Part J
Water Sensitive Urban Design and Integrated Water Cycle Management
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1 Introduction

Water is a limited resource that must be managed both for immediate needs and long-term economic and environmental sustainability. With urban development increasing our water usage, altering flow regimes in our local waterways and increasing pollutant loads in stormwater runoff, sound policies are required to ensure a sustainable environment for present and future generations.

Council has adopted a water sensitive urban design approach to the management of water within the Blacktown Local Government Area to reflect a similar approach to water management being implemented throughout the North West Growth Centre.

Water sensitive urban design is an approach that helps integrate water cycle management into urban planning and design. It is used to help mitigate and reduce the impacts of development on our local waterways and natural environment.

There are a range of measures that can be used to meet the development requirements of Council such as:

- Water conservation measures including reduction of potable use through installation of water efficient appliances
- Use of rainwater or reuse of stormwater or treated effluent for toilet flushing, washing machines, garden watering, car washing or for industrial purposes
- Structural stormwater treatment measures such as gross pollutant traps, secondary filtration systems or porous paving
- Vegetated stormwater treatment measures such as street tree bioretention systems, bioretention systems and wetlands
- Schemes which incorporate structural and vegetated stormwater treatment measures such as stormwater harvesting and reuse schemes
- On-site stormwater detention measures such as surface storages or tanks.

Integrated water cycle management is an approach to the management of water that considers all aspects of water including rainwater, stormwater, groundwater, water supply and use, reuse and treatment.

1.1 Objectives of this Part

The objectives of this Part of Blacktown Development Control Plan (DCP) 2015 are to:

(a) Provide direction and advice to applicants in order to facilitate water sensitive urban design and integrated water cycle management within the Development Application (DA) process

(b) Provide design principles that will assist development to meet the aims of this Part of the DCP

(c) Provide objectives, targets and controls for water conservation, water quality, waterway stability, on-site stormwater detention, erosion, sediment and pollution control and groundwater.
1.2 **Aims of this Part**

The aims of this Part are to:

(a) Protect and enhance natural watercourses and their associated ecosystems and ecological processes
(b) Minimise potable water demand and wastewater generation
(c) Minimise stream erosion by matching the post development runoff regime to the pre development or natural water runoff regime
(d) Mitigate the impacts of development on water quality and quantity
(e) Mitigate the impacts of development on groundwater, particularly in saline groundwater environments
(f) Ensure any changes to the existing groundwater regime do not adversely impact upon any other properties and the environment
(g) Integrate water cycle management measures into the landscape and urban design to maximise amenity
(h) Minimise the potential impacts of development and other associated activities on the aesthetic, recreational and ecological values of receiving waters
(i) Minimise soil erosion and sedimentation resulting from site disturbing activities
(j) Ensure the principles of ecologically sustainable development are applied in consideration of economic, social and environmental values in water cycle management.

1.3 **Relationship to other documents**

This DCP Part is to be read in conjunction with the NSW State Environmental Planning Policy (Sydney Region Growth Centres), State Environmental Planning Policy (Western Sydney Employment Area), Blacktown Local Environment Plan, Blacktown City Council’s Engineering Guide for Development, Blacktown City Council’s Civil Works Specification, Blacktown City Council’s Water Sensitive Urban Design Handbook, the Upper Parramatta River Catchment Trust On-site Stormwater Detention Handbook (version 4), The Blue Book – Managing Urban Stormwater: Soils and Construction and any other relevant policies, handbooks, guides, fact sheets, templates, checklists or other documents released from time to time by Blacktown City Council that relate to water sensitive urban design and integrated water cycle management.

1.4 **Definitions**

*Activity* means any development on land and may include, but is not limited to, any one of the following:

(a) The erection of a building
(b) The carrying out of work in, on, over or under land
(c) The use of land or of a building or work
(d) The subdivision of land whether involving earthworks or not
(e) Any soil disturbing activity in or on a public place or on lands owned by Blacktown City Council which may or may not be the subject of an approval.

(f) Any act, matter or thing for which provision may be made under Section 26 of the Environmental Planning and Assessment Act 1979 and which is prescribed for the purposes of this definition but does not include any act, matter or thing referred to in Section 26 for which development consent is required or which is prohibited under an environmental planning instrument.

Aquifer means a body of saturated rock or soil containing a system of interconnected voids from which significant (economic) quantities of groundwater may be extracted.

