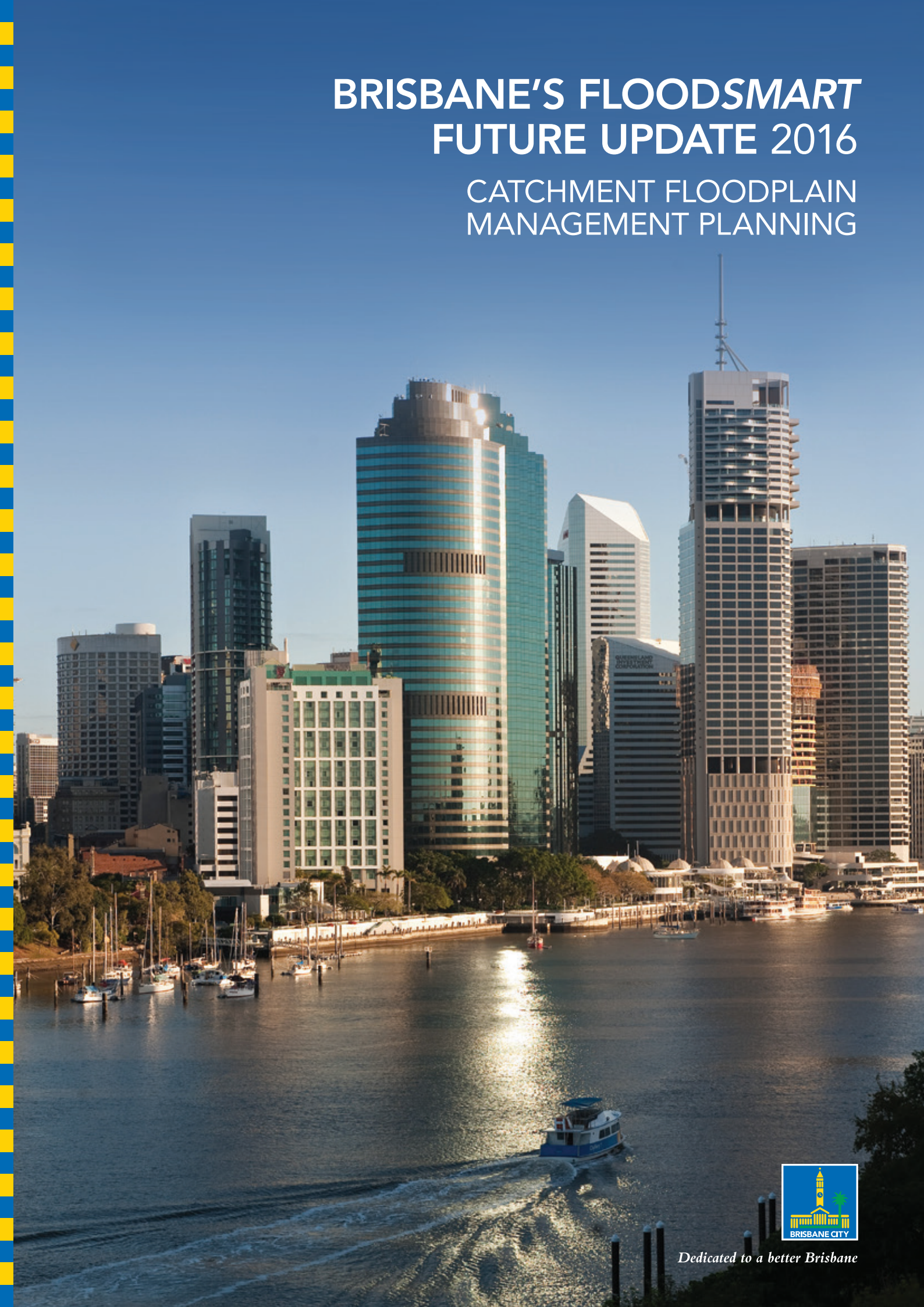


BRISBANE'S FLOODSMART FUTURE UPDATE 2016

CATCHMENT FLOODPLAIN MANAGEMENT PLANNING



Dedicated to a better Brisbane

Brisbane's FloodSmart Future – Catchment floodplain management planning

INTRODUCTION

Brisbane is a thriving, world class city, enjoyed for its subtropical climate. During the summer months severe storms with heavy rainfall are common and can result in flooding.

Managing and minimising the impacts of flooding have always been a priority for Brisbane City Council.

To ensure that Brisbane is better prepared for flooding in the future and to address the recommendations made by the Queensland Floods Commission of Inquiry, Council developed the Flood Action Plan, establishing its commitment to undertake catchment floodplain management planning.

This document outlines the catchment floodplain management planning, which has been undertaken to date for a number of Brisbane's creeks.

Together we can build a more resilient city; a city that is safe, confident and ready.

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This document is...

- A framework for planning and decision making
- A strategic guide for Council, businesses and the general public
- A suite of potential projects which could be implemented in the short medium or long term

This document does...

- Seek to reduce flood risk to people and the developed and natural environment
- Consider creek flooding and storm surge

This document isn't...

- A statutory plan
- Detailed advice on specific locations or projects
- A financial commitment to undertake every project

This document doesn't...

- Consider river flooding or overland flow

River flooding will be considered as part of the Brisbane River Flood Studies being carried out by the Queensland Government. Council has a program of ongoing drainage investigation, design, upgrade and construction works which considers overland flow flooding.



