State Planning Policy – state interest guidance material

Water quality

July 2017

Queensland Government

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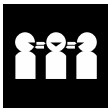

An electronic copy of this report is available on the Department of Infrastructure, Local Government and Planning's website at **www.dilgp.qld.gov.au.**

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Using the SPP state interest guidance material

The Queensland Government established the State Planning Policy (SPP) to define the matters of state interest in land-use planning and development. State interests in the SPP consist of a state interest statement, state interest policies and, where applicable, assessment benchmarks.

This guidance material has been prepared to support the implementation of the SPP and the interpretation of the *Water quality* state interest. Although the SPP broadly applies to a range of activities undertaken by state and local governments, the guidance material is particularly focused on assisting local governments when making or amending a local planning instrument and when applying the assessment benchmarks (to the extent relevant).

The SPP does not prioritise one state interest over another, providing flexibility for decision-makers to respond to specific regional and local circumstances. This allows for the state interests to be considered in their entirety rather than as individual or separate priorities. State interests are to be considered in the context of the guiding principles in the SPP which promote an *outcome focused*, *integrated*, *efficient*, *positive* and *accountable* planning system.

The SPP guidance material is intended to be read in conjunction with the SPP and the relevant state interest. The SPP guidance material is not statutory in its effect and does not contain any new policy. It is not mandatory for local governments to use the guidance material but it is provided to assist with the interpretation and application of the state interest policies and the assessment benchmarks contained in the SPP.

The SPP guidance material is structured as follows:

Part 1: Understanding the state interest – This section briefly explains why a particular matter is a matter of state interest, describes the purpose of the relevant state interest statement and defines the core concepts associated with the state interest.

Part 2: Integrating the state interest policies – This section provides background and further explanation for each of the state interest policies defined in the SPP. It also provides examples and options regarding how to appropriately integrate each state interest policy into a local planning instrument.

Part 3: Mapping – This section identifies and explains the mapping layers contained in the SPP Interactive Mapping System (IMS) relevant to a particular state interest. It also clarifies how a local government can locally refine state mapping in certain instances and outlines where online mapping for the state interest can be accessed (if relevant).

Part 4: Applying assessment benchmarks – In accordance with the Planning Regulation, an assessment manager or referral agency must have regard to the SPP when assessing a development application. For some state interests, there are also specific assessment benchmarks that must be used by a local government for development assessment. This section outlines the development applications to which the assessment benchmarks apply and how a development application may demonstrate compliance with these benchmarks, to the extent that these are relevant. The assessment benchmarks contained in the SPP will apply to assessable development in addition to any assessment benchmarks contained in a local planning instrument, to the extent of any inconsistency.

Part 5: Example planning scheme provisions – This section provides example planning scheme provisions that a local government may choose to adopt, or to adapt, for its local planning instrument. It is important to note that the example planning scheme provisions provided may only be in relation to a particular aspect of a state interest, rather than addressing all of the particular state interest policy requirements.

Part 6: Supporting information – This section provides a list of technical resources that a local government may wish to consider when preparing for making or amending a planning scheme. This section also provides a glossary of terms and acronyms used throughout the SPP guidance material.

Where text in this guidance material is in a coloured text box, it is an excerpt from the SPP and is either the state interest statement, state interest policy or the assessment benchmarks applicable to the *Water quality* state interest.

Any queries related to the SPP guidance material or the SPP should be sent to SPP@dilgp.qld.gov.au.

Part 1: Understanding the state interest

State interest statement

The environmental values and quality of Queensland waters are protected and enhanced.

Water underpins our quality of life and our economy, but sustained urban population growth in Queensland has placed strain on the quality of our water.

Urban stormwater run-off can damage water quality in waterways, reducing the health of aquatic ecosystems and limiting human uses of water. Unless well managed, urban stormwater can release contaminants such as nutrients, sediments, pathogens and solid waste (or gross pollutants) to waterways.

Development, particularly urban development, creates significant areas of impervious surfaces that can alter stormwater flows, volumes and velocities. These changes can cause increased erosion in waterways and result in damage to roads, bridges and culverts, as well as reduce ecosystem health through loss of habitat and increased disturbance.

Development in areas not connected to municipal sewerage systems has the potential to discharge wastewater to waterways if not appropriately managed.

Planning and development decisions can assist with improving the quality and functioning of water supply resource catchments and the cost, operational efficiency and safety of bulk water supply. The *Water quality* state interest informs land-use planning, development assessment and provision of infrastructure requirements to protect our water supply catchments.

Core concepts

Environmental values and water quality objectives

Environmental values (EVs) define the uses of the water by aquatic ecosystems including its biota, physical form, riparian vegetation, flow, and physico-chemical water quality, as well as human activities such as drinking water, irrigation, aquaculture, and recreation. EVs also include primary industry, farm use, stock watering, aquaculture, human consumption, primary recreation, secondary recreation, visual appreciation, raw drinking water, industrial use, and cultural and spiritual values.

Water quality objectives (WQOs) or water quality guidelines are quantitative, long-term objectives for receiving waters that protect environmental values. WQOs are long-term goals for water quality management. They are measures, levels or narrative statements of particular indicators of water quality that define what the water quality should be to protect the environmental values. They are not end-of-pipe or emission objectives. However, WQOs may be expressed as contaminant concentrations or sustainable load measures of water for a particular use.

Design objectives for managing stormwater

The SPP requires stormwater to meet certain design objectives (see Appendix 2 of the SPP) for both the construction and post-construction phases.

For the construction phase, the SPP's stormwater management design objectives require that developments apply best practice erosion and sediment control. These objectives are derived from *Best practice erosion and sediment control* (2008), International Erosion Control Association of Australasia (IECA).

For the post-construction phase, the SPP's stormwater management design objectives require minimum reductions in the mean annual load for key pollutants.

Compliance with the load reduction targets will typically be demonstrated using an accepted quantitative model (such as MUSIC – Model for Urban Stormwater Improvement Conceptualisation) with all model inputs and outputs provided to the approval authority to enable review and verification of the model results.

Alternative locally appropriate stormwater management

Alternative 'off-site' or 'regional treatment' approaches have emerged to offer more flexibility to local governments to deliver similar or improved water quality outcomes to the post-construction stormwater management design objectives with better urban design integration than can be achieved by multiple, standalone, on-site stormwater systems.

The SPP supports local governments using water-sensitive urban design to develop alternative and locally appropriate solutions to stormwater management. This includes solutions that help protect the environmental values of local waterways by meeting post-construction phase stormwater management design objectives.

In determining a locally appropriate solution to managing urban stormwater, the following common principles should be considered:

- application is to the post-construction phase of development only – off-site solutions do not remove construction phase requirements for erosion and sediment control
- individual development impacts must first be avoided, then minimised, before considering the use of off-site solutions for any remaining impact
- off-site solutions should be consistent with the infrastructure charging framework
- stormwater management should address all impact pathways including both altered quality and hydrology
- measures must be acceptable to the community and deliver multiple benefits wherever possible
- off-site solutions for stormwater quality do not remove requirements for post-construction phase stormwater management requirements for flooding and hydrologic objectives.

The Department of Environment and Heritage Protection (DEHP) has developed a policy to provide guidance on developing an alternative stormwater management solution. This policy is published on the DEHP website. Any alternative solution will be required to demonstrate it will deliver equivalent or improved outcomes to the stormwater management design objectives.

The Living Waterways framework developed by Healthy Land and Water Ltd (formerly Healthy Waterways) may provide an alternative and locally appropriate solution for the post-construction phase of development, where the quantitative assessment of the elements of the structured framework meets the deemed requirements of the stormwater management design objectives.

An advantage of the Living Waterways framework is that it recognises and credits the multiple benefits associated with avoidance techniques that are not usually accounted for in MUSIC.

High ecological value waters and slightly disturbed waters

The Environmental Protection (Water) Policy 2009 classifies Queensland waters into four categories of management intent or level of protection. These are:

- high ecological value waters (HEV) maintain natural condition
- slightly disturbed waters (SD) maintain or improve natural condition
- moderately disturbed waters (MD) maintain or achieve the relevant water quality guidelines
- highly disturbed waters (HD) improve progressively over time.

The SPP focuses on identifying and protecting HEV and SD waters to achieve the water quality policy outcomes.

HEV waters are waters where the biological integrity is effectively unmodified or highly valued and the management intent is to maintain their condition and biological integrity.

SD waters have the biological integrity of HEV waters with slightly modified physical or chemical indicators but effectively unmodified biological indicators. The management intent is to maintain the water quality of these waters and areas and progressively improve towards HEV.

High ecological value aquatic ecosystems

HEV aquatic ecosystems are aquatic ecosystems (wetland or watercourse) where the biological integrity is effectively unmodified or highly valued.

The SPP seeks to manage potential adverse impacts from urban development on HEV aquatic ecosystems by ensuring that land for urban purposes is located in areas that avoid disturbance to HEV aquatic ecosystems. Where this is not possible, future urban development should be located where it will minimise disturbance to HEV aquatic ecosystems.

Water resource catchments and water supply buffer areas

Water resource catchments are areas where water from rain and run-off is collected by the landscape for harvesting from surface waters or groundwater systems to supply drinking water.

Located within water resource catchment areas are water supply buffer areas. These buffer areas are particularly vulnerable to contamination, including groundwater recharge areas and areas in the vicinity of a dam, lake, reservoir or watercourse off-take structures that supply drinking water. Water supply buffer areas are currently only mapped in South East Queensland.

Development has the potential to negatively impact on the cost, operational efficiency and safety of drinking water if not appropriately managed. For example, the impacts of development can result in increased sediment, pathogens and nutrients entering waterways, which may result in the interruption and/or loss of water supply, require higher levels of treatment (thus increasing costs), cause nuisance and/or harm to public health, or affect environmental values.

Within water resource catchments and water supply buffer areas, local planning schemes should ensure assessable development protects the environmental values of drinking water supply.

Water-sensitive urban design

Water-sensitive urban design (WSUD) means urban planning or design that integrates water cycle management. This approach involves planning and designing urban environments to manage the urban water cycle and maintain natural hydrological and ecological systems. The SPP supports the use of WSUD and its principles to assist achieving the *Water quality* state interest.

The principles of WSUD are:

- protecting existing natural features of the natural drainage system including waterways and water bodies and ecological processes
- integrating public open space with stormwater drainage corridors to maximise public access, recreation activities and visual amenity while preserving waterway habitats and wildlife corridors
- maintaining the natural hydrologic behaviour of catchments and preserving the natural water cycle by minimising changes to the natural frequency, duration, volume and peak discharge of urban stormwater
- protecting water quality environmental values of surface and groundwaters
- minimising demand on the reticulated water supply system and using stormwater as a valued resource
- minimising capital and maintenance costs of stormwater infrastructure and minimising sewage discharges to the natural environment
- integrating water into the landscape to enhance visual, social, cultural and ecological values.

High-risk soils

High-risk soils, for the purposes of the SPP, are:

- erosive soils – soils that are more susceptible to erosion due to their physical structure or chemistry
- dispersive soils – soils that are structurally unstable and readily disperse into their constituent particles (e.g. clay, silt and sand) in water. Flocculants and coagulants may be required to interfere with this process to allow suspended sediment to settle out of the water column, for example in a sediment basin
- sodic soils – soils with a high percentage of sodium ions (in soluble or exchangeable form), exhibiting degradation such as dispersion when wet and crusting when dry
- saline soils – soils containing sufficient concentrations of soluble salts within the soil profile to result in reduced plant productivity or damage to infrastructure such as roads and building footings
- acid sulfate soils (ASS) – soils that include both actual and potential ASS. Soil or sediment containing highly acidic soil horizons (or layers) affected by the oxidation of iron sulphides is known as actual ASS. Soil or sediment containing iron sulphides or other sulphide material that has not been exposed to air and oxidised is known as potential acid sulfate soils (PASS).