Building means any part of a building, and also includes any structure or part of a structure (including any temporary structure or part of a temporary structure), but does not include a moveable dwelling or associated structure or part of a manufactured home, moveable dwelling or associated structure.

Business Development as generally defined in the Blacktown LEP 2015 and includes not-for-profit and government organisations undertaking developments such as schools, aged or disabled care facilities, nursing homes, hospitals, affordable housing, meeting halls, places of public worship, entertainment and sporting facilities or similar.

Civil Works Specification refers to the document dated February 2005 and developed by Blacktown City Council and entitled Civil Works Specification as amended or superseded.

Contributions Plan means a plan prepared, exhibited and adopted by Blacktown City Council in accordance with Section 94 of the NSW Environment Planning and Assessment Act 1979, authorising the conditioning of contributions.

Cooling towers means heat removal devices used to transfer and process waste heat to the atmosphere by evaporating water to remove process heat and cool the working fluid to near the wet-bulb air temperature or by relying solely on air to cool the working fluid to near the dry-bulb air temperature. Common applications include cooling the circulating water used in oil refineries, chemical plants, power plants and building cooling.

Deemed to Comply Certificate means a certificate of compliance produced by Blacktown City Council’s Deemed to Comply Tool.

Deemed to Comply Tool means the online tool developed by Blacktown City Council that can demonstrate compliance with the water conservation, water quality and/or on-site stormwater detention controls.

Detention means the temporary storage of stormwater generated within an allotment to restrict the discharge leaving the site to a predetermined rate to prevent an increase in flooding downstream both in the local drainage system immediately downstream of the site and along the creeks and watercourses further downstream.

Dewatering means the removal of water from solid material or soil by a solid-liquid separation process. This is often done during the site development phase of a major construction project due to a high water table and may involve the use of pumps.

Development footprint means the area of new work which is the subject of the development application. It refers only to new external work. It includes new paved areas and new buildings and new for old building replacements.
**Drainage** means the natural or artificial movement of surface and sub-surface water from a given area.

**Dual reticulation** means the delivery of the supply of water from two different sources using separate pipes, for example when an alternative water source such as sewage or stormwater is used for non-potable purposes such as irrigation and toilet flushing and Sydney Water’s supply is used for potable purposes such as drinking and cooking.

**Dwelling** means a room or suite of rooms occupied or used or so constructed or adapted as to be capable of being occupied or used as a separate domicile.

**Ecologically sustainable development** has the same meaning as the definition in the *Local Government Act 1993*.


**Erosion** means the process by which the detachment, entrainment, suspension and transport of soil occurs by wind, water or gravitational effects. Erosion leads to sedimentation.

**Erosion and sediment control plan** means a plan as described in Appendix 1 of this Part.

**Flow path** means the route which water draining from an area will take.

**Flow rate** means the volume of fluid, in this instance water, that passes through a given point per unit of time.

**Flow duration** means the time period over which flows occur.

**Groundwater** means water contained within the voids and spaces in rocks or soils.

**Groundwater management system** means the processes or practices used to control groundwater.

**Gross pollutant** means contaminants equal to or greater than 5 millimetres in diameter that, when introduced into an environment, cause instability, disorder, harm or discomfort to the physical systems or living organisms. This may include for example trash, litter and vegetation.

**Gross pollutant and hydrocarbon trap** means a trap that captures 90% of gross pollutants and 90% of hydrocarbons.

**Hydrocarbon** means a compound of hydrogen and carbon, such as any of those which are the chief components of petroleum and natural gas.

**Impervious areas** means areas which have no or very limited ability to transmit fluids from the surface through to the subsurface. Impervious areas occur where the soil surface is sealed eliminating rainwater infiltration and natural groundwater recharge. They consist mainly of artificial structures such as pavements, rooftops, sidewalks, roads and parking lots covered by materials such as asphalt, concrete, brick and stone. Soils compacted by urban development are also highly impervious.
Integrated water cycle management is an approach to the management of water that considers aspects of water including rainwater, stormwater, groundwater, water supply and use, reuse and treatment.


Non-potable water means water that is not fit or suitable for drinking and consumption purposes that may be used for other alternative non-potable uses such as laundry, toilet flushing and air conditioning cooling towers etc. Non-potable water includes rainwater and stormwater and recycled sewerage. The source determines appropriate uses with rainwater having more fit for purpose uses than the other two sources, subject to treatment methods.

