Temporary State Planning Policy

[INSERT]/11 Planning for Stronger, More Resilient Floodplains

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Date: 19/09/11

Exhibit Number: S31

Sustainable Planning Act 2009

TEMPORARY STATE PLANNING POLICY

Planning for Stronger, More Resilient Floodplains

September 2011

Making the temporary State planning policy

This temporary State planning policy was made by the Honourable Paul Lucas MP, Deputy Premier and Attorney-General, Minister for Local Government and Special Minister of State under Chapter 2, Part 4, Division 3 of the *Sustainable Planning Act 2009*.

Commencement

This temporary State planning policy takes effect on [INSERT DATE].

Prepared by:

Queensland Reconstruction Authority

August 2011

Contents

Explanatory statement

Planning for Stronger, More Resilient Floodplains

During July to December 2010, extreme rainfall was experienced across large parts of eastern Australia, with Queensland experiencing its wettest Spring on record. As a result, Queensland's catchment areas were significantly saturated prior to major rain events that caused severe flooding throughout Queensland between November 2010 and April 2011.

Most of Queensland's major towns and cities are located on a floodplain, both inland and coastal. In order to ensure the resilience of these town and cities and the subsequent safety of their residents from threats of future flood events, these towns and cities must, to the greatest extent possible, be capable of withstanding or minimising the effects of future flood events.

Development within Queensland is principally regulated by local government planning schemes which provide guidelines for acceptable types of development within the boundaries of local government areas. By understanding how floodplain systems operate, future development within Queensland can incorporate measures aimed at ensuring that planning and development continues whilst minimising the effects of future flood events by incorporating specific and consistent floodplain management measures into existing planning schemes, where appropriate.

Temporary State Planning Policy (insert number): Planning for stronger more resilient floodplains (the SPP) has been developed to support the designation of Natural Hazard Management Areas (Flood) . Through the identification of NHMA (Flood) Local Governments can amend their existing planning schemes and incorporate planning scheme provisions to regulate assessable development within the NHMA (Flood).

Outcome sought by the Temporary SPP

This SPP seeks to ensure that development is planned, designed and constructed to minimise potential flood damage to towns and cities and to improve safety of individuals and communities.

This outcome supports the objective of the *Sustainable Planning Act 2009*.

Effect of the Temporary SPP

The effect of the SPP is to:

- Suspend the effect of paragraphs A3.1 and A3.2 of Annex 3 of State Planning Policy 1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide
- Make a Temporary State Planning Policy dealing with and giving effect to the matters suspended in paragraphs A3.1 and A3.2 of Annex 3 of State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide by providing local government with information necessary to determine the Natural Hazard Management Area (Flood) and then adopt an associated overlay map(s) and code by way of an amendment to an existing planning scheme.

Implementing the Temporary SPP

The Temporary SPP is to be implemented by:

- Allowing a local government to amend existing planning scheme to incorporate a Natural Hazard Management Area (Flood) in accordance with Annex 1; and to
- Informing strategic land use planning decisions for the preparation of new *Sustainable Planning Act 2009* planning schemes

The Temporary SPP will influence planning and development decisions wholly or partially within a Natural Hazard Management Area (Flood).

The Temporary SPP is supported by the Guideline: Planning for Stronger, More Resilient Floodplains, which gives further information and advice on the implementation of this Temporary SPP.

The Temporary SPP is supported by an extensive mapping process evaluating floodplains across Queensland.

1. Policy outcome

Policy outcome sought by the Temporary SPP

1.1 State Planning Policy 1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide requires the identification of natural hazard management areas. The identification of the natural hazard management area for flood (the Natural Hazard Management Area (Flood)) is dependent upon a local government adopting a flood event for the management of development in a particular locality.

1.2 To promote a better understanding of floodplains via a correlation between land use planning and floodplain management, the State government has prepared a number of tools which may be adopted by a local government to assist in identifying the Natural Hazard Management Area (Flood), and in regulating development partially or wholly within a floodplain.

2. Application of the Temporary SPP

State planning policy and State planning policy guideline

2.1 The Temporary State Planning Policy: Planning for Stronger, More Resilient Floodplains is a statutory instrument under the *Sustainable Planning Act 2009*.

2.2 The Temporary State Planning Policy Guideline: Planning for Stronger, More Resilient Floodplains (SPP guideline) provides advice about implementing the SPP and is declared to be extrinsic material under the *Statutory Instruments Act 1992*, s. 15.

2.3 When designating land for community infrastructure, a Minister or local government must consider the development outcomes set out in the code in Annex 1 of this policy.

2.4 Terms used in the SPP, code and SPP guideline have the same meaning as defined in the *Sustainable Planning Act 2009* and the *Sustainable Planning Regulation 2009*. The glossary explains particular words used in the SPP and the SPP guideline.

Areas to which the Temporary SPP applies

2.5 The Temporary SPP applies to all Local Government Areas.

3. Making or amending a planning instrument

Achieving the policy outcome through a local planning instrument

3.1 A local planning instrument achieves the policy outcome in section 1.1 to 1.2 of this Temporary SPP if it results in an amendment to a local government planning instrument, or a new local government planning instrument, which designates a Natural Hazard Management Area (Flood) as per Annex 1.

4. Information and advice about the Temporary SPP

Sources of information and advice

4.1 The Queensland Reconstruction Authority and the Department of Environment and Resource Management (DERM) can provide advice about implementing and interpreting the SPP, and on reflecting the SPP in a planning instrument.

4.2 The Guideline contains further information about the maps and code.

4.3 The Department of Local Government and Planning can provide advice about reflecting the SPP in a local planning instrument, and the operation of the Integrated Development Assessment System (IDAS).

Operation of the Temporary SPP

4.4 The Temporary SPP will operate for up to 12 months.

Annex 1

NATURAL HAZARD MANAGEMENT AREA (FLOOD)

Where proposing amendments to an existing planning instrument under the *Sustainable Planning Act 2009*, a Natural Hazard Management Area (Flood) is:

1) land inundated by a Defined Flood Event (DFE) and identified in a planning instrument; or
2) the Interim Floodplain Assessment Overlay mapping and Model Code provided by the Queensland Reconstruction Authority; or
3) the Interim Floodplain Assessment Overlay mapping and Model Code as amended by the relevant Local Government.

Where proposing a new planning instrument under the *Sustainable Planning Act 2009*, a Natural Hazard Management Area (Flood) is:

1) land inundated by a Defined Flood Event (DFE) and identified in a planning instrument; or
2) the Interim Floodplain Assessment Overlay mapping and Model Code provided by the Queensland Reconstruction Authority; or
3) the Interim Floodplain Assessment Overlay mapping and Model Code as amended by the relevant Local Government.

Queensland Reconstruction Authority

Planning for stronger, more resilient floodplains

Part 1 – Interim measures to support floodplain management in existing planning schemes

Australian Government
Geoscience Australia

Queensland Government

In developing this toolkit, the Queensland Reconstruction Authority has consulted more than 10 Local Governments and the Local Government Association of Queensland (LGAQ).

The sheer scope and scale of the weather events which affected Queensland last summer meant that to build and plan stronger, more resilient communities into the future, Councils need more comprehensive data to make informed decisions about how and where we build.

To assist Queensland Councils the Authority has undertaken the single largest floodplain mapping exercise in the State's history. The maps contained in the toolkit - *Planning for Stronger, more Resilient Floodplains* are drawn from evidence of past flooding, including soils, topography and satellite imagery.

They are informed by the 2010/11 summer disasters but do not represent the actual flood line for that period. Why? Because while the whole of Queensland was affected last summer, we know there have been larger floods in some areas in the past. What the maps do show are areas where inundation has previously occurred or is likely to occur. At the conclusion of this mapping exercise, floodplain mapping will be available for the whole of Queensland.

The State's river systems do not stop at local Government boundaries and so for the first time, these floodplain maps have also been developed on a catchment-by-catchment basis. And with them, comes the opportunity for Councils to adopt the floodplain maps and supporting developmental controls into existing planning schemes.

This guideline provides Councils – especially those who have perhaps historically lacked the resourcing capacity to undertake these types of studies - with a ready-made toolkit to help assess future development applications and the opportunity to better align floodplain management and land use planning.

The Queensland Reconstruction Authority wishes to thank in particular the Banana Shire Council and the Fitzroy Basin Association who have made significant contributions to the pilot program and who, along with the LGAQ, have provided input and support for its development.

Banana SHIRE
SHIRE OF OPPORTUNITY

fba
FITZROY BASIN ASSOCIATION

Planning for stronger, more resilient floodplains

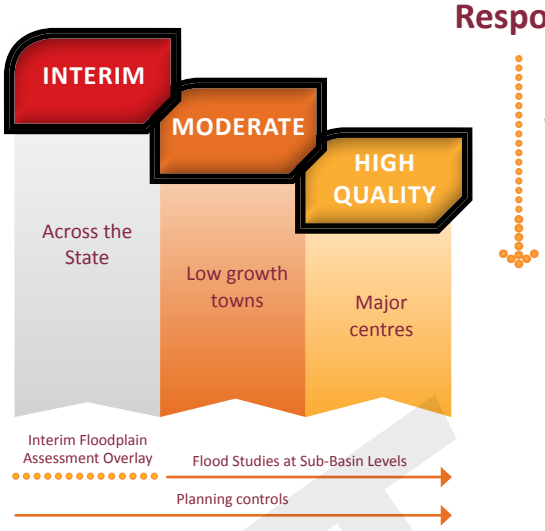
Queensland is a State of meteorological extremes, with floods occurring regularly across many parts of the State. From July to December 2010, this was no better demonstrated as Queensland experienced its wettest spring on record. In total, 13 major river catchments reached their highest recorded peak levels and 210 townships and suburbs were affected by flooding.

Most of our towns and cities are located on floodplains, both inland and coastal. This is an historical fact, principally for reasons associated with water supply, transportation, waste disposal, advantageous points for river crossings, access to productive soils or recreation purposes. Hence, these towns and cities will be subject to flooding from time to time.

Put simply, if we are to use floodplains for these purposes, we need to acknowledge and plan for flooding in a way that improves resilience of our built form and encourages the safety and well being for our communities and individuals.

Seeing significant change in Queensland's floodplains will be generational – the full implementation of this improved resilience will be seen over time through specific shifts in local land use planning policy and development assessment decision-making that take account of the vulnerabilities of development in the floodplain. However, through interim changes to the way development is addressed in these risk areas, real steps can be taken now to ensure new development in Queensland's floodplains considers and responds to adverse flood events.