Groundwater-dependent ecosystems

Groundwater-dependent ecosystems are ecosystems that require access to groundwater on a permanent or intermittent basis to meet all or some of their water requirements in

order to support their communities of plants and animals, ecological processes and ecosystem services. Ecosystem dependency on groundwater may vary over time and spatially (depending on location in the landscape). Groundwater-dependent ecosystems include aquifers, caves, lakes, palustrine wetlands, lacustrine wetlands, rivers and vegetation.

Non-tidal artificial waterways

Non-tidal artificial waterways include access channels, constructed urban lakes or other bodies of water that are designed to be:

- permanent bodies of open water
- ringed with hard edges or emergent macrophytes
- indirectly connected to tidal water (by a lock or weir or other system)
- artificial lakes (generally land locked without a direct connection to tidal waterways).

Non-tidal artificial waterways are often used as water quality treatment systems. However, if treatment devices (such as swales, bioretention basins or constructed wetlands) do not manage stormwater entering these waterways, poor water quality can result and is difficult to treat.

Integrated catchment management

Integrated catchment management incorporates a catchment-wide approach to integrating and improving land, water and related biological resources to achieve the sustainable use of these resources. It embraces:

- a holistic approach to natural resource management within catchments, marine environments and aquifers, with linkages between water resources, vegetation, land use, and other natural resources recognised
- integration of social, economic and environmental issues
- coordination between all the agencies, levels of government and interest groups within the catchment
- community consultation and participation.

Applying an integrated catchment management process integrates stormwater management practices with geomorphologic, ecological, soil, land-use and cultural issues within a drainage catchment. The outcome of an integrated catchment management process is often a catchment management plan or strategy.

Total water cycle management

Total water cycle management (TWCM) recognises water as a valuable and finite resource that must be managed on a total water cycle basis. TWCM recognises that:

- all aspects of the water cycle (water supply, wastewater, stormwater, groundwater and environmental flows) within a catchment are interdependent
- the management practices applied to any single component of the water cycle must integrate with all other elements
- infrastructure planning within any component of the water cycle must integrate with all other components of the water cycle.

Key to TWCM is the development of a TWCM plan, which outlines a local government's TWCM strategy and implementation plan.

The *Queensland urban drainage manual* provides guidance on how to incorporate TWCM principles into stormwater planning and management.

Natural channel design

The principle of natural channel design is based on providing the required hydraulic conveyance of a drainage channel and floodway while maximising its potential environmental values. This holistic approach combines the disciplines of hydraulic engineering, fluvial geomorphology and in-stream and riparian ecology. Natural channel design should be informed by community engagement.

Part 2: Integrating the state interest policies

When making or amending a local planning instrument, each local government is required to consider all state interests in the SPP and appropriately integrate those state interests applicable to their local area.

Appropriately integrating a state interest requires all state interest policies to be considered by a local government, but it does not necessarily mean a local government must address every state interest policy when making or amending a local planning instrument. For example, if a local government needs to balance competing state interests in a local planning instrument, it may not be possible to address all policies.

This balancing of state interests may mean that the planning scheme preferences one state interest policy over another. This outcome will be considered as part of the state interest review. Ministerial approval means the approach taken by the local government in balancing the state interest polices is endorsed by the state.

This section provides examples for how to appropriately integrate each state interest policy for the *Water quality* state interest.

State interest policy (1)

Development facilitates the protection or enhancement of environmental values and the achievement of water quality objectives for Queensland waters.

Effective land-use planning can gradually reduce the impacts of development on water quality, as well as protect or enhance the environmental values of Queensland waters.

The *Water quality* state interest is intended to inform land-use planning and development decisions to create settlement patterns and well-designed development that mitigates the risk of reducing the quality of water across Queensland.

How to appropriately integrate the policy

1.1 When making or amending a planning scheme, confirm if river basins in the local government area have environmental values (EV) and water quality objectives (WQOs) in Schedule 1 of the Environmental Protection (Water) Policy, available on the Department of Environment and Heritage Protection's website.

1.2 Include in the strategic framework, strategic and specific outcomes that:

- require development to protect and enhance EVs and achieve WQOs relevant to the local planning area
- maintain or enhance the quality of surface-water and groundwater within the local planning area where appropriate
- incorporate principles of total water cycle management and water-sensitive urban design
- ensure development within water resource catchments and water supply buffer areas protects the EVs of drinking water supply.

1.3 Ensure zoning reflects the management intent of waters, and avoid zoning areas with higher levels of management intent (high ecological value waters, slightly disturbed waters) for urban development.

1.4 Use appropriate zonings and/or overlays to identify areas of ecological significance, waterway corridors, wetlands or natural drainage lines where urban development is to be precluded to protect or enhance water quality.

1.5 Include in an overlay of waterway corridors and wetlands, provisions that require stormwater treatment to be located outside waterway corridors and wetlands and require riparian buffers to be maintained and rehabilitated.

1.6 Ensure development codes require development to incorporate total water cycle management and water-sensitive urban design principles

1.7 Ensure development with the potential to harm water quality is triggered for assessment against relevant water quality codes.

State interest policy (2)

Land zoned for urban purposes is located in areas that avoid or minimise the disturbance to:
(a) high-risk soils
(b) high ecological value aquatic ecosystems
(c) groundwater dependent ecosystems
(d) natural drainage lines and landform features.

Many of the threats to long-term water quality and hydrology associated with urban development can be avoided or minimised by ensuring urban development is located in areas without environmental constraints such as high-risk soils, high groundwater tables, groundwater dependent ecosystems, natural drainage lines and steep slopes.

High-risk soils have physical and/or chemical properties that:

- have a higher risk of being eroded
- will stay suspended in the water column if mobilised
- may damage structures built within them.

High-risk soils can affect water quality in waterways at both the construction and post-construction (operational) phases of development if not managed appropriately. Development should avoid high-risk soils wherever possible because of the complex management actions required to address potential impacts on water quality. If this is not possible, extensive erosion hazard assessment (including soils testing) should be undertaken to identify areas of least risk for development and adopting practices to minimise ongoing erosion.

The health of aquatic ecosystems can decline through changes to water quality or hydrology that occur when parts of a waterway catchment become urbanised. Impacts on the health of aquatic ecosystems that result from changes to hydrology are particularly difficult to address. Groundwater-dependent ecosystems can also be adversely affected through reduced water tables or increased contaminants in groundwater. The SPP seeks to avoid these adverse effects by ensuring that the zoning of land for urban purposes avoids or minimises disturbances to these significant natural ecosystems.

Development that responds sympathetically to topography, rather than significantly modifies the landscape, will generally deliver better water quality outcomes. Maintaining natural drainage lines to convey stormwater also delivers water quality benefits. Local governments are encouraged to adopt Natural Channel Design principles for maintaining

natural drainage lines that convey stormwater and maximise environmental values and water quality benefits.

In preparing a planning instrument, it is advisable to review existing information held by local governments, regional Natural Resource Management groups and the Queensland Government to identify areas where the constraints covered by this water quality policy exist. In addition, background technical studies may be required to identify and avoid areas of development constraint within future urban growth areas.

Where land zoning already allows development for urban purposes in areas with high-risk soils or valuable aquatic ecosystems, impacts can be minimised through scheme provisions that ensure development design is responsive to these environmental constraints.

How to appropriately integrate the policy

2.1 Avoid or minimise the identification of land for urban purposes in the settlement pattern of the strategic framework where there are:

- high-risk soils
- high ecological value aquatic ecosystems
- groundwater dependent ecosystems
- high groundwater tables.

2.2 Include in the strategic framework, strategic and specific outcomes that:

- protect water quality by locating and designing development for urban purposes to avoid or minimise disturbance of high-risk soils, natural drainage and landform features as well as impacts upon aquatic ecosystems and groundwater-dependent ecosystems
- ensures development for urban purposes retains and enhances natural drainage features and environmental corridors such as creeks, gullies, waterways, wetlands, habitats and vegetation and provides buffers to minimise and mitigate the impact of development on water quality.

High-risk soils

2.3 In areas being investigated for urban expansion, avoid known areas of high-risk soils or undertake studies to identify high-risk soils, and avoid or minimise disturbances to these areas. In areas where the presence of high-risk soils is likely but not identified, include provisions in relevant codes that require development to identify high-risk soils, avoid these areas or, if avoidance is not possible, manage the impacts.

2.4 In areas where high-risk soils are known to be present, use an erosion-management overlay to identify areas that are more susceptible to erosion hazard, dispersal or release of contaminants (salinity, acidic leachate), if disturbed.

2.5 Support the erosion-management overlay with code provisions that require development to avoid disturbing high-risk soils or, if avoidance is not possible, to minimise and manage the effects of soil disturbance on waterways and wetlands. This should include requirements for erosion and sediment management.

2.6 Consider additional code provisions to address specific issues of certain soil types, such as acid sulfate soils or salinity.

2.7 *Best Practice Erosion & Sediment Control* (IECA 2008) provides an erosion hazard assessment checklist for identifying higher risk areas where increased planning requirements are needed.

High ecological value aquatic ecosystems, groundwater-dependent ecosystems, natural drainage lines, and landform features

2.8 When considering urban expansion, avoid areas containing HEV aquatic ecosystems and groundwater-dependent ecosystems, and consider avoiding areas containing SD waters.

2.9 Identify HEV aquatic ecosystems and groundwater-dependent ecosystems and include these ecosystems in a zone that supports their protection and enhancement. Consider mapping these ecosystems in an overlay with provisions that further support their retention and enhancement. Any unavoidable impacts should be minimised through location, design, operation and management requirements. Consideration should also be given to providing a similar level of protection for SD waters.

2.10 Identify natural features and environmental corridors such as creeks, gullies, waterways, wetlands, habitats and vegetation through overlay mapping. Consider inclusion in the overlay mapping of buffers to these natural features and corridors to mitigate impacts on receiving waters. Buffers should be of sufficient width and design to counteract changes to water quality, quantity and flow, and impacts on riparian and aquatic flora and fauna. Local governments are encouraged to adopt Natural Channel Design principles.

2.11 Support overlay mapping with planning scheme provisions that:

- require these natural features to be retained and enhanced – e.g. through buffers that mitigate impacts to receiving waters
- ensure that stormwater is not discharged into natural waterways and wetlands without adequate treatment
- require stormwater treatment devices to be located outside natural waterways and wetlands
- require development to retain natural stormwater drainage areas.

2.12 If temporary modifications are required to waterways or wetlands, ensure development mitigates the impacts and restores the natural characteristics of the waterway, including flora and fauna.

2.13 Make development that will affect HEV aquatic ecosystems, groundwater-dependent ecosystems, natural drainage lines or landform features assessable development and assess it against relevant code provisions. This includes material change of use, reconfiguring a lot and operational works development proposals.

State interest policy (3)

Development is located, designed, constructed and operated to avoid or minimise adverse impacts on the environmental values of receiving waters arising from:
(a) altered stormwater quality and hydrology
(b) waste water (other than contaminated stormwater and sewage)
(c) the creation or expansion of non-tidal artificial waterways
(d) the release and mobilisation of nutrients and sediments.

