

Brisbane City Council
**QUEENSLAND FLOODS
COMMISSION OF INQUIRY**



Dedicated to a better Brisbane

**Submission Four
4 November 2011**

1. OVERVIEW

The Brisbane City (Council) refers to the invitation of the Queensland Floods Commission of Inquiry (Commission) to provide a Submission on the topic of Flood Mapping.

1.1 Key issues

Key issues include:

a. Purpose of flood information

Different types of information, levels of detail and supporting material may be appropriate when producing flood mapping products for different purposes and audiences. Separate mapping products, supporting information and distribution strategies may therefore be required.

b. Simplicity and accessibility

Residents desire succinct and clear flood mapping and information. Likewise, simplicity and availability of flood information, including on the internet, is essential in allowing residents to utilise mapping and other flood-related information.

Information must be provided in a manner that allows an individual to be able to determine how the flood level relates to their particular property, the local area and the wider catchment.

c. Linking risk to action

The supply of flood risk or planning information via a map is most effective when supplemented by information regarding the appropriate action to take to respond to and mitigate identified flood risks. The objective of such information is to build community capacity to plan and respond to flood risk as part of a participative decision-making process involving residents and Council.

1.2 Flood Mapping and Modelling

There are two major forms of flood mapping:

- Historical (actual)
- Theoretical or predicted (modelled)

This is informed by different forms of information (eg, modelling & historical data).

Council supports flood modelling on a whole of catchment basis to support the creation of consistent and accurate flood mapping products within Local Government Areas. For the Brisbane River this requires the cooperation of all local governments in the catchment and the State Government. It is important that where a catchment is shared between more than one local government, the model for the whole catchment is

shared by all the relevant local governments and that those local governments use the same methodology for that catchment.

1.3 Source of Flooding

There are multiple sources of flooding which need to be accounted for, including river, creek, storm tide and overland flow.

1.4 Submission Structure

The following pages address the questions specifically posed by the Commission in relation to flood mapping. This is a high level submission and Council intends to provide additional input (as required) at the time the Commission provides its draft Recommendations.

2. COUNCIL'S FLOOD MAPPING CAPABILITIES

Council has developed a range of sophisticated flood mapping capabilities supported by products, systems and tools that are used to assist residents and Council. The following outlines Council's capabilities in this area.

Council provides:

- Pre produced overland flow maps (Flood Flag Maps) available for viewing on Council's corporate website <http://www.brisbane.qld.gov.au/community-support/emergency-management/flooding/Understand-your-flood-risk/flood-flag-map/index.htm>

