

Stormwater runoff is defined as the flow of water across the land surface, which is generated from rainfall that does not immediately infiltrate into the ground. Stormwater runoff is significant in urban areas where impervious surfaces like roads, driveways and rooftops prevent water from soaking into the soil. Proper management of stormwater runoff is crucial to prevent flooding and reduce the risk of water pollution.

Property owners have a statutory obligation, under common law precedents and the Local Government Act 1995, to confine stormwater within their boundaries effectively. This can be achieved through various methods such as the utilization of rainwater tanks, directing water to infiltration system such as soakwells or connecting to established stormwater infrastructure such as lot connection manholes.

The Shire has developments which have site specific requirements accessible to the Shire's website. These requirements remain valid and are not superseded by this updated guideline. However, to address inconsistencies arising from varying interpretations of these requirements by different stakeholders, the Shire introduces this updated guideline aimed at standardizing stormwater management practices. These guidelines establish several distinct scenarios, each designed to address the varying characteristics of residential/commercial lots within the Shire.

The updated guidelines cover stormwater management requirement for different types of lots, including considerations for size, soil conditions, and land zoning. Consultant should apply the scenario most relevant to their development scenario.

Stormwater Management Scenarios

Engineering consultant must evaluate the characteristics of the development site to determine the applicable Scenario.

- Scenario 1: Residential lots with more than 300 sqm land area suitable for on-site drainage
- Scenario 2: Residential lots with more than 300 sqm and up to 1000 m² of land area with site conditions not suitable for on-site drainage
- Scenario 3: Residential lots with 300sqm land area or less
- Scenario 4: Residential Lots with more than 1000m² of land area including rural lots
- Scenario 5: Commercial Lots including residential grouped dwelling

Scenario 1: Residential Lots more than 300m² land area suitable for on-site drainage

All residential lots within this category will have a suitable site for on-site drainage. The requirement for this category is to install soakwells or infiltration devices to cater for the first 15mm of roof area. Any excess runoff will flow onto road reserve via overland flow.

Some requirements are below:

- The Site will have medium to high permeability soil with deep groundwater.
- If the existing site is unsuitable for on-site drainage, combination of clean fill import AND installation of subsoil within road reserve may be required.

Scenario 2: Residential Lots more than 300m² and up to 1000m² land area not suitable for on-site drainage

In general, the Shire would require that the site be worked to allow the lot to be suitable for on-site drainage and be categorized as Scenario 1. If all options have been exhausted and the site is still considered not suitable for on-site drainage, then all residential lots within this category shall have a lot connection manholes installed which connects to the Shire's drainage system.

All downpipes from roof gutter shall be connected to the Lot Connection pipe/manholes provided by the developer.

Contact Us

Enquiries

Call: (08) 9526 1111

Fax: (08) 9525 5441

Email: info@sjshire.wa.gov.au

In Person

Shire of Serpentine Jarrahdale

6 Paterson Street, Mundijong WA 6123

Open Monday to Friday 8.30am-5pm (closed public holidays)



www.sjshire.wa.gov.au

Scenario 3: Residential Lots with 300m2 land area or less

All residential lots within this category should have lot connection manholes installed by developer. All downpipes from roof gutter shall be connected to the Lot Connection pipe/manholes.

Scenario 4: Residential Lots with more than 1000m2 of land area including Rural Lots

All residential rural lots should be designed as followed:

- First 15mm from impervious areas (roof and driveway) will need to be contained or retained on site.
- An On Site detention system (OSD) such as open basin is required for runoff event above the first 15mm. The OSD will need to be designed to cater for up to 1%AEP – critical duration with a permissible site discharge at predevelopment flow rate.