All development, particularly development for urban purposes, has the potential for run-off to reduce water quality due to the release of contaminants such as nutrients, sediment and wastewater. Development can also change the volume, rate and direction of stormwater run-off, changing natural waterway hydrology. This can result in increased scouring, displacing aquatic fauna and flora, and increased flood levels downstream.

Avoiding areas and activities that will lead to adverse impacts on water quality and hydrology is preferred. Where this is not possible, impacts should be minimised and mitigated by applying an integrated approach to development design that treats urban run-off to maintain or improve the condition of waterways and water quality generally and addresses changes in run-off rate and volume.

The impacts from altered stormwater run-off can be managed through approaches that integrate water planning into development at a catchment scale, such as integrated catchment management plans and the application of water-sensitive urban design (WSUD) approaches, such as the Living Waterways framework.

Baseline waterway health assessments and catchment management plans can be developed for future urban areas – or in existing urban areas where it is proposed to increase density, which may result in more impervious areas. These will determine the existing baseline water quality of waterways and the quantity of flows entering waterways and enable benchmarks to be set for development to achieve.

Artificial waterways and lakes alter natural waterway flow and function, which can affect the water quality and hydrology of natural streams and rivers. Management of artificial water bodies to maintain heathy water quality can also be problematic, and management often falls to local government after a development is completed.

Freshwater urban lakes are susceptible to a range of ecological and amenity issues, while brackish lakes often have high operational costs because of the need for mechanical flushing systems. Many local government areas have a legacy of artificial lakes and canals created in this fashion. These regularly suffer from algal blooms or excessive weed growth, resulting in an unsightly and unpleasant odour-generating water body, requiring ongoing maintenance or costly retrofitting of stormwater quality or aeration devices.

To avoid ongoing management problems, stormwater entering an artificial waterway should be treated through appropriately designed devices (swales, bioretention basins or constructed wetlands).

How to appropriately integrate the policy

3.1 Include in the strategic framework, strategic and specific outcomes that ensure:

- development manages stormwater quality and hydrology to avoid or minimise impacts on the environmental values of receiving waters at all stages of development (i.e. construction and post-construction)
- the principles of total water cycle management and water-sensitive urban design are incorporated into development
- development avoids or manages wastewater discharges to support the achievement of environmental values for receiving waters (connection to the planned sewerage network will reduce the need for alternative wastewater treatments)
- the creation or expansion of constructed lakes and artificial waterways are managed to maintain an appropriate level of water quality within and exiting the artificial waterway
- constructed lakes and artificial waterways are located outside natural wetlands and groundwater-recharge areas and do not reduce the quality of these natural waters
- development manages the release of nutrients and sediments into waterways to achieve the environmental values of receiving waters.

3.2 When investigating future urban areas, or areas for increased density that will increase impervious areas, consider the recommendations from the Queensland Water Quality Guidelines and *Queensland urban drainage manual,* especially when identifying waterways of conservation value, or areas suffering erosion or have soils that are known to be prone to erosion. Failure to adequately consider the potential risk to these may challenge the ability of local governments to protect existing environmental values and hamper achievement of water quality objectives in downstream receiving waters.

3.3 Include provisions in a water quality development code or other suitable code that ensures:

- construction activities avoid or minimise adverse impacts on stormwater quality with any remaining impacts mitigated
- development avoids, or minimises and mitigates, changes to waterway hydrology that adversely impact on receiving waters and waterways
- development avoids releasing contaminants into receiving waters from stormwater
- development does not discharge wastewater into a waterway, unless it is demonstrated to be best practice environmental management for that site and is treated and managed to achieve the environmental values of receiving waters[1]
- development adopts water-sensitive urban design principles to manage urban stormwater run-off.

3.4 For non-tidal artificial waterways and lakes, include requirements that:

- ensure development for an artificial waterway or lake is not located within natural wetlands or waterways
- provide for the maintenance of the water quality within artificial waterways and lakes
- encourage a multifunctional design, providing aesthetic value, flood management, stormwater harvesting, and aquatic habitat – water-sensitive urban design principles can be applied to achieve these multiple objectives
- ongoing management is considered.

3.5 Consider within the planning scheme (or through planning scheme policies, as appropriate):

- design guidelines and standard drawings for water quality and flow management from existing best practice sources appropriate for the climatic region;[2] these may be developed specifically for the local government area or region – for example, some local governments have developed a range of specific design criteria suited to local climatic conditions
- standard requirements to ensure artificial waterways and lakes are designed as long-term sustainable assets
- investigation requirements for the risk of mobilisation of nutrients of concern on a proposed development site
- measures to prevent or reduce incidences of algal blooms.

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1 Some industrial developments also require an environmental authority for an Environmentally Relevant Activity under the *Environmental Protection Act 1994* (EP Act) to regulate environmental emissions.

2 See Part 6: Supporting Information for best practice documents.

State interest policy (4)

At the construction phase, development achieves the applicable stormwater management design objectives in table A (appendix 2).

The construction phase of development exposes and loosens soil and generates litter (gross pollutants) that is readily mobile and will enter waterways if not contained. Extended periods of exposed and disturbed soils on construction sites elevates the risk of rainfall dislodging soil particles and causing erosion and the potential for the release of sediment to waterways. Reducing the potential for erosion during the construction phase of development is important to achieving water quality objectives in waterways.

The measures in the SPP's table A: *Construction phase – stormwater management design objectives* (appendix 2) should be applied to development to manage the impacts from stormwater run-off to water quality during construction. These measures are temporary for the duration of construction and are to be applied on the development site.

The requirements of table A (parts 1–3) are based upon the construction-phase design objectives of *Best practice erosion and sediment control* (IECA 2008). This is a series of documents that provides comprehensive guidance on industry accepted best practice for erosion and sediment control on building and construction sites.

How to appropriately integrate the policy

4.1 Include in the strategic framework, strategic and specific outcomes for development to manage stormwater quality and flow within a development site during the construction phase to achieve the water quality objectives for receiving waters.

4.2 Include code provisions that:

- require development to achieve the construction phase stormwater objectives in table A (Parts 1–3) of the SPP or more specific measures or targets that provide an equivalent or improved outcome to table A
- ensure that the construction-phase stormwater-treatment facilities (erosion and sediment control) are located on the construction site
- provide sufficient area on the construction site to accommodate temporary stormwater treatment measures.

4.3 Consider within the planning scheme (or through planning scheme policies, as appropriate) the following:

- reference to the relevant sections of *Best practice erosion and sediment control* (IECA, 2008)
- nomination of preferred design standards (e.g. Erosion Risk Ratings or Design Storm Events)
- reference to the applicable sections of the *Queensland urban drainage manual*.
- consideration of guidelines and manuals produced by Water by Design.
- reference to the Environmental Protection (Water) Policy 2009.

State interest policy (5)

At the post-construction phase, development:

(a) achieves the applicable stormwater management design objectives on-site, as identified in table B (appendix 2); or

(b) achieves an alternative locally appropriate solution off-site that achieves an equivalent or improved water quality outcome to the relevant stormwater management design objectives table B (appendix 2).

When it rains, run-off from urban development releases nutrients, soil and litter, washing these stormwater contaminants into waterways. Creeks and waterways become degraded and considerable public resources are required to remediate waterways and clean-up rubbish.

As development occurs, more impervious surface can result, increasing the volume and velocity of stormwater run-off. If not properly managed, this will harm creeks and waterways.

The SPP requires development to manage stormwater post-construction to achieve the water quality design objectives in table B of the SPP (appendix 2).

The stormwater management design objectives in table B of the SPP address both stormwater quality and waterway stability. The table provides post-construction targets for development to manage pollutants, together with the volume and velocity of stormwater entering waterways. The stormwater design objectives establish minimum standards developed from best available data on the performance efficiency of current best practice treatment technologies (typically expressed as minimum average annual pollutant load reductions or minimum average percentage reductions in pollutant loads).

If modelling is not used to demonstrate compliance with post-construction stormwater management design objectives, the default bioretention treatment area required to comply with the objectives is 1.5 per cent of the contributing catchment.[3] Use of this default area may result in a larger footprint than if modelling is undertaken.

The SPP provides flexibility to achieve the objectives of table B on or off the development site.

A local government may wish to develop an integrated catchment stormwater quality management plan to inform off-site stormwater measures that achieve the overall stormwater reduction targets listed in table B. This approach provides local governments with flexibility to manage stormwater more holistically across the catchment, better plan for stormwater infrastructure, and treat stormwater where on-site treatment is not feasible.

Off-site stormwater treatment approaches need to be driven by local governments, be based on the catchment or sub-catchment scale and be consistent with the infrastructure charging framework. The SPP does not support development adopting off-site stormwater-quality solutions on a site-by-site basis.

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[3] For example, a 10-hectare residential or industrial development would require a 0.15 hectare bioretention treatment area.

In addition to off-site measures, reducing the imperviousness of surfaces on-site helps minimise the stormwater run-off and reduce stormwater-management requirements. To encourage low-impact design that minimises stormwater run-off, development with less than 25 per cent imperviousness of the net developable area is not required to achieve the stormwater design objectives in table B of the SPP.

How to appropriately integrate the policy

5.1 Include in the strategic framework, strategic and specific requirements for development to manage stormwater quality and flow to achieve post-construction stormwater quality objectives.

5.2 Include in planning instruments post-construction stormwater-management design objectives. Planning instruments should adopt either SPP's table B design objectives for a reduction in mean annual load targets (for the relevant climatic region) or more specific measures or targets that provide an equivalent or improved stormwater-management outcome than table B.

5.3 Include code provisions requiring development to achieve the design objectives developed in accordance with 5.2 above.

5.4 Where alternative locally appropriate off-site solutions that provide an equivalent or improved water quality outcome to table B of the SPP have been identified and supported by local government, include provisions that support this outcome.

5.5 Ensure the code provisions require development to adopt water-sensitive urban design principles.

5.6 Consider incorporating into a local government infrastructure plan provisions relevant to post-construction stormwater management. These should be supported by planning scheme policies that include technical design guidelines. Documents and technical information appropriate for inclusion include the *Queensland urban drainage manual*, *Best practice erosion and sediment control*, and the Water by Design guidelines.

The planning scheme should require that any technical drawings, treatment designs, engineered solutions or hydrology studies submitted as part of a development are prepared by a suitably qualified Registered Professional Engineer of Queensland (RPEQ).

5.7 At a minimum, a material change of use or reconfiguring a lot that meets the thresholds in table B of the SPP is triggered for assessment against the stormwater management design objectives of the planning instrument. Local governments may reduce the thresholds in table B to trigger smaller development sites where appropriate to local circumstances (predominant development type/receiving water quality etc.).

State interest policy (6)

Development in water resource catchments and water supply buffer areas avoids potential adverse impacts on surface waters and groundwaters to protect the drinking water supply environmental values.

Drinking water sustains life and supports the growth of the state's economy. Protecting water resource catchments from the impacts of development is essential for the delivery of a safe, reliable and affordable water supply. The impacts of development can result in

increased sediment, pathogens and nutrients entering waterways, which may result in the interruption and/or loss of water supply, require higher levels of treatment (and therefore greater expense), cause nuisance and/or harm to public health, and damage environmental values.

Development in water resource catchments and water supply buffer areas should be appropriately sited and designed to avoid the risk of sediments, nutrients and contaminants compromising the quality of the drinking water supply.