Flood Flag Maps

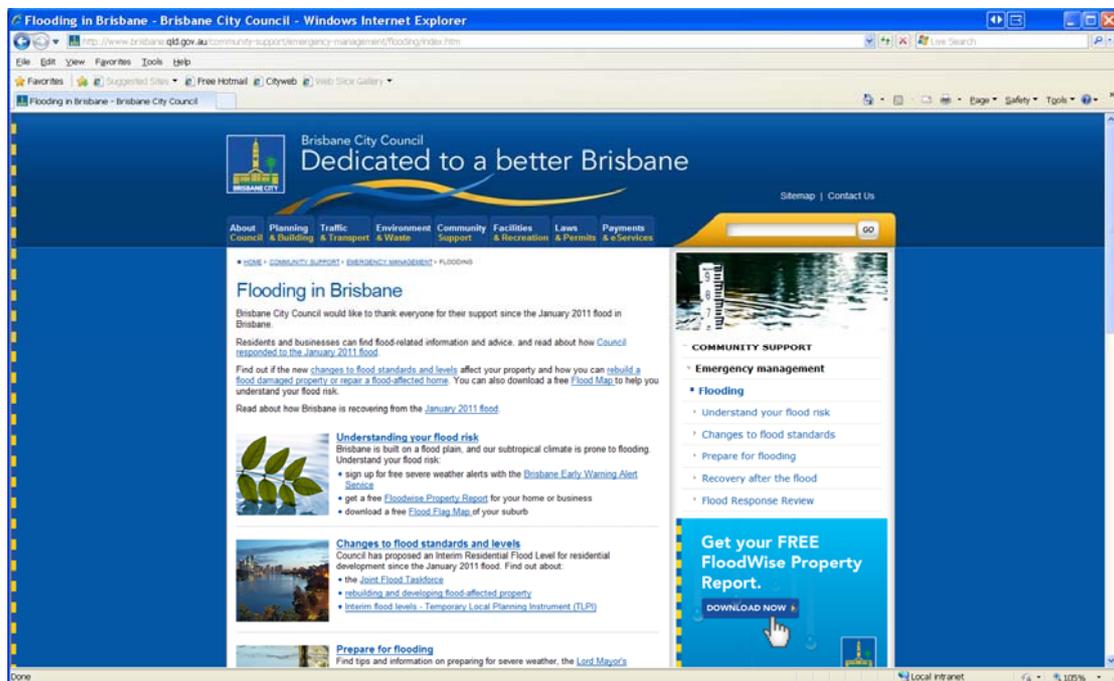




Brisbane City Council Submission Four – Flood Mapping

- Pre produced flood maps for a variety of flood events from 3,000 to 38,000 (PMF) cubic metres per second (cumecs). These are used for future strategic planning purposes and disaster response.
- FloodWise property reporting system, available at: <http://www.brisbane.qld.gov.au/community-support/emergency-management/flooding/Understand-your-flood-risk/floodwise-property-report/index.htm>) – an online system that provides property owners with a flood report for an individual property.

FloodWise Property Reports



Brisbane City Council Submission Four – Flood Mapping

The screenshot shows a web browser window displaying the Brisbane City Council's FloodWise Property Report page. The browser's address bar shows the URL: <http://www.brisbane.qld.gov.au/community-support/emergency-management/flooding/understand-your-flood-risk/floodwise-property-report/index.htm>. The page header features the Brisbane City Council logo and the slogan "Dedicated to a better Brisbane". A navigation menu includes links for About Council, Planning & Building, Traffic & Transport, Environment & Waste, Community Support, Facilities & Recreation, Laws & Permits, and Payments & Services. The main content area is titled "FloodWise Property Report" and includes a sub-header "FLOODWISE PROPERTY REPORT". The text explains that Brisbane experiences high annual rainfall and that the FloodWise Property Report is designed to help residents and professionals assess flood risk. It mentions a "New flood level information" section and a "Free FloodWise Property Report" section. A sidebar on the right contains a search bar, a "COMMUNITY SUPPORT" section with links for "Emergency management", "Flooding", and "Understand your flood risk", and a "FloodWise Property Report" section with a link for "Frequently asked questions". At the bottom of the sidebar, there is a promotional banner for "CIRCUS CHARITY NIGHT" featuring the "GREAT MOSCOW CIRCUS" on Wednesday 9 November at Marchant Park, Chermide, with showtimes from 7PM - 9PM and a "BOOK NOW!" call to action. The footer of the page includes "Local intranet" and a "Change zoom level" option.



Brisbane City Council
FloodWise Property Report

Report Reference
1780660
 31/10/2011 13:11:53

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The FloodWise Property Report is a free report to inform Brisbane residents and professionals about flood risks for a specified lot or property so they may better prepare for flooding and to plan and build in accordance with Council requirements. A flood level higher than those shown below can occur in any year, although such events are rare.

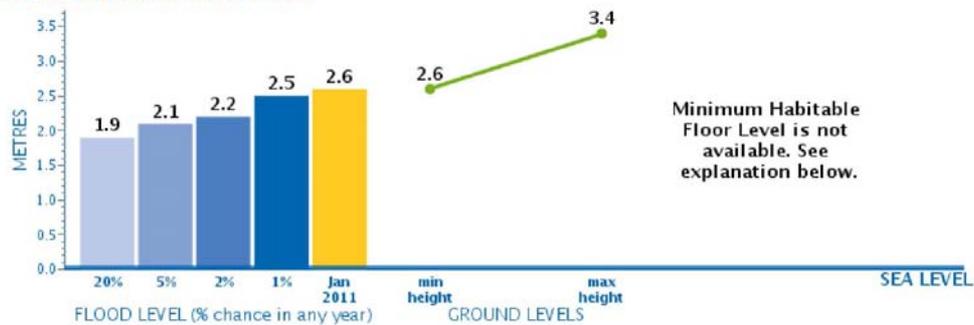
To find out more about how the contents of this report may affect your ability to build or renovate, as well as Council advice on how to protect your property and family by being FloodWise, visit www.brisbane.qld.gov.au, a Customer Service Centre or call (07) 3403 8888.

