SC6.9 Stormwater management

SC6.9.1 Application

1. This planning scheme policy applies to development where an applicable code identifies Planning Scheme Policy 9 Stormwater management as supporting an outcome of the code.

SC6.9.2 Relationship to the Planning Scheme

1. This planning scheme policy is to be read in conjunction with the assessment benchmarks specified in the Planning Scheme and applies to the whole of the local government area. This Policy specifically relates to section 9.4.7 Stormwater management code and ensuring development is consistent with the stormwater management design objectives specified in the code.

SC6.9.3 Purpose

1. The purpose of this planning scheme policy is to:
   a. provide supporting information about achieving outcomes in the planning scheme code;
   b. identify requirements for site assessments and management plans;
   c. provide supporting technical information, where relevant;
   d. identify other relevant guidelines, standards and information sources;
   e. ensure stormwater management issues are appropriately addressed at the reconfiguring a lot and material change of use stages and any problems are identified and addressed prior to the operational works stage.
2. The planning scheme policy is arranged into 3 sections:
   a. qualifications;
   b. technical standards;
   c. requirements for assessments and management plans.
3. An information request will be requested where the information required by this policy is not supplied when a development application is made.

SC6.9.4 Qualifications

1. Stormwater quality management must be designed and certified by a suitably qualified person. A suitably qualified person is one (or more) of the following:
   a. For Urban Stormwater Quality and Quantity Management: A Registered Professional Engineer of Queensland (RPEQ) (civil engineering, environmental engineering). The person must have at least 5 years demonstrated experience in the design and delivery of stormwater management strategies.
   b. For Erosion and Sediment Control: A person who has minimum 5 year experience as a Certified Practitioner in Erosion and Sediment Control (CPESC) or a suitably experienced engineer (RPEQ) with training in soil science and erosion and sediment control. Such persons will be responsible for designing erosion and sediment control plans and supervising the delivery of erosion and sediment control on development sites.
   c. Non-tidal artificial waterways: A person with tertiary qualifications or equivalent, such as an RPEQ (environmental engineering) or environmental scientist (or similar), and at least 5 years demonstrated experience in the design and management of non-tidal artificial waterways or lakes.
2. Note that suitable qualification in one of the disciplines above does not necessarily mean the person is qualified in all aspects of stormwater management. For example, a person qualified to complete stormwater quality and quantity management does not necessarily qualify for non-tidal artificial waterways, lake design or geomorphic assessment.

Note—Erosion and sediment control plan means a plan:

(a) prepared by an appropriately qualified person; and

(b) stating measures to be implemented, including measures relating to the design and location of buildings and structures, to minimise erosion and sediment run-off impacts of the use.

SC6.9.5 Technical standards

1. A reference in the policy to a specific resource, guideline, standard or document means the latest version of the resource, guideline, standard or document. Refer also to section 4 - Flood hazard policy.
2. The listed technical standards are not intended to be exhaustive. It is expected that appropriate references are also used in accordance with accepted best practice.

SC6.9.5.1 Guidelines

1. Beesley LS, Middleton J, Gwinn DC, Pettit N, Quinton B and Davies PM, Riparian Design Guidelines to Inform the Ecological Repair of Urban Waterways (2017), Melbourne, Australia: Cooperative Research Centre for Water Sensitive Cities.
2. Brisbane City Council, Natural Channel Design Guidelines.
3. Engineers Australia, Australian Run-off Quality: A guide to Water Sensitive Urban Design.
4. MUSIC Modelling Guidelines.
5. Queensland Dam Safety Management Guideline.
6. Small Dam Safety: Information for Queensland small dam owners.
7. Guidelines for failure impact assessment of water dams.
8. Guideline for construction of new levees or modification of existing levees.
9. Guidelines for construction or medication of category 2 and 3 levees.

