on ground water in the area.
3. Verify any known or likely locations of Acid Sulphate Soils or other contaminants.
4. Contact the relevant NSW Government department to identify registered bores in the area.
5. Contact the relevant NSW department and request an assessment of local groundwater conditions (i.e., groundwater flow direction, known sustainable yield capacity etc.)
6. Undertake assessment of sustainable yield
7. Undertake water quality sampling against ANZECC guidelines for recreation/irrigation.
8. Undertake an assessment of potential drawdown of known surrounding bores.
9. Where relevant, assess groundwater dependent ecosystems.
10. Identify drilling costs and design.

8.3.1 Recommended Checklist

Council recommends that the following groundwater bore installation checklist be used when proposing groundwater extraction and use:

1. Prior to Commencement of Works

1. Development consent obtained from Council.
2. Bore licence obtained.
3. Below ground services locations checked (Dial Before you Dig, survey etc).
4. Driller's licence viewed, classification appropriate.

2. During Work

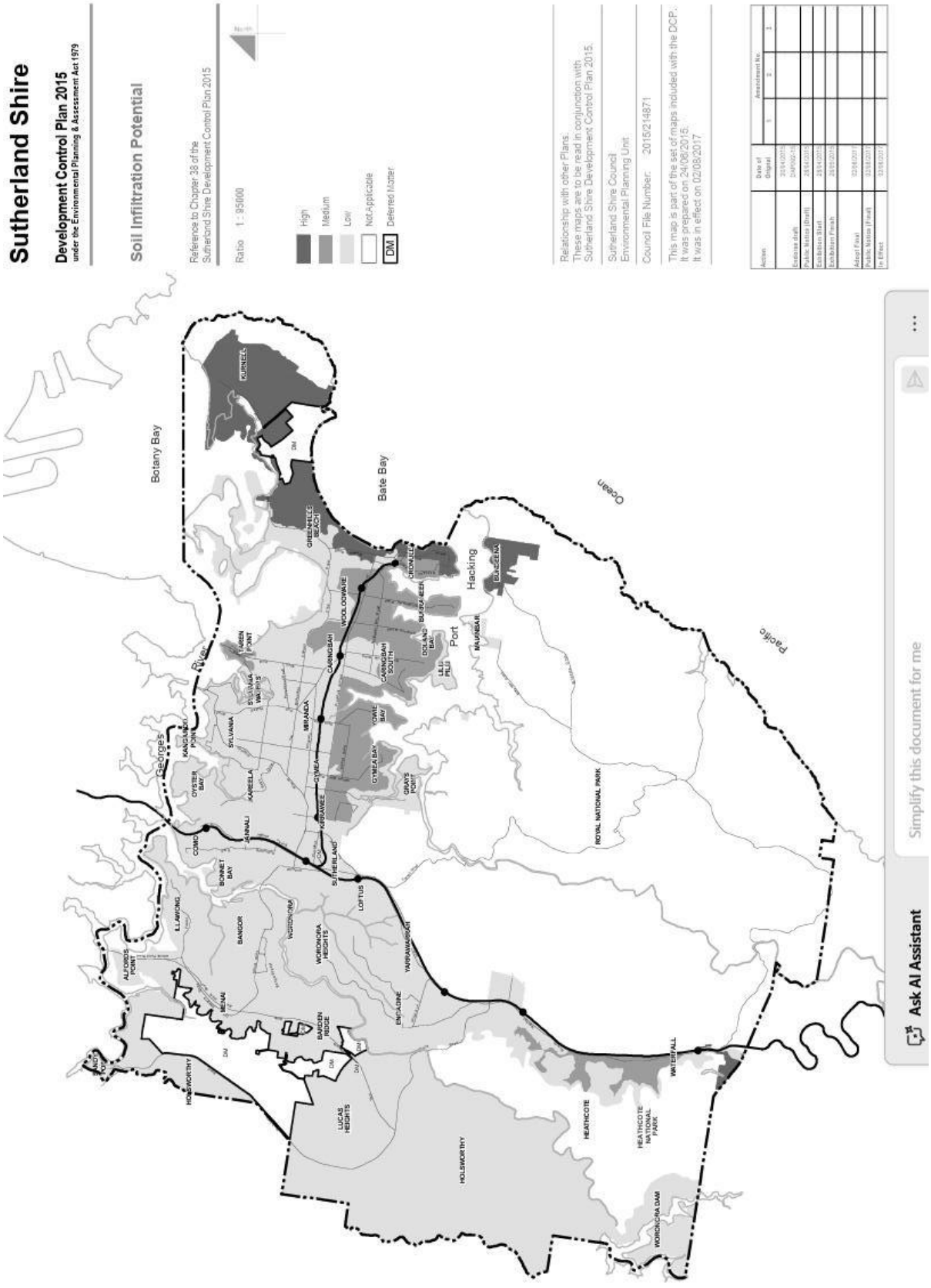
1. Bore designed and constructed in accordance with *Minimum Construction Requirements for Water Bores in Australia – 2nd Edition.*
2. Water quality sample(s) collected (including natural background levels).
3. Discharged water controlled on-site and disposed of appropriately.