On-site stormwater detention measures means practices that control the peak post development flows of stormwater being discharged from a site to below pre-developed flows of stormwater being discharged from a site.

Perched aquifer means an aquifer in which infiltrating water remains separated from an underlying main body of groundwater, with an unsaturated zone existing between the two.

Potable water means water reserved for or suitable for drinking purposes/consumption.

Public open space means land zoned as RE1 Public Recreation in the Blacktown LEP 2015.

Rainwater tank means a reservoir or container that is used to collect and store (harvest) rain that runs off impervious surfaces such as roofs via gutters and downpipes.

Receiving watercourses means any watercourse to which water is delivered from an area. The method of delivery may include, for example, subsoil drainage, local overland flow paths, pipes or other watercourses.

Sediment means material of varying size, both mineral and organic, that is being or has been moved from its site of origin by the action or wind, water or gravity and comes to rest.

Sedimentation means the deposition of sediment, usually in locations such as a channel, along a fence line, in an area of low slope, depression, watercourse or sediment trap.

Soil means a natural material consisting of layers, amalgamates or individual particles or mineral and/or organic constituents, or variable thickness, that differs from its parent material in morphological, physical, chemical and mineralogical properties and biological characteristics.

Stormwater means rainwater plus anything the rain carries along with it. In urban areas this includes the rain that falls on the roof of houses, or collects on paved areas such as driveways, roads and footpaths, and is carried away through a system of pipes that is separate to the sewerage system.

Stormwater harvesting and reuse scheme means a process of collection, treatment, storage and use of stormwater.

Stormwater management means the processes or practices used to control stormwater.
**Stormwater treatment measure** means both hard and soft engineering practices that treat and improve the quality and quantity of stormwater.

**Stream forming flow** is defined as the following percentage of the 2 year ARI flow rate estimated for the catchment under natural conditions to help maintain waterway stability:

(a) 10 per cent for cohesionless (for example sandy) bed and banks
(b) 25 per cent for moderately cohesive bed and banks
(c) 50 per cent for cohesive (for example stiff clay) bed and banks.

**Note:** 25% is the default percentage to be used in the Blacktown LGA due to dispersive characteristics of the typical local clay soils. However, 50% may be used if proven to the satisfaction of Council that the use of the 50% threshold is appropriate. To achieve this, however, the applicant will need to demonstrate that the soils are capable of withstanding the erosive forces generated through the increased flow.

**Subsoil drainage** means drainage of the layer of soil under the surface of the ground.

**Total nitrogen** is the sum of the nitrogen present in all nitrogen-containing components in the water column including large and small phytoplankton and zooplankton, suspended microphytobenthos, dissolved inorganic nitrogen (nitrate and ammonia), dissolved organic nitrogen, labile detritus (both at the Redfield ratio and the Atkinson ratio) and refractory detritus. Total nitrogen concentration is determined by a balance between inputs (diffuse catchment loads, point source loads) and loss terms (export from the site to a watercourse and within the sediments).

**Total phosphorus** is the sum of the phosphorus present in all phosphorus-containing components in the water column including large and small phytoplankton and zooplankton, suspended microphytobenthos, dissolved inorganic phosphorus (both absorbed and desorbed), dissolved organic phosphorus, labile detritus (both at the Redfield ratio and the Atkinson ratio) and refractory detritus. Total phosphorus concentration is determined by a balance between inputs (diffuse catchment loads and point source loads) and loss terms (export from the site to a watercourse and within the sediments).

**Total suspended solids** is a measure of the mass of solid material (organic and inorganic) suspended in the water column. Suspended solids can include a range of inorganic and organic particles suspended in the water column which can be defined as the filterable residue retained on a 2.0 micron pore size filter dried at 105 degrees centigrade.

**Voluntary Planning Agreement (VPA)** means a planning agreement under section 93F of the NSW Environmental Planning and Assessment Act 1979.

**Watercourse** has the same meaning as ‘river’ under the Water Management Act 2000 as amended or superseded.

**Water conservation measure** means practices that contribute to a reduction in water usage.

**Water sensitive urban design (WSUD)** is an approach that integrates water cycle management into urban planning and design. It is used to help mitigate and reduce the impacts of development on our local waterways.