SC6.9.5.2 Standards

1. Australian Rainfall and Runoff
2. ARR Data Hub, https://data.arr-software.org.
3. Austroads, Guide to Bridge Technology Part 8: Hydraulic Design of Waterway Structures
4. Department of Agriculture and Fisheries, Accepted development requirements for operational work that is constructing or raising waterway barrier works
5. Department of Agriculture and Fisheries, Habitat Guidelines
   a. Fish passage in streams: Design of stream crossings (FHG 001);
   b. Restoration of fish habitats: Marine areas (FHG 002);
   c. Fish habitat buffer zones (FHG 003);
   d. Mangrove nurseries: Construction, propagation and planting (FHG004).
6. International Erosion Control Association, Best Practice Erosion and Sediment Control.
7. IPWEAQ Standard Drawings DS-070 to DS-080.
8. Queensland Urban Drainage Manual.
9. Transport and Main Roads, Road Drainage Manual.
10. Water Sensitive Urban Design Principles including Water by Design Guidelines:
    a. Framework for the Integration of Flood and Stormwater into Open Space;
    b. Stormwater harvesting guidelines;
    c. Bioretention Technical Design Guidelines;
    d. Wetland Technical Design Guidelines;
    e. Waterbody management guidelines;
    f. Construction and Establishment Guidelines: Swales Bioretention Systems and Wetlands.
11. Accepted development requirements for the construction of new levees or the modification of existing levees.

Table SC6.9-1: Minimum water quality technical standards to be used at each stage of development

DEVELOPMENT STAGE	STANDARD
Planning application (Concept design)	Concept Design Guidelines for Water Sensitive Urban Design MUSIC Modelling Guidelines
Operational Works application (Detailed Design)	IPWEAQ Standard Drawings DS-070 to DS-080 Water Sensitive Urban Design Principles: a. Water by Design: Bioretention Technical Design Guideline b. Water by Design: Wetland Technical Design Guidelines c. Technical Design Guidelines for South-East Queensland
Construction, establishment and handover	Water Sensitive Urban Design Principles: a. Water by Design: Construction and Establishment Guidelines b. Water by Design: Maintaining Vegetated Stormwater Assets c. Water by Design: Transferring Ownership of Vegetated Assets

SC6.9.6 Consultation

1. Council may seek third party advice or comment about an application where:
   a. development may conflict with a code; or
   b. technical advice is required to assess the development.
2. Where technical advice is outsourced to an independent consultant an additional fee will apply.

SC6.9.7 Requirements for stormwater assessment and management plans

1. A Stormwater assessment and management plan should include the following:
   a. project location and address;
   b. project title and description;
   c. the date on which the assessment and any plans were prepared, including any amendments;
   d. name and relevant professional qualifications of the person/s preparing the assessment;
   e. for all plans include a north point, scale, location of property boundaries, road alignments and street names.
2. A Stormwater management plan should provide the minimum requirements shown in the table below:

Table SC6.9-2: Standard requirements for impact assessments and mitigation plans

SECTION:	DETAILS
1: Summary	This section should include: a. authorship details including contact information; b. industry accreditation number; c. document certification by RPEQ;

SECTION:	DETAILS
	d. assumptions, design criteria, hydrologic and hydraulic assessment, results and key findings, recommendations and conclusions; e. any areas of non-compliance with the Stormwater Management code; f. how areas of non-compliance with the Stormwater Management code will be managed or overcome.
2: Introduction	This section should include: a. the purpose, aims and objectives of the Stormwater assessment and management plan; b. scope of study including any limitations
3: Existing Site Conditions	This section should include information and plans showing: a. existing and land use or development; b. site topography and contours; c. catchment and sub catchments boundaries including a description of external catchments, upstream catchment and the downstream receiving environments; d. soil type (including dispersive potential, iron content and potential ground water issues (as applicable)); e. existing vegetation including areas to be cleared and retained; f. Council's existing stormwater drainage system including an analysis of the capacity of the system to accept the extra flows, existing stormwater devices, such as drains, detention basins, stormwater quality filters, and existing easements; g. major and minor flow paths and inundation extents and levels including 5% AEP, 1% CC AEP and extreme events (if applicable); h. all discharge points from the site including drain location/s, dimensions, elevation/s and capacity; i. any local flooding issues; j. any other site-specific issues. *Note—Many areas of the Council's stormwater system are known to have capacity issues and a detailed assessment is required to ensure that new development does not worsen existing stormwater drainage problems is recommended.*
4: Development details	This section should include: a. site details, real property description and street address; b. description of the proposed development and resulting land use/s; c. details of any relevant previous approvals; d. the date on which the assessment and any plans were prepared, including any amendments; e. name and relevant professional qualifications of the person/s preparing the assessment and management plan; f. plans that show as a minimum: north point, scale, location of property boundaries, roads, street names, vegetation location.
5: Catchment design objectives	This section should identify:

