

DOCUMENTS TO TENDER

Second Statement of Russell Cuereel

26 September 2011

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Date:

5/10/11

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Exhibit Number:

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QUEENSLAND FLOODS
COMMISSION OF INQUIRY

STATEMENT OF RUSSELL KEITH CUEREL

I, **RUSSELL KEITH CUEREL** of c/- [REDACTED] George Street Brisbane in the State of Queensland, Manager, Infrastructure Management, Office of the water Supply Regulator, Department of Environment and Resource Management (DERM), solemnly and sincerely affirm and declare:

Requirement from Queensland Floods Commission of Inquiry

1. I have seen a copy of a letter dated 7 September 2011, which is attachment **RKC-10**, from the Commissioner, Queensland Floods Commission of Inquiry (Commission) to me requiring a written statement under oath or affirmation, and which details the topics my statement should cover.
2. I have also provided a statement to the Commission dated with today's date in regard to information about State Planning Policy 1/03.

Item 1: All State policies, regulations and standards that regulate stormwater management and stormwater infrastructure; a list of the entities that administer these policies, regulations and standards; and identifies for each entity the policies regulations and standards it administers.

3. As Manager, Infrastructure Management (PO6), Office of the Water Supply Regulator, I only have responsibility for the department's management of the Queensland Urban Drainage Manual (QUDM). QUDM is a stormwater planning and design guideline produced by the department in collaboration with industry (principally local governments, developers and their consultants). QUDM does not directly regulate stormwater infrastructure. However, it is often used by local governments in setting their stormwater policies and standards and is something of a benchmark for the industry.
4. I am generally aware that DERM is responsible for a number of legislated requirements that impact on stormwater infrastructure. However, as I do not have a working knowledge of all the requirements, I cannot confidently give an exhaustive list. Those I am aware of are:
 - a. the requirement that local governments prepare management plans to manage urban stormwater quality (Total Water Cycle Management Plans) under the Environment Protection Act;
 - b. authorising of works in water courses under the *Water Act 2000*; and

- c. dam safety obligations with respect any element of stormwater/flood mitigation infrastructure (such as detention basins) which meet the criteria under the *Water Supply (Safety and Reliability) Act 2008*.
5. I am also aware that:
- a. DLGP require local governments to have Priority Infrastructure Plans to support their Infrastructure Charges Plans (for all infrastructure – including stormwater); and
 - b. Main Roads is generally responsible for stormwater infrastructure associated with their roads.
6. Also relevant are Chapters 2 and 3 of QUDM (extracts attached **RKC-11**) which list all the state agency / legislation requirements (as far as could be determined at the date QUDM was last published) that are potentially relevant to the planning and design of a local government's stormwater infrastructure and stormwater management

Item 2: The Department of Environment and Resource Management's (DERM) role and extent of involvement in formulating and administering the policies, regulations and standards referred to in paragraph 1.

7. I can only comment on this item with respect to QUDM and OWSR.
8. QUDM provides guidance to local governments for *formulating policies, regulations and standards that regulate stormwater management and stormwater infrastructure*. QUDM was first published in the mid-1990's and was developed through an equal partnership between Brisbane City Council, Institute of Public Works Engineering Australia and the Department using a specialist consultant and industry consultation.

The only major review of QUDM since its introduction was industry driven and was completed in 2007. It involved a steering committee of industry representatives overseeing the work of a (different) specialist consultant. In conjunction with the review/update of QUDM, the original partnership arrangements were renegotiated with the result that DERM (OWSR) now has sole ownership of QUDM. Future reviews are likely to follow the practice of responding to industry demand.

OWSR has no role in regulating stormwater management and stormwater infrastructure. OWSR does not have any mechanism for mandating the adoption of QUDM. It is up to local governments (generally) to choose the standards and practices it implements. However I understand that much of what is in QUDM is very widely accepted across Queensland (and elsewhere).

Item 3: Whether and how DERM has reviewed, or has plans to review, the adequacy of the measures to mitigate the impact of flooding in policies, regulation and standards or other mechanisms that regulate stormwater management and stormwater infrastructure, including (but not limited to):

- a) **Any investigation that has been carried-out or report that has been commissioned or written following the 2010/2011 flood events that addresses the flood capacities of the State's stormwater management and stormwater infrastructure and the associated management of this infrastructure: and**
- b) **Any briefing notes produced by DERM as a result of the 2010/2011 flood events in relation to measures employed to mitigate the impact of flooding for stormwater management and stormwater infrastructure produced**

I am not aware of any plans by DERM to review the adequacy of the measures to mitigate the impact of flooding in policies, regulation and standards or other mechanisms that regulate stormwater management and stormwater infrastructure. The last review of QUDM was completed fairly recently and I am not aware of any demand from industry for another review at this stage.

- (a) I am not aware of any investigations carried-out or reports commissioned or written following the 2010/2011 flood events that address the flood capacities of the State's stormwater management and stormwater infrastructure and the associated management of this infrastructure. The only State stormwater infrastructure I am aware of would be that owned by Main Roads.
- (b) I am not aware of any briefing notes produced by DERM as a result of the 2010/2011 flood events in relation to measures employed to mitigate the impact of flooding for stormwater management and stormwater infrastructure.

Item 4: Your view as to whether the measures to mitigate the impact of flooding in the existing policies, regulations and standards and other mechanisms that regulate stormwater management and stormwater infrastructure and other mechanisms are effective. Please include a description as to your view as to whether there are any shortfalls in, or difficulties with enforcement of, the policies, regulations and standards

- 8. Local governments set and enforce flood mitigation/public safety standards to be met by the stormwater systems in their local area(s) through their design standards and codes for development. Similarly, Main Roads would determine the standards for their stormwater systems.

I am not aware of any general State Government policies, regulations and standards to regulate stormwater management and stormwater infrastructure to mitigate the impact of flooding. I am only aware of OWSR's role in maintaining the Queensland Urban Drainage Manual which local governments may (or may not) chose to use in setting their own standards.

My view with respect to any shortfalls in, or difficulties with enforcement of, the local government policies, regulations and standards that regulate stormwater

management and stormwater infrastructure would be that the situation it is likely to vary across the state with the varying circumstances of each local government.

Item 5: Your view as to the potential for use of flood detention basins, stormwater culverts and backflow devices as measures to mitigate the impact of flood on property and infrastructure, including the advantages and disadvantages of each

9. In my view, each of the above stormwater/flood management measures has a place in mitigating the impact of flood on property and infrastructure – especially on existing property and infrastructure.

The most desirable mitigation measure is to ensure that as far as possible, natural flow paths are understood and their capacities are retained.

My view is that, as with most infrastructure (which can only remain effective within its design limits) stormwater and flood mitigation infrastructure can only deliver reductions in flood impacts for flows up to the design standard adopted. The design standard(s) adopted usually represents what has traditionally been accepted as a reasonable balance between the risk and cost to the community. This is often expressed in different standards for different elements of a stormwater system (e.g. kerb and channelling and the piped network under a road versus the capacity of the roadway itself). However, as in most areas of infrastructure provision, the cost versus benefits and who pays plays a significant role in the standard adopted.

Detention basins are used to reduce peak flows by storing water and discharging that water over a longer timeframe (and hence at a lower flow rate). Systems that involve multiple detention basins must be appropriately analysed and designed to ensure that the basin discharges don't interact adversely to exacerbate downstream flooding.

Culverts are generally designed to maintain the flow capacity of a drainage path that has had an obstruction introduced – such as a road or railway embankment across a creek or gully. Depending on the impact of flows above a culvert's design flow, the whole structure may (or may not) have provision for coping with these higher flows (e.g. a road embankment may be designed to cope with flows which exceed the culvert capacity and overtop it without excessively damaging the embankment). Culverts can block with debris and this is also usually considered in the design.

Backflow devices are generally required on the outlets of stormwater systems which can be subject to receiving water levels high enough to cause water to flow in the reverse direction and potentially exit the system affecting the surrounding area. Areas that require backflow devices are generally low-lying and hence difficult to adequately drain in all potential circumstances.

Item 6: The stormwater infrastructure for which DERM has responsibility. Your view as to whether the existing stormwater infrastructure in Queensland is adequate for mitigating flood impacts; and if not, what are the inadequacies and how may they be remedied, and what steps, if any, is DERM intending to take to remedy these inadequacies.