PROPERTY DETAILS:

Address: 52 SMALLMAN ST BULIMBA QLD 4171

Lot Details: L.17/RP.866232

FLOOD LEVEL INFORMATION



Flood Levels

The blue bars in the graph above show the percentage chance of that level being reached or exceeded in any year. The orange bar shows the January 2011 flood level at this address or lot.

Ground Levels (Min - Max)

The line above shows this property's lowest and highest ground levels. Confirm with a surveyor.

Minimum Habitable Floor Level

If a property is in an overland flow path or a large allotment a minimum habitable floor level cannot be provided. See flood and property flag information over page.



For a detailed summary of anticipated flood levels and flags see technical summary over page.

HIGHEST SOURCE OF FLOODING

RIVER The highest source of flooding affecting this property originates from a river. For more information about flooding in your area you can view and download Council's Flood Flag Maps by visiting www.brisbane.qld.gov.au/floodmap

FLOOD AND PROPERTY DEVELOPMENT FLAGS

Current records indicate this property may be affected by one or more flood or property development flags. Please review the technical summary over page for more detail.

Technical Summary

Use this summary to supply information about this property to surveyors, builders, certifiers, architects and engineers who may request this FloodWise Property Report. This summary has been designed to be easily read if scanned or faxed.

Property Details	
Address:	52 SMALLMAN ST BULIMBA QLD 4171
Lot Details:	L.17/RP.866232

Flooding Information

Estimated Peak Flooding Levels

Minimum Ground Level (AHD)	2.6 m	ARI (Years)	% chance	Level (AHD)	Source
Maximum Ground Level (AHD)	3.4 m	5	20%	1.9 m	STORM TIDE
Interim Residential Flood Level (IRFL)	2.6 m	20	5%	2.1 m	STORM TIDE
Interim Residential Flood Level Source	RIVER	50	2%	2.2 m	STORM TIDE
Minimum Habitable Floor Level (AHD)	N/A	100 or DFL	1%	2.5 m	STORM TIDE
		January 2011		2.6 m	RIVER

Flooding may also occur from:	OVERLAND FLOW
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Flood and Property Development Flags

Overland Flow Path	Mapping indicates this property is in an overland flow path. Overland flow is the excess run-off during high rainfall events that travels overland following low-lying, natural drainage paths. Such flooding commonly occurs when underground drainage exceeds capacity. It is recommended you consult a Registered Professional Engineer of Queensland to determine this property's habitable floor level and flooding depth.
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Disclaimer

- 1 Defined Flood Levels and Interim Residential Flood Levels, and the Minimum Habitable Floor Levels based on them, are determined from the information available to Council at the date of issue. These flood levels, for a particular property, may change if more detailed information becomes available or changes are made in the method of calculating flood levels.
- 2 Council makes no warranty or representation regarding the accuracy or completeness of a FloodWise Property Report. Council disclaims any responsibility or liability in relation to the use or reliance by any person on a FloodWise Property Report.

Useful Definitions

Australian Height Datum (AHD) – The reference level for defining ground levels in Australia. The level of 0.0m AHD is approximately mean sea level.

Average Recurrence Interval (ARI) or % Chance – The probability of experiencing a flood of a particular magnitude. ARI can be interpreted in terms of years (frequency). ARI levels quoted in this report are measured in height above sea level (AHD). ARI can also be described as the percentage chance that a location will flood in any one year. For example, a 5 year ARI flood event corresponds to a 20% likelihood of a flood of this magnitude or greater occurring in any one year.

Defined Flood Level (DFL) – The flood level associated with a defined flood event. Commonly, the standard used is the 100 year ARI. For further information refer to the House Code in Brisbane City Plan 2000, specifically Table 1: House Flood Immunity Levels for residential property.

Maximum and Minimum Ground Level – Highest and lowest ground levels on the property based on available ground level information. A Registered Surveyor can confirm exact ground levels.

Minimum Habitable Floor Level – The minimum level above sea level at which habitable areas of development (generally including bedrooms, living rooms, kitchen, study, family and rumpus rooms) must be constructed.

City Plan 2000 – City Plan 2000 sets out what you can build and where new development should go. Council assesses proposed new development against the City Plan 2000.

Interim Residential Flood Level (IRFL) – The flooding standard adopted by Council following the January 2011 flood event to be applied to new residential development.

Find Out More

Whether you are building, buying, renting or preparing your property for flooding, obtaining a FloodWise Property Report is the first step in determining your property's flood risk. Council's 'Be FloodWise' series of publications can assist you to plan ahead, respond to and recover from flooding. They are available online at: <http://www.brisbane.qld.gov.au/floodwise> or by phoning Brisbane City Council on (07) 3403 8888.