SECTION:	DETAILS
	a. stormwater quantity objectives for lawful point of discharge (usually a continuum – not a single point) for aflux, velocity, flow and hazard management, likely locations of offsite impacts requiring management; b. stormwater quality design objectives; c. waterway stability design objectives; d. whether frequent flow objectives are required and their derivation.
6: Stormwater Strategy	This section should Identify: a. opportunities and constraints; b. strategies for managing potential impacts of the development; c. strategies for achieving compliance with each of the design objectives including calculations of volumes and anticipated quality at Construction Phase and Operational Phase of the development including fully developed site catchment and release points; d. stakeholders and consultation with any party responsible for any specific actions including documentation of any discussions with Council, and affected landowners, affected landowners' consent for operational works application and construction works. *Note—Where development proposes to discharge an altered or concentrated flow of stormwater runoff onto adjacent (or downstream) property, a letter of approval from the property owner(s) must be supplied at application stage (an easement is likely required). Where this is not the case, stormwater flows must not create actionable nuisance over the pre-developed conditions and overall catchment response.*
7: Stormwater Quantity	This section should include: a. flow mitigation requirements to meet the waterway stability objectives; b. mitigation measures to achieve no actionable nuisance downstream; c. hydrologic modelling assumptions; d. demonstration of satisfactory management of each Lawful Point of Discharge or stormwater drainage; e. identify the location of proposed easements internal and external to the site; f. identify the location of proposed external works; g. proposed storage volumes – if a staged development, at each stage of the development and anticipated volume for each stage; h. infrastructure details – including outlet structures RLs and sizes, infrastructure life and replacement costs; i. maintenance - including responsibility and costs over the short and long term; j. water cycle management plans; k. provide plans and drawings of the location, and the details of stormwater management measures including sizes/ volumes and cross sections with dimensions, levels, batter slopes, and boundary clearances, demonstration of management of hazard within and outside of the site on eg. roadways, channels, detention basins, application and implementation of Crime Prevention Through Environment Design ("CPTED"), service clashes and operational accessibility (where applicable). l. proposed development levels related to AHD.

SECTION:	DETAILS
	Note—in many cases the practical approach to demonstrate satisfactory consideration of timing and impact dictates modelling (in TUFLOW or equivalent) of the proposed site and locality.
8: Stormwater Quality	This section should include: a. MUSIC modelling or complying solutions; b. modelling assumptions; c. reduced imperviousness; d. supporting calculations demonstrating compliance; e. design - Construction Phase and Operational Phase; f. plans showing location of water quality devices;; g. plan details to be commensurate with preliminary approval for operational works.
9: Detailed Design and Staging	This section should include: a. detailed design of measures; b. timing and delivery of strategy components where a development is staged (including separate implementation/maintenance periods as required); c. construction management to prevent interim stormwater quantity or quality impacts; d. conversion of construction phase erosion and sediment control measures to operational phase; e. the design and selection of pipe class must consider the construction loadings. Pipes must have a service life of 80-100 years without cracking.
10: Assessment against Stormwater management code	This section should demonstrate how the proposed development complies with the Stormwater management code and identify any areas of non-compliance and how these will be managed. Provide justification for any proposed variation.
11: Conclusions and Recommendations	Summary of stormwater management plan and any key issues for detailed design. Summary of modelling results.
12: References	List of documents referred to in the study.
13: Appendices	As required but as a minimum should include: a. relevant reference material and models that have been relied on; b. documenting model methodology and setup; c. proposed plans.
14: Digital file	Model files (input and output), output files for each event (including difference mapping) - elevation, depth, velocity, velocity x depth, hazard (H1 to H6) in suitable format.