3. After Completing Works

1. 'Form A – Particulars of Completed Work', completed and signed and copy forwarded to the relevant NSW Government office.
2. Water quality samples submitted to NATA registered laboratory and copy of results forwarded to the relevant NSW Government department office.
3. Bore hydraulic testing carried out in accordance with *AS2358-1900 Test Pumping of Water Wells*.
4. Bore decommissioned in accordance with *Minimum Construction Requirements for Water Bores in Australia – 2nd Edition* if decision is made to abandon the work.

Annexures

Appendix A: Infiltration map (available on Council's website)



Appendix B: Procedure to Obtain a Private Drainage Easement

Part 1: Steps to Obtain an Easement

The following steps are recommended to be followed when seeking an agreement to an easement from a downstream property owner.

1. **Review Easement Options**

- Review the layout of the adjoining lots and determine available routes that the pipeline may take to provide a direct connection to Council's drainage infrastructure.
- Consider alternative paths where the pipe could feasibly traverse multiple properties.

2. **Prepare a Sketch Plan**

- Prepare a sketch plan for each downstream owner/s property showing:
    - the proposed easement location, alignment, width and
    - all critical features that the construction of the infrastructure may impact such as buildings, pools and trees.
- Seeking early advice from a civil engineer will help to ensure that your plan is accurate and achievable.

3. **Estimate Compensation**

- In obtaining the easement you need to offer the affected downstream property owner/s reasonable financial compensation.
- Council does not adjudicate on amounts of compensation.
- These negotiations are a private matter between the property owners, but a genuine attempt to obtain an easement should include financial compensation.
- The amount of financial compensation is best calculated by obtaining a registered valuation of the easement over each affected property. Alternatively, you can obtain a single rate per square metre of easement from the valuer that can be applied for all easement width and length combinations.
- When calculating the amount of compensation offered, the costs associated with investigating, facilitating or establishing the easement should be excluded. These costs are the responsibility of the applicant.
-

4. **Send Offer to Downstream Property Owners**

- Communicate with your neighbour about seeking a drainage easement and confirm whether they agree to one. You can use the standard letter of offer and standard downstream letter of response template which can be found in **Part 2** and **Part 3 of this Appendix.**
- Correspondence with your neighbour must include:
    - An explanation of the reason an easement is being sought and benefit to downstream neighbour.
    - A copy of a concept sketch plan showing the intended alignment and width of the easement on the downstream sites
    - An explanation of the method of construction of stormwater infrastructure
    - The value of financial compensation offered.

5. **Prepare Stormwater Management Plans**

- The details on the plans are dependent on whether the downstream property owners have agreed to the easement:
    - If the downstream property owner agrees to the easement, Show the proposed easement details on the Stormwater Management Plan. Refer to the DA lodgement requirement document for Stormwater Plan Requirements.
    - If the downstream property owner does not agree to the easement, The stormwater plan must provide an alternative method of stormwater disposal in accordance with this specification.

6. **Submit the Documentary Evidence to Council with Your DA**

- Provide a copy of all correspondence including copies of:
    - Letter/Email of offer sent to downstream owners, including the value of the financial offer of compensation.
    - A copy of the concept sketch plan that accompanied the letter of offer to the downstream owners.
    - Letter/Email response from downstream property owners
- Where a proposed drainage easement is over Council owned Real Property (i.e. not a Road Reserve, but a registered Lot and DP), the applicant must submit a *Use of Council land application*.