The 'Be FloodWise' publications include:

Preparing for Flooding

Assess your flood risk, prepare for and respond to, flood events.

Be FloodWise - A guide for residents

Buying / Renting

Assess the flood risk of a property before making a decision to rent or buy.

Buying and renting fact sheet

Building or Renovating

Renovations around your home or business can impact on your flooding exposure. Ensure your house meets City Plan 2000 flood immunity

Building and renovating fact sheet

If you are planning to renovate or build, Council recommends you engage a Registered Professional Engineer of Queensland to undertake a thorough assessment of all flood risks specific to the property.



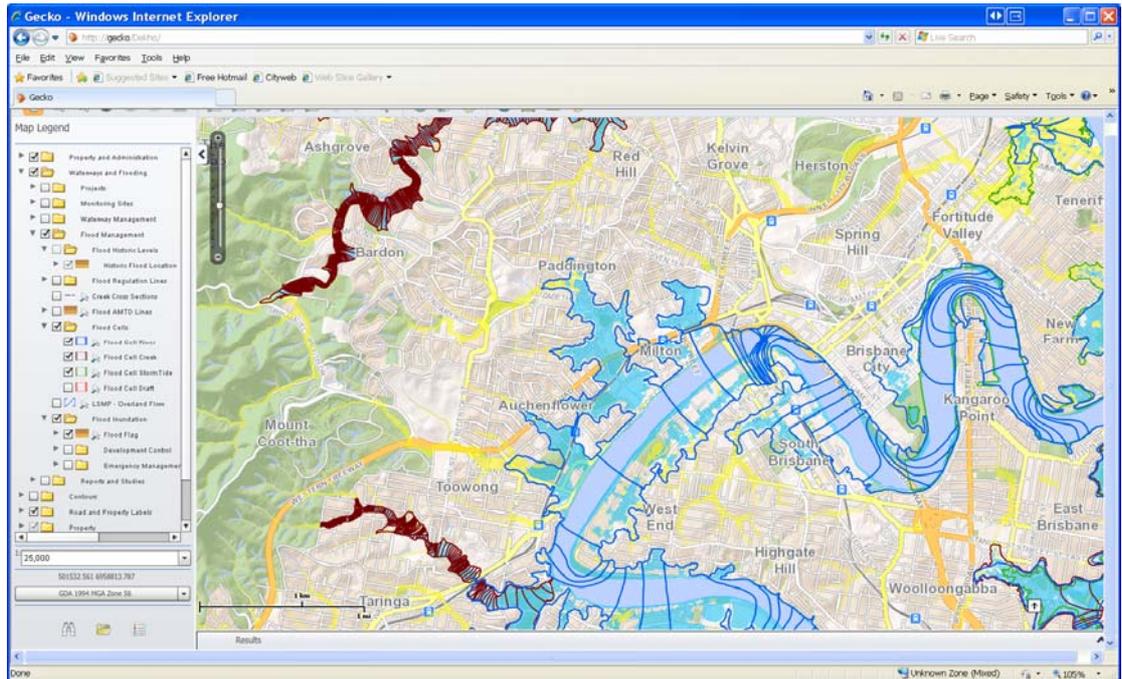
Get a Free Flood Flag Map

Find out more about predicted flooding in your suburb or area by downloading a free Flood Flag Map. The map shows overland flow paths and where flooding may occur from creeks, rivers and storm tides on a suburb scale.

For more information visit www.brisbane.qld.gov.au/floodmap or visit a Council Customer Service Centre