How to appropriately integrate the policy

6.1 Ensure the strategic intent and relevant themes within the strategic framework of a planning scheme recognise, and are consistent with, the importance of maintaining healthy functioning catchments that protect the quality of the drinking water supply.

6.2 Identify water resource catchments, water supply buffer areas and water supply sources on relevant planning scheme maps – e.g. strategic framework and overlay mapping.

6.3 Consider the following zonings, overlay and assessment provisions when integrating the state interest:

- In a water resource catchment (not in a water supply buffer area), land may contain various zonings, but appropriate requirements to avoid potential impacts on water quality should be included (in an overlay, for example).

  In a water supply buffer area (outside an urban footprint), land should be zoned for non-urban purposes that support compatible forms of development and include planning controls to avoid potential impacts on water quality. Compatible forms of development within a water supply buffer area are low-impact land uses, like many rural and recreational activities whose impacts can be easily managed to ensure there is no adverse impact on water quality, hydrological regimes and environmental values. More intensive and high-impact forms of development, including further fragmentation of premises through reconfiguration, should be avoided.

6.4 Refer to Part 5 of this guidance material for an example code of a Water Resource Catchment Overlay Code, which details recommended categories of development and assessment benchmarks for development both within a water resource catchment (not in a water supply buffer area) and land in a water supply buffer area.

Part 3: Mapping

To support the SPP, wherever possible and to the extent relevant, matters of state interest are spatially represented as layers included in the SPP IMS. The mapping is necessary to help local government, the community and industry understand and interpret where and how state interest policies and assessment benchmarks included in the SPP apply.

Several mapping layers contained in the SPP IMS are prepared by entities other than the Department of Infrastructure, Local Government and Planning and may serve an additional purpose outside the Queensland planning system. Where relevant, the SPP IMS represents the single point of truth for the spatial representation of the state interests expressed in the SPP.

Appendix 1 of the SPP identifies three categories of mapping layers provided or referred to in the SPP IMS that are intended to be used in one of the following ways:

Category 1 – State mapping layers that must be appropriately integrated in a local planning instrument in a way that achieves the relevant state interest policy.

Category 2 – State mapping layers that must be appropriately integrated, and can be locally refined by a local government in a local planning instrument in a way that achieves the relevant state interest policy.

Category 3 – State mapping layers that are provided for local government information purposes only.

The SPP IMS is located at: www.dilgp.qld.gov.au/spp-mapping. Any queries related to the SPP mapping should be sent to mappingenquiries@dilgp.qld.gov.au.

This section provides clarity regarding the mapping layers on the SPP IMS relevant to the *Water quality* state interest.

Mapping layers

Spatial data

Queensland Spatial Catalogue (QSpatial) provides data in various formats available for download and/or purchase:
http://qldspatial.information.qld.gov.au/catalogue/custom/index.page

Environmental values and water quality objectives

Environmental values and water quality objectives are being progressively determined for areas of Queensland. Environmental Values and Water Quality Objectives documents and supporting Water Quality Plans/Maps are included in Schedule 1 of the Environmental Protection (Water) Policy once completed (available on the Department of Environment and Heritage Protection's website.). Once scheduled, spatial data will be provided at spatial data QSpatial. After being included in schedule 1, the maps for MSES will be amended (if required) to include any new or amended areas of HEV waters.

***Note**: While management intent identifies a cadastral unit (lot or land parcel) for clarity on the map products, it is the actual waters that carry the environmental value, water quality objectives and management intent.*

Water resource catchments and water supply buffer areas (within South East Queensland)

The SPP IMS includes layers prepared by Seqwater, which identify water supply buffer areas, water resource catchments and water supply sources in South East Queensland.

Water resource catchments and water supply buffer areas (outside South East Queensland)

Local governments will need to identify drinking water supply sources (such as reservoirs) and buffers within their local government area.

High ecological value water areas	
Purpose	Displays EPP Water management intent – high ecological value waters High ecological value waters must be reflected in a local planning instrument (SPP, table A, appendix 1)
Mapping category	Category 1
Data custodian	Department of Environment and Heritage Protection
Head of power	Environmental Protection (Water) Policy 2009 – Schedule 1
Methodology	Not publicly available

Slightly disturbed waters ecological value water areas	
Purpose	Displays EPP Water management intent – slightly disturbed waters Slightly disturbed waters can be reflected in a local planning instrument (SPP, table C, appendix 1)
Mapping category	Category 3
Data custodian	Department of Environment and Heritage Protection
Head of power	Environmental Protection (Water) Policy 2009 – Schedule 1
Methodology	Not publicly available

Stormwater climatic regions	
Purpose	Displays the climatic regions in Queensland for the application of appendix 2, table B: *Post-construction phase stormwater management design objectives*. Climatic regions reflect variations in rainfall seasonality, frequency and intensity across Queensland
Mapping category	Category 3
Data custodian	Department of Environment and Heritage Protection
Head of power	State Planning Policy
Methodology	N/A

Water resource catchments, water supply buffer areas and urban water storage	
Purpose	Displays water resource catchments, water supply buffer areas and urban water storage across South East Queensland.
Mapping category	Category 1 (Water Resource Catchments and Water Supply Buffer Areas) and Category 3 (Urban Water Storage)
Data custodian	Seqwater
Head of power	State Planning Policy
Methodology	Not publicly available

Part 4: Applying assessment benchmarks

The SPP contains specific assessment benchmarks for the *Water quality* state interest.

Under the Planning Regulation 2017 the assessment benchmarks apply if the *Water quality* state interest has not been appropriately integrated in a planning scheme. If this is the case, a development application must be assessed against the assessment benchmarks to the extent of any inconsistency with the planning scheme and where the assessment manager considers these assessment benchmarks are relevant to the proposed development.

In addition, the assessment manager must have regard to the SPP (including the *Water quality* state interest statement and policies), where the planning scheme has not appropriately integrated the state interest. The SPP applies as a matter to have regard to where the assessment manager considers these matters are relevant to the proposed development and only to the extent of any inconsistency with the planning scheme.

This section provides guidance for local government when determining how a development application may satisfy these assessment benchmarks.

Applicable development:

These performance outcomes apply to the following development applications, to the extent the SPP has not been identified in a local planning instrument as being appropriately integrated.

For receiving waters, a development application for:

(1) a material change of use for an urban purpose that involves premises 2500 metres^2 or greater in size and;
- **(a) will result in six or more dwellings; or**
- **(b) will result in an impervious area greater than 25 per cent of the net developable area; or**

(2) reconfiguring a lot for an urban purpose that involves premises 2500 metres^2 or greater in size and will result in six or more lots; or

(3) operational works for an urban purpose that involves disturbing a land area 2500 metres^2 or greater in size.

For water supply buffer areas, a development application:

(4) located wholly outside an urban area and relating to premises that is within, or partly within, a water supply buffer area, that involves:
- **(a) a material change of use for the intensive animal industry, medium and high-impact industry, noxious and hazardous industry, extractive industry, utility installation that involves sewerage services, drainage or stormwater services, waste management facilities, or motor sport facility; or**
- **(b) reconfiguring a lot to create five or more additional lots if any resultant lot is less than 16 hectares in size, and any of the lots created will rely on on-site wastewater treatment.**

The stormwater impacts from both the construction and post-construction (or operational) phases of land development need to be considered in development assessment as the issues and assessment methodology are different. Critical impact factors include the soil erosion hazard of the landscapes being developed, and the increased rainfall run-off that

occurs when land is cleared and topsoil removed. The impacts of construction phase erosion and sediment loss can greatly outweigh any water quality improvements in the post-construction (operational) phase of the development, if the construction impacts are not managed appropriately.

Development should be designed to respond to the natural landscape and drainage features rather than attempting to fit the landscape to the development. Urban stormwater management solutions should be resolved at the earliest opportunity in the design and development assessment process to ensure that the most appropriate location and solution can be determined.

Assessment benchmark (1)

Development is located, designed, constructed and operated to avoid or minimise adverse impacts on environmental values arising from:
(a) altered stormwater quality and hydrology
(b) waste water
(c) the creation or expansion of non-tidal artificial waterways
(d) the release and mobilisation of nutrients and sediments.

How a development application may demonstrate compliance with the assessment benchmark

(A) Altered stormwater quality or hydrology

1. Development provides a stormwater management system (designed in accordance with the *Queensland urban design manual)* that achieves the integrated management of stormwater to:
   (a) protect the environmental values of receiving waters
   (b) maximise the use of water sensitive urban design.

   Compliance should be demonstrated through a stormwater management plan.
2. The entry and transport of contaminants in stormwater is avoided or minimised.
3. Development should:
   (a) maximise the retention of natural waterway corridors and drainage paths
   (b) seek to apply natural channel design for any constructed drainage paths
   (c) protect in-stream ecosystems from the adverse impacts of increased run-off frequency by capturing the initial portion of run-off from impervious areas
   (d) create conditions such that the frequency of hydraulic disturbance to in-stream ecosystems in developed catchments is similar to pre-development conditions.
4. The development is designed to minimise run-off and peak flows by:
   (a) minimising impervious surfaces
   (b) maximising opportunities for rainwater or stormwater capture and reuse on-site.

(B) Wastewater

5. Development:
   (a) minimises wastewater discharge by re-use, recycling, recovery and treatment for disposal to sewer

(b) avoids releasing wastewater discharges to a waterway by complying with the Queensland Plumbing and Wastewater Code.

(C) Non-tidal artificial waterways

6. Development for non-tidal artificial waterways may demonstrate compliance by:
   (a) applying design, construction and operation approaches that avoid or minimise adverse impacts on ecological processes, water quality, flood capacity, waterway integrity, and ecosystem and human health
   (b) locating development for non-tidal artificial waterways:
      (i) to avoid groundwater recharge areas
      (ii) in low lying areas
      (iii) to minimise disturbance to natural wetlands and any associated buffers
      (iv) to minimise disturbing soils or sediments
      (v) to avoid or minimise altering natural hydrologic regime in acid sulfate soil and nutrient hazardous areas
      (vi) to be compatible with existing tidal waterways.
   (c) treating stormwater before discharge into a non-tidal artificial waterway.
   (d) minimising the release and mobilisation of nutrients and sediments.

(D) Release and mobilisation of nutrients and sediments

7. Compliance with this assessment benchmark can be demonstrated through compliance with tables A (parts 1–3) and B of the SPP (Appendix 2).

Assessment benchmark (2)

Development achieves the applicable stormwater management design objectives outlined in tables A and B (appendix 2).

How a development application may demonstrate compliance with the assessment benchmark

8. In *Table* A: *Construction phase – stormwater management design objectives (see appendix 2 of the SPP)*, the SPP outlines construction activities for the development that avoid or minimise adverse impacts on sediment mobilisation, stormwater quality and hydrological processes by having a suitably qualified person[4] develop an erosion and sediment control program (ESCP). The program demonstrates:
   - that release of sediment-laden stormwater is avoided or minimised by achieving the design objectives listed below in table A of the SPP, or
   - stormwater quality will be managed in accordance with an acceptable regional or local guideline so that target contaminants are treated to a design objective at least equivalent to table A of the SPP.

[4] A suitably qualified person is a certified practitioner in erosion and sediment control (CPESC) or a certified practicing soil scientist.

9. Achieve the waterway stability and flood flow management desired outcomes in table A of the SPP. The *Queensland urban drainage manual* (2013) provides additional guidance on flood-flow management.