10. To the best of my knowledge, DERM is not responsible for any stormwater infrastructure.

With respect to the adequacy of existing stormwater infrastructure in Queensland, my view is that it is likely to be highly variable across local government areas and between older and newer systems. The reasons for my view are:


- The broad range of climatic conditions across the state (e.g. frequent high intensity rainfall in the tropics to infrequent lower intensities in the southern inland).
- The range of topographic conditions in which stormwater systems are required to operate (e.g. flat coastal lowlands with tidal influences to steep / short response-time areas – sometimes in the same catchment)
- The capital cost of stormwater systems (which are generally borne by the developer) and the ongoing operation and replacement/upgrading costs (generally borne by councils).
- The nature of stormwater infrastructure – i.e. it has traditionally been made-up of mostly “passive” hidden assets required to perform infrequently; hence maintenance/upgrading expenditure may not be as high a priority as more obvious or “active” assets.
- Changing rainfall intensity standards due better rainfall data from longer records and climate change
- Variable financial capacity across councils to fund upgrades/improvements to older systems
- Increasing development on urban fringes resulting in increased peak discharges and potential overloading of existing downstream systems

I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of the *Oaths Act 1867*.

Signed


Russell Keith Cuerel

Taken and declared before me, at Brisbane this 14th day of September 2011


~~Solicitor/Barrister/Justice of the
Peace/Commissioner for Declarations~~

2.00 Stormwater planning

The purpose of this chapter is to assist Local Governments in the development of an integrated set of management actions to ensure the delivery of a holistic Stormwater Management Strategy.

2.01 General

The long-term impact of stormwater runoff on both the natural and built environments greatly depends on the extent to which stormwater issues are integrated into the overall urban planning process.

Stormwater planning may be used to define:

- (i) The objectives of stormwater systems (e.g. should the primary focus be on flood control, water quality, stormwater harvesting, the adoption of low cost solutions, or a combination thereof).
- (ii) The preferred stormwater systems and design standards for greenfield and infill developments.
- (iii) The objectives and design standards for stormwater upgrades and relief drainage schemes.
- (iv) Funding needs, cost constraints and a ranking system for retro-fitting existing drainage networks.
- (v) The means of providing stormwater infrastructure in an equitable manner for all landowners within a catchment.
- (vi) The required protection of environmental values.
- (vii) The means of optimising existing opportunities for the placement of stormwater infrastructure.

The strategic stormwater planning undertaken by individual local governments and regional bodies should occur within an Integrated Catchment Management framework in cooperation with all relevant stakeholders.

The planning of stormwater systems needs to be integrated with land use planning (e.g. open space) as well as planning for other infrastructure (e.g. water supply) so as to maximise the benefits of complementary measures and to ensure that conflicting outcomes are avoided. Under the principles of Water Sensitive Urban Design, stormwater planning should be integrated with water supply and wastewater planning as well as the management of ground waters.

The planning and design of relief drainage schemes and the retro-fitting of stormwater quality improvement systems should be based on current best management practice.

Stormwater planning within a local government can exist on three levels:

1. An area wide Stormwater Management Strategy
2. Catchment-based Stormwater Management Plans—including Urban Stormwater Quality Management Plans (USQMPs)
3. Site-based Stormwater Management Plans—including Site-based Stormwater Management Plans (SMPs)

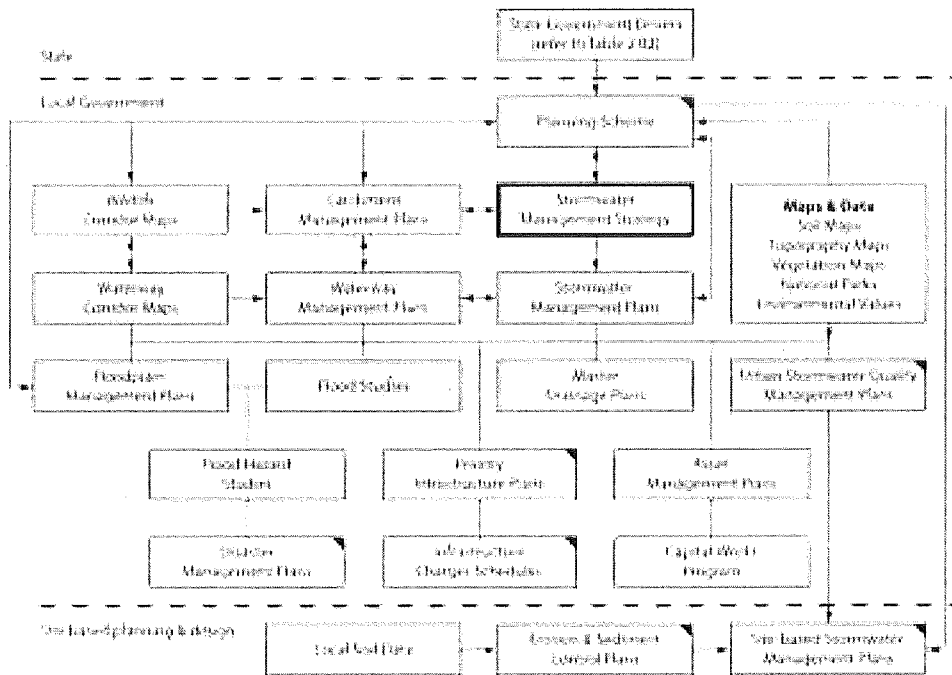
2.02 Stormwater management strategy

To achieve coordination of the many disciplines and objectives, a local government should develop a Stormwater Management Strategy that covers its entire area and encompasses all stormwater-related activities in a manner that achieves the principal stormwater objectives. Even though the development of such a Strategy is not a legislative requirement, it does represent best practice.

A Stormwater Management Strategy may be used to:

- (i) Assist in the development of catchment-based Urban Stormwater Quality Management Plans that appropriately reflect local issues and design standards.
- (ii) Guide councils in the planning, design and management of stormwater infrastructure.
- (iii) Guide the development industry in the design of water sensitive urban communities.
- (iv) Guide council in the operation of its general business activities in a manner consistent with its stormwater management objectives.

A Stormwater Management Strategy must integrate with a local government's other strategic plans such as the various Catchment Management Plans, Waterway Management Plans, Floodplain Management Plans, Open Space Plans, and Water Supply and Wastewater Strategies. The linkages between the Stormwater Management Strategy and associated management plans are shown in Figure 2.01 and Table 2.02.1. This figure is not exhaustive and does not include the links to things such as Open Space Plans and Water/Wastewater Strategies.



Linkage between Stormwater Strategy and Various Management Plans
(Tagged boxes indicate plans required by specific legislation as of 2007)

Figure 2.01

The Stormwater Management Strategy should be consistent with the aims of the *Environmental Protection Act* and the *Environmental Protection (Water) Policy*, and where practical should incorporate the following:

- Catchment-based policies that reflect the local catchment resources, environmental and community ‘values’, development limitations and soil conditions.
- Policies applicable to the various land use, topography, soil, environmental and economic conditions.
- Acknowledgment of the need to assess the cumulative impacts of pollutants, land use changes, and changes in stormwater runoff, rather than the impact of works in isolation.
- Encouragement of creativity and forward thinking.
- Policies equally applicable to all land users, including Council works, developers, builders, the public and agriculture (where appropriate).
- Policies that encourage cooperation and open communication between the community, land users and the various authorities.
- Policies that encourage cooperation and coordination between water supply, sewerage, groundwater and stormwater managers with respect to total water cycle management.
- Appropriate allocation of resources for implementation, maintenance, training and policing.