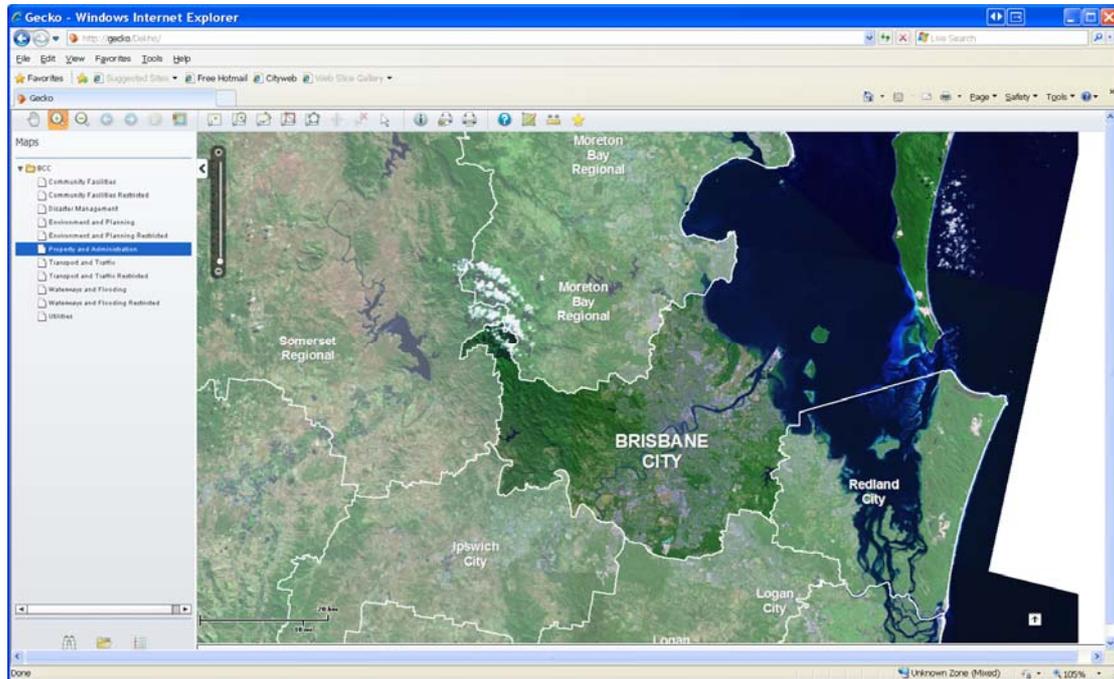
- eBIMAP GIS system – Council’s external online mapping system. eBIMAP is a subscription based service used by the development and planning industry to view Council related data. Flooding layers are included in this service. More information on eBIMAP is available on Council’s website at: <http://www.brisbane.qld.gov.au/planning-building/tools-forms/ebimap/index.htm>

Gecko – Flood Management Layers



- Gecko GIS system – Council’s internal web mapping system and is not available publicly. This system displays a diverse range of flood related data that can be overlaid with property information, Council assets and infrastructure, planning information and natural assets. This aids both internal and external planning and decision making.

Gecko – Property and Administration Layer



- Digital elevation models (DEMs) – These are used to generate flood heights used for planning and predictive modelling.
- Water Information System (WIS) data (formerly known as *FloodWise*) – this is a live system that uses information from telemetry sites to monitor flood levels. This information is then used to inform warnings to communities, including by way of SMS.
- Rainfall gauges and maximum height gauges for monitoring rainfall and informing Council of flood events.
- Identification of critical infrastructure and development of asset management plans including flood mitigation and business continuity plans in the event of a flood.
- Regular updates of key spatial data sets including aerial photography, street networks, property information, utilities and census information. These updates then feed into Council systems such as eBIMAP and Gecko SIS for planning and events.
- Regular updates of disaster related GIS information including critical infrastructure, evacuation centres and Council facilities. These are maintained in layers and kept current and accurate.
- Specialised GIS and engineering technical staff available to analyse the above information for future planning and decision making.

In a flood event and in addition to Council's usual flood management capabilities, Council also provides:

- Spatial Information Services staff to provide GIS analytical and mapping services within the Disaster Intelligence team.
- Brisbane River Flood Forecasting System which provides Council's Contact Centre with predicted individual property flood heights during an event and is available to residents.
- Bender – a flood profile development application that takes information from gauges and “bends” the profile to closest known profile. This is used as a predictive tool in an event and informs the Brisbane River Flood Forecasting System.
- Spatial Information Services have six dedicated laptop computers, running a suite of GIS software and external hard drives containing all Council's spatial data. This is a stand alone capability that can be run within Council's Local Disaster Co-ordination Centre on Council's network or off site at another location.
- Damage assessment data can be collected using hand held devices and published live to the Amazon cloud server via the 3G network.
- Standalone capability so that it not tied to an event.

3. WHAT AREA SHOULD BE COVERED BY A FLOOD MAP? FOR EXAMPLE, A LOCAL GOVERNMENT AREA, A CATCHMENT, A BASIN, A SUB-BASIN?

All areas at potential risk of flooding from rivers, creeks, storm tide and overland flow should be covered by flood maps. These could be displayed at a regional, catchment and/or local area or suburb scale as necessary, provided they convey a clear understanding of relevant flood issues that impact properties.