The key to ensuring our State copes with these flood events is improving the resilience of our communities. In response, the Queensland Reconstruction Authority (the Authority) has prepared this two part guideline ***Planning for stronger, more resilient floodplains.***



Responsibilities

National
State
Region
Local

As demonstrated above, an important aim of ***Planning for stronger, more resilient floodplains*** is to provide a fit for purpose response to help Councils introduce consistent and specific planning controls to manage flood risks in the floodplain assessment area.

Part 1 represents a interim response that can be applied across the entire State. Part 1 includes the development of an *Interim Floodplain Assessment Overlay* incorporating a mapping product and supporting planning scheme provisions. A major driver of this Guideline is the ability to provide low growth Councils with workable products now, in lieu of detailed flood studies which will take significant time and resources to complete across the State. It is recognised that not all Councils will benefit from Part 1 as some Councils are well advanced with flood mapping and planning scheme provisions. However, all Councils can learn from recent events and incorporate the principles of floodplain management in the development and preparation of their new planning schemes.

Floodplain Management

Stronger, more resilient floodplains

Context

2010/2011 events

QldRA Roles and Functions

Understanding 1
- Scale of impact from the 2010/2011 event
- Structure of floodplains and river systems

Analysis 2
- Floodplain Mapping
- Building Code of Australia

Implementation 3
- Toolkit to support Councils
- Mapping
- Code provisions

Delivery 4
- Process for incorporating toolkit into existing planning scheme provisions

The Authority acknowledges the following organisations that have provided their support to this important program of work:

- Geoscience Australia
- Banana Shire Council
- Fitzroy Basin Association
- Bureau of Meteorology
- CSIRO

Key information is provided throughout this Guideline. It is marked with this symbol. It has been provided courtesy of the Queensland Floods Science, Engineering and Technology Panel *Understanding Floods – Questions and Answers.*

A full copy of this document can be downloaded from: www.chiefscientist.qld.gov.au

Introduction

During Summer 2010/2011 Queensland experienced unprecedented events that resulted in the entire State being disaster activated. Whilst flooding in Queensland is not rare, between November 2010 and April 2011, 91 per cent of the State was disaster activated as a result of flooding. The scale of the event of summer 2010/2011 has never before been seen.

The management of our floodplains is complex. Balancing the role of the floodplain from protection of agriculture and the environment, to stimulating economic growth and supporting new population growth is a difficult process to manage. Each has its role and arguably each is as important as the other.

To ensure that Queensland learns from the recent natural disasters the Authority has partnered with the Department of Local Government and Planning (DLGP) including Building Codes Queensland (BCQ), the Department of Environment and Resource Management (DERM) and the Department of Community Safety (DCS) to deliver a body of work supporting greater resilience and understanding of our floodplains and to better inform and influence the land use planning process.

An outcome of this partnership is the development of this Guideline, entitled ***Planning for stronger, more resilient floodplains***. This is a two part Guideline aimed at raising awareness and represents the start of a journey to improve floodplain management throughout Queensland utlising the land use planning process.

To support this process, the Authority has partnered with Banana Shire Council (BSC), a Council that was significantly affected by events in December 2010/ January 2011. Together with the Fitzroy Basin Association (FBA) the BSC will embark on a journey to help improve the management of floodplains through the land use planning process.

Part 1 – ***Interim measures to support floodplain management in existing planning schemes*** delivers a toolkit that includes interim planning scheme measures and supporting mapping to those Councils who currently do not have any floodplain mapping. The mapping has been produced with the support of DERM and the mapping product provided represents an Interim Floodplain Assessment Overlay (Floodplain Maps). The Guideline also identifies a clear implementation path for those Councils that choose to adopt the interim code provisions and mapping.

Part 2 – ***Standard planning scheme provisions and flood study template*** will provide more detailed floodplain assessment guidance to Councils who are looking to prepare their new Planning Schemes under the Sustainable Planning Act 2009 (SPA).

An important aim of this Guideline is to help Councils introduce consistent and specific planning controls to manage flood risks in the floodplain assessment area.

About this Guideline

This Guideline has been developed to support Councils by offering interim fit for purpose measures to ensure that potential flooding impacts can be considered as part of the development assessment process. The Guideline is divided into four key parts:

1 Understanding

- Scale of impact from the 2010/2011 event
- Structure of floodplains and river systems

2 Analysis

- Floodplain planning
- Building Code of Australia

3 Implementation

- Interim Floodplain Assessment Overlay – Mapping
- Interim Floodplain Assessment Overlay – Code provisions

4 Delivery

- Proposed amendment process for existing planning schemes

Part 1 principally focuses on providing Councils with an assessment trigger allowing consideration of a development proposal's potential impact on the floodplain. As an interim solution, this Guideline does not offer a comprehensive solution for managing new or existing development in floodplain areas. It does however, offer those Councils and indeed applicants, additional scheme provisions to ensure that there is due consideration as to what and how a development proposes to respond to a potential flood impact. This toolkit does not replace or override any existing engineering development standards, such as local road design manuals or the *Queensland Urban Drainage Manual*. Critically, it also does not replace or diminish the need for disaster warning and response plans or evacuation procedures. Even after adopting the recommendations in this Guideline, people should not become complacent to the risk of flood.

Objectives

The main objectives of the Guideline are to:

- Promote a greater understanding of the scale and extent of floodplains in Queensland and their management
- Promote a greater correlation between floodplain management and land use planning
- Provide Councils with an information toolkit that they can adopt in a timely manner to provide interim measures to support development assessment
- Support a more resilient built form outcome in flood prone areas through additional interim planning scheme measures.

What will Part 2 contain?

Queensland is in a unique position as the majority of Councils are resolving to prepare new SPA compliant planning schemes.
As Part 1 is an interim measure supporting existing planning schemes, Part 2 will build upon Part 1 to work towards a consistent approach of floodplain management in new planning schemes. To support this approach, Part 2 will address the following matters:

- Fit for purpose flood study template to help inform the strategic planning process developed in partnership with CSIRO and Bureau of Meteorology
- Standardised floodplain management provisions
- Advice on transition strategies for land uses, zoning recommendations and other key land use policy matters which effectively translates flood studies and floodplain management plans into land use plans using the Queensland Planning Provisions (QPP).

1 Understanding

Overview of events

During July to December 2010, extremely heavy rainfall was experienced across large parts of eastern Australia, with Queensland experiencing its wettest spring on record. This rain pattern was influenced by the strongest La Niña affect in the Pacific Ocean since the mid 1970s and as a result, Queensland's catchment areas were significantly saturated before major rain events occurred during November 2010 to April 2011.

- On 25 December 2010, the Category 1 Tropical Cyclone Tasha crossed the Queensland coast between Gordonvale and Ravenshoe
- Pre-existing weather conditions and sustained high rainfall between 23–28 December 2010 resulted in flooding in many parts of central and southern Queensland
- On 29 December 2010, Theodore was the first town to be fully evacuated in the history of Queensland. Condamine became the second township. Each was fully evacuated twice.
- On 10 January 2011, the townships of Maryborough, Bundaberg and Gympie were affected by rising floodwaters, leading to the widespread inundation of houses and businesses. Additionally, the Bruce Highway was cut in several locations
- On 10 January 2011, exceptionally heavy rainfall intensified in Toowoomba, culminating in unprecedented flash flooding within Toowoomba's Central Business District
- On 10 January 2011, a further torrent of water hit the Lockyer Valley where the towns of Grantham, Murphy's Creek, Postman's Ridge, Withcott and Helidon were severely affected
- On 11 January 2011, heavy rain continued in the Brisbane River catchment with flooding of Laidley and Forest Hill
- On 12 January 2011, the Bremer River in Ipswich had reached 18 metres while some low-lying Brisbane suburbs had already started to be inundated

Flooding snapshot 2010/2011

210 towns and suburbs were affected by flooding

13 river catchments recorded their highest peak levels

Total evacuation of a township, Theodore and Condamine (twice)

Critical infrastructure was affected

Rockhampton airport was closed

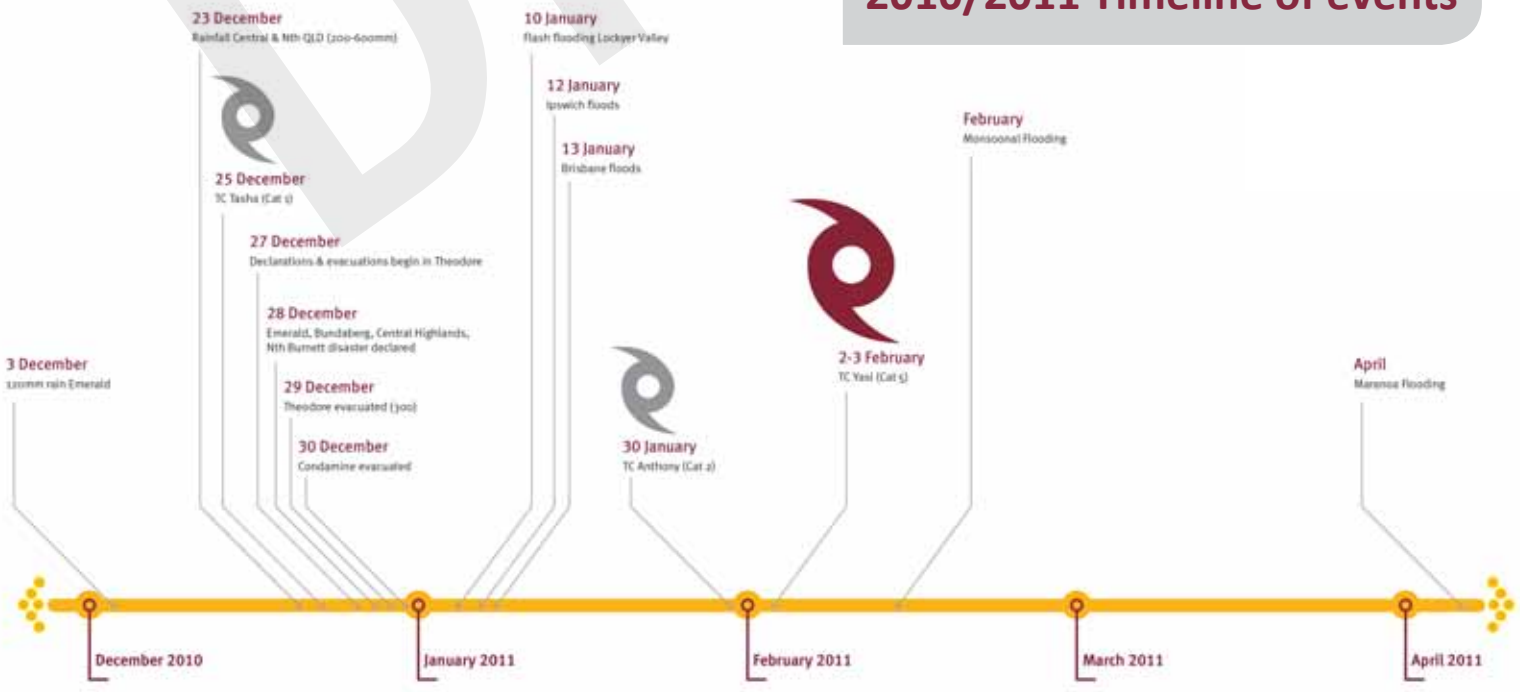
Water purification systems were flooded hampering clean up efforts and access to safe drinking water