Part 2: Example letter for request of an easement through a downstream property

Use this letter when requesting drainage easements from downstream property owners. The letter explains the reason for the request and identifies the compensation amount. The letter should be accompanied by a sketch plan showing where the easement is proposed to be located on the downstream property. Refer to **Part 1** of **Appendix B** for further details on steps to obtaining an easement.

Date:

Dear_____

Request for Drainage Easement at_____

I am writing to kindly request your assistance in establishing a drainage easement through your property. This easement would allow the stormwater from my proposed development at _____to connect safely and legally to Council's drainage system. A copy of the proposed stormwater plan is attached for your reference.

An easement is the most appropriate and reliable way to manage stormwater from my development. A properly designed and piped easement ensures stormwater is safely contained underground and directed away from your property, reducing the risk of nuisance runoff. The registered drainage easement will provide a secure, long-term, low-maintenance solution for everyone involved. In the future, the new drainage infrastructure may also help manage water on your own land and make development of your property easier.

Alternate options to drain my proposal, such as absorption trenches, can sometimes be used. However, they can be unreliable, difficult to maintain, and may cause concentrated water flows. These systems can fail over time, which often leads to issues for downstream neighbours. Hence a cooperative approach to this will benefits both households in the long-term.

A drainage easement is a legal right, registered on the land title, that allows stormwater to pass through a property via underground pipes. You remain the full owner of your land and can continue to use it as you normally would—paths, driveways, lawns, and gardens are all still permitted in the easement area. The main restriction is that buildings and large trees cannot be placed over the easement, which is usually along a side or rear boundary where building is already limited. In most cases, the easement area will make little practical difference to your lifestyle or property use.

As the landowner providing the easement, you are of course entitled to reasonable compensation. Based on local market values, I would like to offer you **$**_____ as compensation for granting the easement. If you are comfortable with this amount, please provide your solicitor's contact details and I will arrange for the legal documents to be prepared. I will cover all construction, survey and registration costs, as well as your reasonable legal expenses associated with reviewing the documentation.

During construction, every effort will be made to protect your property from any disturbance. If any gardens, paving, or similar features are unavoidably affected, I will ensure they are fully restored at my cost to a similar standard.

This easement will benefit both property owners. I hope this letter answers your questions and provides reassurance about what is involved. I would be very grateful for your consideration of this request, as it will allow my development to meet Council's requirements while ensuring stormwater is managed responsibly and safely.

If you have any queries, please feel free to contact me on (_____). You are also welcome to contact Sutherland Shire Council on 02 9710 0333 if you would like independent advice.

I would appreciate it if you could complete and return the **attached** response from within thirty (30) days.

Yours sincerely

Owner:

Property Address:

Part 3: Example letter for downstream property owner's response to a request for an easement

This letter template can be sent when a drainage easement is sought to confirm if downstream property owners agree to a drainage easement. It's designed for the downstream owners to fill out and return, to indicate whether they agree or not to an easement. Refer to **Part 1** of **Appendix B** for further details on steps to obtaining an easement:

Please tick one or more of the following boxes to indicate your position in relation to providing the easement for the benefit of the development at:

(insert address) _____

_____

Being the registered owner/s of the property at:

(insert address) _____

_____

Thank you for your letter regarding the proposed drainage easement.

☐ I / We agree to provide the easement on the previous page as it is the most efficient and safest long-term solution for managing stormwater. I/We accept that you will be responsible for all other costs.

☐ I / We do not agree to provide the easement. I/We understand that without a proper easement, stormwater from your property may need to be managed on-site and could potentially cause nuisance runoff in the future, which might lead to adverse impacts on neighbouring land—including mine.

Owners (all owners need to sign this form)

Name	Name
Date ____/ ____/ _____	Date ____/ ____/ _____
Tel (Home/Work/Mobile)	Tel (Home/Work/Mobile)
Signature	Signature

Solicitors Details

Name
Address
Company Name (if applicable)
Mailing Address (if different)
Tel (Work/Mobile)
Email address

Two copies of this response form have been forwarded to you. One copy is for your records. Please return the completed second copy in the enclosed envelope within two weeks.

Thank you again for your assistance.