Table 2.02.1 Brief outline of various plans

Area Basis	Plan/Study	Main Output
Council wide	Planning Scheme *	Development controls.
	Wildlife Corridor Maps	Identification and protection of significant wildlife corridors.
	Stormwater Management Strategy	Local government approach to stormwater management.
	Disaster Management Plan *	Strategic coordination of local government and State Emergency Services.
	Priority Infrastructure Plan *	Strategic planning on the development of local government infrastructure.
	Asset Management Plan	Strategic planning on the management of local government infrastructure assets.
	Capital Works Program	Strategic planning on the financing of local government infrastructure.
Catchment based	Catchment Management Plans	Environmental and social management of waterway catchments.
	Waterway Corridor Maps	Identification of minimum floodway and riparian widths.
	Waterway Management Plans	Management strategy for the protection of urban waterways, floodways and riparian areas.
	Stormwater Management Plans (SMPs)	Management strategy for urban stormwater quality and flood control.
	Urban Stormwater Quality Management Plans (USQMPs) *	Management strategy of the urban stormwater quality.
	Floodplain Management Plans	Strategic planning and management of full floodplain, including flood risk and land use planning.
	Flood Studies	Numerical modelling of extent and frequency of waterway flooding.
	Flood Hazard Studies	Degree of flood hazard within a floodplain
	Infrastructure Charges Schedules *	Strategic assessment of stormwater infrastructure charges.
Local area study	Master Drainage Plans	Strategic management of sub-catchment flooding.
Site based	Local Soil Data	Site specific soil testing.
	Erosion & Sediment Control Plans (ESCPs) *	Site specific erosion and sediment control strategy for a low-risk/small development.
	Site-based Stormwater Management Plans *	Site specific environmental management plan for a high-risk/large development.

* Required by specific legislation

2.03 Stormwater management plans

Stormwater Management Plans (SMPs) set out how stormwater is to be managed within a catchment. These plans set out the proposed management of activities within a catchment which are likely to:

- (i) alter stormwater runoff volume, velocity, rate, duration and frequency;
- (ii) adversely affect the environmental values of receiving waters either through physical modification or changes to runoff quantity or quality.

In effect, Stormwater Management Plans define the proposed management of stormwater quantity and quality, and the protection of receiving water features, such as the protection of existing waterways, lakes and wetlands. They also provide the basis for determining developer charges for 'trunk' stormwater infrastructure.

Stormwater Management Plans may vary widely in their content depending on what studies or management plans already exist and the needs/interests of the target audience (e.g. community, local government officers, State Government departments).

Different State Government departments will look for Stormwater Management Plans to address different aspects of stormwater management. Some of these aspects are legislative requirements and others are just good practice.

As a general guide, Stormwater Management Plans should include consideration of the following issues:

- (a) protection from flooding;
- (b) acceptable health risk;
- (c) measures to reduce changes to the volume and velocity of stormwater runoff and changes to the natural flow regime of urban waterways;
- (d) measures to maximise the infiltration of stormwater into the ground, thus providing long-term environmental flows to minor streams;
- (e) measures to minimise harm to receiving waters by stormwater;
- (f) opportunities to prevent the initial contamination of stormwater and to remove introduced contaminants;
- (g) opportunities for roadside pollution containment systems (i.e. the temporary trapping of pollutants from accident and traffic spills for later removal and treatment);
- (h) community needs, including education and participation in the planning process;
- (i) aesthetics, public safety and other social concerns;
- (j) water conservation and recycling;
- (k) recreational, open space, landscape and ecological values of waterway corridors;

- (l) protection or rehabilitation of riparian vegetation along waterways;
- (m) rehabilitation of degraded drainage corridors;
- (n) integration of stormwater planning with catchment and land use planning;
- (o) consideration of alternatives to the release of stormwater across beaches or into poorly circulated waters;
- (p) any other issues relating to the objectives of stormwater management as outlined in Sections 1.03 and 1.09.

When preparing a Stormwater Management Plan, each local government should consider the range of issues most relevant to the particular catchment and how best the SWP may address these issues. Table 2.03.1 sets out the broad areas of State Government interest and the ‘drivers’ for addressing these issues within a SWP.

Table 2.03.1 Key Aspects of SMPs for various State Government Departments

Government Department	Key Aspects of SMP	“Drivers”
Environmental Protection Agency (EPA)	<ul style="list-style-type: none"> • Water quality (USQMP) • Environmental “values” • Waterway features (e.g. protection and rehabilitation of natural water bodies) 	<ul style="list-style-type: none"> • <i>Environmental Protection Act (1994)</i>
Natural Resources and Water (NRW)	<ul style="list-style-type: none"> • Water allocation • Riverine protection 	<ul style="list-style-type: none"> • <i>Water Act (2000)</i>
	<ul style="list-style-type: none"> • Water supply and/or sewerage planning and management 	<ul style="list-style-type: none"> • Water Resources Plan under the <i>Water Act (2000)</i>
Department of Emergency Services	<ul style="list-style-type: none"> • Water quantity (e.g. flood control and land use planning) 	<ul style="list-style-type: none"> • State Planning Policy 1/03
Department of Primary Industries (DPI)	<ul style="list-style-type: none"> • Fish passage (aquatic corridor management) • Waterway features (e.g. protection and rehabilitation of mangroves and fish habitats) 	<ul style="list-style-type: none"> • <i>Fisheries Act (1994)</i>
Department of Aboriginal and Torres Strait Islander Policy	<ul style="list-style-type: none"> • Recognition, protection and conservation of Aboriginal cultural values within associated waterways 	<ul style="list-style-type: none"> • <i>Aboriginal Cultural Heritage Act (2003)</i>
Department of Local Government, Planning, Sport and Recreation (DLGPS&R)	<ul style="list-style-type: none"> • Priority Infrastructure Plans • Infrastructure Charges Schedules 	<ul style="list-style-type: none"> • <i>Integrated Planning Act (1997)</i> and • <i>Integrated Planning and Other Legislation Amendment</i>

The planning of urban drainage systems, flood management systems and stormwater treatment systems often use specialised numerical models, thus the development of a Stormwater Management Plan may incorporate the following modelling exercises:

- (a) Flood studies
- (b) Master drainage studies
- (c) Stormwater quality studies
- (d) Infrastructure studies

2.04 Flood studies and floodplain management plans

Flood studies primarily focus on the modelling and prediction of creek and river flooding.

Floodplain Management Plans are developed for the purpose of managing flood risk across the full width of the floodplain, not just the designated floodways.

Flood Studies may be used to provide the following information:

- (i) master planning for waterway flood control;
- (ii) design standards for stormwater detention/retention systems possibly varying within different regions of a given drainage catchment;
- (iii) design standards for stormwater volume and peak discharge control possibly varying within different regions of a given drainage catchment;
- (iv) design standards for the flood immunity of roadways and evacuation routes;
- (v) allowable planting densities for floodways and assessment of opportunities to rehabilitate riparian zones.

In addition to providing essential flood level information, flood studies should be integrated with Waterway Corridor Mapping and Floodplain Management Plans to develop an envelope of minimum floodway corridor widths and development controls.

2.05 Master drainage plans

Master Drainage Planning provides the basis for the provision of stormwater infrastructure to address traditional drainage, local flooding and safety issues; however, these plans may also address water quality issues.

Master Drainage Planning involves a detailed hydraulic analysis of the required stormwater drainage system having regard for the objectives of the Stormwater Management Strategy or Stormwater Management Plan.

Master Drainage Planning may be used to provide the following information:

- (i) master planning for local flood control;
- (ii) master planning for drainage control, including relief drainage needs;
- (iii) master planning for stormwater detention and retention, including on-site detention standards;
- (iv) master planning for aspects of stormwater quality (optional, depending on terms of reference).

Master Drainage Planning may be performed as a precursor to the development of a Stormwater Management Plan, or as a supplement to an existing Stormwater Management Plan.

2.06 Urban stormwater quality management plans

The National framework for the management of water quality, including stormwater management, is presented within the National Water Quality Management Strategy (a series of documents and guidelines).

Queensland's *Environmental Protection (Water) Policy (2000)* requires each local government which has authority over an urban stormwater system to establish stormwater quality management goals and develop a coordinated approach to achieving these goals. These stormwater management goals are to be established through the setting of water quality *objectives* based on agreed environmental *values*. A coordinated approach to achieving these objectives is to be founded on the development of appropriate environmental management plans, including the development of Urban Stormwater Quality Management Plans (USQMPs).

The *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ARMCANZ & ANZECC, 2000a) adopt three desirable levels of protection in respect to ecosystems:

- Pristine to slightly modified systems – requiring protection.
- Slightly to moderately modified systems – requiring restoration.
- Highly modified systems – requiring local identification of the values to be secured.

The Australian Guidelines for Urban Stormwater Management (ARMCANZ & ANZECC, 2000b) indicate that 'the primary purpose of Stormwater Management Plans is to identify actions that will improve the environmental management of urban stormwater and protect environmental values of receiving waters'.

The *Model Urban Stormwater Quality Management Plans and Guidelines* (EPA, 2007) provides guidelines on the preparation and required content of Urban Stormwater Quality Management Plans. One of the first tasks should be to determine the required "degree of complexity" of the plan and any

associated catchment modelling. This should be related to the complexity of the catchment and its environmental risk.