50,000 km of road requires rebuild or repair

Damage bill from all disasters is $6.8B

- On 13 January 2011, the Brisbane and Bremer Rivers peaked at 4.46 metres and 19.5 metres respectively. These were lower than 1974 flood levels but the flooding caused significant inundation in both cities
- On 30 January 2011, Category 2 Tropical Cyclone Anthony crossed the coast close to Bowen, battering the coastal strip between Townsville and Mackay, depositing significant rainfall on already saturated areas
- On 3 February 2011, Category 5 Severe Tropical Cyclone Yasi struck. The largest severe cyclone to hit Queensland in recent times, it comprised a damaging core some 400 kilometres across with associated severe weather activity across 1000 kilometres of coastline, including a storm tide of more than five metres, peaking near Cardwell.

2010/2011 Timeline of events



Establishment of the Queensland Reconstruction Authority

The Authority was established through state legislation on 21 February 2011 as a statutory authority for the efficient and effective coordination of the reconstruction effort.

The Authority's mission is to reconnect, rebuild and improve Queensland, its communities and economy. This recognises that reconstruction starts house by house, street by street, community by community, industry by industry and results in a more resilient Queensland.

One of the core functions of the Authority is to respond to the disaster events of summer 2010/2011 and address both short and long term goals. The Authority has recognised a need for a greater understanding of the management of our floodplain specifically as it relates to land use planning outcomes.

Flooding and floodplains

Australia's floodplains are the commercial, social and ecological arteries of the nation. As such they constitute a national asset: an asset subject to damage when floods occur.

Most of our towns and cities are located on floodplains, both inland and coastal. This is an historical fact, principally for reasons associated with water supply, transportation, waste disposal, advantageous points for river crossings, access to productive soils or recreation purposes. Hence, these towns and cities subject to flooding from time to time.

Over time, uses in these areas have also become entrenched and in more recent times lifestyle, mobility and consumer sentiment has meant that these areas continue to be used for a range of commercial, social and ecological purposes. While these uses remain, so too will the potential risks when floods occur.

Put simply, if we are to use floodplains for these purposes, we need to acknowledge and plan for flooding in a way that improves resilience of our built form and encourages the safety and well being for our communities and individuals.

In Australia, flooding can be caused by four different mechanisms: heavy rainfall, storm surge, tsunami and dam failure. Rainfall and storm surge flooding create the most common and significant threats to social and economic well being of flood-prone communities. Tsunami and dam failure can result in catastrophic damage and likely loss of life. The probability of this type of flooding in Australia is low.

Thus, as devastating as recent events have been, they are not unique: 77 floods were recorded in Australia in the last 35 years of the 20th century; eight major floods were recorded in Australia in the 19th century and six in the first decade of the 21st century. Nature will undoubtedly continue to surprise us.

Floodplains are generally the more fertile areas of the continent. A significant proportion of Australia's agricultural output is produced on floodplains including irrigated agriculture. Regular flooding of these areas enhances agriculture by increasing soil moisture.

A floodplain is an essential component of a catchment, and floodplain management is a critical part of overall catchment management.

Cost of flooding

In Australia, floods are the most expensive type of natural disaster with direct costs for the period from 1967 to 2005 estimated at an average of $377 million per year (calculated in 2008 dollars).[1]

Until recently, the most expensive year for floods in Australia was 1974, when floods affecting New South Wales, Victoria and Queensland resulted in a total damage bill in today's figures of $2.9 billion. The Queensland Government estimates costs for the 2011 floods will exceed this figure with the damage to local government infrastructure estimated at $2.5 billion and the total damage to public infrastructure across the State at $6.8 billion. Conversely, and as discussed in section 3 – Implementation, flooding should be the most manageable type of natural disaster.

History of floodplain management

Floodplain management in Australia has evolved through four successive phases:

1. structural works
2. planning
3. flood emergency management
4. all-embracing management

During the structural works phase, predominantly in the 1970s, structural works (typically levees) were used to protect existing properties at risk. Little consideration was given to the use of levees and their potential impact on the environment, risk management planning or even land use planning. However, in 1974 a series of severe floods in New South Wales, Victoria and Queensland caused widespread and significant damage. The outcome was that a better understanding and regulation of levees was required.

In the 1980s and 1990s the importance of flood emergency management was brought into focus predominantly by the New South Wales Bogan River flood in April 1990 which required the forced evacuation of the town of Nyngan.

From the early 1990s the importance of an all-embracing approach to floodplain management was apparent with the States / Territories being far more advanced than previously in an integrated approach to floodplain management.

1 Floodplain Management in Australia, Best Practice Principles and Guidelines, SCARM Report 73, CSIRO Publishing

What factors contribute to floods?

Rainfall is the most important factor in creating a flood, but there are many other contributing factors. When rain falls on a catchment, the amount of rainwater that reaches the waterways depends on the characteristics of the catchment, particularly its size, shape and land use. Some rainfall is 'captured' by soil and vegetation, and the remainder enters waterways as flow. River characteristics such as size and shape, the vegetation in and around the river, and the presence of structures in and adjacent to the waterway all affect the level of water in the waterway.

So what exactly is floodplain management?

The objectives of floodplain management as determined by the Standing Committee on Agriculture and Resource Management (SCARM) are to:

- limit to acceptable levels the effect of flooding on the well-being, health and safety of flood-prone land, individuals and communities
- limit to acceptable levels the damage caused by flooding to private and public property
- ensure that the natural function of the floodplain – to convey and store floodwaters during a flood – is preserved
- encourage the planning and use of floodplains as a valuable and sustainable resource capable of multiple, but compatible, land uses of benefit to the community

Floodplain Management Process

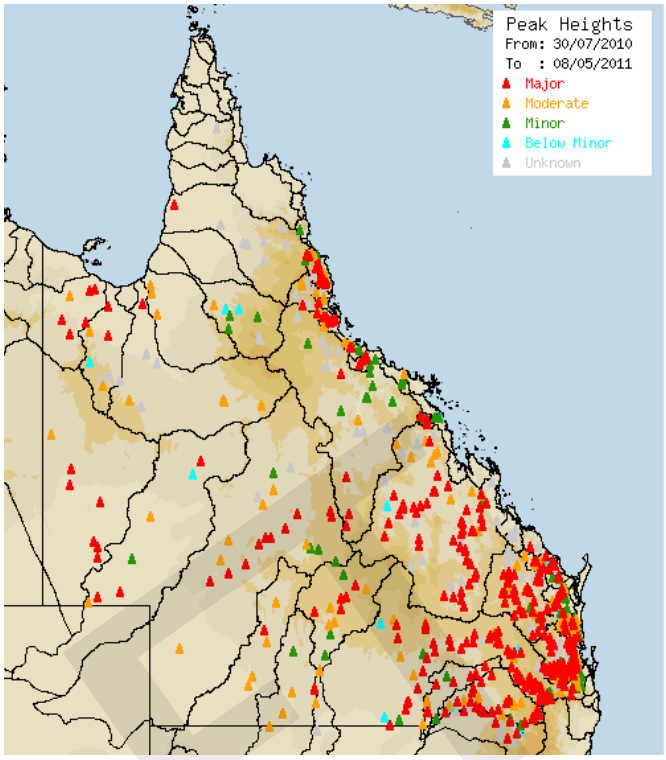
Ultimately the best way to manage our floodplains is through an integrated and approriate mix of measures which are specific for each floodplain area.

The floodplain management process typically encompasses three sequential stages[2]:

- Flood Study – a technical study to determine the nature and extent of flooding
- Floodplain Risk Management Study – an options assessment which evaluates management measures and options for the floodplain in respect to both existing and future development
- Floodplain Management Plan – formal adoption of a plan of management for the floodplain.

The time scale for this process can be in excess of 2 years and includes extensive community consultation. It is well understood that comprehensive community consultation throughout the floodplain management process leads to greater community acceptance of the outcomes. Without appropriate community consultation the estimate of flood risk can often be incorrect. This Guideline should be seen as part of a continuum towards best practice in mapping and managing risk in floodplains.

[2] Mark Babister, WMA Water, Natural Disaster Insurance Review August 2011



Peak heights during the 2010/2011 summer event. Source: *Bureau of Meteorology*

Six major floods occurred in Brisbane between 1885 and 1910, followed by more than 60 years without a major flood

Size of Flood (chance of occurrence in any year) ARI/ (AEP)	Probability of Experiencing the Given Flood in a Period of 70 Years	
	At least once	At least twice
1 in 10 (10%)	99.9%	99.3%
1 in 20 (5%)	97.0%	86.4%
1 in 50 (2%)	75.3%	40.8%
1 in 100 (1%)	50.3%	15.6%
1 in 200 (0.5%)	29.5%	4.9%

Probabilities of experiencing a given size flood once or more in a lifetime. Modified from *Floodplain Development Manual: the management of flood liable land, NSW Government, 2005*

ARI – Average recurrence interval

AEP – Annual Exceedance Probability

How do we estimate the chance of a flood occurring?

Understanding the chance of different sized floods occurring is important for managing flood risk. The chance of a flood event can be described using a variety of terms, but the preferred method is the Annual Exceedance Probability (AEP). A flood with a 1% AEP has a one in a hundred chance of being exceeded in any year. Currently, the 1% AEP event is designated as having an 'acceptable' risk for planning purposes nearly everywhere in Australia. However, good planning needs to consider more than just the 1% AEP flood.

Understanding the River Systems

Understanding Australia's river systems is integral to developing an appropriate interim land use planning and mapping solution. This exercise has been instrumental to guide and direct how to best map, plan and therefore manage appropriate land use responses.

In Australia there are twelve drainage divisions (Figure 1). Drainage divisions do not stop at state or territory boundaries and they continue until they terminate at the sea, ocean or inland lake.