**Water table** means the top level of water stored underground; the surface of groundwater in the soil.

**Waterway stability** refers to the ability of a watercourse to withstand erosive forces.
2 Application of this Part

2.1 Development to which this Part applies

The water quality controls in this Part apply to the following forms of development:

- All business and industrial development with a development footprint of greater than 150 square metres, excluding subdivisions and childcare centres.
- All residential development excluding subdivisions, single dwellings, secondary dwellings, dual occupancies, group homes, boarding houses and alterations or additions to other forms of residential development that are less than 150 square metres.

The water conservation controls in this Part apply to the following forms of development:

- All business and industrial development with a development footprint of greater than 150 square metres.

The on-site stormwater detention and waterway stability controls in this Part apply to the following forms of development:

- All business and industrial development, excluding subdivisions, with a development footprint of greater than 150 square metres and that is located within an on-site stormwater detention area as defined by the on-site stormwater detention map on Council’s website
- All residential development located within the Upper Parramatta River Catchment (see Figure 1), excluding the exceptions defined under Section 3.4.2 of the Upper Parramatta River Catchment Trust On-site Stormwater Detention Handbook version 4, as repeated below:
  i. Single dwellings, extensions, additions and improvements on single residential lots created before November 1991 (when the OSD policy was adopted), except where OSD is required as a restriction on the property title
  ii. The residual lot containing an existing dwelling that is excised as part of a subdivision of a lot created prior to 1991, provided that flows from the excised portion are directed away from the OSD system, noting that OSD is required for the new lots created. Subsequent single residential building/additions on the residual lot will also not be required to provide OSD
  iii. The residual lot containing an existing industrial or commercial development which is excised as part of a subdivision of a lot created prior to 1991, provided that there is no significant development proposed on the residual lot and that flows from the residual lot are directed away from the OSD system, noting that OSD is required for the new lots created
  iv. Dual occupancy dwellings on a lot with an existing residence involving less than 150 sqm of development area
  v. Subdivisions of existing dual occupancies where no changes to the buildings or site are proposed
  vi. Boundary adjustments and consolidation of allotments where no additional lots are created
vii. One-off minor developments, minor additions and repairs where the proposed development area is less than 150 sqm (subsequent minor developments or additions will require OSD). This exclusion is aimed principally at small areas within large commercial or industrial sites. It does not apply to any development where the development area includes more than 150 sqm of impervious surfaces nor to dual occupancies.

viii. Change of use where no physical changes to the outside of the property are proposed.

ix. Areas within large properties (usually commercial or industrial, but may be residential) not covered by the development application or construction certificate.

x. New developments in subdivisions where OSD has already been provided for the entire subdivision.

xi. Buildings in rural areas.

xii. The grassed playing field and vegetated area of public sports and recreational facilities that are not part of a development.

- All residential development located within the Hawkesbury-Nepean River Catchment (see Figure 1), excluding:
  i. Land identified in Figure 1 as not subject to OSD.
  ii. Subdivisions, single dwellings, secondary dwellings, dual occupancies, group homes, boarding houses and childcare centres and alterations or additions to other forms of residential development that are less than 150 sqm.

**The erosion, sediment and pollution controls** in this Part apply to the following forms of development:

- All development that will involve disturbance of the soil surface or that includes the cut or placement of fill or storage of materials.

**The groundwater controls** in this Part apply to the following forms of development:

- All development that is equal to or less than 40 metres from the top of bank of a watercourse that has a cut or fill proposed which is equal to or greater than 1 metre over the existing pre-developed surface.
- All development that is greater than 40 metres from the top of bank of a watercourse that has a cut or fill proposed which is equal to or greater than 1.5 metres over the pre-existing developed surface.
Figure 1 Catchment areas subject to OSD
2.2 Integrated development

In accordance with Section 91 of the Environment Planning and Assessment Act 1979 certain approvals, permits or licences are required from the NSW Government in order for development to be carried out. The requirements for approvals, permits or licensing may change if legislation is amended, repealed or superseded. Advice from the appropriate NSW Government agency should be sought prior to any detailed planning.
3 Application requirements

3.1 Strategies, assessments and/or plans to be submitted

The strategies, assessments and/or plans that are required to be prepared and submitted are summarised in Table 1. All electronic files associated with or included as part of any of the documents listed in Table 1 must be submitted with the documentation. Note that the WSUD Handbook, Deemed to Comply Tool, Blacktown City Council Engineering Guide for Development and Blacktown City Council Civil Works Specifications are available on Blacktown City Council’s website.