In addition to the catchment-based Urban Stormwater Quality Management Plans, site-based Stormwater Quality Management Plans may need to be developed for a particular development or land activity. The existence of a catchment-based plan does not negate the need for a site-based plan, but the site-based plan must achieve a level of protection no less than that established within the catchment-based plan. Site-Based Stormwater Management Plans are discussed further in Chapter 11.

2.07 Priority infrastructure plans

The *Integrated Planning Act (1997)* provides for local governments to levy infrastructure charges to fund the supply of *development infrastructure items*. Development infrastructure items are limited to land and capital works for: urban water cycle management infrastructure (water, sewerage, stream management, disposing of water and flood mitigation); circulation networks (roads, dedicated public transport corridors, public parking, cycle ways, pathways); public recreation infrastructure, and land for local community purposes.

The priority infrastructure plan is an important strategic planning tool that aims to align the local government's ability to service with infrastructure, the areas identified for future urban growth in the planning scheme. It is also the core element of the infrastructure charging framework in the *Integrated Planning Act (1997)*. It provides a clear, transparent and certain basis for the calculation of infrastructure charges.

The assumptions underpinning each plan are critical elements of the priority infrastructure plan. Their purpose is to provide a logical and consistent basis for the detailed infrastructure planning in the plan. Together with the desired standards of service they assist in the development of the plans for trunk infrastructure, which provide a detailed infrastructure planning benchmark for the calculation of infrastructure charges and upon which additional infrastructure cost assessments may be based.

Priority infrastructure plans for stormwater infrastructure are a requirement under the Act where it is intended to levy infrastructure charges for "trunk" elements of the system, (i.e. system elements serving more than one development or new and existing development) such as:

- Major drainage and flood mitigation elements (e.g. regional detention basins, stream hydraulic improvements, levees, culverts).
- Regional water quality improvement infrastructure (e.g. wetlands, instream GPTs, stream rehabilitation).

2.08 Infrastructure charges schedules

Before an infrastructure charge is set the item must be identified in an *infrastructure charges schedule* which is part of the local government's *priority infrastructure plan*.

The infrastructure charges schedule:

- provides a transparent account of the cost of the trunk infrastructure being charged for;
- indicates when new trunk infrastructure is likely to be provided;
- quantifies existing and expected new users;
- shows how costs are to be apportioned to those users;
- states the charge various users will be required to pay.

An infrastructure charges schedule must state either or both of the following:

- (i) Timing—the estimated time (year) that the trunk infrastructure forming part of the network will be provided.
- (ii) Thresholds—the thresholds for providing the trunk infrastructure forming part of the network (e.g. when a demand level is reached it triggers the provision of certain trunk infrastructure).

2.09 Associated mapping & planning schemes

The preparation of the following planning tools can greatly assist local governments in the development of Stormwater Management Plans.

(a) Soil maps

Regional soil maps may be used for a variety of purposes including:

- (i) To assist local governments in the preparation of Stormwater Quality Management Plans.
- (ii) If soil properties such as infiltration capacity are homogeneous across large regions, then a local government may choose to prepare a list of *preferred* stormwater management systems for different soil regions. Such a listing may assist local government officers in the review of development applications. For example, constructed urban lakes may not be desirable within regions of highly dispersive soils, or a local government may prefer the used of swales only in regions of highly porous soils.
- (iii) Soil maps can be integrated with Erosion Risk Maps to identify those development areas that require a higher *Erosion & Sediment Control* standard during the construction/building phase, or those regions where the natural waterways are likely to be more susceptible to channel erosion following urbanisation.

- (iv) Soil maps greatly assist in the development of construction site *Erosion & Sediment Control Plans (ESCPs)*.

Soil properties of greatest interest to stormwater designers are:

- erosion potential (slope, texture, dispersion index); and
- infiltration capacity.

Erosion Risk Mapping (IEAust, 1996) can be used to assign the erosion risk or development potential of a region. It is important that the ranking system clearly identifies outcomes that produce actual variations in stormwater management practices within different areas of erosion risk, otherwise the mapping exercise provides little value.

(b) Wildlife corridor maps

A Wildlife Corridor Map identifies essential terrestrial and aquatic movement corridors that link habitat and breeding areas, specifically the terrestrial linkage of bushland reserves. These maps are generally required prior to the development of Waterway Corridor Maps.

(c) Waterway corridor maps

Waterway Corridor Maps identify:

- (i) those waterway corridors that are required for aquatic habitat;
- (ii) those waterways that are required to support fish passage;
- (iii) those waterways that act as terrestrial wildlife corridors;
- (iv) minimum waterway corridor widths (typically defined as 30, 60 and 120 metre minimum corridor width);
- (v) minimum desirable overbank riparian vegetation widths;
- (vi) any Ramsar* listed wetlands linked to waterways.

* The Ramsar Convention on Wetlands of 1971 held in the Iranian town of Ramsar which resulted in a United Nations treaty enacted in 1975.

Ideally, Waterway Corridor Maps should also identify and rank (in order of potential impact) existing or potential fish passage barriers.

(d) Catchment management plans

Catchment Management Plans may address a wider range of issues, possibly including:

- land use needs, for example recreational and open space requirements possibly linking to Open Space Master Plans;
- community needs, for example community education on catchment and waterway related issues;
- flora and fauna needs, including catchment and inter-catchment movement corridors;

- other threats to sustainable land use and/or conservation needs such as weed control.

(e) Asset management plans

All stormwater infrastructure requires ongoing maintenance to ensure its performance. Traditionally, ensuring that adequate maintenance occurs has been somewhat problematic. This is typically because stormwater infrastructure is only required to perform its function intermittently or infrequently; however, timely maintenance must be given a high priority if the objectives of stormwater management are to be met.

Proposed new infrastructure should be considered on both its ability to meet design objectives and its whole of life operation and maintenance needs.

2.10 References

ARMCANZ & ANZECC, 2000a. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. National Water Quality Management Strategy Paper No.4, prepared by Agriculture and Resources Management Council of Australia and New Zealand & Australian and New Zealand Environment and Conservation Council, Canberra.

ARMCANZ & ANZECC, 2000b. *Australian Guidelines for Urban Stormwater Management*. National Water Quality Management Strategy, prepared by Agriculture and Resources Management Council of Australia and New Zealand & Australian and New Zealand Environment and Conservation Council, Canberra. ISBN 0 642 24465 0.

Environmental Protection Agency, 2007. *Model Urban Stormwater Quality Management Plans and Guidelines*. Environmental Protection Agency, Queensland Government, Brisbane.

Institution of Engineers Australia, 1996. *Soil Erosion and Sediment Control – Engineering Guidelines for Queensland Construction Sites*. The Institution of Engineers, Australia, Queensland Division, Brisbane.

3.00 Legal aspects

This chapter contains general information on the main legal issues relevant to stormwater and drainage. It does not purport to provide specific legal advice. Where particular stormwater or drainage works are proposed, a specific due diligence assessment should be made to identify the particular legal requirements applicable to the project.

3.01 Principles

Urban development generally modifies the naturally occurring drainage regime, thus potentially altering the volume, rate, frequency, duration and velocity of runoff. Urban drainage works may also divert flow between natural catchments, modify existing flow paths and/or concentrate flow along drainage paths and at outlets. These changes may affect the safety, amenity and enjoyment of persons and property, possibly resulting in legal disputes.

Legal issues arising from the planning and proposed construction of drainage works need to be negotiated and resolved with adjoining owners—and any other landowners who could be detrimentally affected—before work commences and before approval of the works can be granted by the relevant local authority. In Queensland, local governments generally have jurisdiction over issues associated with stormwater and drainage in their local government area.

Local governments are responsible for the assessment and approval of drainage and stormwater works on a site under the *Plumbing and Drainage Act, 2002*. They must also assess applications for *development* approvals in relation to such works and, where appropriate, may impose conditions which are relevant to and/or reasonably required of such development. The term "*development*" has a particular statutory meaning in Queensland by virtue of the *Integrated Planning Act, 1997* (IPA). Developers therefore need to determine what stormwater and drainage works come within that definition.

In addition to the legislative requirements, there can be specific requirements located within a local government's planning scheme, local laws and/or stormwater drainage manuals/codes that need to be complied with.