Queensland hosts part of five (5) of these drainage divisions including:

- Northeast Coast (1)
- Gulf of Carpentaria (9)
- Murray Darling Division (4)
- Bulloo – Bancannia Division (10)
- Lake Eyre Division (11)

Within each drainage division there are several major river basins. Like the national drainage divisions, there are no river basins in Queensland that correlate with Local Government Areas. Therefore, the majority of Local Government Areas will contain several major river basins. There are 246 major river basins nationally, 75 of which are located in Queensland (Figure 2):

- Northeast Coast Division – 46 River Basins
- Gulf of Carpentaria Division – 19 River Basins
- Murray Darling Division – 5 River Basins
- Bulloo – Bancannia Division – 1 River Basin
- Lake Eyre Division – 4 River Basins

Major river basins usually comprise multiple rivers that converge on the river after which the river basin is named. For example, the Fitzroy River Basin includes the prominent rivers of Dawson and Nogoa, which drain into the Fitzroy River. Therefore, each river basin is usually comprised of one or more Sub-Basins. Again, for example, the Fitzroy River Basin is further divided into the following Sub-Basins:

- Isaac River Sub-Basin
- Nogoa River Sub-Basin
- Comet River Sub-Basin
- Dawson River Sub-Basin
- Mackenzie River Sub-Basin
- Fitzroy River Sub-Basin

Just like the major river basins, Sub-Basins do not correlate with Local Government Area (LGA) boundaries. Figure 3 shows the Dawson River Sub-Basin.

By understanding how our major river systems are governed, it can help identify the best way to adopt a standardised approach to land use planning provisions. Given the importance of what happens within a sub-basin, it is recommended that the best management of floodplains is for planning to be undertaken at a sub-basin level. This means that every LGA is likely to have more than one sub-basin within their LGA boundaries and the size of the sections of Sub-Basins they contain will vary. This underlines the need for the preparation of the Floodplain Management Plans to be a collaborative exercise and the traditional means of relying on individual local governments to prepare these plans should be reconsidered.

Local Government boundaries do not correlate with river systems or basin boundaries.

Drainage Divisions

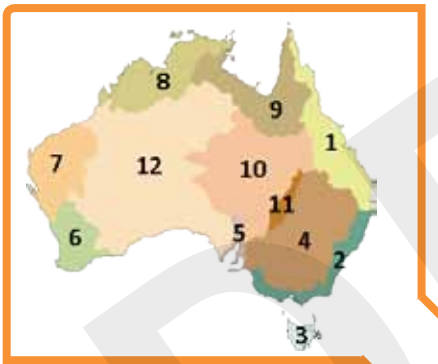


Figure 1 – National drainage divisions

River Basins

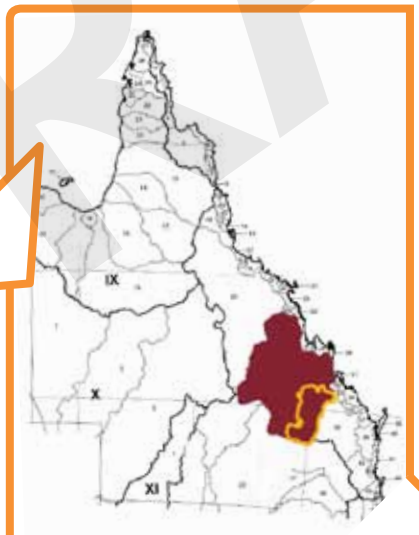


Figure 2 – Qld River Sub-Basins

Sub-Basins

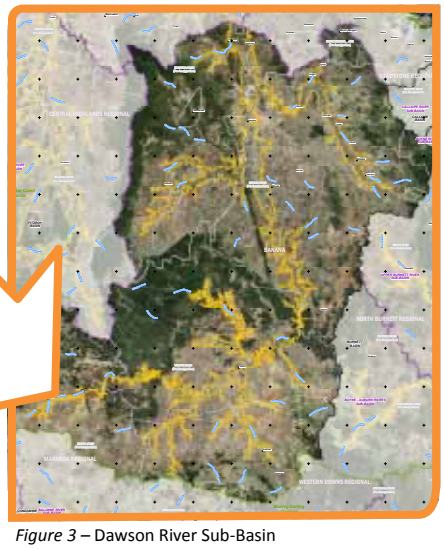


Figure 3 – Dawson River Sub-Basin

EXAMPLE

Dawson River – Sub-Basin

Drainage Division	1 – NorthEast Coast
River Basin	30 – Fitzroy
Sub-basin	Dawson River
Applicable LGAs	Banana Shire
	Central Highlands Regional
	Maranoa Regional
	Western Downs Regional
	Rockhampton Regional
	Woorabinda Aboriginal Shire

2 Analysis

Australia, and in particular Queensland, is prone to a long list of natural hazards, including flooding, cyclones, severe storms, bushfire, landslide and earthquakes.

The recent flood events seen across the State have highlighted the importance of considered land use planning that responds to the risks presented by natural hazards and particularly flooding.

Understanding how our river systems work here in Queensland acknowledges that an integrated approach to land use planning on floodplains is required to bring together the diverse issues and stakeholders that affect, or are affected by, floodplain management. This approach takes flooding behaviour, flood risk and flood hazard into account, along with all other relevant planning factors.

The end product of this process is a floodplain management plan that facilitates the use of the floodplain for appropriate purposes; limits flood hazard, and damage to socially acceptable levels; enhances the waterway and floodplain environment; and fosters flood warning, response, evacuation, clean-up and recovery in the onset and aftermath of a flood.

Floodplain Management in Australia – Best Practice Principles recommends the adoption of an approach to floodplain management at a total catchment (sub-basin) level beyond the LGA boundaries.

This sub-basin perspective is needed in order to manage effectively the result of existing development and the cumulative effects of future development on stormwater and mainstream flooding. This perspective includes both the upstream and downstream implications of proposed land use developments and floodplain management activities.

This approach will require collaboration from many stakeholders to support the ultimate goal of integrated management of our floodplains. This approach should extend beyond the development assessment process.

Traditionally a flood study is a comprehensive technical investigation of flooding behaviour that defines the extent, depth and velocity of floodwaters for floods of various magnitudes.

There are two principle components to a flood study:

Hydrologic analysis or estimation of flood discharges for floods of various magnitudes.

Hydraulic analysis or determination of the extent, depths and velocities of flooding.

This level of detail is not always required to facilitate improved floodplain management. In recognition of the time and cost to prepare detailed flood mapping and studies by Councils, the Authority, with the support of DERM, commenced a mapping exercise in June 2011 to establish interim mapping of floodplains to support Councils' existing planning schemes.

The dataset to inform the interim mapping product to be identified as *Interim Floodplain Assessment Overlay* (Floodplain Maps) was developed using the following overall principles:

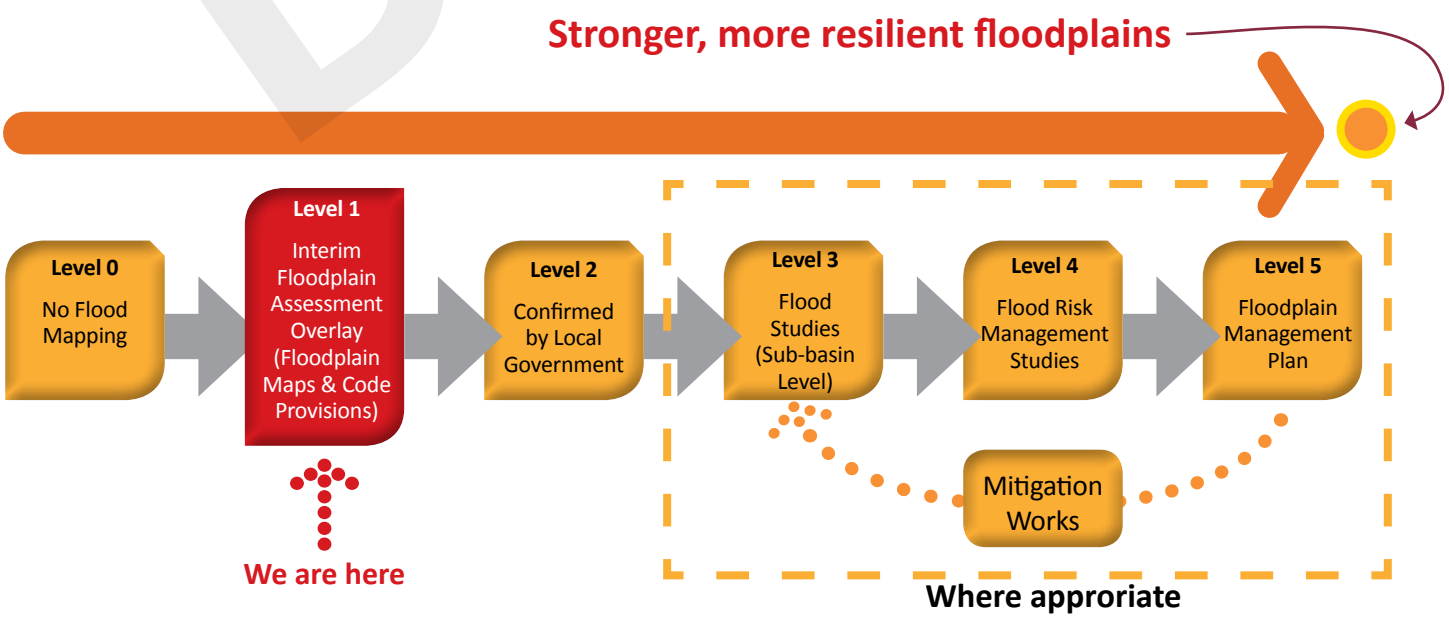
- suitability for a Statewide approach
- a consistent approach
- repeatable if more accurate data is available in the future
- evidential and justifiable

In terms of a maturity model for floodplain mapping, the Floodplain Maps are at level one and provide a framework for communities to decide priorities for more detailed flood studies (*Refer to Figure 4*).

Flood Mapping Maturity Levels

Level 0	No Flood Mapping
Level 1	Sub-Basin 'Interim Floodplain Assessment Overlay Mapping'
Level 2	Confirmed (by local govt) Floodplain Assessment Overlay Mapping. Potential to adopt as equivalent to Probable Maximum Flood defined at Sub-Basin level.
Level 3	Flood Studies completed in priority areas.
Level 4	Flood Risk Management Study
Level 5	Implemented Floodplain Management Plan

Figure 4 – **Flood Maturity Mapping Model**



The following is an overview and summary of each dataset used in the compilation of the floodplain maps:

Land zone 1

general term: estuarine (tidal flats and beaches)

Quaternary estuarine and marine deposits subject to periodic inundation by saline or brackish marine waters. Includes mangroves, saltpans, off-shore tidal flats and tidal beaches. Soils are predominantly Hydrosols (saline muds, clays and sands) or beach sand.