Appendix C: An Example of Positive Covenant/Restriction on Use of Land for an On-site Stormwater Detention System

1. Terms on the Restriction on the Use of Land firstly referred to in the above-mentioned plan.

1.1 The registered proprietor shall not make or permit or suffer the making of any alterations to any on-site stormwater detention system which is, or shall be, constructed on the lot(s) burdened without the prior consent in writing of Council. The system is detailed on the plans approved by _____as Construction Certificate No. _____.

For the purpose of this Restriction:

The expression **"on-site stormwater detention system"** shall include all ancillary gutters, downpipes, pipes, drains, orifice plates, walls, earth banks, kerbs, pits, grates, tanks, basins, chambers, basins and other surfaces designed to temporarily detain water and control stormwater as well as surfaces graded to the on-site stormwater detention system on any part of the burdened lot(s).

"System" means any on-site stormwater detention system constructed on the lot(s) burdened.

"Proprietor" includes the registered proprietor of the burdened lot from time to time and all heirs, executors, assigns and successors in title to the burdened lot and where there are two or more registered proprietors of the burdened lot the terms of this Positive Covenant will bind all those registered proprietors jointly and severally.

"Council" means the Sutherland Shire Council or its successor.

Name of Authority having the power to release, vary or modify the Restriction referred to is Sutherland Shire Council.

2. Terms of the Positive Covenant secondly referred to in the abovementioned plan.

The system is detailed on the plans approved by _____as Construction Certificate No. _____. A copy of this Construction Certificate is held on Council file Certificate No. _____.

2.1 The registered proprietor of the lot(s) hereby burdened will in respect of the system:

a) Regularly keep the system clean and free from grass clippings, silt, rubbish and debris and the like.

b) Maintain, repair and replace at the sole expense of the registered proprietor the whole of the system or any part of it due to deterioration or damage without delay so that it functions in a safe and efficient manner.

c) Must keep records of such maintenance and repairs by a suitably qualified professional and must make these available to Council upon request.

d) Permit the Council or its authorised agents from time to time and upon giving reasonable notice (but at a time and without notice in the case of an emergency) to enter and inspect the land for condition of the device and the state of construction, maintenance or repair of the device, for the compliance with the requirements of this covenant; and

e) Comply with the terms of any written notice issued by the Council in respect of the requirements of this covenant within the time stated in the notice.

2.2 Pursuant to Section 88F (3) of the Conveyancing Act 1919 the Council shall have the following additional powers:

a) In the event that the registered proprietor fails to comply with the terms of any written notice issued by the Council as set out above the Council or its authorised agents may enter the land with all necessary materials and equipment and carry out any work which the Council in its discretion considers reasonable to comply with said notice referred to in part 2.1 (e) above; and

b) the Council may recover from the registered proprietor in a Court of competent jurisdiction:

(i) any expenses reasonably incurred by it exercising its power under sub-paragraph 2.2 (a) hereof. Such expense shall include reasonable wages for Council's employees engaged in effecting the work referred to 2.2 (a) above, supervising and administering the said work together with costs reasonably estimated by the Council, for the use of materials, machinery, tools and equipment in conjunction with the said work.

(ii) legal costs on an indemnity basis for issue of the said notices and recovery of the said costs and expenses together with the costs and expenses of registration of a covenant charge pursuant to Section 88F of the Act of providing any certificate required pursuant to Section 88G of the Act or obtaining any injunction pursuant to Section 88H of the Act.

For the purpose of this Covenant:

The expression **"on-site stormwater detention system"** shall include all ancillary gutters, downpipes, pipes, drains, orifice plates, walls, earth banks, kerbs, pits, grates, tanks, basins, chambers, basins and other surfaces designed to temporarily detain water and control stormwater as well as surfaces graded to the on-site stormwater detention system on any part of the burdened lot(s).

"System" means any on-site stormwater detention system constructed on the lot(s) burdened.

"Proprietor" includes the registered proprietor of the burdened lot from time to time and all heirs, executors, assigns and successors in title to the burdened lot and where there are two or more registered proprietors of the burdened lot the terms of this Positive Covenant will bind all those registered proprietors jointly and severally.

"Council" means the Sutherland Shire Council or its successor.

Name of Authority having the power to release, vary or modify the Positive Covenant/Restriction referred to is Sutherland Shire Council.