10. In *Table B: Post construction phase – stormwater management design objectives (see appendix 2 of the SPP),* the SPP provides flexibility to achieve compliance either on-site or off-site:

    (a) on-site compliance:

        (i) development with an impervious area of 25 per cent or less of the net developable area meets the post-construction design objectives of table B of the SPP; or

        (ii) for developments with greater than 25 per cent imperviousness of the net developable area, compliance with the post-construction design objectives can be demonstrated by:

        - modelling of pollutant export and stormwater treatment performance – for example, the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) is widely adopted for this purpose and should be undertaken in accordance with either local government or regional guidelines (where available); or
        - adopting the default bioretention treatment area for all Queensland regions of 1.5 per cent of the contributing catchment.

    (b) off-site compliance:

        (i) off-site compliance with the post-construction design objectives can only be achieved where a locally appropriate solution that delivers an equivalent or improved water quality outcome to the design objectives in table B of the SPP has been developed by a local government.

11. Where development is required to achieve the waterway stability management design objective in table B of the SPP,[5] compliance can be demonstrated through a stormwater management plan developed by a suitably qualified person.

12. See *Example code: water quality* (Part 5) for further examples of how development may demonstrate compliance with this assessment benchmark.

Assessment benchmark (3)

Development in a water supply buffer area avoids adverse impacts on drinking water supply environmental values.

How a development application may demonstrate compliance with the assessment benchmark

Water supply buffer areas are areas particularly vulnerable to contamination, including groundwater-recharge areas and areas in the vicinity of a dam, lake, reservoir or watercourse off-take structure that supply drinking water. This assessment benchmark

[5] The waterway stability objective applies if development drains to an unlined waterway within or downstream of the site where an increased risk of erosion exists due to changes in hydrology. Local governments may also require application of the waterway stability objective where there are planned future rehabilitation works to return a lined channel to a natural channel design.

seeks to ensure that development in a water supply buffer area avoids adverse impacts on the environmental values of drinking water supply.

An applicant may demonstrate that applicable development complies with the assessment benchmark through:

(a) ensuring the quality of surface water and groundwater entering water supply resources is maintained or improved

(b) maintaining the quantity of surface run-off to not increase peak discharges or run-off volumes

(c) protecting the physical integrity of waterways, wetlands, lakes, springs, riparian area and natural ecosystems that contribute to the healthy functioning catchments

(d) location of development in accordance with the recommended separation distances and other locational criteria specified in Table 6.

The Example Code: Water Resource Catchment Overlay provides further examples of how development may demonstrate compliance with this assessment benchmark (refer to Part 5 of this guidance material).

To demonstrate compliance, applicants may also consider relevant provisions of Seqwater development guidelines: *Development guidelines for water quality management in drinking water catchments*.

Part 5: Example planning scheme provisions

Example planning scheme provisions for the *Water quality* state interest have been prepared. A local government may choose to adopt or otherwise adapt these when making or amending a planning scheme.

The example planning scheme provisions should not be the only way to appropriately reflect the *Water quality* state interest. It is not intended that a local government would use these example provisions verbatim.

Where a local government seeks to adopt the example planning scheme provisions, variations will be required to reflect the local circumstances, opportunities and aspirations of each local government area.

Strategic outcomes

- Integrated decision-making occurs at the catchment level and considers all aspects of the water cycle to facilitate the protection or enhancement of environmental values and the achievement of water quality objectives for Queensland waters.
- Development incorporates water-sensitive urban design principles.
- Stormwater and wastewater is managed to protect or enhance the water quality of receiving waters, and the ecological and hydrological processes of catchments.
- Development avoids or minimises disturbance to high-risk soils, high ecological value aquatic ecosystems, groundwater dependent ecosystems, natural drainage lines and topography.
- Protecting water supply catchments and managing development in water supply buffer areas to ensure drinking water is safe, secure and reliable.

Where relevant:

- The waterways and wetlands that contribute to the water quality and marine habitats of the Great Barrier Reef are protected from the adverse impacts of development to maintain high standards of water quality and aquatic ecosystem health.

Example code: Water quality

Application

This code applies to development where the water quality code is identified as applicable in the tables of assessment.

Purpose

The purpose of the water quality code is to ensure development is planned, designed, constructed and operated to manage stormwater and wastewater as part of an integrated water cycle in ways that protect the environmental values identified in the Environmental Protection (Water) Policy 2009 and contribute to the achievement of water quality objectives for Queensland waters.

The purpose of the code will be achieved through the following overall outcomes:

- Development contributes to protecting or enhancing the environmental values of receiving waters.
- Development facilitates the achievement of water quality objectives for Queensland waters.

- Development avoids or minimises disturbance to natural drainage, erosion risk, salinity, and landscape features and mitigates any impacts from disturbance to receiving waters to maintain environmental values.
- The water quality of both surface and groundwaters and the ecological and hydrological processes of catchments are protected.
- Development in areas that drain directly into high ecological value waters demonstrate that relevant water quality and hydrologic objectives can be achieved.
- Stormwater is managed to maintain or re-create natural hydrological processes and minimise impacts from altered run-off regimes.
- Environmental values of receiving waters are protected from adverse development impacts arising from the creation or expansion of non-tidal artificial waterways such as urban lakes.
- Development adopts best practice water-sensitive urban design and integrated water-cycle management approaches responding to regionally specific climate and water quality characteristics
- Life-cycle costs of water quality infrastructure are considered and minimised.

Table 1: Assessment benchmarks for assessable development

Performance outcomes	Acceptable outcomes
Receiving waters: stormwater management – protecting water quality and hydrological processes	
PO1 High environmental value waters are protected from adverse impacts of development.	No acceptable outcome is nominated. ***Note**: High environmental value waters are classified under the Environmental Protection (Water) Policy 2009.*
PO2 The development is planned and designed considering site land-use constraints to allow the provision of effective stormwater management systems and to avoid or minimise adverse impacts on environmental values of receiving waters.	**AO2.1** Development demonstrates it has minimised disturbance to: a) natural drainage b) areas with erosive, dispersive, sodic and/or saline soils c) acid sulfate soils d) groundwater levels e) landscape features and vegetation. **AND** **AO2.1** The development layout is informed by a site stormwater management plan that is consistent with any local area stormwater management planning. ***Note**: Local area stormwater management planning may include local government infrastructure or catchment plans, Healthy Waters management plans, Water Quality improvement plans, Natural Resource Management plans, and Great Barrier Reef strategic plans.* **AND** **AO2.3** Development ensures that there is sufficient site area to accommodate an effective stormwater management system. **AND**

Performance outcomes	Acceptable outcomes
	AO2.4 Stormwater management systems are located outside of wetlands, waterways and riparian areas and prevent increased channel bed and bank erosion.
PO3 Construction activities for the development avoid or minimise adverse impacts on sediment mobilisation, stormwater quality and hydrological processes.	**AO3.1** An erosion and sediment control program (ESCP) demonstrates that release of sediment-laden stormwater is avoided or minimised by achieving the design objectives listed in table A of the SPP (appendix 2): *Construction Phase – Stormwater management design objectives* (all parts). **OR** **AO3.2** The ESCP demonstrates how stormwater quality will be managed in accordance with an acceptable regional or local guideline so that target contaminants are treated to a design objective at least equivalent to table A of the SPP (all parts).
PO4 Development manages stormwater to avoid or minimise the environmental impacts of stormwater discharge on the quality and waterway hydrology of receiving waters.	**AO4.1** Development is managed in accordance with an approved stormwater management plan that meets the objectives in table B of the SPP (appendix 2): *Post-construction phase – Stormwater management design objectives.*
PO5 Development prevents increased bed and bank erosion in receiving waterways by limiting changes in run-off volume and peak flows.	**AO5.1** The development is designed to: a) minimise impervious areas b) maximise opportunities for capture and reuse of stormwater c) incorporate natural channel design principles d) achieve the waterway stability objectives listed in table B of the SPP. ***Note:*** *The waterway stability objective listed in table B applies if development drains to an unlined waterway within or downstream of the site where there is an increased risk of erosion due to changes in hydrology. Local governments may also require application of the waterway stability objective where there are planned future rehabilitation works to return a lined channel to a natural channel design.*
PO6 Development protects in-stream ecology by maintaining pre-development low-flow discharge regimes.	No acceptable outcome is nominated.
PO7 Development ensures that the entry and transport of contaminants into stormwater is avoided.	No acceptable outcome is nominated. ***Note****: Prescribed water contaminants are defined in the Environmental Protection Act 1994.*
Receiving waters: point source wastewater management (other than contaminated stormwater and sewage)	
PO8 Wastewater discharge to a waterway avoids or minimises adverse impacts to ecological processes, riparian vegetation, waterway integrity, and downstream ecosystem health.	**AO8.1** A wastewater management plan (WWMP) is prepared by a suitably qualified person and addresses: a) wastewater type b) climatic conditions c) water quality objectives d) soil conditions and natural hydrology e) best practice environmental management.

Performance outcomes	Acceptable outcomes
	AND **AO8.2** The WWMP provides that wastewater is managed in accordance with a waste-management hierarchy that: a) avoids wastewater discharges to waterways, or b) if wastewater discharge to waterways cannot practicably be avoided, minimises wastewater discharge to waterways by reuse, recycling, recovery and treatment for disposal to sewer, surface water and groundwater. **AND** **AO8.3** For development in coastal catchments: a) Wastewater discharge to waterways is managed to avoid or minimise the release of nutrients of concern so as to minimise the occurrence, frequency and intensity of coastal algal blooms. b) The lowering of groundwater levels is avoided where potential or actual acid sulfate soils are present. c) Wastewaters are managed so that: (i) the pH of any wastewater discharged is maintained between 6.5 and 8.5 to avoid mobilisation of acid, iron, aluminium, and metals (ii) holding times of neutralised wastewaters ensure the flocculation and removal of any dissolved iron prior to release (iii) visible iron floc is not present in any discharge (iv) precipitated iron floc is contained and disposed of, and (v) wastewater and precipitates that cannot be contained and treated for discharge on site are removed and disposed of through trade waste or another lawful method. ***Note**: Nutrients of concern include nutrients or other trace elements that can enhance the growth of algae and include nitrogen, phosphorous, iron or organic matter (dissolved organic carbon).*
Receiving waters: non-tidal artificial waterways	
PO10 The location of non-tidal artificial waterways: a) avoids groundwater-recharge areas b) incorporates low lying areas of a catchment connected to an existing waterway c) does not disturb natural wetlands and any associated buffer areas d) minimises disturbing soils or sediments e) avoids altering the natural hydrologic regime in acid sulfate soil and nutrient hazardous areas.	No acceptable outcome is nominated.
PO11 Any non-tidal artificial	**AO11.1** Where a non-tidal artificial waterway is located adjacent to, or

Performance outcomes	Acceptable outcomes
waterway is located in a way that is compatible with existing tidal waterways.	connected to, a tidal waterway by means of a weir, lock, pumping system or similar: a) there is sufficient flushing or a tidal range of >0.3m, or b) any tidal-flow alteration does not adversely impact on the tidal waterway, or c) there is no introduction of salt water into freshwater environments.
PO12 Stormwater is treated before discharge into a non-tidal artificial waterway.	**AO12.1** Stormwater is treated to achieve the applicable stormwater management design objectives before being discharged into a non-tidal artificial waterway. ***Note**: Refer to appendix 2 of the SPP for applicable stormwater management design objectives.*
PO13 Any non-tidal artificial waterway is designed, constructed and managed in a way that avoids or minimises adverse impacts on ecological processes, water quality, flood capacity, waterway integrity, and ecosystem and human health.	**AO13.1** Any non-tidal artificial waterway is designed and constructed by a suitably qualified registered professional engineer, Queensland (RPEQ) with specific experience in establishing artificial waterways. **AND** **AO13.2** Any non-tidal artificial waterway is managed and operated by a responsible entity during the life of the waterbody under a management plan that allows for adaptive management of adverse impacts. **AND** **AO13.3** Aquatic weeds, pests and vectors are managed.