The management function of ensuring that activities (including proposed stormwater and drainage works) comply with the law is called *due diligence* or *legal compliance*. It is a specific element of *risk management*.

In the context of stormwater and drainage projects, important elements of a due diligence assessment will include the following:

- (i) Identify the nature and extent of all of the proposed drainage and stormwater works.

- (ii) Identify details (including current tenure details) of all sites where works will take place and any adjacent areas (including upstream and downstream sites) which may be impacted by the works.
- (iii) Assess what *development approvals* and other planning requirements apply to the proposed works and the actions needed to satisfy those requirements.
- (iv) Assess the nature and extent of any *tenure security* that is required for both initial construction and ongoing operation of the works—this may range from a simple easement up to the acquisition of freehold title over a site. Assess also the actions needed to put in place the appropriate form of tenure.
- (v) Identify all other specific *statutory approvals* and permits required for all of the works and the actions required to obtain such approvals.
- (vi) Assess any compliance needed under *statutory duties of care*—such as the *environmental protection duty of care* and the *cultural heritage duty of care*—and any compliance actions needed to address them.
- (vii) Assess any compliance implications at *common law*—such as the creation of a nuisance—and the compliance actions needed to address them.

(a) Diversion of stormwater

Often it may be considered necessary to divert runoff from a sub-catchment to a different point of discharge than that occurring naturally. This, however, should not be contemplated without consideration of the possible legal consequences of the increase in discharge at the new outfall, or without the approval of the local government.

(b) Concentration of stormwater

Where surface flow (as distinct from that in a natural watercourse) is diverted or collected either by open channel or conduit and as a result the flow is increased at a particular point, the flow may be said to be concentrated. The construction of buildings or other development (such as large paved areas) may also have this effect. Problems arise when concentrated flows are not dissipated by the time the flow reaches a property or development boundary.

(c) Outlet works

When transitioning from the new drainage system to the existing/natural drainage system, the outlet works are important in dissipating energy, preventing scour, limiting siltation and possibly controlling water quality. The outlet works may include a headwall, wingwalls, apron, energy dissipater, pollution trap, a transition section of lined or unlined open channel, and a low-flow pipe or channel.

(d) Worsening or nuisance

Where, as a result of the development or drainage works, the downstream owner suffers a loss of enjoyment of their property, or suffers actual physical

damage to their property, this is considered to be worsening, or nuisance causing damage. Such nuisance may be the result of changes in peak discharges, flood levels, the frequency and/or duration of flooding, flow velocities, water quality, sedimentation or scour effects.

It must be emphasised that compensation paid to the property owner in respect of land or easement acquisition is merely payment for the right to discharge. Such payment is not intended to “compensate” for any potential nuisance which may be caused to the property owner as a result of the discharge. Any such nuisance may be actionable in law under legal principles. The presence of a compensation clause in an Act of Parliament should not be considered as the authorisation of a nuisance by a Statutory Authority.

Some of the basic principles of law relating to nuisance arising from stormwater and surface water drainage are outlined in two landmark cases (*Gartner v. Kidman* (1962) 108 CLR 12 and *Rudd v. Hornsby Shire Council* (1975) 31 LGRA 120). Discussion on common law and its nexus to the management of nuisance impacts is provided in Section 3.11.

3.02 Lawful point of discharge

The term *lawful point of discharge* has no prescribed legal meaning. A point of discharge which is "lawful" will be determined according to whether all applicable regulatory and other legal requirements have been met and any necessary statutory approvals have been obtained. There may be more than one lawful point of discharge for any particular property.

Determination of whether a lawful point of discharge exists at a particular location, includes the following two-point test:

- (a) That the location of the discharge is under the lawful control of the local government or other statutory authority from whom permission to discharge has been received. This will include park, drainage or road reserve, stormwater drainage easement.
- (b) That in discharging in that location, the discharge will not cause an actionable nuisance (i.e. a nuisance for which the current or some future neighbouring proprietor may bring an action or claim for damages arising out of the nuisance). In general terms this implies no worsening as a result of the discharge.

Where the conditions of the first test have not been satisfied prior to development, it will be necessary to obtain a lawful point of discharge. This will usually be achieved by the acquisition of stormwater drainage easements or drainage reserves over one or more downstream properties until the conditions of the second test have been met. It will normally be necessary for a large part of the design to have been completed prior to determining the extent of any necessary easements.

Note that a watercourse may not necessarily constitute a lawful point of discharge, unless the requirements of the above two tests and other legal requirements have been satisfied.

3.03 Discharge approval

In lieu of the provision for lawful point of discharge outlined above, some local governments may be prepared to accept a letter from the downstream owner to the developer granting “discharge approval”. In this letter, the downstream owner usually agrees to accept the discharge from the upstream property provided that the works proposed by the developer are constructed in accordance with drawings approved by the local government.

The “discharge approval” is a form of contract between the developer and the owner of the downstream property under which some consideration will usually be paid for the right to discharge. This situation has apparently been successful over time and essentially relies on the goodwill of the parties.

“Discharge approval” may be revoked by the downstream owner, unless there is a binding contract, or a grant of easement. A subsequent purchaser will not be bound by the previous owner’s contract unless the subsequent owner agrees to be so bound, either as a condition of the contract of purchase or by the executing of an appropriate agreement. It would then be left to the aggrieved party to resolve the situation by, for example, attempting to enforce the contract, if one existed. The local government would have no ability to enforce any such contract if it was not a party to it.

3.04 Proposed works on non-freehold land

Drainage works may on occasions be required on *non-freehold land*. Such land is governed by the *Land Act, 1994* (Land Act). Non-freehold land includes unallocated State land, State land subject to reserves, deeds of grant in trust, State land leases (including pastoral leases), most foreshores and most waterways.

There are various interests in non-freehold land that can be granted—usually by the State of Queensland through the Department of Natural Resources & Water. Those interests include the following:

- (i) dedication of new reserves;
- (ii) alteration to the boundaries of existing reserves;
- (iii) perpetual and term leases;
- (iv) permits to occupy;
- (v) public utility easements.

In most cases, the form of interest that the proponent of a drainage project is likely to seek will be the dedication of a new reserve for drainage purposes or an easement.

3.05 Drainage reserves

Where a natural open channel or similar overland flow path exists in a proposed development, a drainage reserve will be required to contain the design flow within the actual drainage reserve area. An allowance must be made for freeboard as outlined in Section 9.03.4. Provision should also be made for any requirements of the Stormwater Management Strategy (or similar) for the area.

Reserves are dedicated by the Minister for Natural Resources & Water on behalf of the State of Queensland through the publication of a gazette notice under the Land Act. Reserves can only be dedicated over unallocated State land. This means other existing interests in the State land may first need to be removed.

New reserves can only be dedicated for one of the purposes listed in Schedule 1 of the Land Act. Those purposes include "*drainage*". The dedication of a new reserve for drainage purposes may be appropriate where a large area of State land is required for flood mitigation or the like. More frequently, a public utility easement will be sought over non-freehold land for drainage purposes.

3.06 Easements

In Queensland, an easement is defined by two documents, namely, the survey plan which shows the location of the easement, and the easement document which sets out the rights granted by the grantor to the grantee and the conditions under which those rights may be exercised.

Easements for drainage purposes can be sought over both freehold and non-freehold land. The Titles Office holds standard easement documentation which may be referenced in an easement document.

(a) Need for easements

When a drain (open or piped) is located within property not under the control of the local government, a drainage easement in favour of the local government will be required along the route of that drain.

Overland flow should not normally be designed to pass through private property but, where this situation cannot be avoided and is acceptable to the local government, an easement will be required.

(b) Existing easements

Many survey plans show easements that may not necessarily be legally recognised because there is no registered easement document. In the case of an easement granted at subdivision or acquired by private treaty, the

encumbrance will normally be noted on the title deed held by the owner. This may not be the case where an easement has been resumed, but the easement would nonetheless exist. A notation will usually exist on the copy of the title deed held by the Department of Natural Resources & Water.

Where the developer seeks to use an existing easement which is part of the local government's stormwater system, the local government's consent will be required under the Local Government Act.

(c) Acquisition of an easement

The acquisition of an easement may involve either of the following approaches:

- (i) Voluntarily acquisition by agreement between the landowner and the proponent (i.e. the voluntary grant of an easement to the proponent).
- (ii) Involuntary acquisition by way of *compulsory acquisition*. This approach may be required if the owner is not prepared to agree, or if reasonable terms of agreement can not be negotiated.