Land zone 3

general term: alluvium (river and creek flats)

Quaternary alluvial systems, including floodplains, alluvial plains, alluvial fans, terraces, levees, swamps, channels, closed depressions and fine textured palaeo-estuarine deposits. Also includes estuarine plains currently under fresh water influence, inland lakes and associated dune systems (lunettes). Excludes talus slopes, colluvial deposits and pediments. Includes a diverse range of soils, predominantly Vertosols and Sodosols, also with Hydrosols in higher rainfall areas.

SALI Soil Limitation Mapping

Refers to a soil type which has a limitation of flooding. Soil qualities and limitations are properties that can be assessed on an individual soil material basis and can affect the viability and sustainability of land uses.

Contours

Contour data with 10 metre vertical intervals available over the whole State has been used. In some selected cases to aid the visual interpretation, other available contour information has been used.

Stream Orders

Starting at the headwater, the stream is assigned number one to be made 1st order. As several 1st order streams converge the resultant stream becomes 2nd order. Two 2nd order streams converging form a 3rd order, etc. This is known as the Strahler Method. The number of orders in Queensland's Sub-Basins vary. The Dawson River sub-basin for example is classified to a 9th order. Flooding can occur in the headwater streams (ie. 1st order), but is more likely to be significant in higher order streams. For each sub-basin the appropriate stream orders have been selected to use in developing the Floodplain Mapping.

Imagery

Aerial imagery across the State is captured using different modes. The most common is through Landsat 5. Landsat 5 is the fifth satellite of the Landsat program. It was launched on 1 March 1984, with the primary goal of providing a global archive of satellite images. The program is managed by United States Geological Survey (USGS), and data from Landsat 5 is collected and distributed from the USGS's Center for Earth Resources Observation and Science. Australia like many countries has an agreement with the USGS where new satellite imagery is downloaded every 16 days and provided to Geoscience Australia. The imagery has a pixel resolution of 30 metres. In addition to Landsat more detailed aerial photography captured at the time of a flood over a town and cities has been used where available. During the summer 2010/2011 events, approximately 100 towns were captured with high resolution aerial imagery.

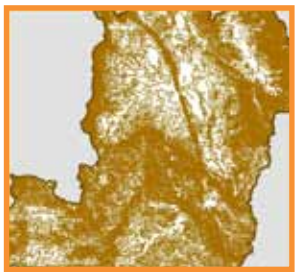
This is the largest mapping exercise currently underway in Australia. The mapping has been undertaken at a sub-basin level. Many Councils may have more than one sub-basin within their Local Government Area.

What are Land Zones?

Land zones represent major differences in geology and in the associated landforms, soils, and physical processes that gave rise to distinctive landforms or continue to shape them (Sattler and Williams 1999). Land zones are generally derived by amalgamating a range of geological, land system and/or soil mapping units at 1:100 000 to 1:250 000 scale. *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland. Version 3.1. Updated September 2005. Queensland Herbarium*

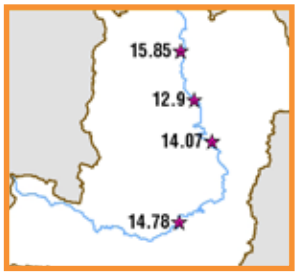
The Interim Floodplain Assessment Overlay (Floodplain Maps) was developed using multiple datasets. An example is shown for the Dawson River sub-basin:

- 10 metre contours
- Landsat imagery
- Gauging stations
- Stream orders 5 – 9
- Flood extent for 2011 generated from aerial photography
- Pre-clear vegetation mapping of Landzones 1 & 3 combined with soil flooding limitation mapping
- Aerial photography taken at or near flood peak



Contours

Landsat



Gauging Heights

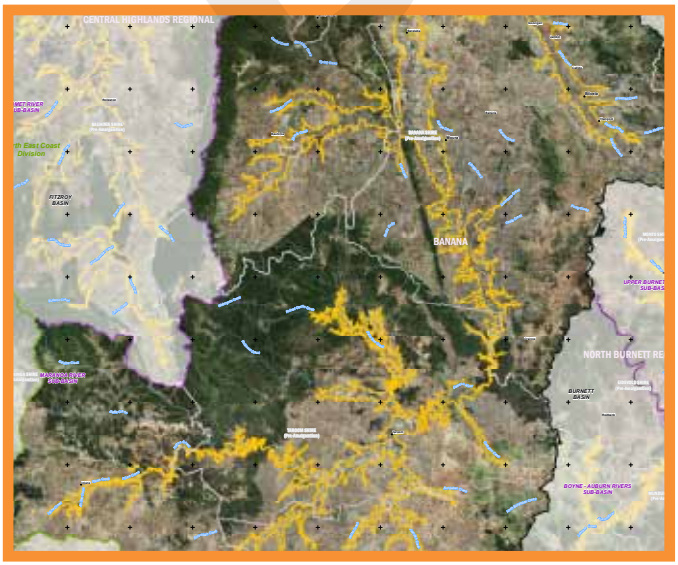
Stream Orders

Pre Clear Mapping

Aerial Taken – Theodore

The mapping product will be provided to Councils as:

- a Mapbook (a series of A3 Mapsheets covering the whole sub-basin) in both electronic and hard copy format;
- digital data compatible with geographic information systems (GIS) and
- interactive lot and plan search
- all mapping is available at www.qld.gov.au/floodcheck
- Until the mapping is locally verified and checked by Council it will remain as interim.



Example: Interim Floodplain Assessment Overlay for the Dawson River Sub-basin

Example: Interim Floodplain Assessment Overlay for the town of Biloela

3 Implementation

Planning for stronger, more resilient floodplains is a journey towards achieving better floodplain management through the land use planning process. Whilst not all Councils require assistance in achieving this objective, some do and may benefit from the use of this Guideline.

Floods are the most manageable of all natural disasters. Unlike other natural disasters, generally there is an understanding of where floods will occur and estimates of the likelihood of flooding, flood behaviour and the consequences of flooding in some cases. On the other hand the unpredictability of Severe Tropical Cyclone Yasi meant it was not known when it would make landfall until just hours before it crossed the coast. Therefore, through a combination of learning from the Yasi experience and analysing its aftermath, we can plan more efficiently for similar events and, at the same time, create more resilient communities.

New Construction Standards

The Australian Building Codes Board has developed a draft national Standard for Construction of Buildings in Flood Hazard Areas (draft Standard), which is scheduled to be introduced into the Building Code of Australia (BCA) in 2013, following appropriate consultation. The scope of the draft Standard is limited to class 1 (houses and townhouses), class 2 (units and flats), class 3 (hotels, motels and backpackers), class 4 (caretakers dwelling), class 9a (health care) and class 9c (aged care) buildings. It provides specific performance requirements and deemed-to-satisfy (DTS) provisions for the design and construction of new buildings in a flood hazard area, as designated by the relevant authority (ie. Local Government).

DLGP is proposing early adoption of the draft Standard as a new mandatory part of the Queensland Development Code (QDC). Additional non-mandatory provisions, which are currently outside the scope of the draft Standard, are also proposed to be included in the QDC to be adopted by Local Governments on a voluntary basis through a planning scheme, Temporary Local Planning Instrument, or by resolution. It is proposed that the new QDC will apply to new buildings and additions to existing buildings, but not generally to building alterations (for example, internal repairs such as adding bathroom or removing a wall).

However, unless there is appropriate mapping to indicate a building is within a flood prone area, these new provisions may not be triggered.

Temporary State Planning Policy

To assist in this process the Authority partnered with DLGP to implement a new Temporary State Planning Policy (TSPP) – Planning for stronger, more resilient floodplains – which creates the statutory mechanism by which a Local Government may look to adopt the Interim Floodplain Assessment Overlay as part of their existing planning scheme.

The TSPP suspends the effect of paragraphs A3.1 and A3.2 of Annex 3 of State Planning Policy 1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide, which identifies the process by which a Local Government may designate a Natural Hazard Management Area (Flood) (NHMA).

The effect of the TSPP is to allow amendments to an existing planning instrument under the SPA for a Natural Hazard Management Area (Flood) to include:

1) land inundated by a Defined Flood Event (DFE) and identified in a planning instrument; or
2) the Interim Floodplain Assessment Overlay mapping and Model Code provided by the Queensland Reconstruction Authority; or
3) the Interim Floodplain Assessment Overlay mapping and Model Code as amended by the relevant Local Government.

The TSPP therefore gives effect for a Local Government to designate a NHMA (Flood) to be adopted either in the current form provided by the Authority or as amended by the Local Government following a visual assessment through a minor planning scheme amendment process, provided that the amendment does not deviate from the intent of the interim provisions and the purpose as outlined in this Guideline and the TSPP. A Temporary Local Planning Instrument (TLPI) may also be an option for adoption of the mapping and code provisions however, preference is for a minor scheme amendment process be followed.

The TSPP remains in effect for a period of 12 months. It is expected that these amendments will be taken into consideration in the review of the SPP1/03 and an amendment of SPP1/03 will be undertaken prior to the expiry of the TSPP.

Interim Toolkit supporting the TSPP

Part 1 of this Guideline provides a voluntary interim toolkit which includes the Interim Floodplain Assessment Overlay (IFAO). The IFAO includes:-

- Interim Floodplain Assessment Overlay Maps (Floodplain Maps) prepared by the Authority in both digital and hard copy; and
- Interim Floodplain Assessment Overlay Model Code (Model Code).

It is acknowledged that not all local governments require this interim tool. Councils with adequate provisions and mapping will not need this Guideline. The response needs to be fit for purpose recognising the differing needs of each local government. However, even for those Councils who feel that there are adequate provisions within their existing scheme, the floodplain maps may help to:

- inform the strategic planning process for the preparation of their new QPP compliant planning scheme; and
- identify an area for the purpose of triggering the relevant building assessment provisions, if their existing flood mapping does not already perform this function.

For those Councils wishing to adopt the interim provisions, this can be done through incorporating a new section into the existing planning scheme, titled “Interim Floodplain Assessment Overlay” and incorporating as a minor amendment to the planning scheme. Alternatively, a Council may use a TLPI however the minor amendment process is preferred given the limited timeframe associated with TLPIs. Further advice in relation to the interim tool and how it can be implemented is provided in section 4 of this Guideline.

