Section 25 – Water Management

25.1 Preamble

Council recognises that stormwater is a valuable resource which, when managed appropriately can contribute to the attainment of quality environments and water conservation objectives. New urban development has the potential to be designed and constructed in a way that is complementary rather than antagonistic to the natural environment and the existing built environment. With reference to stormwater this is commonly referred to as water smart development.

Water smart development, is development that is carefully designed, constructed and maintained to minimise impacts on the natural water cycle and the existing urban form. It is part of the contemporary trend towards more sustainable solutions that protect the environment and cost less.

Water smart development can help counteract many negative impacts of urban development on the natural water cycle. By utilising appropriate measures in the design and operation of development, it is possible to:

- Maintain and restore natural water balance
- Reduce flood risk in urban areas
- Reduce erosion of water ways slopes and banks
- Improve water quality in streams and ground water
- Make more efficient use of water resources
- Reduce cost of providing and maintaining water infrastructure
- Protect and restore aquatic and riparian ecosystems and habitats.

The intent of this section is to foster the potential for water smart development and encourage more sustainable approaches to urban design and urban water management in Muswellbrook Shire.

The following legislation and policies are relevant to development to which this section of the DCP applies:

- Water Management Act 2000
- Protection of the Environment Operations Act 1997
- The Hunter-Central Rivers Catchment Action Plan 2013-2023
- Muswellbrook Shire Council Policy – Rivers and Drainage Channels

25.1.1 Aims

The aims of this section of the DCP are to:

- Ensure stormwater is controlled in a way that minimises nuisances and damage to the adjoining properties
- Manage natural drainage lines and water bodies to sustainably protect the health of the receiving waterway.
- Mitigate pollutants from entering waterways.

- Ensure appropriate easements are provided over existing drainage systems on private property.
- Assist in the efficient use of water.

Development specific design

This DCP section has been written to ensure that water management techniques employed in any new development in Muswellbrook Shire are appropriate to the type of development. This DCP section applies to any development that requires consent other than:

- changes to existing building facades;
- minor alterations and additions to residential buildings that increase floor area by less than 10%
- advertising signs; and
- changes of use, except for a change of use that may involve the use, storage or transportation of potential contaminants/polluting substances or changes to at-grade car parking areas that are exposed to rainfall events.

25.2 ALL DEVELOPMENT

Development has the potential to increase the impermeable area of the site and this has an impact on the quantity, quality and frequency of stormwater flowing from the site. The rapid, concentrated collection and increased volume and discharge of stormwater can contribute to nuisance localised flooding, increased soil erosion, sedimentation of water ways and destruction of aquatic eco systems. Appropriate stormwater management is essential for maintaining the amenity of urban areas and health of the environment.

The general provisions of this section apply to all development proposals, and specific information on residential, non-residential and subdivision requirements will also apply to specific development proposals.

25.2.1 Applications

Objectives

a) To ensure that stormwater discharges do not cause poor environmental outcomes or nuisance to adjoining or neighbouring lands.

Controls

i) Council requires that all impervious areas be designed so that overflows do not adversely affect neighbouring properties by way of intensification, concentration or inappropriate disposal across property boundaries.

ii) Where the site falls away from the street and an interallotment drainage line exists, overflows are to be directed to that interallotment drainage line. Otherwise, the overflow may be directed to a dispersion trench subject to favourable geotechnical conditions. Design details for dispersion trenches shall be obtained from an appropriately qualified civil engineer and submitted with applications for approval.

iii) Overflows from paved areas adjacent to the property boundary must be re-directed by a kerb or formed gutter or table drain to drain into an approved piped system or away from neighbouring properties in a manner that will not cause a nuisance.

A Development Application is to be accompanied by information and concept or preliminary plans demonstrating compliance with the relevant requirements of this section of the DCP.