Scenario 5: Commercial Lots including grouped dwelling

Scenario 5A: Commercial Lots within sandy area suitable for on-site drainage

The Shire adopts DWER's Decision process for stormwater management in Western Australia for stormwater management. All development should be designed to meet the following criterias:

1. First 15mm from car parking and road circulation areas are to be treated via bio-retention swale before recharging into ground. Unless proponent can demonstrate that this is not required by using UNDO tool from DWER's website. The finding from UNDO tool should be included in the submission.
 - a. For the bio-retention swale, the vegetation is to comply with *Vegetation Guidelines for Stormwater Biofilters in Southwest Western Australia (Monash University, 2014)*
 - b. For the bio-retention swale, the filter media used to be consistent with the, *Guidelines for Soil Media in Bioretention Systems (FAWB, 2008)*
2. In excess of the first 15mm storage requirement, The Shire requires stormwater to be managed on site up to 1% AEP rainfall event. This may be done by the use of infiltration system such as soakwells, basins/sumps or swales on site.
 - a. Base of infiltration basin shall have 500mm clearance to the Average Annual Groundwater Level.
 - b. Geotechnical investigation is required to determine infiltration rate on site. Maximum allowable infiltration rate is 5m/day
 - c. For 10% AEP, stormwater to be contained underground and not to flood the carpark/road circulation
 - d. For rainfall event above 10% AEP, car parking area can be used as above ground storage
3. If Lot level is lower than the road reserve level, stormwater to retain stormwater for up to 1 in 100 years – 24 hour duration.

Scenario 5B: Commercial Lots within area not suitable for on-site drainage (E.g. clay area or high groundwater level)

If the site is not suitable for on-site drainage, then all commercial lots within this category shall meet the following criteria:

1. Similar to Scenario 5A, First 15mm from car parking and road circulation areas are to be treated.
2. In excess of the first 15mm storage requirement, On Site Detention (OSD) devices to be sized to manage stormwater on site for up to 1%AEP, no runoff is allowed to discharge/overflow onto neighbouring property for up to this event.
 - a. A permissible discharge rate of no more than 20%AEP predevelopment flow rate may be discharged into the Shire's drainage system with the flow rate controlled by an orifice.
 - i. PSD shall use predevelopment runoff coefficient of 0.15 to 0.35 depending on conditions of predevelopment land.
 - ii. PSD calculation shall use a minimum time of concentration of 6minutes.
 - iii. Discharge point to any waterways shall be approved by relevant authority i.e. water corporation or Department of Water and Environmental Regulation.
 - iv. If there is no existing drainage system, overflow pit may be permitted to be installed within driveway.
 - v. Connection to the Shire's asset will need to be at the most perpendicular alignment to road alignment (i.e. straight line from property).
 - b. For 10% AEP, stormwater to be contained underground and not to flood the carpark/road circulation
 - c. For rainfall event above 10% AEP, car parking area can be used as above ground storage)

Scenario 5C: Commercial Lots within rural area

Decision process for Stormwater Management in WA was initially developed with urban development in mind. However, its design criteria are also applicable to rural areas as constructed impervious areas can exist in both urban and rural setting. Therefore, all commercial lots within this category shall meet the following criteria:

1. Similar to Scenario 5A, First 15mm from car parking and road circulation areas are to be treated before recharge.
2. In excess of the first 15mm storage requirement, OSD devices to be sized to manage stormwater on site for up to 1%AEP,
 - a. An outlet from OSD can be allowed to discharge water to daylight at a rate consistent to predevelopment flow rate. Flow rate can be controlled by an orifice.
 - i. PSD shall use predevelopment runoff coefficient of 0.15 to 0.35 depending on conditions of predevelopment land.
 - ii. PSD shall not be point discharge. I.e. dispersion will be required to protect erosion further downstream
 - iii. PSD calculation shall use a minimum time of concentration of 6 minutes.
 - b. For 10% AEP, car park and road circulation area are not to be flooded. I.e. stormwater to be contained within basin or underground system.
 - c. For rainfall event above 10% AEP, car parking area can be used as above ground storage
3. If there is a natural depressed area within the site, the volume and function of existing depressed area need to be maintained. The post development volume of storage and flow direction will need to be consistent to the predevelopment stage to ensure no impact on upstream and downstream areas resulting from the development.