In relation to freehold land, an easement may be either of the following:

- (i) A standard easement under the *Land Title Act, 1994* (Land Title Act). Such an easement can be for a wide range of purposes but requires that there be both a *dominant tenement* (i.e. land benefited by the easement) and a *servient tenement* (ie. land burdened by the easement). Such an easement is granted by the owner of the servient tenement to the owner of the dominant tenement. The easement must be registered on the register of freehold land titles.
- (ii) A *public utilities easement* or *easement-in-gross*. Such an easement does not need to specify a dominant tenement and can only be obtained for a limited list of purposes (including "*drainage*"). A public utilities easement can only be granted to a *public utilities provider*—which specifically includes a local government. The public utilities easement must also be registered on the register of freehold land titles.

In relation to non-freehold land, *public utility easements* are available. Such an easement can be sought under Chapter 6 Part 4 Division 8 of the Land Title Act. The easement should be granted for "*drainage*" purposes. Such easements are registered on the State Land Register. The Queensland Government's policy on *Easements Over State Land Held in Trust* (No. LTP/2004/1624) now enables an easement to be registered over both a reserve (where the State is deemed to be the owner of the land) and a Deeds of Grant in Trust (DOGIT).

Where an easement is required for drainage or stormwater works in relation to private development, either for the benefit of the local government over the developer's land or for the benefit of the developer over an adjoining owner's land, the creation of such an easement can be made the subject of a condition of a development approval by the local government.

(d) Acquisition by private treaty

Acquisition by private treaty is the normal method by which a person deals privately with another for the purchase of land or easement rights. It is normally undertaken by a direct approach to the proprietor of the property and will usually require some consideration (usually monetary compensation). There is no legal impediment to this approach save that any easement which is to be transferred to the local government must be granted in favour of the local government and in terms generally acceptable to it. Most local authorities have standard easement documents. A valuation for compensation prepared by a Registered Valuer is usually the basis for commencing negotiations.

(e) Acquisition by a local government

A local government can acquire an interest in freehold land (including the freehold itself or an easement) under the *Acquisition of Land Act, 1967* (Acquisition of Land Act).

There are special provisions in the Land Act for the resumption of certain interests in non-freehold land (including the taking of easements over non-freehold land). Such resumptions are generally undertaken by the State on behalf of a constructing authority (which includes a local government). The constructing authority must meet the costs. Native title over non-freehold land can also be compulsorily acquired; however, for most stormwater and drainage projects there will usually be more straightforward options for addressing native title.

Under the Acquisition of Land Act, the governments may purchase (acquire by private treaty) or resume (take) land for drainage purposes. Resumption is an option available only to government bodies (i.e. not to a private person) with the necessary procedures and approvals described in the Act.

Resumption can only be exercised for purposes set out in the schedule to the Acquisition of Land Act, or for purposes authorised or required by other legislation. The purposes in the schedule include "*drainage*", "*flood gates and flood warnings*", "*flood prevention or flood mitigation*" and "*works for the protection of the seashore and land abutting thereon*".

There are statutory procedures which must be strictly followed in order to successfully complete a compulsory acquisition. The interest being acquired is deemed to have been taken by the constructing authority upon the publication of a gazette notice. The interest in land which is resumed is converted into a right on the part of the former interest-holder to claim compensation from the constructing authority.

Under section 577 of the *Water Act, 2000* (Water Act), a water authority has power to take any land to which the Acquisition of Land Act or the Land Act apply for drainage purposes.

Where a local government is prepared to approve engineering design prior to the granting of any necessary easements, this will not generally occur before lodgment of the survey plan and easement document with the Department of Natural Resources & Water. Dealing Numbers (receipts) are usually acceptable proof of lodgment.

(f) Acquisition under the property law act

A property owner in order to effectively use their land may apply to the Court under the *Property Law Act* for a right to use other land not under the person's ownership. Such statutory right of use may take the form of an easement, licence or some other form and can be subject to a number of conditions including conditions as to the length of time the right may remain in existence. An order will only be made if the Court is satisfied that it is consistent with the public interest that the property should be so used and that the owner of the affected land may be adequately compensated.

These orders are largely discretionary orders a Court can make and the Court has wide power to make ancillary orders such as orders relating to the preparation of a plan of survey, the execution of any documents necessary for registration and directions for the conduct of proceedings generally.

(g) Easement dimensions

Easements need to be of such width, length and location to enable necessary works (e.g. construction, maintenance and/or site inspection) to be carried out. Easement widths should be not less than the greater of the following:

- (i) 3.0 metres for all single pipes from 300mm up to 1350mm diameter (in new developments) or as otherwise determined by the local government.
- (ii) 1.0 metre wider than the distance between outer edges of the pipes or box culverts (in new developments) or as determined by the local government.
- (iii) Width of flow path required to carry the difference between the peak discharge for the *Defined Flood Event* (refer to Section 7.03.2) and the capacity of the underground system together with an allowance for freeboard as outlined in Section 7.03.

For the purposes of this sub-section the capacity of the underground system may be taken as being its capacity when carrying the discharge from the minor design storm, with provision for blockage of grates as detailed in Section 7.05. The exception may be where the system is located in extremely flat ground or near an outlet that becomes fully submerged under major storm conditions, a detailed check shall be undertaken to ensure that the minor system does not have a lesser capacity under these conditions.

- (iv) Easements for open channels shall, unless agreed otherwise with the local government, be of sufficient width to provide an access track along at least one side of the channel for operation of maintenance

vehicles. Refer to Sections 9.02 and 9.07.2 for recommendations on minimum access and maintenance widths. An allowance must be made for freeboard as outlined in Section 9.03.4.

3.07 Acquisition by private developer for easement or drainage reserve purposes

The following is a suggested procedure for private developers to acquire an easement or drainage reserve in favour of a local government over a downstream property:

- (a) Advise the local government of the intention and the reasons for the acquisition and seek the agreement in principle from the local government to the proposed means of obtaining the lawful point of discharge.
- (b) Request a copy of the standard easement document used by the local government.
- (c) Once the “in principle” agreement has been obtained from the local government write to the downstream owner outlining the need for the easement and seek to meet with the owner to set out the proposal in detail including any proposed compensation;

Note: It is obviously in the developer's interest to obtain the easement for the least possible cost. It is usual in such cases for the developer to pay all costs of the downstream owner associated with the transaction such as legal fees, valuation fees and mortgage release fee in addition to his own costs such as survey, legal fees, titles office fees, local government fees, valuation fees and compensation.

The downstream owner may require compensation either in monetary terms or “in kind”. The usual basis for monetary compensation will be a valuation prepared by a Registered Valuer. The downstream owner may negotiate with the developer on his own behalf or obtain a valuation (normally at the developer's cost). Negotiations usually proceed from that point. “In kind” compensation usually involves some construction works in lieu of monetary compensation, but the valuation of compensation would still be on the same basis. Either method should be acceptable to the developer and the local government. Where “in kind” compensation is accepted, it is wise to ensure that such works are acceptable by the local government.

- (d) Once the basis for acquisition has been agreed, the survey plan and easement document should be prepared. The survey plan and document must be approved by the local government.

Note: Some local governments require all easements in their favour to be prepared by surveyors and/or solicitors of their choice at the developer's cost. Difficulties in relation to time can sometimes result from this requirement and the developer must pay attention to this aspect to avoid unreasonable delays.

- (e) Once the downstream owner has signed the survey plan and easement document these should be lodged with the local government for signature and possibly sealing.

Note: A sealing fee may be applicable.

- (f) The survey plan and easement document should then be lodged in the Department of Natural Resources & Water for registration. Apart from a number of special situations, neither the plan nor the document may be removed from the Department of Natural Resources & Water during the registration process if they have been sealed by the local government.

As mentioned in Section 3.06 (e), a local government may be prepared to approve engineering plans prior to the granting of necessary easements, but this will not generally occur before lodgement of the survey plan and easement document with the Department of Natural Resources & Water. Dealing Numbers (receipts) are usually acceptable proof of lodgement.