Water resource catchment overlay

This section provides an example water resource catchment overlay code relevant to development assessment in a water resource catchment and/or water supply buffer area.

Example categories of development

This example water resource catchment overlay includes Tables 2 and 3, which provide example categories for development within a water resource catchment.

Table 2 identifies categories of development within a water resource catchment but not inside the water supply buffer area.

Table 3 identifies categories of development located within a water supply buffer area.

Accepted development

Proposed accepted development in Table 2 or Table 3 that complies with all relevant accepted development requirements in Table 4 meets the purpose of the code.

Assessable development

Development is assessable development (code or impact) and assessable against the relevant assessment benchmarks in Table 5 if:

- identified as accepted development in Table 2 or Table 3, but the development does not comply with the relevant accepted development requirements in Table 4

- identified in Table 2 or Table 3 assessable development.

Table 2: Example categories of development in a water resource catchment (not in a water supply buffer area)

Development	Categories of development	Assessment benchmarks
Any material change of use or reconfiguring a lot (excluding those listed below) where not connected or proposed to be connected to reticulated sewer	For a single dwelling house: Accepted, where any associated sewage treatment facility and disposal area complies with the following criteria: a) 50m setback to a stream order 1–3; or b) 100m setback to a stream order 4 or greater; or c) 400m setback to the full supply level of a dam, lake or reservoir or watercourse that serves as a potable water supply d) is not located on land with a slope greater than 10% or on land below the 1% Annual Exceedance Probability (AEP) flood event. For any other development: Accepted, where satisfying the assessment criteria in Table 3. Otherwise, assessable.	Example code: Water Resource Catchment Overlay
Industrial (medium, high, special, marine)	Assessable	Example code: Water Resource Catchment Overlay
Intensive animal industry		
Extractive industry		
Utility installation that involves sewerage services, drainage or stormwater services, or waste-management facilities		
Motor sport facility		

Table 3: Example categories of development in a water supply buffer area

Development	Categories of development	Assessment benchmarks
Any material change of use (excluding those listed below), reconfiguration of a lot or operational work	Accepted, where satisfying the assessment criteria in Table 3. Otherwise: Assessable.	Water Resource Catchment Overlay
Industrial (medium, high, special, marine)	Assessable	Water Resource Catchment Overlay
Intensive animal industry		
Extractive industry		
Utility installation that involves sewerage services, drainage or stormwater services, or waste-management facilities		
Motor sport facility		

Example code: Water resource catchment overlay

Application

This code applies to development:

1. within the water resource catchments overlay as identified on the overlay map; and
2. identified as requiring assessment against the water resource catchments overlay code by the tables of assessment.

Purpose

The purpose of the code is to ensure that development and activities in a water resource catchment (and water supply buffer area) are appropriately sited, designed and managed to maintain or improve water quality, flow regimes, environmental values and the physical integrity of natural processes to protect drinking water supply.

The purpose of the code will be achieved through the following overall outcomes:

- The quality of surface water and groundwater entering water supply sources is maintained or improved
- The quantity of surface water from development does not increase peak discharges or run-off volumes
- Development does not compromise the drinking water supply environmental values identified in the Environmental Protection Policy (Water) 2009
- The physical integrity of waterways, wetlands, lakes, springs, riparian areas and natural ecosystems that contribute to maintaining healthy functioning catchments is protected.

***Note**:*

- *Council may refer development applications to the relevant water supply authority to seek advice on the following assessment criteria. In South East Queensland, this is Seqwater.*

- *Depending on the threshold amounts proposed, certain activities may be an Environmentally Relevant Activity under the Environmental Protection Regulation 2008 requiring assessment and approval by the Department of Environment and Heritage Protection.*

Table 4: Example requirements for accepted development – material change of use, reconfiguring a lot and operational work

Wastewater and sewage	
Assessment criteria (AC) 1	**AC1.1** Development does not generate wastewater. **OR** **AC1.2** Development is connected to reticulated sewer and does not involve an on-site sewage treatment facility. **OR** **AC1.3** Where involving a dwelling house, any sewage-treatment facility and disposal area complies with the following: e) 50m setback to a stream order 1–3; or f) 100m setback to a stream order 4 or greater; or g) 400m setback to the full supply level of a dam, lake or reservoir or watercourse that serves as a potable water supply. **AND** **AC1.4** A sewerage treatment facility and disposal area is not undertaken on a slope greater than 10%. **AND** **AC1.5** A sewerage treatment facility and disposal area is not undertaken at or below the 1% Annual Exceedance Probability (AEP) flood event.
Vegetation management	
AC2	**AC2.1** Vegetation clearing does not occur within the following separation distances: a) 25m to a stream order 1–3; or b) 50m to a stream order 4 or greater; or c) 200m to a full supply level of a dam, lake or reservoir or watercourse that serves as a potable water supply. **AND** **AC2.2** Vegetation clearing is not undertaken at or below the 1% Annual Exceedance Probability (AEP) flood event. **AND** **AC2.3** Vegetation clearing is not undertaken on a slope greater than 15%.
Stormwater quality and hydrology	
AC3	**AC3.1** Development does not involve an impervious area greater than 1,000 m². **AND**

	AC3.2 Development does not involve the establishment of artificial waterways. **AND** **AC3.3** Development does not involve extraction of groundwater for a commercial purpose. **AND** **AC3.4** Development fences all livestock from waterbodies where a site is being used for animal husbandry and animal keeping activities.
Excavation and filling	
AC4	**AC4.1** Earthworks do not occur within the following separation distances: a) 25m to a stream order 1–3; or b) 50m to a stream order 4 or greater; or c) 200m to a full supply level of a dam, lake or reservoir or watercourse that serves as a potable water supply. **AND** **AC4.2** Earthworks are not undertaken at or below the 1% AEP flood event. **AND** **AC4.3** Earthworks are not undertaken on a slope greater than 15%.
Storage and handling of dangerous goods, hazardous substances or environmentally hazardous materials	
AC5	**AC5.1** The storage or handling of dangerous goods, hazardous substances or environmentally hazardous materials involves an aggregate quantity less than 200L or 200kg. **OR** **AC5.2** The storage or handling of dangerous goods, hazardous substances or environmentally hazardous materials with an aggregate quantity greater than 200L or 200kg and no more than 1000L or 1000kg maintains the following separation distances: a) 50m to a stream order 1–3 b) 100m to a stream order 4 or greater, or c) 800m to a full supply level of a dam, lake or reservoir or watercourse that serves as a potable water supply.
AC6	**AC6.1** Dangerous goods, hazardous substances or environmentally hazardous materials are located and stored in the following manner: a) at or above the 1% AEP flood event b) undercover in a building or similar structure c) in or on a dedicated impervious secondary containment store or device that permits full recovery of spills d) in a manner that prevents the movement of packages/containers from their place of storage during a flood event e) in accordance with AS 1940:2004 The Storage and Handling of Flammable and Combustible Liquids.

Table 5: Assessment benchmarks for assessable development

Performance outcomes	Acceptable outcomes
Separation distances	
PO1 Development maintains an adequate separation distance and avoids areas of potential flood inundation to protect waterways or water supply sources.	**AO1.1** Development complies with the separation distances and other locational criteria specified in Table 5. ***Note**: Where another setback distance or locational criteria is identified within this code, the higher standard applies.*
Wastewater (other than sewage)	
PO2 Development does not discharge wastewater unless demonstrated to not compromise the drinking water supply environmental values. ***Note**: Drinking water supply environmental values are contained within Schedule 1 of the Environmental Protection Policy (Water) 2009.*	**AO2.1** Development does not generate wastewater. **OR** **AO2.2** Wastewater generated from the development is collected and contained on-site, and is: a) lawfully disposed to sewer b) transferred off-site for treatment/disposal to an appropriately licensed facility c) reused on-site in a closed-cycle irrigation scheme, industrial processes, washing/cleaning or other purpose, or d) treated to meet the drinking water supply environmental values prior to release. ***Note**: Where development involves the release of wastewater, a Wastewater Management Plan (WWMP) is to be prepared by a suitably qualified person. Plans are to provide an assessment of all risks and associated mitigation strategies for preventing adverse impact on the quality of drinking water and may require a water quality monitoring program.*
PO3 Where treated wastewater is irrigated to land, it will: a) be confined to a dedicated area of land on-site b) be suitably located and sized c) use irrigation practices that will not harm groundwater and on-site surface water quality. ***Note**: Developments involving the irrigation of wastewater will need to provide a MEDLI Modelling Report demonstrating the nominated land area for wastewater irrigation is suitably located and sized to accommodate design wastewater loads, storages are suitably sized to accommodate design wastewater loads, and proposed irrigation practices will not damage water quality. It is recommended the modelling exercise incorporate scenarios based on both a 10-year and 20-year planning horizon and incorporate a minimum of three irrigation concepts.*	No acceptable outcome is nominated.

Solid waste	
PO4 Solid wastes generated by the development must be managed, stored and disposed in a manner that does not adversely impact on the quality of any surface water or groundwater.	The following acceptable outcomes are applicable to the intensive animal industry only. For all other development, no acceptable outcome is nominated. **AO4.1** The stockpiling of waste litter, manure and other organics is undertaken as follows: a) on surfaces constructed with permanent impervious underlay to minimise leaching (groundsheets will only be accepted where stockpiling is temporary) b) located outside of an effluent irrigation area c) located 3m above the seasonal high-water table and away from recharge areas d) sized to accommodate the proposed disposal timeframes e) designed with run-off diversion drainage upstream to prevent uncontaminated stormwater movement into the area f) bunded to capture contaminated run-off for appropriate treatment and disposal g) covered, desirably within a shed but otherwise with weatherproof material. **AND** **AO4.2** The reuse of waste litter, manure and other organics as soil conditioners or fertilizers is not undertaken on-site. **AND** **AO4.3** Composting activities are not undertaken on-site. **AND** **AO4.4** Carcasses are not buried on-site except as required in accordance with any emergency animal disease directive by a biosecurity agency.
Sewage treatment and disposal	
PO5 Sewage treatment systems are designed, constructed and managed in ways that do not compromise the environmental values for the supply of drinking water.	**AO5.1** Development does not involve an on-site sewerage facility. **OR** **AO5.2** Where the combined total peak design capacity of sewage treatment is less than 21 Equivalent Persons (EP), the design of the system achieves a Low or Medium Risk classification in accordance with Seqwater's *Land use risk tool for on-site sewerage facilities.* **OR** **AO5.3** Where the combined total peak design capacity of sewage treatment is 21EP or greater, the system is located and designed in the following manner: a) at or above the 0.5% AEP flood event