SC6.9.8 Requirements for total water cycle management plans

1. The following advice applies where development is of a type and location subject to the water quality overlay.

SC6.9.8.1.1 Reconfiguration of a lot

1. On site or communal sewage treatments systems are required to be designed, constructed and managed to protect and minimise the release of Prescribed Water Contaminants in accordance with the *Environmental Protection Act 1994* to the site or waters on-site. An on-site effluent disposal system is required to be certified under the *Plumbing and Drainage Act 2018*.
2. Approval for an Environmentally Relevant Activity is required for ERA 63 – Sewage treatment at threshold for sewage treatment works with total daily peak design capacity greater than 21 equivalent persons.
3. Communal stormwater treatment systems should minimise contaminants before discharge to surface or groundwater, in compliance with the *Environmental Protection Policy (Water) 2009*. Schedule 1 of the *Environmental Protection Policy (Water) 2009* provides the environmental values and water quality objectives for the Lockyer Creek catchment.

SC6.9.8.1.2 Material change of use

1. Development that is subject to a requirement for a stormwater management plan should protect drinking water quality by implementing a total water cycle approach that includes the use, reuse and disposal of:
   a. water;
   b. stormwater;
   c. sewage;
   d. wastewater (other than sewerage).
2. A water cycle environmental management plan is to be prepared by a suitably qualified person consistent with *Environmental Protection Act 1994*.
3. A water quality management plan should address the total water cycle and:
   a. minimise water use;
   b. minimise the use and strength of contaminants;
   c. avoid the creation of wastewater;
   d. wastewater should be managed through a combination of responsible and efficient wastewater treatment, reuse and disposal strategies that:
      ii. store wastewater on-site until collected and disposed of by a regulated waste treatment facility;
      iii. dispose of wastewater on-site so that the water quality complies with the objectives suitable for agricultural irrigation under the *Environmental Protection (Water) Policy 2009*;
      iv. dispose of wastewater to a satisfactory reticulated sewerage system or an on-site effluent disposal system which is certified under the *Plumbing and Drainage Act 2018*;
      v. dispose of wastewater to surface or groundwaters so that the water quality complies with the objectives suitable for drinking under the *Environmental Protection (Water) Policy 2009* and the *Australian Drinking Water Guidelines*.
4. Schedule 1 of the *Environmental Protection Policy (Water) 2009* provides the environmental values and water quality objectives for the Lockyer Creek catchment.
5. For any declared water catchments under the overlays OM12A and OM12B, development should aim to meet the specific outcomes of the *Seqwater Development Guidelines for Water Quality Management in Drinking Water Catchments*.

SC6.9.9 Requirements for a failure impact assessment

1. Detention basins are effectively dams and the requirements of the *Water Supply (Safety and Reliability) Act 2008* apply. Where it is considered that the failure of a detention basin may have a population at risk of 2 or more persons, a failure impact assessment of the detention basin is required to determine the downstream impact of a failure of the asset that releases the full volume over a period of 30 minutes. The requirement for the failure impact assessment is purely based on population at risk and not height or volume of the detention basin. These requirements may also apply to levees and in this case, the levees regulation apply.
2. Advice from the regulator indicates that the minimum design standard required for failure immunity is likely to be greater than a 1% CC and over a number of extreme events. Refer to the regulations and best engineering practice.

SC6.9.10 Alternative quality design objectives and management measures

1. There are several approaches promoted within the industry to demonstrate compliance with the stormwater quality design objectives.
2. Alternative management measures are applicable only when the development is exempt from complying with stormwater quality design objectives.
3. It should be noted that not all alternative management measures will be accepted by Council; however, each compliance approach and their applicability are described below.