Table 1 Strategies, assessments and/or plans to be submitted

<table>
<thead>
<tr>
<th>Information to be submitted</th>
<th>Applies to</th>
<th>Reference</th>
<th>Submission Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed Development Application Checklists</td>
<td>All development</td>
<td>Development Application Checklists available from Council’s planners</td>
<td>Development Application</td>
</tr>
<tr>
<td>Water Quality Modelling Report</td>
<td>All development that meets the water quality controls through an onlot approach and does not use a Deemed to Comply Solution</td>
<td>WSUD Handbook</td>
<td>Development Application</td>
</tr>
<tr>
<td>Deemed to Comply Certificate</td>
<td>All development that uses a Deemed to Comply Solution</td>
<td>Deemed to Comply Tool</td>
<td>Development Application</td>
</tr>
<tr>
<td>Drainage Plan</td>
<td>All development to which this Part applies</td>
<td>Blacktown City Council Engineering Guide for Development and Civil Works Specification</td>
<td>Development Application</td>
</tr>
<tr>
<td>Groundwater Assessment Report</td>
<td>All development where the groundwater controls apply</td>
<td>WSUD Handbook</td>
<td>Development Application</td>
</tr>
<tr>
<td>Groundwater Management Plan</td>
<td>All development where the groundwater controls apply and where the groundwater assessment report demonstrates potential impacts on groundwater</td>
<td>WSUD Handbook</td>
<td>Development Application</td>
</tr>
<tr>
<td>Works as Executed Plans</td>
<td>All development that meets the water quality and on site stormwater detention controls through an onlot approach</td>
<td>Blacktown City Council Engineering Guide for Development and Civil Works Specification</td>
<td>Post practical completion of construction</td>
</tr>
<tr>
<td>Layout and text for water signage</td>
<td>All development that meets the water quality controls through an onlot approach</td>
<td>WSUD Handbook</td>
<td>Prior to Occupation</td>
</tr>
<tr>
<td>Compliance</td>
<td>All development where the water</td>
<td>WSUD Handbook</td>
<td>Prior to</td>
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Certificates for Non-potable Water Supply and Irrigation

<table>
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<tr>
<th>Conservative controls apply and/or development that uses rainwater or stormwater harvesting as an onlot approach to meet the water quality controls</th>
<th>Occupation</th>
</tr>
</thead>
</table>

Positive Covenant

| All development that meets the water quality and on-site stormwater detention controls through an onlot approach | Blacktown City Council Engineering Guide for Development and Civil Works Specification | Prior to Occupation |

Maintenance and Monitoring Schedule

| All development that meets the water quality and on-site stormwater detention controls through an onlot approach | WSUD Handbook | Prior to Occupation |

Maintenance Contract

| All development that meets the water quality and on-site stormwater detention controls through an onlot approach | WSUD Handbook | Prior to Occupation |

### 3.2 Matters for consideration

The following matters are to be taken into consideration during the preparation of all DAs to which this Part applies:

(a) **WSUD principles** – consider the WSUD principles as described in the WSUD Handbook

(b) **Roads** – consider the location of the road, placement and incorporation of measures within and around roads, verges and footpaths, and ease of maintenance particularly having regard to traffic and flooding requirements

(c) **Safety** – consider public safety and the safety of operation and maintenance personnel as well as health and safety considerations

(d) **Operation and maintenance** – consider maintenance and monitoring regimes and whole of lifecycle costing for the management of any proposed measures

(e) **Flooding** – consider the impact of flooding on the integrated water cycle management measures having regard to the safety of people, safe storage of poisons and chemicals that could be released into the environment, access and ability to deliver the intended objective for which the measures are designed (for example water quality improvement).
4 Controls

4.1 General

All development must submit the strategies, assessments and/or plans as described in Table 1 where applicable. All aspects of any development works must comply with Blacktown City Council's:

(a) WSUD Handbook
(b) Engineering Guide for Development
(c) Civil Works Specification.

Prior to the issue of any Subdivision Certificate, Occupation Certificate or upon completion of works, all relevant Certificates and Plans must be lodged in accordance with Blacktown City Council's Engineering Guide for Development.

All constructed assets that will be transferred to Council shall be maintained for a period of no less than 3 years post practical completion. Inspections may be held during the 3 year maintenance period. An inspection will also be held on completion of the 3 year maintenance period and prior to the transfer of ownership. If the asset is not of an acceptable standard to Council at these inspections, the asset shall be rectified to the satisfaction of Council. This will include extension of the maintenance period.