The Floodplain Maps provided (as well as an adopted flood level) can also be used by Councils to trigger the relevant building assessment provisions for construction of buildings in flood hazard areas. This applies to both the current suite of building provisions and those soon to be implemented through the proposed amendments to the QDC.

It is also important to note the adoption of the Floodplain Maps is not proposed to alter the level of assessment for development within the overlay area. It simply utilises the existing levels of assessment prescribed in the Table of Development for an area. Therefore, the adopted Floodplain Maps will be used as a trigger for already Assessable Development to be assessed against the Model Code. Any changes to the levels of assessment will require specific consideration by Council and DLGP as part of the amendment process.

Mapping

The Interim Floodplain Assessment Overlay (Floodplain Maps) are being produced across the State. As per section 2 of this Guideline, the Floodplain Maps have been derived by overlaying best available statewide information sources. Individual maps have been designed for display with the cadastre at 1:50,000 scale to allow for properties to be located in respect to the floodplain area.

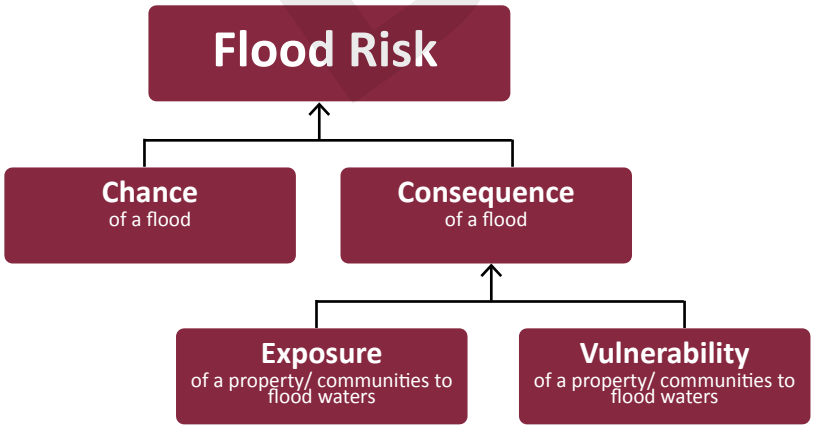
By the end of October 2011, this project will have mapped 40 per cent of the State's area, which when combined with existing flood mapping represents coverage for approximately 90 per cent of the State's population. By mid 2012, Floodplain Maps for relevant areas of the entire State will be available.

Further information on the mapping products, including current coverage and availability can be found at **www.qld.gov.au/floodcheck**

Brisbane River in flood 1974 *Source: Queensland State Archives*

Example:- Interim Floodplain Assessment Overlay for the town of St George in Balonne Shire Council

Brisbane River in flood 2011 *Source: Queensland Reconstruction Authority*



Components of Flood Risk

Source:- Queensland Floods Science, Engineering and Technology Panel Understanding Floods – Questions and Answers

How do we manage flood risks?

Flood risk includes both the chance of an event taking place and its potential impact. Land use planning informed by floodplain management plans can reduce risk for new development areas. Flood risk is harder to manage in existing developed areas; however modification measures such as dams or levees can change the behaviour of floodwaters. Similarly, property modification measures can protect against harm caused by floods to individual buildings, and response modification measures help communities deal with floods.

Planning scheme provisions – Model Code

To support the Floodplain Maps an Interim Floodplain Assessment Overlay Model Code (Model Code) can be applied in assessing any assessable development on land wholly or partially within the area shown on the Floodplain Maps.

The Model Code is provided in ***Schedule 1***.

Councils may decide on the types of development to which the Model Code applies.

The purpose of the code is to manage built form outcomes in the floodplain so that risks to life and property during future flood events are minimised, and to ensure that future development does not increase the potential for flood damage on site or any other property.

For clarity and consistency, all development-related terms defined elsewhere in other Queensland legislation (such as the *Sustainable Planning Act 2009, Dangerous Goods Safety Management Act 2001*) have the same meaning in this Guideline and its Schedules.

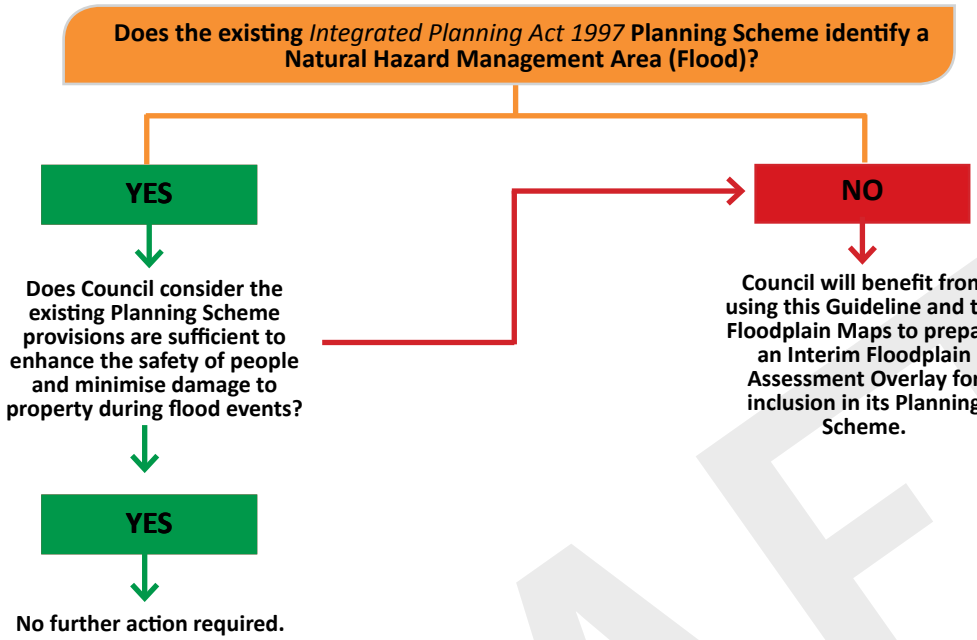
To demonstrate the practical application of the Interim Floodplain Assessment Overlay (including the Floodplain Maps and the Model Code) in a development assessment context, a number of case studies are provided follwing ***Schedule 1*** of this Guideline. This identifies how certain types of assessable development would be assessed against the Model Code.

The traditional 'Queenslander' style home was designed to allow the cool breezes to circulate through the house in the hot summer and to let flood waters flow underneath.

Images sourced from:- Queensland Image Library and Getty Images

4 Delivery

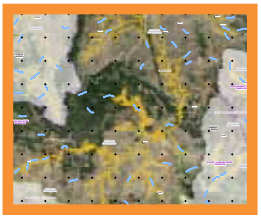
The following flow chart has been prepared to help Councils decide if the interim solution should be considered and adopted within their existing planning scheme.



Understanding the operation of an overlay

The IFAO includes the Floodplain Maps that for already assessable development will trigger assessment against the additional provisions included in the Model Code. The IFAO can be incorporated into the planning scheme as a new section titled "Interim Floodplain Assessment Overlay". In other words, development identified within the specific mapped area (Floodplain Maps) will trigger an additional set of provisions (Model Code) that will be used to assess development applications within the overlay area.

The IFAO does not necessarily change the level of assessment for development within the mapped overlay area. However, Councils can use the IFAO to change levels of assessment if they choose to do so.



Floodplain Maps

+

Performance Outcomes

Acceptable Solutions

Model Code Provisions

= Interim Floodplain Assessment Overlay

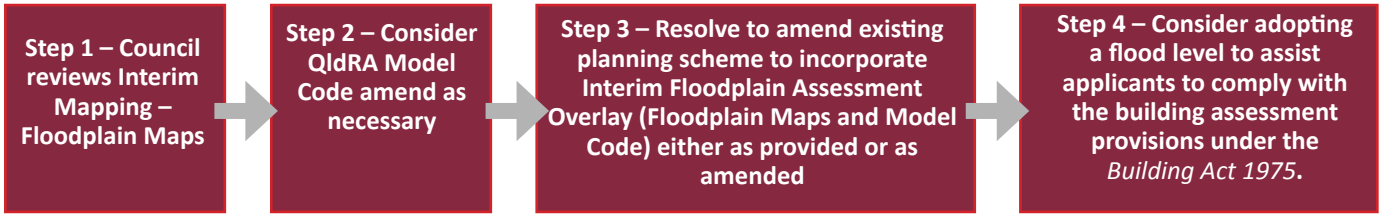
Incorporation into existing Planning Schemes

Existing Planning Schemes in Queensland utilise a number of approaches to trigger additional provisions for certain areas and sensitive development within Local Government areas. The Table below provides a simplified explanation of how the IFAO might be incorporated into different planning schemes across the State.

Existing planning scheme	Incorporation method
Planning Scheme uses overlays which, when assessing development in a particular (mapped) area to which the overlay applies, triggers an additional set of provisions or regulation. *For example some Planning Schemes may include existing overlays such as Acid Sulphate Soils Overlay, Conservation Overlay and Road and Rail Noise Impacts Overlay.*	Include an additional overlay in the 'Overlays' part of the Planning Scheme entitled 'Interim Floodplain Assessment Overlay' which will include reference to the Floodplain Maps and the additional provisions included in the Model Code.
Planning Scheme does not include an 'Overlays' section, rather uses the 'Codes' Part of the planning scheme to identify area codes that are based on mapping and trigger additional provisions for development within that area. *For example some Planning Schemes may include existing area codes such as Biodiversity Code, Heritage Place Code and Aviation Area Code.*	Include an additional code in the "Codes" Part of the Planning Scheme entitled 'Interim Floodplain Assessment Code' which will act as an area code and will include reference to the Floodplain Maps that will trigger the additional provisions included in the new 'Interim Floodplain Assessment Code'.

Process

If Councils decide this Guideline is applicable to their local government area, Councils can follow the steps below to adopt an Interim Floodplain Assessment Overlay within their existing Planning Scheme.



Step 1 Review Interim Floodplain Assessment Overlay – (Floodplain Maps)

The Authority will provide all Local Governments with a copy of the relevant Floodplain Maps for their Local Government Area. The Floodplain Maps have been developed using the best data available statewide to the Authority. More detailed data, information, local knowledge and records may be readily available to Local Governments. Accordingly, while Councils can choose to adopt the Floodplain Maps in their current form, the Authority strongly encourages local governments to consider the Floodplain Maps and ascertain whether they identify all of the areas within the Local Government Area that are potentially subject to flooding.