Lot level

For all development, the Shire requires a sand pad to be constructed as per below criteria:

- Sand pad level to have a minimum of 1.2m separation from MGL or 1.5m to AAMGL, and
- Finished lot levels shall be set a minimum of 0.5m above the level of 50% AEP phreatic line OR groundwater mounding between subsoil pipes, and
- Development that is located within the flood fringe is considered acceptable with respect to major flooding. However, a minimum habitable floor level of 500mm above the adjacent 1% AEP flood level is required, and
- In all other parts of catchment, minimum habitable floor level is to be 300mm above 1% AEP overland flow paths level.

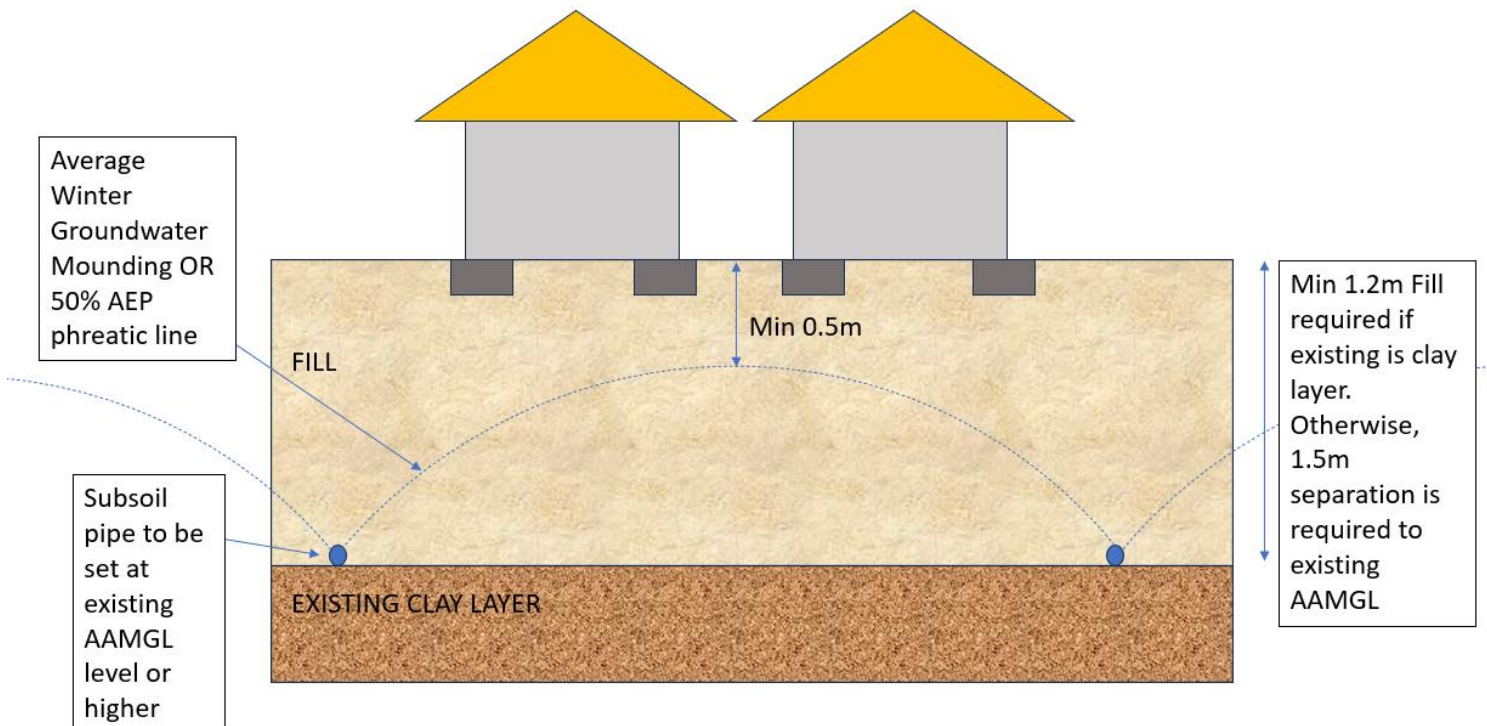


Figure 1: Subsoil Mounding Diagram

Lot Connection Manholes

A lot connection manhole is a drainage manhole within private property, installed by the Developer.