	b) the hydraulic capacity of the system is five times the average dry weather flow (ADWF) c) no direct discharge of sewage to a waterway or water supply source occurs, unless during a bypass event that exceeds peak hydraulic capacity and sewage is screened and disinfected before release d) where treated sewage will be used in irrigation, application is: (i) confined to a dedicated area of land suitably located and sized, and using irrigation practices that will not adversely affect groundwater and surface water quality (ii) located at or above the 0.5% AEP flood event e) where the combined total peak design capacity of sewage treatment is 1500EP or greater, and direct discharge to a waterway is the only reasonably practical disposal option, the contribution of flow from the system must be modelled over the range of reasonably expected flow events. If the proportion of flow is: (i) <10% of the total flow, 3-log reduction bacteria and virus, and 4-log reduction protozoa minimum pathogen log-reduction values apply; or (ii) >10% of the total flow, it must demonstrate compliance with the *Australian guidelines for water recycling (Phase 2): Augmentation of drinking water supply* (to be undertaken in consultation with the relevant water supply authority). ***Note**: Developments involving the irrigation of sewage will need to provide a MEDLI Modelling Report demonstrating the nominated land area for irrigation is suitably located and sized to accommodate design sewerage loads, storages are suitably sized to accommodate design sewage loads and proposed irrigation practices will not result in any adverse impact on water quality. It is recommended the modelling exercise incorporate scenarios based on both a 10-year and 20-year planning horizon and incorporate a minimum of three irrigation concepts.*
Vegetation management	
PO6 Maintain the current extent of any vegetation located adjacent, or connected, to any waterway or water supply source.	**AO6.1** Clearing does not occur within the following separation distances: a) 25m to a stream order 1–3; or b) 50m to a stream order 4 or greater; or c) 200m to a full supply level of a dam, lake or reservoir or watercourse that serves as a potable water supply. **AND** **AO6.2** Clearing is not undertaken at or below the 1% AEP flood event or on a slope greater than 15%.
Stormwater quality and hydrology	
PO7 Manage stormwater at the construction phase to protect drinking water supply environmental values and facilitate the achievement of water quality objectives for receiving waters.	**AO7.1** At the construction stage, an erosion and sediment control program (ESCP) demonstrates that stormwater achieves the design objectives listed in table A of the SPP (appendix 2): *Construction Phase – Stormwater management design objectives* (all parts).

***Note**: Drinking water supply environmental values are contained within Schedule 1 of the Environmental Protection Policy (Water) 2009.*	**OR** **AO7.2** An ESCP demonstrates how stormwater quality will be managed at the construction stage in accordance with an acceptable regional or local guideline so that target contaminants are treated to a design objective at least equivalent to table A of the SPP (all parts). **OR** **AO7.3** Stormwater run-off generated during operation is captured and transferred off-site or captured and treated to any applicable re-use standards and reused on-site.
PO8 Manage stormwater during operational (post-construction) stages to protect drinking water supply environmental values and facilitate the achievement of water quality objectives for receiving waters. ***Note**: Drinking water supply environmental values are contained within Schedule 1 of the Environmental Protection Policy (Water) 2009.*	**AO8.1** Development does not involve an impervious area greater than 1,000m^2. **OR** AO8.2 Development is for reconfiguring a lot that; (a) will not create more than two additional lots; or (b) involves a land area less than 1000m^2. **OR** **AO8.3** Stormwater run-off generated during operation (post-construction) demonstrates a minimum reduction in mean annual load from unmitigated development that achieves the following stormwater management design objectives: a) 85% reduction in total suspended solids b) 65% reduction in total phosphorus c) 45% reduction in total nitrogen d) 95% reduction in gross pollutants. **OR** **AO8.4** Stormwater run-off generated during operation is captured and transferred off-site or captured and treated to any applicable re-use standards and reused on-site. ***Note:** A Site Stormwater Quality Management Plan is to be prepared by a suitably qualified individual such as a Civil Engineer or an Environmental Professional and is to be certified by a Registered Professional Engineer (RPEQ) (Civil or Environmental) to demonstrate compliance with the stormwater design objectives.*
PO9 Development maintains or improves the quality of surface water by adopting measures that exclude livestock from entering a water body where a site is being used for animal husbandry and animal-keeping activities.	No acceptable outcome is nominated.

PO10 Development avoids and minimises changes to the existing surface water natural hydrological regime so that: a) there is no change to the reference high-flow and low-flow duration frequency curves, low-flow spells frequency curve and mean annual flow to and from waterways as a result of the development b) any relevant flows into waterways comply with the relevant flow objectives of the applicable water plan for the area c) the collection and re-use of stormwater occurs so there is no increase to the velocity or volume of stormwater flows entering a waterway.	No acceptable outcome is nominated.
PO11 The design and location of artificial waterways: a) use natural channel design principles to minimise erosion, flooding and maintenance while maximising ecological and aesthetic values of waterways b) are compatible with any existing natural waterways c) are designed to ensure surface water hydrological regimes are maintained.	No acceptable outcome is nominated. ***Note**: The Ipswich City Council Waterway and Channel Rehabilitation Guidelines (version 3 or as updated) or Brisbane City Council Natural Channel Design Guidelines (2003 or as updated) demonstrate best practice natural channel design works.*
PO12 Development maintains the existing groundwater hydrological regime.	**AO12.1** Development does not change the existing groundwater hydrological regime by lowering or raising the water table and hydrostatic pressure outside the bounds of variability of existing predevelopment conditions. **AND** **AO12.2** Development does not result in the ingress of saline water into freshwater aquifers. ***Note**: Where development is likely to impact on the water table, a hydrological assessment undertaken by a suitably qualified professional may be required to demonstrate no adverse impact on the groundwater hydrological regime.*
Excavation and filling	
PO13 The siting and design of earthworks minimises impacts on the natural landform that may cause contamination or interfere with the flow of a waterway or water supply source.	**AO13.1** Earthworks comply with the following: a) 25m setback to a stream order 1–3 b) 50m setback to a stream order 4 or greater, or c) 200m setback to a full supply level of a dam, lake or reservoir or watercourse which serves as a potable water supply. **AND** **AO13.2** Earthworks are not undertaken at or below the 1% AEP or on a slope greater than 15%.

PO14 Any earthworks minimise erosion and the movement of sediment off-site.	No acceptable outcome is nominated. ***Note**: A Sediment and Erosion Control Plan is to be prepared by a suitably qualified and experienced professional in accordance with best practice such as IECA 2008, Best Practice Erosion and Sediment Control.*
Dangerous goods, hazardous substances or environmentally hazardous materials	
PO15 Dangerous goods, hazardous substances or environmentally hazardous materials are stored and handled in a manner that minimises the potential for contamination of surface and groundwater in the event of a leak or spill.	**AO15.1** The storage or handling of dangerous goods, hazardous substances or environmentally hazardous materials involves an aggregate quantity less than 200L or 200kg. **OR** **AO15.2** The storage or handling of dangerous goods, hazardous substances or environmentally hazardous materials with an aggregate quantity greater than 200L or 200kg and less than 1000L or 1000kg maintains the following separation distances: a) 100m to a minor waterway b) 100m to a stream order 4 or greater c) 800m to a full supply level of a dam, lake or reservoir or watercourse that serves as a potable water supply. **AND** **AO15.3** Dangerous goods, hazardous substances or environmentally hazardous materials are located and stored in the following manner: a) at or above the 1% AEP flood event b) undercover in a building or similar structure c) in or on a dedicated impervious secondary containment store or device that permits full recovery of spills d) in a manner that prevents the movement of packages/containers from their place of storage during a flood event e) in accordance with AS 1940-2004: The Storage and Handling of Flammable and Combustible Liquids. **OR** **AO15.4** The storage of dangerous goods, hazardous substances or environmentally hazardous materials (other than petroleum products) in aggregate quantities greater than 1000L or 1000kg is not undertaken unless a site-specific risk assessment presents minimal risk to drinking water quality. For petroleum products only: **AO15.5** The storage of petroleum products in bulk (greater than 1000L) aboveground uses self-bunded vessels that meet *Australian Standard AS 1692 Steel Tanks for Flammable and Combustible Liquids*. **OR**

	AO15.6 The storage of petroleum products in bulk (greater than 100L) aboveground uses single-skin vessels installed within a bunded compound that: a) is sufficiently impervious (permeability should be <10–9 m/s) to retain and recover spillage b) has a net capacity of at least 100% of the bunded vessel or aggregate quantity of vessels where operated as a single unit. **OR** **AO15.7** Petroleum products belowground (greater than 200L) are stored in vessels that are non-corrodible, double walled with an interstitial space between, and meet the requirements of Australian Standard AS 1692: *Steel Tanks for Flammable and Combustible Liquids* and/or UL 1316 *Glass fibre reinforced plastic underground storage tanks for petroleum products, alcohols and alcohol gasoline mixture.*
Material change of use for extractive industry only	
PO16 Extraction activities do not impact on erosion, natural fluvial processes, river bank stability or the storage capacity volume of a floodplain.	No acceptable outcome is nominated.
For reconfiguring a lot only	
PO17 When reconfiguring a lot, all resultant lots requiring an on-site wastewater treatment system do not compromise the environmental values of drinking water supply.	**AO17.1** Any new lot can accommodate an area for on-site wastewater treatment and disposal complying with the following: a) 50m setback to a stream order 1–3 b) 100m setback to a stream order 4 or greater c) 400m setback to a full supply level of a dam, lake or reservoir or watercourse that serves as a potable water supply. **AND** **AO17.2** Any new lot can accommodate an area for on-site wastewater treatment and disposal that is at or above the 1% AEP flood event and on a slope at or less than 10%. **AND** **AO17.3** Any proposed lots that are to accommodate a future on-site wastewater system maintain an average lot size of at least 2.5 ha. ***Note**: A wastewater site analysis is to be prepared by a suitably qualified professional demonstrating the above.*

Table 6: Example separation distance and other locational criteria

Development type and activities	Stream Order 1 To 3	Stream Order 4 or greater	Full supply level of a dam, lake or reservoir or watercourse that serves as a potable water supply	Flood immunity
Intensive animal industry	50m	100m	800m	AEP 1%
Aquaculture	Case-by-case basis	Case-by-case basis	N/A	N/A
All other agricultural or forestry land uses	50m	100m	400m	Buildings – AEP 1% Other areas – AEP 20%
Extractive industry	50m	100m	400m	AEP 1%
All other industrial uses	100m	100m	800m	
Motor sport facility	50m	100m	400m	Buildings – AEP 1% Other infrastructure (e.g. trails) – AEP 20%
Outdoor sport and recreation				
Major sport, recreation and entertainment facility				
Service station	50m	100m	800m	AEP 1%
All other development types	50m	100m	400m	AEP 1%

Part 6: Supporting information

Alternative locally appropriate stormwater management

Water by Design is a suite of documents developed by Healthy Waterways to achieve sustainable water management including topic areas of:

- total water cycle management http://healthywaterways.org/initiatives/waterbydesign/recoveringwaterways/twcm
- water-sensitive urban design http://healthywaterways.org/initiatives/waterbydesign/wsud
- erosion and sediment control http://healthywaterways.org/esc
- recovering waterways http://healthywaterways.org/initiatives/waterbydesign/recoveringwaterways

Groundwater-dependent ecosystems

Groundwater-dependent ecosystems mapping: https://wetlandinfo.ehp.qld.gov.au/wetlands/facts-maps/gde-background/

Further information on the *Groundwater Dependent Ecosystem Atlas* (Bureau of Meteorology) can be found at: www.bom.gov.au/water/groundwater/gde/.

Queensland waters

Further information on Queensland's wetlands and waterways can be found on the Wetland Info website at: https://wetlandinfo.ehp.qld.gov.au/.