3.08 Statutory requirements

Statutory requirements for aspects of some stormwater and drainage projects often involve the need for a development permit (usually rolled into IPA and sought using the *Integrated Development Approval System (IDAS)* process). Sometimes however, separate specific statutory approvals or permits are required under other legislation (eg. a tree clearing permit may be required for works on State land including reserves under the Land Act). In other cases (for example, Native Title compliance and compliance with statutory duties of care), legislation will not require approvals or permits. Rather the proponent itself needs to satisfy prescribed compliance processes and procedures on a "self regulation" basis.

Table 3.08.1 contains examples of legislation under which specific statutory approvals or permits may be required for some stormwater and drainage projects.

Table 3.08.1(a) Example of relevant statutory approvals and permits

Legislation	Activity
<i>Integrated Planning Act 1997 (IPA)/ Fisheries Act 1994 (Fisheries Act)</i>	A development permit is required for operational work that involves removal, destruction or damage to a marine plant. Those operational works are assessable in accordance with IPA and the Fisheries Act.
IPA/Fisheries Act	A development permit is required for operational work that involves constructing or raising waterway barrier works if it is not self-assessable development. Such works are assessable in accordance with IPA and the Fisheries Act.

Table 3.08.1(b) Example of relevant statutory approvals and permits (cont.)

Legislation	Activity
IPA/ <i>Environmental Protection Act 1994</i> (EP Act).	A development permit is required to dredge material from the bed of any waters. Dredging from the bed of any waters is specified as Environmentally Relevant Activity 19 in the <i>Environmental Protection Regulation 1998</i> . An application for a development permit to allow dredging will be assessed in accordance with IPA and the EP Act.
IPA/ <i>Coastal Protection and Management Act 1995</i> (CPM Act)	A development permit is required for operational work that is tidal work. Tidal work is defined in the CPM Act as work in, on or above land under tidal water, or land that will or may be under tidal water because of development on or near the land. Those works are assessable in accordance with IPA and the CPM Act.
IPA/ <i>Water Act 2000</i> (Water Act)	A development permit is required to construct a referable dam as defined under the Water Act or to increase the storage capacity of a referable dam by more than 10%. Refer to Section 5.12 for the definition of a referable dam. An application for a development permit to allow the construction of a referable dam or to increase the storage capacity of a referable dam by more than 10% will be assessed in accordance with IPA and the Water Act. It should be noted that there are other requirements in the Water Act relating to the construction of a referable dam.
Water Act	A water licence is generally required under Section 206 of the Water Act to interfere with the flow of water on, under or adjoining any land.
IPA/ Water Act	A development permit is required for operational works for anything constructed or installed that allows the interference with water. An application for a development permit for those works will be assessed in accordance with IPA and the Water Act.
Water Act	A permit is required to: <ul style="list-style-type: none"> • destroy vegetation in a watercourse, lake or spring; • excavate in a watercourse, lake or spring; • place fill in a watercourse, lake or spring. A drainage channel can be a watercourse for purposes of the Water Act.
<i>Nature Conservation Act 1992</i> (NCA)	Where drainage or stormwater works are to take place in a National Park, Conservation Park or other area protected under the NCA, Section 35(1) requires that an application be made for a permit. The Environmental Protection Agency will need to be satisfied that: <ul style="list-style-type: none"> • the cardinal principles of any relevant National Park management will be observed; • the works are in the public interest; • the works are ecologically sustainable; and • there is no reasonably practicable alternative to the works.

3.09 Key legislation

It is important for those involved in managing drainage and stormwater projects to have a general understanding of the land use planning regime under which they will need to operate. Stormwater and drainage works themselves may require development approvals under relevant legislation. An overview of the main legislation is set out below.

3.09.1 *Integrated Planning Act 1997*

"Development" is defined in the *Integrated Planning Act 1997* (IPA) to include:

- (a) building work, including works regulated under the Standard Building Regulation (SBR);
- (b) plumbing and drainage work, as defined in the *Plumbing and Drainage Act 2002*; and
- (c) operational work involving:
 - (i) the extraction of gravel, rock, sand or soil from the place where it naturally occurs; and
 - (ii) undertaking work in, on, over or under premises where that work materially affects premises or the use of premises.

Accordingly, works involving the installation of drainage and stormwater infrastructure, or managing the drainage and stormwater impacts of works at a site, can constitute *development* under IPA.

Where development constitutes *assessable development* under a local government's planning scheme, the development must be assessable in accordance with the provisions of IPA. In addition, building work assessable against the *Standard Building Regulation* is assessable development under IPA. There are also many other activities identified as assessable development in Schedule 8 of IPA which can involve drainage works and which require development approval under IPA.

When granting a development approval under IPA, a local government may include conditions in the development approval to deal with stormwater and drainage issues. In accordance with Section 3.5.30 of IPA, such conditions must be relevant to, but not an unreasonable imposition on the development, or they must be reasonably required in respect of the development.

In some circumstances the *Standard Building Regulation* or a planning document prepared by a local government dealing with stormwater and drainage may constitute a *code* for the purposes of IPA and apply to works which constitute assessable development.

3.09.2 Plumbing and Drainage Act 2002

The *Plumbing and Drainage Act 2002* (P&D Act) regulates the technical aspects of the installation of stormwater and drainage facilities including any work carried out on such facilities at a site. The P&D Act sets out the process for obtaining approval to carry out works involving stormwater and drainage facilities.

Drainage installation works on a site where those works do not become the property of the Local Government must always be carried out in accordance with the P&D Act.

The P&D Act does not apply to works associated with the overland flow of stormwater. It does however apply to works which involve installing or maintaining a connection to a local government's existing stormwater and sewerage infrastructure.

The P&D Act has been rolled into IPA so that approval for plumbing and drainage works assessed in accordance with the P&D Act must be sought using the Integrated Development Approval System (IDAS) under IPA.

3.09.3 Building Act 1975

Under the *Building Act 1975* (Building Act), a person must comply with the *Standard Building Regulation* when carrying out building work. The *Building Code Australia* forms part of the *Standard Building Regulation*.

The *Building Code Australia* contains certain performance requirements relating to the management of surface water drainage during the construction of a building. The deemed-to-satisfy provisions require compliance with AS 3500.3 – Plumbing and Drainage – Stormwater Drainage.

AS 3500.3 is also referred to in the Queensland Development Code (QDC) Part 9 - Stormwater Drainage. However that part of the QDC does not have any legislative force in Queensland.

The Building Act has been rolled into IPA so that a building approval obtained under the *Standard Building Regulation* must be sought using the IDAS process in IPA.

3.09.4 Local Government Act 1993

Under section 956A of the *Local Government Act 1993* (LG Act), a local government's consent is required to connect a stormwater facility to the local government's stormwater drainage system.

It is an offence under sections 956B and 956D of the LG Act to allow sewerage, sanitary drainage, trade waste and other prohibited substances to enter a local government's stormwater drainage system.

It is also an offence under section 956F of the LG Act to restrict or redirect the flow of stormwater over land in a way that could cause the water to collect and become stagnant.

Local governments are responsible for policing these provisions in their local government areas.

3.09.5 Health Act 1937

Under section 94 of the *Health Act 1937* (Health Act), a local government can require a land owner to carry out works to alter or repair a stormwater drain which the local government finds is in poor condition. For the purposes of this provision, a stormwater drain will be in a poor condition if it is or has the potential to be a nuisance or injurious or prejudicial to health.

A local government can also require a person to take action to abate a nuisance under Section 79 of the Health Act. Situations arising from poor stormwater and drainage management could give rise to a nuisance for the purposes of the Health Act.

Local governments are required by the Health Act to prevent nuisances in their local government area. They can also take steps to rectify stormwater drainage issues at the direction of the State Government.

3.09.6 Environmental Protection Act 1994

Under the *Environmental Protection Act 1994* (EP Act), it is an offence for a person to cause serious or material environmental harm.

Environmental harm is any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value. An environmental value is a quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety.

It is possible that a failure to adequately manage stormwater and drainage at a site could give rise to liability for an offence under the EP Act if that failure has an off-site impact which causes serious or material environmental harm.

3.09.7 Native Title Act 1993

Under the *Native Title Act, 1993* (Native Title Act) any person (including a local government) that undertakes an activity so as to *affect native title* cannot validly do so unless the activity is covered by certain compliance provisions in the legislation. Such activities can include both physical construction activities (such as the construction of stormwater or drainage works) and non-physical activities (such as tenure grants and statutory approvals required for the works).

