# ON-SITE STORMWATER DETENTION

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| **Originated Date:** | Adopted 24 June 2019 (min. ref. 178/19) |
| **Amended Date/s:** | |
| **Applicable Legislation:** | *Urban Drainage Act 2013*<br>Australian Rainfall and Runoff 2016<br>State Stormwater Strategy 2010<br>AS3500.3:2003 Plumbing and Drainage |
| **Objective** | To ensure that stormwater runoff generated by new developments does not adversely impact downstream properties. |
| **Administration** | Community and Development |
| **Review Cycle/Date:** | Next review by June 2023. |

## 1. PURPOSE

This policy details the safeguards enforced by Council to ensure that stormwater runoff generated by new developments does not adversely impact downstream and surrounding properties for all storm events up to and including the 100-year Average Recurrence Interval (1% Annual Exceedance Probability) event.

## 2. DEFINITIONS

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| *Annual Exceedance Probability (AEP)* | The probability that a given rainfall total accumulated over a given duration will be exceeded in any one year. |
| *Average Recurrence Interval (ARI)* | The average or expected time period between exceedances of a given rainfall total accumulated over a given duration. It is implicit in this definition that the periods between exceedances are generally random. |
| *Catchment* | The land area draining to a point of interest. |
| *Council* | Means Northern Midlands Council established in accordance with the *Local Government Act 1993* |
| *Councillors* | Means the individuals holding the office of a member of Northern Midlands Council |
| *Council officer* | Means the General Manager and staff of Council appointed by the General Manager. |
| *Discharge* | Rate of flow of stormwater expressed in unit volume per unit time (litres per second). |
| *Drainage System* | Comprises all components of stormwater infrastructure from the legal point of stormwater discharge to the receiving water body. Includes both constructed assets (pipes, culverts, overland flow paths, roadways, kerb and gutters) and natural assets (waterways and creeks). |
| *On-site Stormwater Detention (OSD)* | Temporary storage and controlled discharge of stormwater runoff intended to reduce the peak flow from a site. |
| *Overland Flow* | The surface flow of stormwater runoff that occurs when the volume of runoff exceeds the capacity of the piped drainage system. |
| *Permissible Site Discharge (PSD)* | The Permissible Site Discharge (PSD) is the maximum allowable post-development discharge from a site for the selected discharge design storm and is estimated on the basis that flows in the downstream stormwater drainage system will not be increased. |

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| *Runoff* | The portion of rainfall that does not infiltrate into the soil, resulting in the presence of surface water. |

## 3. APPLICATION

This policy applies to:

- All commercial, industrial and special use (e.g. community, educational, recreational) buildings or structures
- Multiple dwellings, and where
- The existing drainage system is unable to accommodate an increase in stormwater discharge from the site.

Refurbishment of existing buildings and hardstand which does not increase the impervious area of the site is exempt from this policy.

## 4. CONTEXT

*Australian Rainfall and Runoff 2016* and *Australian Standard AS3500.3:2003 Plumbing and Drainage* establish that stormwater runoff in all storm events up to and including the 1% AEP storm event must be conveyed safely and not present a hazard to people, vehicles, or cause significant damage to property.

Council has a responsibility under the *Urban Drainage Act 2013* to ensure that new developments within the municipal district do not adversely impact on the performance of the local stormwater drainage system or cause an unreasonable flow of water on to downstream or surrounding properties.

This will be achieved by ensuring that on-site stormwater detention systems are incorporated into intensely developed sites to reduce the peak flow of stormwater from the site. The on-site detention system reduces the peak flow by temporarily storing stormwater runoff within the development site while discharging to the Council drainage system at a controlled rate.

The need for an on-site stormwater detention system will be assessed by Council upon receipt of a planning or plumbing application. The installation of an on-site stormwater detention system will be enforced as a planning permit condition or plumbing permit condition.

## 5. EXCEPTIONS

Council may consider waiving a requirement for on-site stormwater detention where:

- The downstream drainage system has been upgraded to accommodate the increase in runoff from the site for all storm events up to and including the 1% AEP event; or
- Where the natural overland flow path is to the road or to an area Council deems as low risk (i.e. not to a developed/developable neighbouring property) Council may only require the 20 year ARI (5% AEP) storm to be detained

## 6. DESIGN OBJECTIVES

The on-site stormwater detention system must:

- Restrict the rate of stormwater discharge to the permissible rate of discharge during the design storm event specified by Council (up to and including the 1% AEP);
- Provide sufficient storage to ensure peak flow rates at any point within the downstream drainage system do not increase as a result of the development during the design storm event specified by Council (up to and including the 1% AEP), unless the downstream drainage system has been designed to accommodate an increase in stormwater discharge from the site;
- Drain within 72 hours to ensure the storage volume is available for a subsequent storm event.

The on-site stormwater detention system should:

- Be integrated into the design of the development so that adequate storage areas are included in the initial stages of the site design.