Soils and erosion and sediment control

The Queensland Government website provides information on soils and soil management in Queensland, including common soil terms, soils types, soils mapping and soils issues and soil management at: www.qld.gov.au/environment/land/soil

Information on soils types, their chemical properties and occurrence is available on the Queensland Government website under 'Soil management' at: www.qld.gov.au/environment/land/soil/. This website allows you to search for soils and land resource mapping projects, then connects to the Queensland Spatial Catalogue where you can download datasets: http://qldspatial.information.qld.gov.au/catalogue//

International Erosion Control Association Australasian Chapter (IECA) Picton, NSW and *IECA (2016, draft). Appendix B Sediment basin design and operation, Revision of Appendix B from IECA, 2008 (DRAFT)* www.austieca.com.au/publications/best-practice-%20erosion-and-sediment-control-bpesc-document. This document provides detailed advice on achieving best practice erosion and sediment control.

Department of Environment and Heritage:

- *Procedural guide: Compliance notes – Land development and construction sites greater than 100m2:* www.ehp.qld.gov.au/water/policy/pdf/draft-consult-2016-procedural-guide-land-dev.pdf
- *Procedural guide: Summary Sheet: Standard work method for the assessment of the lawfulness of releases to waters from construction sites in Queensland:* www.ehp.qld.gov.au/water/policy/pdf/draft-consult-2016-procedural-guide-land-dev-summary.pdf
- iAuditor checklist – Land development [in final stages of development]

A complementary draft procedural guideline for building-scale activity has been developed to incorporate the new erosion and sediment control online tools for the building and construction sectors:

- *Procedural guide compliance notes – Building sites: Standard work method for the assessment of the lawfulness of releases to waters from building and construction sites (less than 2500m2):* www.ehp.qld.gov.au/water/policy/pdf/draft-consult-2016-procedural-guide-building-construct.pdf
- *Procedural guide summary sheet:* www.ehp.qld.gov.au/water/policy/pdf/draft-consult-2016-procedural-guide-building-construct-summary.pdf
- iAuditor checklist – Building and construction sites [in final stages of development]

Total water cycle management

Information about total water cycle management can be found in the *Total water cycle management planning guideline for South East Queensland*, available on the Healthy Land and Water website at http://hlw.org.au/

Water quality and wastewater guidelines

The National Water Quality Management Strategy (NWQMS) is a joint national approach to improving water quality in Australian and New Zealand waterways. It was originally endorsed by two ministerial councils – the former Agriculture and Resources Management Council of Australia and New Zealand (ARMCANZ) and the former Australian and New Zealand Environment and Conservation Council (ANZECC).

- Australian and New Zealand Environment and Conservation Council (2000). *Australian and New Zealand guidelines for fresh and marine water quality*. Paper 4 of the NWQMS: www.agriculture.gov.au/water/quality/guidelines

***Note**: The National Water Quality Management Strategy (NWQMS) and Water Quality Guidelines are currently under review with replacement documents due in late 2017.*
Australian and New Zealand Guidelines for Fresh and Marine Water Quality – Volume 1: www.environment.gov.au/system/files/resources/53cda9ea-7ec2-49d4-af29-d1dde09e96ef/files/nwqms-guidelines-4-vol1.pdf

National Health and Medical Research Council (2011, updated 2016). *Australian drinking water guidelines*: www.nhmrc.gov.au/guidelines-publications/eh52

Water Research Australia. *Water quality guidelines*: www.waterra.com.au/research/water-quality-guidelines/

Department of Environment and Heritage Protection:

- *Queensland water quality guidelines* (Version 3, revised 2013): www.ehp.qld.gov.au/water/pdf/water-quality-guidelines.pdf

- *Technical guideline: Wastewater release to Queensland waters* (2012) EM112: www.ehp.qld.gov.au/assets/documents/regulation/pr-gl-wastewater-to-waters.pdf

Urban stormwater management

MUSIC Modelling by eWater: www.ewater.com.au

Department of Energy and Water Supply. *Queensland urban drainage manual*: www.dews.qld.gov.au/water/supply/urban-drainage-manual
Provides further information for urban developers, catchment managers and government decision-makers to manage urban stormwater quantity and quality to protect the environmental values of waterways. The QUDM summarises planning and technical reference material on best practice urban stormwater quality management.

Water by Design http://healthywaterways.org/resources/documents:

- Constructed Wetland Technical Design Guidelines (2017 in press) – Provides updated information for local governments to reference in planning schemes, development approval conditions and planning scheme policies.

- (2015). *Guide to the cost of maintaining bioretention systems*: http://hlw.org.au/u/lib/mob/20150213075847_0731a67b612832545/wbd_2015_guide-cost-maintain-bioretention_mq_online.pdf
  This guide provides up-to-date information on the cost of maintaining bioretention systems for local governments.

- (2015). *Practice note – MUSIC modelling of bioretention systems with infiltration:* http://hlw.org.au/u/lib/mob/20141014100229_f350af753ddc5db10/prac-note-music-modelling-bioretention-infiltration-online.pdf
  Provides guidance on how to use the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) version 6 to model bioretention systems that promote infiltration of stormwater into the ground.

- (2014). *Living Waterways* – booklet: http://hlw.org.au/u/lib/mob/20141010171640_5607a66ccaf6956d9/2014_livingwaterwaysbooklet-28mb.pdf and *Living Waterways Scoring Guide*
  A flexible best practice environmental management approach that can assist practitioners and government to deliver water management systems that are integrated with outdoor spaces that are socially, economically and environmentally sound. The scoring system encompasses the broader objectives of WSUD to incentivise design solutions that promote interaction with water.

- (2014). *Off-site stormwater quality solutions discussion paper*: http://hlw.org.au/u/lib/mob/20141110112122_17739fe2372e18aa6/20140901-off-site-solutions-discussion-paper-final-website.pdf
  This discussion paper will assist local governments and the development sector to determine if off-site stormwater solutions are appropriate and how to implement them.

- (2014). *Bioretention technical design guidelines:* http://hlw.org.au/u/lib/mob/20150715140823_de4e60ebc5526e263/wbd_2014_bioretentiontdg_mq_online.pdf
  This document provides information for local government to reference in planning schemes and development approval conditions.

- (2012). Rectifying vegetated stormwater assets: http://hlw.org.au/u/lib/mob/20141014104209_53b4d8e4f8a537087/2012_rectifyingguideline-44mb.pdf
  Contains information to help implement effective asset rectification for local government to reference in planning schemes and development approval conditions.

- (2012). *Maintaining vegetated stormwater assets*: http://hlw.org.au/u/lib/mob/20141014104448_50d476147252a7c87/2012_maintainingvegetatedassets-5mb.pdf
  Contains information to help implement effective asset maintenance for local government to reference in planning schemes and development approval conditions.

- (2012). *Transferring ownership of vegetated stormwater assets*: http://hlw.org.au/u/lib/mob/20141014101942_74327747661513c5b/2012_transfervegetatedstormwaterassets-2mb.pdf

Contains information to help implement effective asset handover for local government to reference in planning schemes and development approval conditions.

- (2011). *Framework for the integration of flood and stormwater management into open space*:
  http://hlw.org.au/u/lib/mob/20141014105309_913c096e4a4c64e9b/2011_wbd_openspaceframework_v11-13mb.pdf
  This details best practice approaches for integrating water-sensitive urban design (WSUD) elements into multiple-use open space.

- (2010). *A business case for best practice urban stormwater management:*
  http://hlw.org.au/u/lib/mob/20151210162855_ce5e63beb8581ddc3/2010_wsud_buscase_v11-4mb.pdf
  An analysis of the costs and benefits of stormwater management in Queensland.

- (2010). *Total water cycle management planning guideline for South East Queensland:*
  http://hlw.org.au/u/lib/mob/20151210145807_35d4c9ca987d17746/2010_totalwatercyclemgtplan_v12mb.pdf
  This guideline provides important contextual information, the statutory framework and roles and responsibilities of key stakeholders for Total Water Cycle Management, and the key linkages between other planning instruments that are relevant to the timing, detail and rigour of Total Water Cycle Management Plans.

***Note**: The statutory requirement for the preparation of TWCM plans was removed from the Environmental Protection (Water) Policy 2009 was removed in December 2013. This does not prevent Local Governments or Water supply scheme operators from preparing TWCM Plans to provide guidance for the preparation of Local Government Infrastructure Plans.*

MUSIC Modelling Guidelines (2010)

The purpose of the MUSIC Modelling Guidelines is to ensure a consistent and uniform approach to stormwater quality modelling and assessment. *Note: This guideline is based on MUSIC versions 3 & 4. MUSIC is currently on version 6.*

Water by Design

- (2010). *Deemed to comply solutions: Stormwater quality management*,
  http://hlw.org.au/u/lib/mob/20141110115217_fbbe727dfdc426363/2009_deemedtocomplysolutions_v1short.pdf
  Identifies opportunities to integrate on-site bioretention for smaller developments in SEQ. The solutions are intended to reduce the reporting and assessment requirements for developments, and reduce or avoid the need for water quality modelling and stormwater management plan reporting requirements, while still ensuring appropriate stormwater quality treatment trains are employed.

- (2010). *Construction and establishment guidelines: Swales, bioretention systems and wetlands*. Provides guidance on the construction of bioretention systems, swales and wetlands:
  http://hlw.org.au/u/lib/mob/20141110115715_e0d7137a06637493e/ce_guidelines_v11_frontend.pdf

- (2009). *Stormwater harvesting guidelines* (2009):
  http://hlw.org.au/u/lib/mob/20141110075628_095f2a5acf5a53f2d/wbd_stormwaterharvestingguidelines_draft01.pdf
  Contains information on stormwater harvesting, which can mitigate the impacts of stormwater run-off.

SEQ Health Waterways Partnership (2009). *Concept design guidelines for water sensitive urban design*. This guideline is intended to assist urban design professionals to conceptualise and develop design solutions that integrate best-practice urban water management into urban developments. The guideline is supported by a training course offered by Water by Design.

Cooperative Research Centre for Water Sensitive Cities (2014). *Biofilters and wetlands for stormwater treatment and harvesting*: https://watersensitivecities.org.au/

Cooperative Research Centre for Water Sensitive Cities (2015). *Adoption guidelines for stormwater biofiltration systems: Summary report*, at: https://watersensitivecities.org.au/

Brisbane City Council (2003 or as updated). *Natural channel design*, at: www.brisbane.qld.gov.au/planning-building/planning-guidelines-and-tools/technical-documents#natural

Ipswich City Council (version 3 or as updated). *Waterway and channel rehabilitation guidelines*, at: www.ipswich.qld.gov.au/__data/assets/pdf_file/0017/8531/Waterway_and_Channel_Guidelines_v3.pdf

Townsville City Council (2011). *Water sensitive urban design for the coastal dry tropics (Townsville): Design objectives for stormwater management,* at: www.townsville.qld.gov.au/__data/assets/pdf_file/0007/12220/Design_Objectives_For_Stormwater_Management.pdf

Algal blooms

Department of Natural Resources and Mines (2014). *Queensland harmful algal bloom response plan and operational procedures*, at: https://publications.qld.gov.au/dataset/queensland-harmful-algal-bloom-response-plan-operational-procedures/resource/e2027f75-7140-4e86-88e3-ece775468cd7?inner_span=True

South East Queensland Healthy Waterways Partnership (2009). *Coastal algal blooms of South East Queensland: A field guide,* at: http://algalblooms.org/pdf/algal_blooms_field_guide_0211_web.pdf

More information on algae and algal blooms can be found on the EHP website at: www.ehp.qld.gov.au/coastal/ecology/lyngbya-updates/

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