SC6.9.10.1 On-site stormwater treatment

1. A range of stormwater treatment measures and technologies can be adopted within developments and streetscapes that will fully achieve the stormwater quality design objectives on-site.
2. This is the traditional approach to achieving compliance, whereby a stormwater treatment train is implemented within the development to meet the stormwater quality design objectives. Due to water supply considerations, conventional approaches may not satisfy water quality objectives.

Note - Deemed-to-Comply Solutions (or Complying Solutions) may not meet the water quality requirements.
Note - Numerical Modelling: The Model for Urban Stormwater Improvement Conceptualisation (MUSIC) is widely adopted for this purpose. Modelling should be undertaken in accordance with the latest version of the MUSIC Modelling Guidelines using the split land use approach.
Note - Conventional approaches may not be consistent with inground soil conditions (eg. dispersive soils).

SC6.9.10.2 Living waterways

1. A flexible environmental management approach assists practitioners and government to deliver water management systems which are integrated with outdoor spaces that are socially, economically and environmentally sound. These approaches must satisfy safety, maintenance and operative requirements.

SC6.9.10.3 Off-site stormwater solutions (off-site solutions)

1. Offsite stormwater solutions may be considered in locally applied alternative solutions that achieve an equivalent or improved water quality outcome to the stormwater management design objectives of the State Planning Policy. It is possible for this concept to be applied between multiple developers (in the same catchment) where it can be demonstrated that the combined outcome is equivalent to the outcome required of the individual sites (together)

regardless of whether a particular site has satisfied the objectives. This could be done as an infrastructure agreement and would be considered by Council as part of the development application. The concept of off-site solutions has also been presented as a voluntary mechanism with local governments collecting a fee from developers in lieu of managing stormwater on-site. This money is then used by the local government to implement stormwater solutions off-site. This concept transfers developer responsibility to Council and creates a significant administrative burden for Council. At this time, this off-site solutions concept is not able to be supported and this compliance approach is not applicable.

SC6.9.10.4 Reducing imperviousness

1. Reducing imperviousness may assist in minimising stormwater runoff and reducing stormwater management requirements. To encourage low impact design that minimises stormwater runoff, MCU developments with less than 25% effective imperviousness are excluded from achieving the stormwater quality design objectives.
2. Although there is an emphasis on quantitatively meeting design objectives, of equal or greater importance is developing good concept designs which are low maintenance, and which deliver multiple benefits such as high amenity. Concept designs are to be developed in conjunction with each of the compliance approaches and should be based on the Concept Design Guidelines for Water Sensitive Urban Design, Chapter 3.
3. The benefits of low-impact design are well recognised, however traditional compliance methodologies such as through MUSIC modelling have often disadvantaged such approaches due to requirements for infiltrated flows to be accounted for in the pollutant export from the site.
4. Approaches to impervious area management such as the use of porous pavements, green roofs and stormwater harvesting (water tanks accepted for water quality only) and reuse, reduce the effective imperviousness of a site. If the effective imperviousness is reduced to below 25% then the stormwater quality design objectives do not apply, and compliance is achieved.

SC6.9.11 Erosion and Sediment Control Plans (ESCP)

1. Erosion and Sediment Control Plans (ESCP) are to be prepared by suitably qualified and experienced Registered Professional Engineer of Queensland or Certified Professional in Erosion and Sediment Control.

SC6.9.11.1 Standard requirements for ESCP

1. The goals of an ESCP are to:
   a. minimising site erosion;
   b. minimise sediment release from the site and water contamination;
   c. manage concentrated stormwater flows to ensure concentrated stormwater flow paths have sufficient capacity and are structurally stable before each rainfall event;
   d. ensure all site surfaces are ‘effectively stabilised’ before development commences.

Note—An ‘effectively stabilised’ surface is defined as one that does not, or is not likely to result in:

a. visible evidence of soil loss caused by sheet, rill or gully erosion; or

b. lead to sedimentation, or

c. lead to water contamination.