Councils can amend the Floodplain Maps prior to inclusion in a Planning Scheme.

In particular, it is important to recognise that larger, rarer floods may be experienced which exceed the adopted Floodplain Maps, which might require further consideration by Councils particularly if more detailed local information is available. In reviewing and adopting the IFAO, Councils should have regard to:

- the extent of inundation experienced during the Summer 2010 -2011 flood event
- the extent of inundation experienced during other flood events
- other available data sources such as historic records, flood studies or floodplain modelling.

Step 2 Review Interim Floodplain Assessment Overlay (Model Code)

The Model Code has been prepared by the Authority to provide a standard tool for Assessment Managers to ensure suitable measures are adopted by development in areas potentially at risk of flooding.

The Model Code may be adopted without amendment by Councils as an interim measure for floodplain management. This will be the case particularly for those Councils who currently have no Planning Scheme measures to regulate flooding or floodplain management in their existing Planning Schemes.

Alternatively, Councils may decide to enhance the Model Code with additional or alternative provisions that better reflect their area's local topographical or hydrological circumstances prior to adoption. This is particularly relevant for those Councils that already have an assessment code in their Planning Schemes that deals with flood hazard.

As the Model Code has been oriented to local government areas without flood mapping, Councils with existing Planning Scheme provisions related to flood may in fact have more robust planning provisions than the Model Code for the assessment of flood hazard. It would be prudent for those Councils to consider how the Model Code would integrate into that existing suite of flood hazard provisions. It will be important for those Councils to ensure that the adoption of the Model Code does not in fact reduce the capability of Councils to assess and decide development applications in flood hazard areas.

Step 3 Resolve to amend the Planning Scheme

The IFAO can be incorporated into the planning scheme as a new section titled "Interim Floodplain Assessment Overlay", which includes the Floodplain Maps that trigger assessment of Assessable Development against the Model Code.

To adopt these measures and incorporate them into the planning scheme, Council must resolve to:

1. Adopt the Floodplain Maps either as provided or as amended
2. Adopt the Model Code either as provided or as amended
3. Adopt the Floodplain Maps as a NHMA (Flood)
4. Make an Amendment to the Planning Scheme to include:
    - A new section titled "Interim Floodplain Assessment Overlay" including the Floodplain Maps and the Model Code

The amendment to the Planning Scheme must be undertaken in accordance with the Statutory Guideline 02/09 prepared by the Planning Minister under Section 117 of the SPA (Making and Amending a Local Planning Instrument).

It is acknowledged that a TLPI is an option available for the adoption of the IFAO however, this process is not preferred given timeframes and the need for State Interest Review. It is preferred that Councils follow this Guideline and the intent of the TSPP which supports a Minor Amendment to be considered by the Planning Minister.

Minor Vs Major Amendment

The TSPP allows for Councils to undertake a Planning Scheme amendment that can be considered as a Minor Amendment, in order to adopt the interim provisions as outlined in this Guideline.

It is intended that the amendment to the Planning Scheme will be classified as a "Minor Amendment" where the scope of the amendment does not deviate from the intent of the interim provisions as outlined in this Guideline. Accordingly, following the consultation period of this Guideline, those Councils wishing to adopt the amendments (including changes to the Floodplain Maps and the Model Code) are likely to be able to do so following the Minor Amendment process which can be quickly incorporated into the Planning Scheme.

Where a Council seeks to undertake further amendments to the Planning Scheme, beyond the scope of those outlined in this Guideline, the amendment may be classified as a "Major Amendment". Any change deemed to substantially deviate from the intent will need to undergo the Major Amendment process before being adopted into a Planning Sheme.

Step 4 Adopting a Flood Level

Councils may consider adopting a flood level based on historical highest recorded flood levels (or another level that may be more locally appropriate) across their Local Government area to give greater regulatory coverage to development in flood-prone areas. The adoption of a flood level, and the adoption of the Floodplain Maps which would be amended to reflect the adopted flood level, will trigger the relevant building assessment provisions under the *Building Act 1975* related to flooding – the proposed 'deemed to satisfy' QDC amendments in particular have very detailed flood hazard building requirements that specifically relate to setting habitable floor levels.

Therefore, Councils may adopt a flood level that can be used to assess building applications against the proposed QDC. Council may also wish to set a 'freeboard' level – an additional height above the flood level to provide a factor of safety – if this is to be higher than the minimum 300mm freeboard under the proposed QDC. This will ensure that all structures within the Floodplain Maps will be built to the latest standards.

If a flood level is not or cannot be adopted, it is still important to adopt the Floodplain Maps as this mapping will still trigger the relevant building assessment provisions. In this case, building applications will need to prove, through engineering first principles, that structures are fit for purpose in these flood areas.

The following table may assist in determining how to adopt a level within a Planning Scheme area.

DATA	APPLICATION
Historical Flood Data	Where historical flood data exists, it may be possible to use this information to help inform the adoption of a level. Historical data may include: • formally recorded gauge height records for a number of floods; • formally surveyed peak flood levels throughout the area of interest; • photographs of a historical flood; • 'high-water' marks recorded on public or private property; and • interviews with long-term residents.
Existing Flood Studies	A number of river systems in Queensland have been the subject of a flood study. In many cases, these studies were either limited in their scope or performed a number of years ago. Ideally, they should be updated with current data and techniques and/or extended to cover the full range of floods and incorporate catchment development changes as well as future scenarios.
Topography	There may be circumstances where the topography suggests floods are not an issue (i.e. large elevated areas such as plateaus with no significant watercourses). Care should be taken in making such a determination, as land subject to flood hazards is not always obvious.

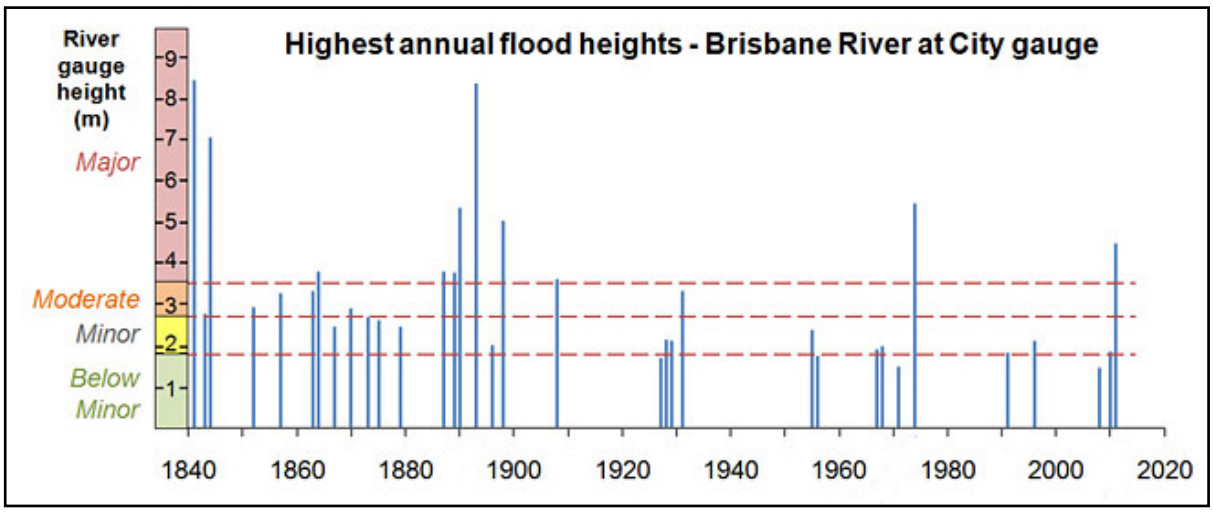
Floods can vary in size

Flood magnitudes are usually classified by their height, and the *Bureau of Meteorology* uses three general categories of flooding related to water level:

Major: This causes inundation of large areas, isolating towns and cities. Major disruptions occur to road and rail links. Evacuation of many houses and business premises may be required. In rural areas, widespread flooding of farmland is likely.

Moderate: This causes the inundation of low lying areas requiring the removal of stock and/or the evacuation of some houses. Main traffic bridges may be closed by floodwaters.

Minor: This causes inconvenience such as closing of minor roads and the submergence of low level bridges and makes the removal of pumps located adjacent to the river necessary.



Source: Bureau of Meteorology

Schedule 1 – Interim Floodplain Assessment Overlay Model Code

1. Application

This Code is an applicable code for assessable development prescribed by a level of assessment table in a zone and/or local plan and involving land wholly or partially within the area identified in the IFAO Floodplain Maps.

This Code is a Queensland Planning Provision (QPP)-compliant Code. For the avoidance of doubt, the following QPP-specific terms in this Code have the following meanings under *Integrated Planning Act 1997* (IPA)-compliant planning schemes:

QPP Compliant Term	Corresponding IPA- compliant Term
Overall Outcome	Overall Outcome
Performance Outcome	Specific Outcome
Acceptable Outcome	Acceptable Solution/Probable Solution
Zone	Area, Precinct, Domain or District or other term commonly understood as a zoning mechanism

Compliance with the Acceptable Outcomes should not be regarded as satisfying all elements of the Performance Outcomes.

The Code must be considered together with other relevant Planning Scheme codes that are applicable to the subject development.

Note: The IFAO Floodplain Maps may also be used to trigger additional design requirements related to flooding for building work assessable under the building assessment provisions, as set out in the Building Act 1975.

2. Purpose

The purpose of the Code is to manage development outcomes in the floodplain so that risk to life, property, community and the environment during future flood events is minimised, and to ensure that development does not increase the potential for flood damage on site or to other property.

3. Overall Outcomes

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

a) Development maintains the safety of people on the development site from flood events and minimises the potential damage from flooding to property.

b) Development does not result in adverse impacts on people's safety, the environment or the capacity to use land within the floodplain.