Lot connection manhole shall have the following requirements:

- Manhole is always required before connecting into the Shire's drainage system.
- Manhole to have an easement if the manhole is servicing neighbouring lot.
- Manhole connection to the Shire's drainage system shall be perpendicular to the direction of drainage pipe alignment.
- Bottom of manholes shall have seep hole and be 300mm above the MGL or clay layer. Outlet shall be elevated 300mm above the base.
- If clearance to MGL or clay layer can not be achieved, the base should be benched and outlet to the Shire's drainage system shall be located at the bottom of the pipe to allow the manhole to be emptied.

If you do not have stormwater connection available, you will require soakwells or a rainwater tank. If you require more information do not hesitate to contact the Shire Office on 9526 1111.

Soakwells

Soakwells are for the disposal of stormwater roof run-off. These need to be constructed and installed at prescribed distances from all buildings and boundaries. A minimum clearance from a soakwell to the dwelling is 1.5 metres.

With smaller lots, the location of soakwells must be considered carefully to obtain the necessary clearances, this may also require an Engineer to certify the stormwater disposal design. It could mean locating soakwells in the front or back of the property only.

Soakwells are typically 300mm to 500mm below ground with the bottom edges. The Shire approves of concrete soakwells with a maximum soakwell depth of 900mm unless a deeper depth is justifiable by way of geotechnical investigation demonstrating clearance clay layer and Maximum Groundwater Level.

Excessive storm conditions can cause flooding therefore soakwells are to be located at the front of property to allow excess water to discharge onto road reserve via overland flow.

Additional soakwells may be required in the case of high rise developments. Also please note that optimal soakage will only occur if the soakwells are regularly maintained.

Rainwater Tanks

Installing a rainwater tank is a great way to collect stormwater for use in and around your home. Rainwater tanks come in all shapes and sizes and can be fitted to homes, businesses, schools, community centres and a whole range of other buildings.

When utilizing a rainwater tank for stormwater management purposes, it is permissible to account for 10% of the tank's volume towards fulfilling the requirement for on-site retention storage. Furthermore, in scenarios where On-Site detention is required, up to 30% of the rainwater tank's volume may be counted towards meeting the on-site detention storage criteria.

If any additional storage is required, air gap above the rainwater tank's outlet can be considered. The outlet shall have an orifice plate of 25mm diameter and connected to legal point of discharge.