## 7 DESIGN GUIDELINES

- Based on the size of the site and the proposed proportion impervious surfaces Council will provide the permissible site discharge (PSD) of the total development (refer to Table 1).
- For developments where the overland flow path is to the road and/or to an area Council deems as low risk, and the 5% AEP storm event is detailed, Council will provide the required PSD and detention volume (refer to Table 1). This volume is applicable only where the entire site drains to a single detention volume.
- For developments where the 1% AEP storm event is detailed and where the entire site drains to a single detention volume, the detention volume may be calculated as the peak volume from a range of storm durations using methods such as the Boyd or Culp methods. Alternatively, modelling may be undertaken.
- For complicated detention arrangements, i.e. where detention is being provided within a number of separate storages and/or connections, the arrangement must be proven to achieve the permissible site discharge from the entire site, in accordance with methods described Australian Rainfall and Runoff 2016. Council require evidence of how the individual elements and entire system behaves during the duration of the design rainfall events.
- In all situations calculations and/or modelling must be presented to Council which show the PSD is not exceeded.
- Design of the detention system must be undertaken by an accredited engineer eligible for membership of Institute of Engineers Australia or equivalent.

## 8 MAINTENANCE REQUIREMENTS

The property owner is responsible for the operation, maintenance and replacement of the on-site stormwater detention system. Where the on-site stormwater detention system is located on common property within a multi-dwelling site, the body corporate is responsible for the operation, maintenance and replacement of the system.

Council recommends that on-site stormwater detention systems are installed with anti-blockage devices, e.g. trash screens to prevent orifice blockages, and are cleared of debris and sediment at least once per year to ensure correct operation.

The clearing of below ground storage facilities should be conducted in accordance with the requirements and risk control measures specified in *AS2865-2009 Confined Spaces*.

## 7. REVIEW

The next review of this document is scheduled for completion by 30 June 2023.

## TABLE 1: PERMISSIBLE SITE DISCHARGE (L/S) AND MINIMUM 1:20 ARI DETENTION VOLUME (M3)

| Block size ($m^2$) | Peak Permissible (L/s) | Fraction Impervious | | | | | |
|---|---|---|---|---|---|---|---|
| | | 50% | 60% | 70% | 80% | 80% | 100% |
| 100 | 0.879 | 0.20 | 0.29 | 0.38 | 0.48 | 0.58 | 0.70 |
| 200 | 1.758 | 0.41 | 0.57 | 0.76 | 0.96 | 1.17 | 1.39 |
| 300 | 2.636 | 0.61 | 0.86 | 1.13 | 1.43 | 1.75 | 2.09 |
| 400 | 3.515 | 0.81 | 1.14 | 1.51 | 1.91 | 2.34 | 2.79 |
| 500 | 4.394 | 1.02 | 1.43 | 1.89 | 2.39 | 2.92 | 3.48 |
| 600 | 5.273 | 1.22 | 1.72 | 2.27 | 2.87 | 3.50 | 4.18 |
| 700 | 6.151 | 1.42 | 2.00 | 2.65 | 3.34 | 4.09 | 4.87 |
| 800 | 7.030 | 1.62 | 2.29 | 3.03 | 3.82 | 4.67 | 5.57 |
| 900 | 7.909 | 1.83 | 2.58 | 3.40 | 4.30 | 5.25 | 6.27 |
| 1000 | 8.788 | 2.03 | 2.86 | 3.78 | 4.78 | 5.84 | 6.96 |
| 1100 | 9.667 | 2.23 | 3.15 | 4.16 | 5.25 | 6.42 | 7.66 |
| 1200 | 10.545 | 2.44 | 3.43 | 4.54 | 5.73 | 7.01 | 8.36 |
| 1300 | 11.424 | 2.64 | 3.72 | 4.92 | 6.21 | 7.59 | 9.05 |
| 1400 | 12.303 | 2.84 | 4.01 | 5.29 | 6.69 | 8.17 | 9.75 |
| 1500 | 13.182 | 3.05 | 4.29 | 5.67 | 7.16 | 8.76 | 10.45 |
| 2000 | 17.576 | 4.06 | 5.72 | 7.56 | 9.55 | 11.68 | 13.93 |
| 2500 | 21.970 | 5.08 | 7.16 | 9.45 | 11.94 | 14.60 | 17.41 |
| 3000 | 26.364 | 6.09 | 8.59 | 11.35 | 14.33 | 17.51 | 20.89 |
| 3500 | 30.757 | 7.11 | 10.02 | 13.24 | 16.72 | 20.43 | 24.37 |
| 4000 | 35.151 | 8.12 | 11.45 | 15.13 | 19.10 | 23.35 | 27.86 |
| 4500 | 39.545 | 9.14 | 12.88 | 17.02 | 21.49 | 26.27 | 31.34 |
| 5000 | 43.939 | 10.15 | 14.31 | 18.91 | 23.88 | 29.19 | 34.82 |
| 5500 | 48.333 | 11.17 | 15.74 | 20.80 | 26.27 | 32.11 | 38.30 |
| 6000 | 52.727 | 12.18 | 17.17 | 22.69 | 28.66 | 35.03 | 41.78 |