Different scales of maps are likely to be more useful for particular users, e.g. property or neighbourhood level for residents, catchment level for authorities and emergency agencies.

This approach requires cross-local government area cooperation to take full advantage of state wide mapping. In addition, a definition of 'flood risk' would need to be agreed.

4. WHO SHOULD BE RESPONSIBLE FOR FLOOD MAPPING? FOR EXAMPLE, THE QUEENSLAND GOVERNMENT, THE COMMONWEALTH GOVERNMENT, LOCAL GOVERNMENTS, CATCHMENT-BASED AUTHORITIES? IF SOME SORT OF JOINT RESPONSIBILITY, HOW WOULD THAT WORK IN PRACTICE?

Local government should be responsible for flood mapping pursuant to guidelines provided by the State Government, following consultation with Council and other local governments. State guidelines should contain sufficient flexibility to allow local government to determine what is the most useful information to produce. This could vary catchment to catchment especially in relation to catchment size and level of development.

Any Guidelines should not limit the usefulness of the maps but rather allow for local implementation by local government to suit particular local characteristics (e.g. nature and types of flood risk from creeks, rivers, overland flow etc., development at risk etc.).

Local government is currently best positioned to manage its flood models. Some flood maps are a product of the flood modelling.

Consideration needs to be given to appropriate funding arrangements to allow local government to deliver local flood mapping.

5. WHO SHOULD PERFORM FLOOD MAPPING? FOR EXAMPLE, PRIVATE EXPERTS, OFFICERS OF LOCAL, STATE OR COMMONWEALTH GOVERNMENTS?

Flood mapping should be produced by local government by experts (in-house or contracted) in this field.

Local governments are familiar with their area and will have first hand experience of past events. They use the relevant modelling and data for the locality in day to day operations.

Without State or Federal funding arrangements to support local flood mapping, consistent quality of mapping may not be produced across the State.

6. SHOULD THERE BE MAPPING GUIDELINES TO GUIDE ALL FLOOD MAPPING COMPLETED IN QUEENSLAND? IF SO, WHO SHOULD SET THE GUIDELINES?

As set out above, Council supports the provision of Guidelines by the State, developed in conjunction with local government, to promote the consistent application of quality mapping products, awareness and preparedness outcomes State-wide.

During an event which travels across catchments and local government boundaries, consistent messaging and references can then be used across the impacted area.

Guidance should not be over-prescriptive, but should allow for local implementation to suit local circumstances. Over-prescription could reduce flexibility for specific needs or innovation.

7. WHO SHOULD FUND FLOOD MAPPING? FOR EXAMPLE, LOCAL GOVERNMENTS WHOLLY, STATE GOVERNMENT WHOLLY, COMMONWEALTH GOVERNMENT WHOLLY, CURRENT RESILIENCE FUNDING PROGRAM ARRANGEMENTS, ANOTHER TYPE OF JOINT FUNDING INVOLVING THE STATE, COMMONWEALTH AND LOCAL GOVERNMENTS? WHAT OTHER FUNDING OPTIONS ARE AVAILABLE?

Currently Council funds its own flood mapping activities. However, Council supports a shift towards greater involvement and guidance from the State Government for Local Government Areas and considers that this should be supported by appropriate Commonwealth and State funding arrangements such as the Natural Disaster Resilience Program or the NSW model of State funding to support local government activity.

A potential alternative funding option might be through consideration of arrangements for providing the information to commercial enterprises.

8. WHAT AMOUNT OF DATA-SHARING IS APPROPRIATE? SHOULD ANY AGENCY WHICH COMPLETES A FLOOD STUDY BE REQUIRED TO SHARE ITS INFORMATION WITH OTHER GOVERNMENT AGENCIES, INSURANCE COMPANIES AND FINANCIAL COMPANIES AND FINANCIAL INSTITUTIONS? ON WHAT TERMS SHOULD IT BE REQUIRED TO SHARE SUCH INFORMATION?

Flood information should be made publicly available free of charge subject to an appropriate quality assurance process and adequate usage guidance/disclaimers which cover both the potential tolerances in flood information provided and the background cadastre.

Through the availability of information, the public and industry can be educated and informed regarding flood risk - the responsibility falls on the community to remain informed and in doing so, creates a resilient and responsive community, rather than a reliant one.

Further, Council believes that flood information should be shared between relevant local governments who have a justifiable need for the information.