Appendix D: An Example of Positive Covenant/Restriction on Use of Land for a WSUD Stormwater Quality System

1. Terms on the Restriction on the Use of Land firstly referred to in the abovementioned plan.

1.1 The registered proprietor shall not make or permit or suffer the making of any alterations to any on-site stormwater detention system which is, or shall be, constructed on the lot(s) burdened without the prior consent in writing of Council. The system is detailed on the plans approved by _____as Construction Certificate No. _____.

For the purpose of this Restriction:

The expression **"WSUD stormwater quality system"** shall include all ancillary gutters, downpipes, pipes, drains, orifice plates, walls, earth banks, kerbs, pits, grates, tanks, basins, chambers, basins, filters, sediment traps, bioretention device, swales, wetlands, permeable pavements, raingardens, rainwater tanks and other surfaces designed to treat and improve the quality of stormwater as well as surfaces graded to the WSUD stormwater quality system on any part of the burdened lot(s).

"System" means any on-site stormwater detention system constructed on the lot(s) burdened.

"Proprietor" includes the registered proprietor of the burdened lot from time to time and all heirs, executors, assigns and successors in title to the burdened lot and where there are two or more registered proprietors of the burdened lot the terms of this Positive Covenant will bind all those registered proprietors jointly and severally.

"Council" means the Sutherland Shire Council or its successor.

Name of Authority having the power to release, vary or modify the Restriction referred to is Sutherland Shire Council.

2. Terms of the Positive Covenant secondly referred to in the abovementioned plan.

The system is detailed on the plans approved by _____as Construction Certificate No. _____. A copy of this Construction Certificate is held on Council file Certificate No. _____.

2.1 The registered proprietor of the lot(s) hereby burdened will in respect of the system:

a) Regularly keep the system clean and free from grass clippings, silt, rubbish and debris and the like.

b) Maintain, repair and replace at the sole expense of the registered proprietor the whole of the system or any part of it due to deterioration or damage without delay so that it functions in a safe and efficient manner.

c) Must keep records of such maintenance and repairs by a suitably qualified professional and must make these available to Council upon request.

d) Permit the Council or its authorised agents from time to time and upon giving reasonable notice (but at a time and without notice in the case of an emergency) to enter and inspect the land for condition of the device and the state of construction, maintenance or repair of the device, for the compliance with the requirements of this covenant; and

e) Comply with the terms of any written notice issued by the Council in respect of the requirements of this covenant within the time stated in the notice.

2.2 Pursuant to Section 88F (3) of the Conveyancing Act 1919 the Council shall have the following additional powers:

a) In the event that the registered proprietor fails to comply with the terms of any written notice issued by the Council as set out above the Council or its authorised agents may enter the land with all necessary materials and equipment and carry out any work which the Council in its discretion considers reasonable to comply with said notice referred to in part 2.1 (e) above; and

b) the Council may recover from the registered proprietor in a Court of competent jurisdiction:

(i) any expenses reasonably incurred by it exercising its power under sub-paragraph 2.2 (a) hereof. Such expense shall include reasonable wages for Council's employees engaged in effecting the work referred to 2.2 (a) above, supervising and administering the said work together with costs reasonably estimated by the Council, for the use of materials, machinery, tools and equipment in conjunction with the said work.

(ii) legal costs on an indemnity basis for issue of the said notices and recovery of the said costs and expenses together with the costs and expenses of registration of a covenant charge pursuant to Section 88F of the Act of providing any certificate required pursuant to Section 88G of the Act or obtaining any injunction pursuant to Section 88H of the Act.

For the purpose of this Covenant:

The expression **"WSUD stormwater quality system"** shall include all ancillary gutters, downpipes, pipes, drains, orifice plates, walls, earth banks, kerbs, pits, grates, tanks, basins, chambers, basins, filters, sediment traps, bioretention device, swales, wetlands, permeable pavements, raingardens, rainwater tanks and other surfaces designed to treat and improve the quality of stormwater as well as surfaces graded to the WSUD stormwater quality system on any part of the burdened lot(s).

"System" means any on-site stormwater detention system constructed on the lot(s) burdened.

"Proprietor" includes the registered proprietor of the burdened lot from time to time and all heirs, executors, assigns and successors in title to the burdened lot and where there are two or more registered proprietors of the burdened lot the terms of this Positive Covenant will bind all those registered proprietors jointly and severally.

"Council" means the Sutherland Shire Council or its successor.

Name of Authority having the power to release, vary or modify the Positive Covenant/Restriction referred to is Sutherland Shire Council.