25.2.2 Existing Drainage Systems and Easements

Objectives

a) To ensure that appropriate long-term arrangements are in place to allow for continued use, rehabilitation and maintenance of existing drainage systems

Controls

i) Where a drainage system serving other property is located on the development site, that system is to be protected by an easement in favour of the beneficiary of the drainage system in order to permit the continued use of the drain. At the same time, a drainage easement gives the beneficiary the right to maintain the pipes contained in the easement.
ii) Where a drainage system that forms part of Council's urban stormwater system is located on the development site, that drainage system is to be protected by an easement, in favour of Council, in order to permit the continued use and maintenance of the system. "Council's urban stormwater system" is defined as any river, creek, drain, channel or swale channelling water within the urban areas of the Shire.
iii) Easements shall contain terms including, but not limited to:
    I. The occupier not obstructing the river, creek, drain channel or swale;
    II. The occupier not running livestock within the area of the easement;
    III. Council having the right to enter the property to undertake rehabilitation, repairs and maintenance to the site of the easement.
iv) Registration of the Easement shall be required prior to the issue of the occupation certificate.

iv) New buildings are not to be constructed over or compromise the integrity of drainage lines or easements originating from outside the site.
v) Where an existing drainage line runs under a proposed building, the drainage line and any associated easement is to be diverted around the building. Redundant easements are to be extinguished and new easements are to be created.
vi) Where an existing drainage system across the site is being retained, access to the existing system is not to be adversely impacted by the proposed development. Also, the development is to be designed so as not to degrade the structural integrity of the system. Vehicular and pedestrian access, and vehicle parking areas, may be constructed over a drainage

system or easement, however the cost of maintaining or replacing these assets, particularly if damaged during a rainfall event, will be the responsibility of the landowner.

vii) Where an existing drainage system across the site is in the form of an open channel, and the depths or velocity of water flowing through the channel in rainfall events poses a risk to life, Council may require the open channel is to be replaced by a suitably designed piped drainage system.

25.2.3 Flooding and Runoff Regimes

Objectives

a) To ensure that post development runoff reflects pre-development conditions
b) To ensure that development does not result in environmental damage within existing drainage courses and receiving waters

A. Replicating Natural Conditions

Developed catchments typically give rise to large percentages of impervious areas. While there is a general perception that this creates more runoff during heavy rain events, the effect of impervious areas on drainage networks is none more pronounced than during common rainfall. Lighter rain occurs more often than intense (flood producing) rain. However, this light rain does not produce runoff from pervious surfaces. On the other hand, developed areas generate significant runoff from these light rain events. Natural creek systems tend to be scoured out by this larger number of runoff events. Whole ecosystems depend on creek beds and banks to survive and in turn these ecosystems deliver positive environmental values.

Controls

(i) Development is to be designed so that runoff from low intensity, common rainfall is equivalent to the runoff from a natural catchment. This can be achieved by intercepting and storing runoff in extended storage detention basins and discharging at greatly reduced rates.
(ii) Alternatively, existing degraded downstream streams can be sympathetically engineered to re-establish a natural riparian eco system that can cope with the changed hydrological regime.

B. Managing peak runoff

Runoff generated by more intense rainfall needs to be managed so that there is no downstream property damage or risk to public safety.

Controls

I. Developments are to be designed in accordance with “Australian Rain Fall and Run off” and the NSW Floodplain Development Manual.
II. Designs to be prepared in accordance with the Muswellbrook Shire Council Handbook for Drainage Design Criteria and the quality assurance requirements of AUS-SPEC are satisfied.

25.2.4 Overflow disposal

Where site discharge controls are used in accordance with this section, overflows will be discharged from those controls from time to time.
In any case, Council has a traditional role in ensuring that discharges are managed appropriately so that they do not cause excessive nuisance to others.

Objectives

a) To ensure that stormwater discharges do not cause excessive nuisance to adjoining or neighbouring lands

Controls

(i) Development is to be designed so that overflows do not adversely affect neighbouring properties by way of intensification, concentration or inappropriate disposal across property boundaries. This can be achieved by securing appropriate easements over downstream properties or discharging overflows directly to the street system where feasible.
(ii) Overflows from paved areas adjacent to the property boundary are to be directed by a kerb or formed gutter to drain away from neighbouring properties.

25.2.5 Pollutants

All litter that finds its way onto roads and into drainage systems ends up in creeks, rivers and the ocean. Litter is a continuing threat to healthy aquatic ecosystems and the visual amenity of waterways.