Flood mapping is an evolving science and tools and techniques continue to develop to provide better information, however the accuracy of the flood mapping cannot be guaranteed. For this reason, the provision of information and mapping to the public must be accompanied by appropriate usage guidance and disclaimers. Provision of information to other authorities will need Agreements or Memoranda of Understanding, to ensure appropriate usage conditions and to protect intellectual property rights.

Council believes that alternative arrangements (such as licensing, or a premium 'paid' service) could be investigated for commercial enterprises (e.g. the insurance industry) requiring tailored flood information or a higher level of access to flood modelling in a way that facilitates their businesses decision-making.

9. WHAT TYPES OF FLOOD MAPPING SHOULD BE AVAILABLE TO THE PUBLIC TO ENABLE THEM TO BE PROPERLY INFORMED WHEN MAKING DECISIONS AFFECTING LAND PLANNING, SUCH AS PURCHASING A PROPERTY OR MAKING A DEVELOPMENT APPLICATION, AND IN THE CONTEXT OF AN EMERGENCY, SUCH AS DECIDING WHETHER AND WHEN TO EVACUATE?

Flood mapping and information should be relevant for the purpose for which it is being used.

Mapping produced with a specific purpose and audience in mind enhances community awareness and preparedness in the context of the information provided. Mapping created to support event specific action can aid in responsiveness.

All mapping products should be supported by complimentary information, promotion and distribution strategies with a focus on linking identified risks to appropriate action.

In the context of an emergency, it may be appropriate to consider the usefulness of making real-time flood information (e.g. from river level gauges) available to the public. Council currently owns and manages a real time flood monitoring system. This system sends alerts when water levels reach certain flood levels and allows real time information to assist with making decisions and providing advice.

9.1 Should the flood mapping available to them be, for example: The flood maps or information used in local planning schemes

Flood mapping should be freely available to the public. It should be noted however that changing any flood mapping that is included in planning schemes requires a lengthy planning scheme amendment process under the *Sustainable Planning Act 2009*. This means that when more up to date and accurate flood information becomes available it cannot be readily changed. There should be consideration given to the ability to be able to fast-track the inclusion of this information if it is included in planning schemes.

Whilst Council can provide estimated flood levels for a property (in metres Australian Height Datum), it currently cannot provide floor levels and is therefore unable to

estimate depths of flooding likely at a property. Commonly many people cannot relate a flood level to their floor level. Estimates of potential depths of flooding would help preparedness for flooding, and therefore future acquisition of floor levels would be an important contribution to providing information that supports flood preparedness. This however would require significant investment for local governments that need to be supported by appropriate Commonwealth or State funding.

The public is equipped with the tools and supporting information required to make an informed assessment of a property's flood risk, and can align planning and development decisions and risk accordingly.

9.2 Should the flood mapping available to them be, for example: Flood maps and information held by State or Commonwealth government agencies

Flood maps should be held by the local government. State or Commonwealth held maps or information should be made available to the Local Authority to prepare flood maps.

Local governments are the sole providers to local residents and the 'one stop' for relevant information. Local governments are closely linked to local communities to ensure that information is readily available to the local population or to ensure that the information they hold is up to date. This avoids resident confusion caused by multiple agency distribution of similar information.

State or Commonwealth agencies could access maps held by the local government if required.

9.3 Should the flood mapping available to them be, for example: Maps showing flood risk, historical flood height at property and similar

The public want to see historical flood maps, and Council believes that historical maps can play an important part in raising awareness of flooding.

There is a risk in presenting historical information for individual properties, since this needs to be derived from limited locations of record. Additionally, historic information may not be representative of present flood behaviour due to creek/catchment changes, the presence of dams, the effect of dam operating rules and the fact that every flood will have different characteristics (eg. gradients, tidal influences, spatial and temporal variation in contributions from tributaries).

9.4 Should the flood mapping available to them be, for example: Maps showing evacuation routes

Maps showing evacuation routes should be provided through a joint Local and State Government web site (eg. Emergency Management Queensland), similar to the model used in NSW.

Reliability of evacuation routes may be low in areas where flooding is highly variable. Regular updates on the safety of the evacuation route may be required as at certain times routes may become impassable or cut off.

The location of evacuation centres and the routes to such centres may be different depending on the type and severity of the event. Although mapping may assist, the communication to residents of the most appropriate evacuation routes requires a degree of flexibility and should be communicated to the public via the medium most appropriate to the specific event.