2. An ESCP must:
   a. be designed, implemented and maintained in accordance with "Best Practice Erosion and Sediment Control" published by the International Erosion Control Association;
   b. include details of the proposed flocculants and automatic dosing systems for sediment basins, including jar testing results;

c. demonstrate the suitability of the proposed flocculants having regard to the downstream receiving environment and water quality;
d. include the results of all soil investigations undertaken for the whole development site;
e. relate to each phase of the works.

3. Very rarely can erosion and sediment control requirements for a single stage be communicated and detailed effectively, and a whole of site plan should be prepared for each stage.
4. Standard notes and drawings do not form a ESCP as they provide no guidance for on-site contractors.

SC6.9.12 Green infrastructure opportunities and operation

Table SC6.9-3: Green infrastructure opportunities and operation

For green infrastructure opportunities and operation

GREEN INFRASTRUCTURE TYPE	OPPORTUNITY AND OPERATION
Swales	Swales are typically provided as roadside vegetated drains that filter and infiltrate stormwater into the soil. They can be turfed or planted with vegetation that provides effective protection for receiving waterways through filtration and can also deliver water to rain gardens or other passively irrigated vegetation. To prevent ponding, a subsurface drain may be required. Water tanks may be provided for private irrigation.
Rainwater tanks for private irrigation	The capture of roof water runoff can provide a significant amount of the household level needs for landscape irrigation. Greening of the private realm contributes significantly to both liveability outcomes and the local character of towns. It has the benefit of reducing demand on potable water, making the most of water that may otherwise not be available for use.
Landscaping buffers	Buffer strips are vegetated surfaces that accept sheet runoff from adjacent impervious surfaces, such as road pavements. This maximises water availability for kerb-side vegetation, including gardens, turf and trees. Buffer strips are to be provided around waterways and gullies to intercept sediment-laden waters.
Passively irrigated trees	Passively irrigated street trees improve the growth and cooling benefits of vegetation. It focuses on ensuring that a suitable soil volume is achieved and directing stormwater drainage to the tree to provide soil moisture. Passively irrigated street trees can be provided with or without wicking zones to provide access to soil moisture through extended dry period. Road pavement competency must be considered and retained.
Bioretention street trees	Bioretention street trees typically use an engineered filter media with the aim of providing water quality treatment. These may be appropriate in new developments where water quality treatment objectives are required to be met.
Wicking lawns and gardens	Wicking lawns use a storage reservoir for the capture and storage of stormwater underneath the turf surface. The reservoir typically consists of coarse sand underneath a quality topsoil typically for turf surfaces. This maintains soil moisture of the root zone via wicking, or capillary rise. Stormwater typically enters a sub-surface drainage system through a filtration system such as permeable pavement or bioretention

GREEN INFRASTRUCTURE TYPE	OPPORTUNITY AND OPERATION
	filter media to prevent clogging of the underdrainage. It can be used at a variety of scales from sports fields to streetscape.
Stormwater harvest	The capture of stormwater from urban runoff can provide an alternative source of water for irrigation of public open space. They can be coupled with stormwater treatment devices required to meet water quality objectives in new development, and be designed to be aesthetically pleasing and located in public settings. Being connected to impervious surfaces such as roads and pavements of urban areas, harvesting facilities (ponds or tanks) can receive runoff from small rainfall events. Water quality must be considered and managed in relation to public health and safety.
Infiltration trench	Infiltration trenches with structural soils can improve deep-soil moisture recharge. Lateral exfiltration to the root zone of street trees can improve access to water and improved growth.
Permeable pavements	Permeable pavements can be used to provide improved infiltration of stormwater into the root zone of trees. They can be used in conjunction with infiltration trenches, wicking beds and passively irrigated vegetation.
Green corridors and waterway riparian areas	Activation and enhancement of waterways and riparian zones can provide linear connection for active transport and recreation, in a cooler part of the land ‘Trees in these areas have greater access to soil moisture and are therefore larger and provide more cooling benefit than other vegetation.