A Positive Covenant for ongoing operation and maintenance of stormwater treatment measures or on-site stormwater detention measures that exist on lot must be provided and be registered with Council's Land and Property Information Section. This provision applies to all development that has stormwater treatment measures or on-site stormwater detention measures on lot.

A Maintenance and Monitoring Contract must be entered into with a reputable and experienced cleaning contractor for the maintenance of the stormwater treatment measures for a minimum of 5 years. This must be an executed contract. A copy of the executed contract(s) and maintenance contractor(s) details shall be forwarded to Council’s WSUD Compliance Officer. This provision applies to all development that has stormwater treatment measures on lot.

4.2 Water quality

All developments shall achieve a minimum percentage reduction of the post development average annual load of pollutants in accordance with Table 2.

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>% post development average annual load reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross pollutants</td>
<td>90</td>
</tr>
<tr>
<td>Total suspended solids</td>
<td>85</td>
</tr>
<tr>
<td>Total phosphorous</td>
<td>65</td>
</tr>
<tr>
<td>Total nitrogen</td>
<td>45</td>
</tr>
<tr>
<td>Total hydrocarbons</td>
<td>90</td>
</tr>
</tbody>
</table>
All development where a Section 94 Contributions Plan applies (see Appendix 1) shall meet the water quality requirements through the provision of contributions in accordance with the Contributions Plan as adopted by Council. This provision does not apply to business and industrial developments greater than 4 hectares.

Development proponents for premises within the Voluntary Contributions Scheme boundary (see Appendix 1) may enter into a VPA with Council to offset their water quality requirements off-site. This provision does not apply to business and industrial developments greater than 4 hectares.

**Note:** Use the map provided in Appendix 1 to determine whether your development falls within the boundary of a Contributions Plan or Voluntary Contributions Scheme. Then use the flowchart in Appendix 1 to determine your options or requirements.

Any VPA must be advertised and executed prior to the determination of the development application. If a VPA is not executed the applicable controls must be met through an on lot approach.

All industrial and business developments where the development footprint is greater than 4 hectares must meet all the water quality controls in this Part through an on lot approach.

All industrial and business developments with a development footprint greater than 2,000 square metres but equal to or less than 4 hectares where a Contributions Plan applies or that opts to enter into a VPA (see map in Appendix 1) shall satisfy the gross pollutant and total hydrocarbon pollutant retention targets specified in Table 2 on lot.

Any water quality modelling must be in accordance with the WSUD Handbook.

Construction of the stormwater treatment measures shall only occur once 90 per cent of the catchment is developed. This is to ensure the treatment measure is not commissioned until the majority of catchment infrastructure is completed and landform stabilised. If the development is to be staged, sacrificial zones must be included in the design and rectified upon completion of development within the catchment.

### 4.3 Water conservation

Buildings not subject to BASIX that are installing any water use fittings must demonstrate compliance with the minimum standards defined by the Water Efficiency Labelling and Standards (WELS) Scheme.

Industrial and business developments must supply 80% of their non-potable demand using non potable sources. Rainwater shall be the primary source and only supplemented by recycled water when rainwater cannot meet 80% of the demand. When the 80% demand threshold cannot be met, the use of non-potable sources shall be maximised and be considered on a merits basis by Council.

Where dual reticulation is being provided for future recycled water delivery, any recycled water supply shall only supplement or ‘top up’ any rainwater or stormwater scheme. Note rainwater tanks shall not be topped up with recycled water unless approved by Sydney Water.

The percentage of proposed roof area directed to a rainwater tank must be maximised to increase the effectiveness and reliability of the reuse system.

Where cooling towers are used they shall:
(a) Be connected to a conductivity meter to ensure optimum circulation before discharge
(b) Include a water meter connected to a building energy and water metering system to monitor water usage
(c) Use alternative non-potable water sources where practical.

Water use within public open space (for uses such as irrigation, pools, water features) must be supplied from non-potable sources such as recycled water, roof water, harvested stormwater or other non-licensed water sources and treated to NSW Government and Commonwealth Government standards.

4.4 On-site stormwater detention and waterway stability

All development must manage post development peak flows in accordance with Blacktown City Council’s Engineering Guide for Development or Upper Parramatta River Catchment Trust On-Site Stormwater Detention Handbook version 4.