9.5 Should the flood mapping available to them be, for example: Maps showing zones of land that are likely to be flooded in certain eventualities. ie, when the flood rises above a certain height at a certain gauge

Council supports an approach that may include the use of different mapping for different applications and situations. This could include a simplified map that accounts for multiple sources of flooding to produce 'zones' to aid risk awareness.

Investigations into providing this information via flood mapping using return intervals to indicate different 'risk zones' are currently underway. The risk is associated with the frequency that a property may experience flooding.

Due to the uncertainties associated with this broad scale form of mapping Council considers it is not suitable for individual property advice.

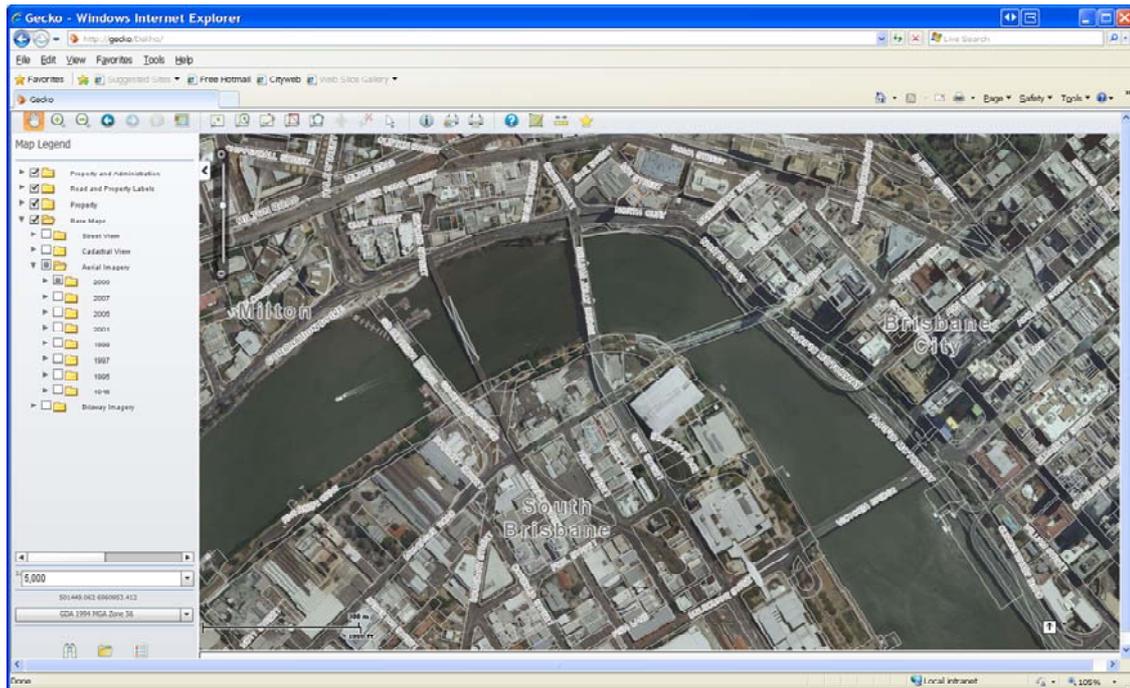
10. WHAT SORT OF INFORMATION OR EDUCATION SHOULD BE PROVIDED TO MEMBERS OF THE PUBLIC TO ASSIST THEM IN UNDERSTANDING THE MAPS?

Council provides:

- Definitions of terminology
- User guides
- FAQs
- Flooding sources
- Identification of how quickly flooding events may occur
- Accuracy of predictions/disclaimers
- Dedicated officers to engage with the community to increase community resilience to not only flooding but all hazards
- Actions to take based on information provided on maps

Supporting information, documentation, promotion and services is essential in ensuring mapping products are effective.

Flood mapping overlaid against orthoimagery is likely to improve understanding of likely flood extents and impacts on properties and neighbouring infrastructure. Council currently runs an orthoimaging project every two years. An example image is presented below. A program of aerial photography supported by appropriate funding would therefore provide an important contribution in assisting the public in understanding the maps.



11. WHAT SORT OF INFORMATION OR MAPPING SHOULD BE AVAILABLE TO INSURANCE COMPANIES OR FINANCIAL INSTITUTIONS FOR THEM TO USE IN DECISIONS ABOUT PROVIDING PRODUCTS TO CONSUMERS?

See section 8 above.