A number of key pollutants present a significant threat to waterways. Dissolved and absorbed pollutants and emulsified hydrocarbons can in some cases be toxic to aquatic ecosystems while nutrients can promote exotic plant growth, including toxic forms of algae. All of these represent a threat to visual amenity, aquatic ecosystems and to recreational values.

Objectives

a) To ensure that stormwater generated from development does not result in pollution of water courses or receiving waters

Controls

I. Stormwater management systems are to be designed to capture and remove all litter larger than 5mm in size.

II. Pollution reduction devices. The objective of pollution reduction devices e.g. Gross Pollutant Traps, is to remove contaminants such as oil, sediment and other pollutants before stormwater discharges into the receiving system beyond the site of the development. Pollution reduction devices must be installed for the following developments:

- residential developments with more than five dwellings or new greenfield residential subdivisions
- all commercial developments that may involve the use, storage or
- transportation of potential contaminants/polluting substances or have at-grade car parking areas that are exposed to rainfall events.
- commercial developments on allotments greater than 2,000m2 where the impervious area exceeds 50% of the area of the site
- all industrial developments

III. The event mean concentration of specific pollutants is not to exceed that in the following table.

Pollutant	Maximum Event Mean Concentration
Sediment	100mg/L
Hydrocarbons	500ug/L
Total Nitrogen	1000ug/L
Ammonia	15ug/L
Phosphorus	100ug/L

Note 2: Council recognises that people are less likely to litter on their own dwelling site. Therefore, litter traps are not required for houses and multi-unit development comprising less than six dwellings.

IV. Pollution reduction devices are to be retrofitted to existing development where practical. Preliminary advice should be sought from Council should the applicant believe such measures are impractical.

V. Maintenance manuals are to be provided for stormwater management systems that include pollution reduction devices, on-site retention, bioretention rain gardens, bioretention swales, porous paving and sand filters within basins. The manual is to address maintenance issues including routine monitoring and maintenance as well as any associated components (such as vegetation, subsurface drainage, filter material, flush outs, etc.) of the system that could impact on device performance. Periodic monitoring and maintenance is to occur to ensure the system functions as designed, and meets water quality and quantity targets as indicated in the DCP (see Table above) over the life cycle of the device. The manual is to be kept onsite

25.3 RESIDENTIAL DEVELOPMENT

Objectives

a) For runoff from impermeable surfaces to be managed by stormwater source controls that:
   - Contain frequent, low-magnitude flows,

- Maintain the natural balance between runoff and infiltration, to promote appropriate groundwater, soil salinity and stream flow characteristics,
- Remove some pollutants prior to discharge to receiving waters,
- Prevent nuisance flows from affecting adjoining properties.

Controls

i. Stormwater drainage complies with AS 3500.3;
ii. Development applications comply with BASIX where it applies;
iii. Further information on commencement dates and details of types of development requiring a BASIX Certificate or to produce a certificate for your proposed development go to www.basix.nsw.gov.au or phone the BASIX Help Line on 1300 650 908;
iv. Gutters and down pipes are installed to collect roof water;
v. Pits are installed to collect water from the low points in yards;
vi. Down pipes and pits are to be connected to the 'discharge controls' for the site;
vii. The site discharge indicator for the development is at least 0.3 determined under Water Smart Practice Note No. 11 – Site Discharge Indicator, and preliminary storm water design details demonstrating ability to comply with this requirement are to be submitted with the development application;
viii. Soil and erosion plans are to be submitted in accordance with the provisions of section 20 of this DCP;
ix. For residential development incorporating 20 or more dwellings on the site, a comprehensive water cycle strategy plan that responds to relevant issues and opportunities for achieving sustainable water cycle outcomes is required to be submitted with the development application; (see end of this section for requirements)
x. Soil and water management plans are required to be submitted with the development application for all residential development where site disturbance is greater than 1,000m^2. (see end of this section for requirements)

Guidelines to refer to
Coombes,P.(2002). Water Smart Practice Note No.4 – Rainwater Tanks. LHCCREMS, Callaghan NSW.
Coombes,P.(2002). Water Smart Practice Note No.5 – Infiltration Devices. LHCCREMS, Callaghan NSW.
Donovan,I.(2003). Water Smart Practice Note No. 11 – Site Discharge Indicator. 2nd Edition.LHCCREMS, Callaghan NSW.