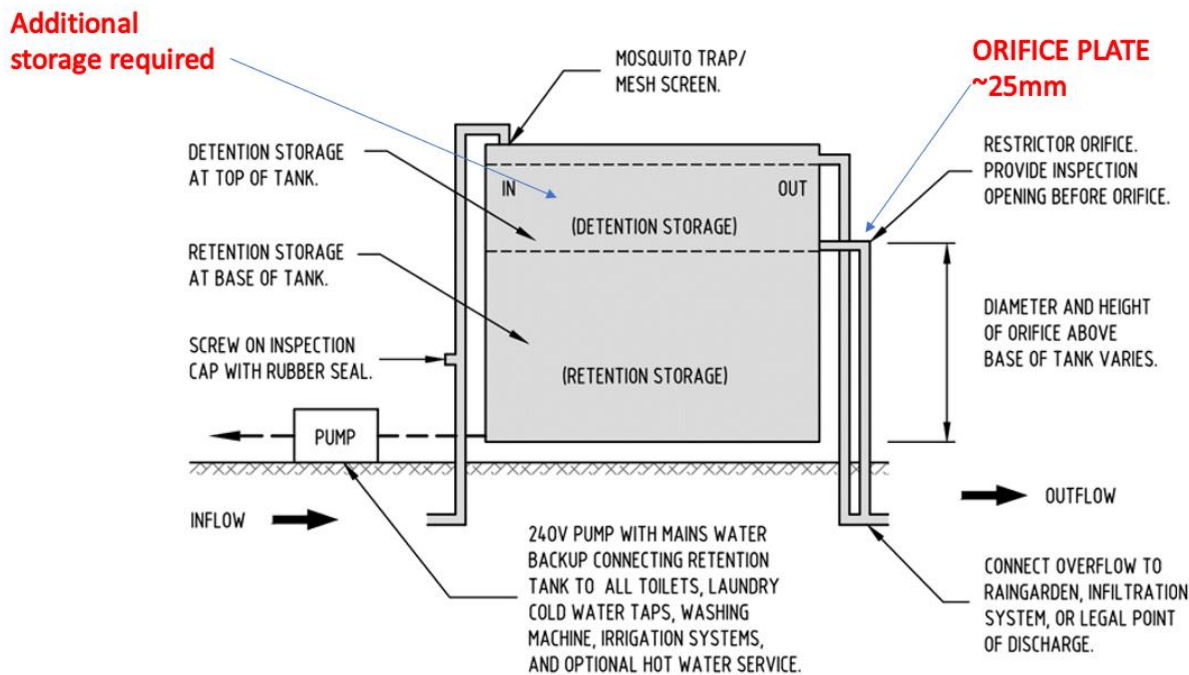


Figure 2: Combination of retention and detention rainwater tank (Source: A guide for water sensitive urban design Guideline, January 2020, by Organica Engineering Pty Ltd)

A rainwater tank does not require a Planning Application provided that the location of the tank should be setback in accordance with Table 4.2 of the Local Planning Scheme No.3. If the Tank is generally closer than 10m from the rear and side boundaries then a Planning Application is required. Tank is a small proprietary type of steel or fibre glass tank with a height not more than a standard fence height i.e 1.8m. It must also have a capacity not greater than 5000L. The location of the tank should be in the rear yard of a property and not be visible from the primary or secondary streets.

All water tanks with a capacity greater than 5000 liters require a building permit application and approval prior to installation. Further information and application forms are available on [Water Tanks » Shire of Serpentine Jarrahdale \(sjshire.wa.gov.au\)](http://www.sjshire.wa.gov.au)

The base of the tank is to be located directly on the ground or supported by a manufacture designed tank stand not exceeding 300mm in height. For all other situations a building permit would need to be obtained prior to installation.

Tips to keep the rainwater in good condition:

- Keep gutters and rooves clean and in good repair.
- The use of a leaf trap is recommended.
- Screen the inlet and tank to prevent bugs, dust and animals accessing
- It is recommended that a licensed plumber installs an approved back flow prevention device
- Remove overhanging branches of trees, shrubs, antenna and other potential perches for birds.

The following link, is information on water tanks within properties;
http://healthywa.wa.gov.au/Articles/U_Z/Water-tanks-on-your-property

Stormwater Management Plan Requirements – LWMS and UWMP

It is expected that when producing stormwater management strategy (including LWMS or UWMP) of development site within the Shire of Serpentine Jarrahdale, the stormwater system design should be based on the principles and strategies outlined in this guideline.

In particular, the following should be clearly defined in the stormwater management plan:

- Residential lots runoff coefficient should include driveway and crossover and to be engineered to achieve Scenario 1 drainage requirements unless there is restriction by existing development.
- Groundwater mounding should be based on “Draft Specification Separation distances for Groundwater Controlled Urban Development” and assumption to be clearly explained including the recharge rate. Recharge rate to use the scenarios in this guideline.