Attached residential housing developments may supply a rainwater tank, which includes space to meet the on-site stormwater detention controls. This must be designed in accordance with the WSUD Handbook. To ensure maximum detention benefit, the rainwater tank shall supply hot water, toilet, laundry and any outdoor uses. If the development does not connect to all the uses specified, the full on-site stormwater detention requirements shall apply.

Industrial and business developments with a development footprint greater than 150 square metres but less than 500 square metres may supply a rainwater tank, which includes space to meet the on-site stormwater detention controls. This must be designed in accordance with the WSUD Handbook. To ensure maximum detention benefit, the rainwater tank shall supply hot water, toilet, laundry and any outdoor uses. If the development does not connect to all the uses specified, the full on-site stormwater detention requirements shall apply.

All development shall ensure that the post development duration of stream forming flows shall be no greater than 3.5 times the pre-developed duration of stream forming flows, with a stretch target of 1. The comparison of post development and pre-development stream forming flows is commonly referred to as the Stream Erosion Index (SEI). Provision of an on-site stormwater detention system designed and constructed in accordance with the Upper Parramatta River Catchment Trust On-site Stormwater Detention Handbook version 4 is deemed to satisfy the waterway stability requirements. Development sites which are exempt from providing on-site stormwater detention are deemed to satisfy this control.

Any changes in flow rate and flow duration within the receiving watercourses as a result of the development shall be limited as far as practicable. Natural flow paths, discharge points and runoff volumes from the site should also be retained and maintained as far as practicable.

4.5 Erosion, sediment and pollution control

All development must have all works or activities undertaken in accordance with Managing Urban Stormwater: Soils and Construction (The Blue Book).
4.6 Groundwater

Where the desktop groundwater assessment report determines there is potential for interaction with groundwater, a groundwater management plan that meets Council's development application requirements must be prepared.

Any dewatering activities may require concurrence from the NSW Government. The NSW Government must be consulted if dewatering is proposed prior to lodgement of the development application.

The applicant must demonstrate no adverse impacts on surrounding or adjacent properties, infrastructure or groundwater dependant ecosystems:

(a) As a result of changes in the behaviour of groundwater created by the method of construction chosen

(b) From changes to the behaviour of groundwater of the surrounding area, created by the nature of the constructed form and groundwater management system used.

Note: As at the date of adoption of this Part no known groundwater dependant ecosystems in the Blacktown Local Government Area have been identified. However, consultation should occur with the relevant NSW Government Department to determine whether any new groundwater dependant ecosystems have been identified.

Where below ground structures are in close proximity to each other (typically less than 3 metres), provision must be made for the natural flow of groundwater to be included in the design of the perimeter or through drainage to offset any restriction to flow.

If the nature of construction methods or the bulk of a below-ground structure creates an impediment to natural flow paths, artificial drains may be used.

Perimeter or through drainage or artificial drains may only be used where it is demonstrated that the natural groundwater flow regime is restored both up-gradient and down-gradient of the site, without any adverse effects on surrounding property or infrastructure.

Any groundwater management systems proposed shall have a minimum design life of 50 years.

Details of the method of construction must be provided where construction occurs on a hillside and involves the construction of permanent structures other than piles or footings below the water table. All components of the structure, including subsoil drainage, must be located entirely within the property boundary.

The groundwater regime shall be maintained as close as possible to the pre-development condition during the construction and operational phases of any development.

Construction techniques, where possible, shall eliminate the need for dewatering.

All groundwater management activities, including monitoring, must be conducted in accordance with the Groundwater Assessment and Management Plan and as agreed to by Council.

For all development involving construction into perched aquifers in porous or fractured rock aquifers, such as shale areas, construction techniques that eliminate the need for pumping shall be employed.
Groundwater management systems shall be designed so that they are easily maintained. A positive covenant and restriction may be required to ensure the continued functioning and maintenance of the approved groundwater system.
Appendix 1  
Precinct scale water quality offset scheme for infill development

The map shows the Section 94 Contributions Plan No. 19 – Blacktown Growth Precinct and Voluntary Contributions Scheme boundary. To establish your requirements, review the map in Figure 2 and determine which contributions area the development is located in and then use the flowchart in Figure 3 to determine your options (if available) and contributions. If the proposed development is close to a boundary please contact Council for clarification.

Figure 2 Map illustrating the Contributions Plan and Voluntary Contributions Scheme boundaries
Figure 3 Flowchart illustrating the options (if available) and contributions under the offset scheme