An activity is deemed to affect native title if, at law, its effect would be to extinguish native title or if it is otherwise *wholly or partly inconsistent with the continued existence, enjoyment and exercise of native title*. Most drainage and stormwater works are likely to be at least partially inconsistent with native title.

In many locations, native title will not be a relevant compliance issue for a project because it will be possible to demonstrate that any native title over the site will have been historically *extinguished*. For example, the law deems that a historical grant of freehold title over an area will have extinguished native title. Consequentially native title is never an issue for a freehold site. The same generally applies where the land is already a properly dedicated road or has previously had a public work constructed on it. Native title compliance may however need to be considered where a drainage or stormwater project (or its upstream or downstream effects) involve unallocated State land, reserve land or other types of non-freehold land.

If a drainage or stormwater project is proposed for a site where it can not be shown that native title has previously been extinguished, the following compliance options are available under the Native Title Act:

- (i) Indigenous Land Use Agreement (ILUA) - The relevant native title party can always consent to any activities by a proponent which affect native title but the consent must be contained in an ILUA. ILUAs are voluntary agreements and must ultimately be registered by the National Native Title Tribunal. Careful consideration needs to be given to various practical issues before a decision to develop an ILUA is made - including timing issues, cost issues, issues relating to overlapping native title claims and compliance with technical requirements in the Native Title Act. Legal advice should be sought.
- (ii) Other compliance provisions - Sometimes a project or activity can proceed irrespective of native title. Certain alternative validation provisions in the Native Title Act need to apply for that to be the case. These usually (but not always) require the proponent to complete a statutory notification process involving the relevant native title party. Some of the alternative validation provisions which may be applicable to stormwater and drainage projects include the following:
 - Section 24HA – Certain acts involving the management of water.
 - Section 24JA – Certain acts on or involving reserve land.
 - Section 24KA – Certain acts involving prescribed public facilities (they include "*a drainage facility, or a levee or other device for management of waterflows*").
 - Section 24LA – Certain limited "*low impact*" acts.
 - Section 24MD – Which enables native title to be compulsorily acquired in some circumstances.

Care should be taken in applying any of the alternative validation provisions. Firstly, they need to be applied in a certain order. Secondly, notification or other procedural rights need to be properly satisfied.

3.10 Statutory duties of care

Legislation casts a prescribed duty of care on all persons who propose to carry out activities which are potentially harmful (eg. harmful to the environmental value of land or the cultural or historic values of indigenous people in areas or objects).

The onus is on the proponent to take their own measures to satisfy the duty of care. Failure to do so will generally constitute an offence and may also involve other consequences (such as Ministerial stop orders or injunctions in relation to threatened breach of the cultural heritage duty of care).

There are (in 2007) two main statutory duties of care likely to have implications for some drainage and stormwater projects. They are the *environmental protection duty of care* under the *Environmental Protection Act, 1994* and the *cultural heritage duty of care* under the *Aboriginal Cultural Heritage Act, 2003*. These duties of care require specific compliance action and may not be met simply by the proponent obtaining development permits or statutory approvals which are otherwise required.

3.10.1 Environmental protection duty of care

The *Environmental Protection Act, 1994* imposes a general environmental duty on all persons including local governments.

That statutory duty requires a person not to carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise harm.

In addition to considering any other specific statutory requirements for a project in relation to environmental protection, the proponent should assess whether any additional practical measures are needed to satisfy this general environmental duty.

3.10.2 Cultural heritage duty of care

The *Aboriginal Cultural Heritage Act, 2003* (ACHA) provides a higher level of legal protection for indigenous cultural heritage in Queensland than was the case before it commenced on 16 April 2004. Aboriginal cultural heritage can now include both *objects* and *areas* (of land or waters) which are culturally or historically significant to indigenous people. All persons (including local governments) must now satisfy a statutory *cultural heritage duty of care* in relation to all activities which could cause harm to such objects or areas. Such activities can include any clearing, excavation or other disturbance of land associated with a drainage or stormwater project.

The *cultural heritage duty of care* requires all persons who carry out activities to take *all reasonable and practical measures to ensure the activity does not harm indigenous cultural heritage*. The onus is on the proponent to take such

measures irrespective of the tenure of the land and irrespective of any other statutory approvals or permissions they may need to obtain.

The legislation sets out a series of statutory compliance options (including satisfying certain *cultural heritage duty of care guidelines*, preparing *cultural heritage agreements* and developing *Cultural Heritage Management Plans* (CHMPs)). These will deem the proponent to have complied with the duty of care and other cultural heritage protection provisions in the legislation. Specific legal advice may need to be sought on which of these compliance options is applicable or most appropriate in any particular case.

In relatively unusual cases, a proponent will have no choice as to which of the statutory compliance options are used—a CHMP will be mandatory. For example, where a project requires an Environmental Impact Statement (EIS) under any legislation, a CHMP must be developed and formally *approved*. Depending on the circumstances, the approval will need to be sought from either the Chief Executive of the Department of Natural Resources & Water or from the Minister for Natural Resources & Water after a *recommendation* from the Land & Resources Tribunal.

3.11 Common law requirements

Drainage disputes are generally a matter of common law as modified by statutory enactment. The issues are often unclear and legal opinion is often necessary to determine an appropriate course of action.

In carrying out works that modify existing stormwater and surface water drainage patterns the rights of adjoining landowners at common law must be taken into account.

A person (including a local government) may be liable under common law principles of nuisance where there has been a substantial or unreasonable interference with another person's use and enjoyment of land. If a person's actions result in the concentration of additional surface water over and above flows that would occur naturally which cause a direct impact to another person's land, liability for nuisance may arise. The impact may be in the form of actual physical injury to land or impairment of the owner's ability to enjoy their land.

The leading case on nuisance arising from stormwater and surface water drainage is *Gartner v Kidman* (1962) 108 CLR 12. It set out the following principles:

- (i) The person from whose land the water flows (upstream owner) is not liable merely because surface water flows naturally from that person's land onto another person's land (downstream owner).
- (ii) The upstream owner may be liable if water flows from the upstream owner's land in a more concentrated form than it naturally would due to man-made alteration of the level or conformation of land.

- (iii) The upstream owner will not be liable for a more concentrated flow caused by the works of a third-party over which the upstream owner has no control (eg. works separately carried out by a local government).
- (iv) A nuisance will not arise where the damage is caused by the upstream owner's natural and ordinary use of the land (eg. where the upstream owner has not carried out works to change natural drainage patterns).
- (v) The downstream owner can put in place measures to prevent the natural unconcentrated flow of water on their land, even where doing so damages the upstream owner's land, as long as the downstream owner uses reasonable care and skill in implementing such measures and does no more than is reasonably necessary to protect the enjoyment of their land.
- (vi) In putting in place measures to prevent the natural unconcentrated flow of water on their land, the downstream owner cannot divert the water onto the land of a third landowner to which it would not have naturally flowed.

The remedies available to the downstream owner in circumstances where a nuisance has occurred are damages for loss or damage caused by the nuisance or an injunction against the upstream owner.

The trial judge in the case of *Alamdo Holdings Pty Ltd v Bankstown City Council* (2003) 134 LGERA 114, found that even a significant increase in the frequency with which land will be inundated can constitute a significant interference with the use and enjoyment of land and hence give rise to an actionable nuisance. On appeal, the High Court of Australia found that s773 of the *Local Government Act 1993 (NSW)* indemnified the defendant Council against liability in respect of such a nuisance (see *Bankstown City Council v Alamdo Holding Pty Ltd* [2005] HCA 46 (although this was in the context of the specific NSW legislation)).

Where a local government has commissioned works giving rise to a nuisance, the local government may be liable for that nuisance. There is also a possibility that a local government will be liable along with an upstream owner in circumstances where it has issued a development approval to the upstream owner allowing the works which cause the nuisance to be carried out.

An upstream owner will not be liable for a nuisance where the downstream owner has consented to the discharge of stormwater or drainage onto their land. For that reason, conditions imposed on a development approval by a local government may require an adjoining landowner's consent to the receipt of additional stormwater and surface water drainage generated by the works covered by the development approval.

This Chapter does not contain an exhaustive commentary on the potential common law liabilities which can arise in the context of drainage and stormwater works. Although nuisance is the most frequent common law

principle invoked in relation to such works and their consequences, other common law principles can also apply in some circumstances. For example, common law principles of negligence will require a proponent of works to ensure that they satisfy their common law duty of care in terms of designing and constructing works with adequate care and skill.