25.4 NON-RESIDENTIAL DEVELOPMENT

Objectives

a) For runoff from impermeable surfaces to be managed by stormwater source controls that;

- Contain frequent, low-magnitude flows,
- Maintain the natural balance between runoff and infiltration, so as to promote appropriate groundwater, soil salinity and stream flow characteristics,
- Remove some pollutants prior to discharge to receiving waters,
- Prevent nuisance flows from affecting adjoining properties.

Controls

I. Stormwater drainage complies with AS 3500.3;
II. Development proposals for this type of development are to demonstrate compliance with AUSPEC D5 and the Muswellbrook Shire Council Drainage Design Criteria.
III. Development applications comply with BASIX where it applies; Further information on commencement dates and details of types of development requiring a BASIX Certificate or to produce a certificate for your proposed development go to www.basix.nsw.gov.au or phone the BASIX Help Line on 1300 650 908;
IV. Gutters and down pipes are installed to collect roof water;
V. Pits are installed to collect water from the low points in yards;
VI. Down pipes and pits are to be connected to the 'discharge controls' for the site;
VII. The site discharge indicator for the development is at least 0.5 determined under Water Smart Practice Note No. 11 – Site Discharge Indicator, and preliminary storm water design details demonstrating ability to comply with this requirement are to be submitted with the development application;
VIII. Soil and erosion control plans are to be submitted in accordance with the provisions of section 20 of this DCP;
    - For non-residential development incorporating facilities to accommodate or employ more than 50 staff, or that involve the use of more than 1 hectare of land for commercial, industrial or special use purposes, a comprehensive water cycle strategy plan that responds to relevant issues and opportunities for achieving sustainable water cycle outcomes is required to be submitted with the development application; (see end of this section for requirements)
IX. Soil and water management plans are required to be submitted with the development application for all non-residential development where site disturbance is greater than 1,000m^2. (see end of this section for requirements)
X. Industrial development buildings are to be provided with an onsite stormwater retention tank in accordance with the following table:

Roof Area	Required Tank Size (L)
Equal or less than 500m2	10,000
More than 500m2	22,500

The tank is to be fitted with appropriate water purifying and hydrocarbon / pollutant separation devices to ensure that water used and entering the stormwater system is clean.

Guidelines to refer to

Coombes,P.(2002). Water Smart Practice Note No.4 – Rainwater Tanks. LHCCREMS, Callaghan NSW.
Coombes,P.(2002). Water Smart Practice Note No.5 – Infiltration Devices. LHCCREMS, Callaghan NSW.
Donovan,I.(2003). Water Smart Practice Note No. 11 – Site Discharge Indicator. 2nd Edition.LHCCREMS, Callaghan NSW.

25.5 SUBDIVISIONS

This part of the section outlines the objectives and controls that are to be used to assess development proposals for the subdivision of land.

Aims

a) Subdivisions are to be designed, constructed and maintained so that development is undertaken in a manner that addresses the following matters:
   - Minimises adverse impacts on the natural water cycle;
   - Takes into account site constraints and hazards;
   - Reduces downstream flooding and drainage impacts;
   - Promotes more efficient use of water;
   - Removes water-borne pollutants prior to discharge to receiving waters;
   - Controls soil erosion during and after the construction phase.

Controls

I. Muswellbrook Shire Council has adopted AUS-SPEC and the Muswellbrook Shire Council Handbook of Drainage Design Criteria as the engineering design and construction standard for subdivision works and infrastructure.

II. All public stormwater management assets are to be installed outside the riparian zone of creek lines.

III. A comprehensive water cycle strategy is required for large lot residential, residential, commercial and industrial greenfield or infill subdivisions of 20 or more lots, unless a comprehensive water cycle strategy was undertaken as part of rezoning studies for the site, and the methodology followed for that strategy is contemporary and proven.