4. Performance Outcomes and Acceptable Outcomes

Performance Outcomes	Acceptable Outcomes
PO1. Development siting and layout responds to flooding potential and maintains personal safety at all times.	**For Material Change of Use and Building Work** **AO1.1**. New buildings are: • located outside the overlay area, or; • located on the highest part of the site to minimise entrance of floodwaters; or • elevated; and • provided with clear and direct pedestrian and vehicle evacuation routes off the site. *Note: If part of the site is outside the IFAO Floodplain Mapped area, this is the preferred location for all buildings.*
	For Reconfiguring a Lot **AO1.2.** New lots are: • located outside the overlay area; or • where possible, located on the highest part of the site to minimise entrance of floodwaters. *Note: If part of the site is outside the IFAO Floodplain Mapped area, this is the preferred location for all lots (excluding park or other relevant open space and recreation lots).* *Note: Buildings subsequently developed on the lots created will need to comply with the relevant building assessment provisions under the Building Act 1975.*

Performance Outcomes	Acceptable Outcomes
Cont'd. PO1. Development siting and layout responds to flooding potential and maintains personal safety at all times.	AO1.3. Road and/or pathway layout provides a safe and clear evacuation path: • if a flood level is adopted[1], by locating entry points into the reconfiguration above the flood level and avoiding culs-de-sac or other non-permeable layouts; or • by direct and simple routes to main carriageways.
	AO1.4. Signage is provided on site (regardless of whether land will be public or private ownership): • indicating the position and path of all safe evacuation routes off the site; and • if the site contains or is within 100m of a floodable waterway, hazard warning signage and depth indicators are also provided at key hazard points, such as at floodway crossings or entrances to low-lying reserves.
PO2. Development is resilient to flood events by ensuring design and construction account for the potential risks of flooding.	***For Material Change of Use and Building Work (Residential Uses)*** AO2.1. Residential dwellings are not constructed as single-storey slab on ground. *Note: The highset 'Queenslander'-style house is a resilient low-density housing solution in floodplain areas. Higher density residential development should ensure only non-habitable rooms (e.g garages, laundries) are located on the ground floor.*
	For Material Change of Use and Building Work (Non-Residential Uses) AO2.2. No Acceptable Outcome specified. *Note: The relevant building assessment provisions under the Building Act 1975 apply to all building work within the IFAO Floodplain Mapped area and must take account of the flood potential within the area.* *Note: Resilient building materials for use within the IFAO Floodplain Mapped area should be determined in consultation with Council, in accordance with the relevant building assessment provisions.*
PO3. Development directly, indirectly and cumulatively avoids any significant increase in water flow, velocity or flood level, and does not increase the potential for flood damage either on site or on other properties.	***For Material Change of Use, Building Work, Reconfiguring a Lot and Operational Works*** AO3.1. Works in urban areas[2] associated with the proposed development do not involve: • any physical alteration to a watercourse or floodway including vegetation clearing; or • a net increase in filling. AO3.2. Works in areas other than an urban area[2] either: • do not involve a net increase in filling greater than 50m^3; or • do not result in any reductions of on-site flood storage capacity and contain within the subject site any changes to depth/duration/velocity of flood waters; or • do not change flood characteristics outside the subject site in ways that result in: o loss of flood storage; o loss of/changes to flow paths; o acceleration or retardation of flows; or o any reduction in flood warning times elsewhere on the floodplain.
PO4. Development avoids the release of hazardous materials into floodwaters.	***For Material Change of Use and Building Work*** AO4.1. Materials manufactured or stored on site are not hazardous in nature; or AO4.2 If a flood level is adopted[1], material manufacturing equipment and containers are located above this level, or AO4.3. If a flood level is not adopted, material manufacturing equipment and containers are located on the highest part of the site to enhance flood immunity. *Note: Refer to the Dangerous Goods Safety Management Act 2001 and associated Regulation, the Environmental Protection Act 1994 and the relevant building assessment provisions under the Building Act 1975 for requirements related to the manufacture and storage of hazardous substances.*
PO5. Community Infrastructure is able to function effectively during and immediately after flood events.	***For Material Change of Use*** AO5.1. No Acceptable Outcome specified.

[1] Council has adopted a habitable floor level of Xm AHD (Xm AHD flood level + 0.3m freeboard) for the purposes of this Code and the relevant building provisions of the *Building Act 1975*.

[2] As defined in the *Sustainable Planning Regulation 2009*.

Case Study 1

Material Change of Use – Residential (Six Townhouses)

Site Location:

Substantially within IFAO Floodplain Mapped Area

Other Planning Considerations:

Within relevant Zone in Planning Scheme that envisages higher density residential development

Proposed Development:

6 x 3 storey townhouses with ground floor car accommodation

Assessment against IFAO Model Code:

This proposed development complies with the Model Code, as:

- Council sought a flood/hydraulic study identifying a flood level for the site, which the applicant provided
- Buildings are elevated above this level and development has a simple direct evacuation route off site
- Dwellings are not single storey slab on ground – habitable rooms are elevated through ground floor used as car accommodation
- Site is in urban area and no alteration to watercourse or filling is proposed
- No hazardous materials to be stored on site
- Not a Community Infrastructure item

Application is supported by Council

Case Study 2

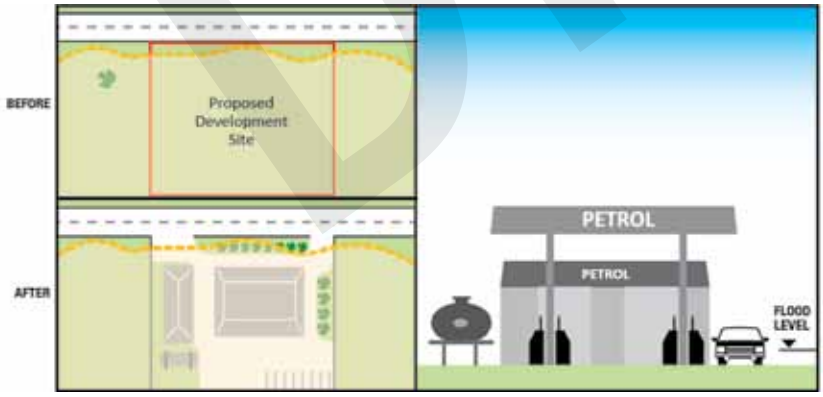
Material Change of Use (Service Station)

Site Location:

Susbtantially within IFAO Floodplain Mapped Area

Other Planning Considerations:

Within relevant Zone in Planning Scheme that envisages service station development



Proposed Development:

Service Station

Assessment againstIFAO Model Code:

This proposed development complies with the Model Code, as:

- Council sought a flood/hydraulic study identifying a flood level for the site, which the applicant provided
- Development located on highest part of site
- Development has simple & direct evacuation route off site
- Site is in urban area and no alteration to watercourse or filling is proposed
- External gas storage (hazardous material) is elevated above flood level and designed in accordance with relevant legislation, while underground tanks are also designed in accordance with relevant legislation
- Service station will have a Business Continuity Plan in place to provide direction on operation during flood events

Application is supported by Council

Case Study 3

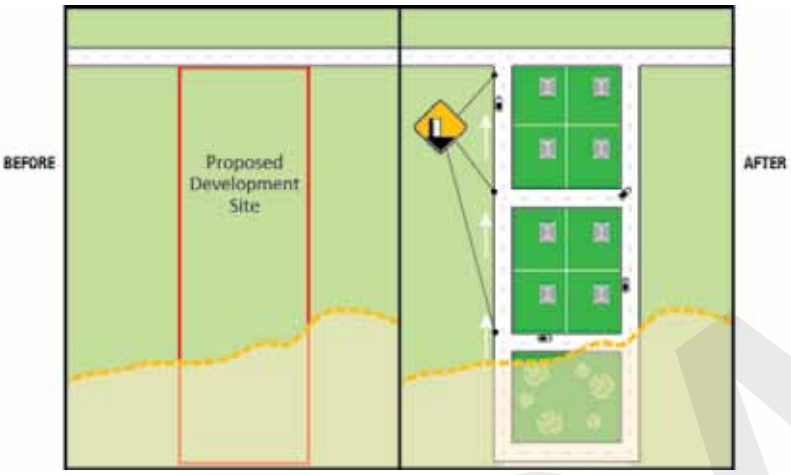
Reconfiguring a Lot – Residential (1 into 8)

Site Location:

Part of site within IFAO Floodplain Mapped Area

Other Planning Considerations:

Within relevant Zone in Planning Scheme that envisages residential subdivision



Proposed Development:

Residential Subdivision 1 into 8 lots

Assessment against IFAO Model Code:

This proposed development complies with the Model Code, as:

- Council requested verification of flood level through flood/ hydraulic study during application stage, which applicant provided
- All proposed new lots located outside of IFAO Floodplain Mapped Area, with a balance park within the overlay area – while not mandatory, this is the most appropriate design outcome to ensure house lots will not be inundated
- Road layout is direct & simple to allow for evacuation during flood
- Appropriate signage is provided indicating evacuation routes
- Site is in urban area and no alteration to watercourse or filling is proposed

Application is supported by Council

Case Study 4

Building Work (New Residential Dwelling)

Site Location:

Substantially within IFAO Floodplain Mapped Area

Other Planning Considerations:

Within relevant Zone in Planning Scheme that envisages low density residential development

Proposed Development:

New residential dwelling that is not assessable development under the Planning Scheme (e.g. exempt or self-assessable)

Assessment:

- Relevant assessment provisions are those under the Queensland Development Code (QDC) (including those for flood hazard triggered by the Floodplain Maps acting as a Natural Hazard Management Area (Flood).
- Interim Floodplain Assessment Overlay Model Code will not apply in this instance.
- Other self-assessable components of the Planning Scheme may still apply as normal (e.g a Residential Zone Code).
- Assessment can be undertaken by private certifier, or Council as required.

Feedback

Planning for stronger, more resilient floodplains has been developed as a toolkit for Councils to support land use planning. The Authority will work closely with Councils during the consultation period to provide advice on both the Guideline and the Floodplain Mapping.

Where mapping has been completed, a hardcopy of the Mapbook and a copy of the digital datasets will be provided to relevant Councils.

The data used in the determination of the "Interim Floodplain Assessment Overlay" is available to Councils via a secure FTP service from the Spatial Information Group within the Department of Environment and Resource Management (DERM). The data consists of a number of whole of state datasets and contour datasets specific to each sub-basin. There are staff members within each Council who currently have access to the DERM FTP service via a secure login and password.

Please contact DERM at productdelivery@derm.qld.gov.au to request access to the datasets via the FTP service.

Feedback on the floodplain mapping can be received by using the feedback button on the interactive mapping website www.qldreconstruction.org.au/maps/interactive-map or via a formal submission during the consultation period.

Councils are invited to contact the Queensland Reconstruction Authority on 07 3008 7200 or alternatively by email to floodplain@qldra.org.au.

Formal submissions during the consultation period can be lodged in the following ways:

Post

Queensland Reconstruction Authority

PO Box 15428

City East Qld 4002

Attention: *Planning for stronger, more resilient floodplains*

Email

floodplain@qldra.org.au

In person

Level 9, 119 Charlotte Street, Brisbane

All submissions are to be received by 11 November 2011.

Rockhampton Source: Queensland Image Library

Queensland Government