25.5.1 Stormwater Collection

Objectives

a) The major – minor principle is a philosophy of stormwater drainage advocated by Engineers Australia in *'Australian Rainfall and Runoff'*. It provides for robust, fail-safe design of drainage systems. The methodology is to design surface levels so that very large (major system) 1% AEP (100 year ARI) events can flow around buildings without relying on underground pipes and that the Major drainage system design and construction:
   - retains, and where practical, restores natural water courses, native riparian vegetation, wetlands and other natural landscape features,
   - incorporates effective measures to manage and treat stormwater and maintain healthy aquatic ecosystems,
   - satisfies acceptable risk management standards for public safety and flood protection.
   - within new developments local drainage shall be designed to avoid local flooding in accordance with the aims and objectives of the NSW Floodplain Development Manual. (April 2005)

b) Pipe (minor) systems are installed to cater for frequent surface flows up to 20% AEP (5 year ARI). This balances cost of drainage and occurrence of inundation.

Controls

I. Surface levels are to be graded such that sites are generally free draining with enough overflow capacity to ensure that waters do not enter buildings when underground drainage systems are beyond their capacity;
II. Drainage pits are to be installed so that nuisance water does not collect at low points;
III. Gutters, down pipes and pits are to be connected to the stormwater management system for the site. Australian Standard 3500.3 sets appropriate standards for stormwater collection and is to be followed when constructing new development. AUS-SPEC provides more guidance on stormwater collection and is to be used in subdivision design;
IV. Public use areas satisfy relevant flood safety criteria as assessed with reference to the NSW Floodplain Development Manual;

25.6 PLANS

Erosion and sediment control strategy and plans

Sediment continues to be one of the major threats to waterways within the urban area. The construction phase of new development has the potential to generate more sediment than at any other time. Council therefore requires that appropriate erosion and sediment controls be applied during construction. Typically, this means a combined strategy that manages materials handling, diversion of clean runoff around the site and filtering of dirty runoff generated by the site.

Erosion and Sediment Control Plans are required for all development as referred to in section 20 of this DCP.

Soil and Water Management Plans

Soil and water management are required for all development where site disturbance is greater than 1,000m2.

Soil and water management plans usually contain a written report as well as a set of plans and are to detail the following:

I. An assessment of the soil type, particularly its propensity to disbursement;
II. An assessment of the constraints and opportunities on the site that limit the site's sediment generating potential through appropriate controls, including construction staging and timing;
III. How upstream 'clean' water is diverted around the site using catch drains;

IV. How runoff generated within the site is intercepted to stop sediment leaving the site utilising sediment basins and flocculation if required;
V. How materials and waste are going to be managed on the site in order to eliminate their sediment generation potential;
VI. What specific maintenance requirements are applicable to the relevant controls; and
VII. Soil and Water Management plans are to comply with the Department of Housing's *'Managing Urban Stormwater: Soils and Construction'* (the "Blue Book").

Comprehensive Water Cycle Strategy Plans

A comprehensive water cycle strategy is the investigation of hydrological issues affecting the feasibility, performance, sustainability and implementation of development, and which considers or identifies:

- Relevant goals for water quality, natural water balance, water efficiency, vegetation conservation, flood risk management and erosion and sedimentation control (these should be consistent with goals contained in water management plans, catchment blueprint, stormwater management plan, and integrated water cycle management plan.)
- Design principles and management measures that are to be applied so as to meet relevant performance goals, including:
- Proposed measures to manage site constraints and hazards such as flooding, slope stability, reactive soils, coastal hazards, erosion hazard, salinity, and land contamination,
- Proposed measures to manage vegetation cover and dependent ecosystems such as wetlands and riparian corridors.
- Proposed measures to manage water quality, flooding, stream flow, groundwater, soil salinity and water consumption.
- A development strategy and infrastructure program that integrates water supply, sewerage, drainage, wastewater treatment and reuse, water quality control, flood risk management, open space provision and ecological protection issues.
- Developer contribution arrangements.
- A program for monitoring achievement of performance goals,
- A maintenance schedule for stormwater source controls, with details of responsibilities and proposed enforcement mechanisms (such as covenants), Proposed educational, economic and community initiatives to minimise adverse impacts on the water cycle.

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