FloodSmart Future Strategy 2012-2031

The Flood Action Plan also recognised the need for a long-term strategic approach to flood risk management, and so the FloodSmart Future Strategy 2012-2031 was developed. The strategy aims to build a more resilient city; a city that is safe, confident and ready. The strategy outlines Council's approach to flood risk management and forms an overarching approach to meet the challenge of managing flooding in Brisbane. This strategic approach to flood risk management is based on gathering a comprehensive understanding of the behaviour and consequences of flooding across a full range of flood events and then identifying an integrated suite of measures to manage the risks.

Kayaking on Norman Creek

Council is undertaking flood studies and floodplain management planning for Brisbane's creek catchments, to better understand flood behaviour and consequences within our catchments. The flood studies provide the most up-to-date technical information regarding flood behaviour including flood frequency, flow rate, depth, velocity, and extent. The information provided by the flood studies is then used to understand the consequences of flooding and identify an integrated suite of floodplain management measures through a process known as **catchment floodplain management planning**.

Our vision is for communities on floodplains that are

safe

because they understand their level of flood risk and are taking action to manage it.

Our vision is for growing our city and economy responsibly,

confident

in how we adapt to flooding.

Our vision is for connected and engaged communities that are

ready

for flooding.

CATCHMENT FLOODPLAIN MANAGEMENT PLANNING

A catchment is an area of land surrounded by natural features such as hills, within which water flows to a common low point, such as a creek, lake, river or bay. A floodplain is an area of land that is subject to inundation by floods. Catchment floodplain management involves assessing and managing flood risks within a catchment, or series of catchments, to reduce the impact on people and to property.

The FloodSmart Future Strategy uses four tools for flood risk management:

1. flood mitigation infrastructure
2. flood awareness and information
3. land use planning and development control
4. flood emergency management.

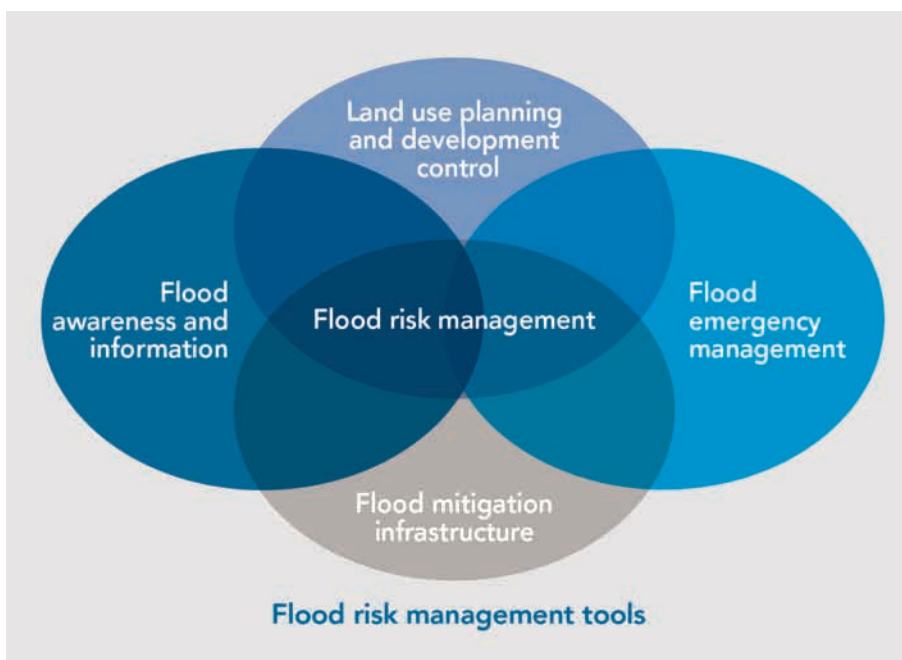
Up until the 1970s, **flood mitigation infrastructure** (e.g. dams, levees, channel modifications) was the primary method of managing flood risks in Australia.

A series of large floods in the 1970s resulted in a change of focus from mitigation infrastructure to **land use planning** as a means of controlling developments on floodplains. The 1990s saw a focus on **flood emergency management** and more recently there has been an emphasis on providing **flood awareness and information**.

It is now recognised that best practice floodplain management requires the coordinated application of all of these management tools. **Catchment floodplain management planning** makes use of these tools to identify a range of measures to better manage flood risk within a catchment.

The process of catchment floodplain management planning considers the consequences of flooding on the community, environment, businesses and infrastructure. It aims to reduce the flood risk to people and property, maintain local economic development and growth, ensure appropriate land use planning, protect the local environment and minimise impacts to infrastructure and services.

By 2015, Council had completed a program of creek flood studies that provided the latest creek flood data for more than 80% of urbanised areas across the city. Council has used this data to undertake catchment floodplain management planning for our creek catchments. The understanding of flood behaviour across the city and the management of Brisbane's catchments will evolve as further information becomes available from Council's ongoing program of flood studies.





Pied Oystercatcher, Boondall Wetlands

CATCHMENT PROFILES

Brisbane is built around its waterways and all of Brisbane's residents live within a catchment. Some creeks start small, running through bushland high in the catchment, others flow across our suburbs and through parks. They crisscross our city until eventually flowing into Moreton Bay.

The following 10 catchment profiles will focus on a number of Brisbane's creek catchments. They describe the size and location of the catchment, the history of flooding within the catchment, what we know about flooding in the catchment as well as some of the existing measures Council has in place to manage flooding.

There are some important points to note before you read on.

- Some catchment profiles will include one catchment, while others include more than one. In some cases a number of the smaller catchments have been grouped together. For example, the Northern catchments are located to the north of Brisbane City and include some or all of Albany Creek, South Pine River, Bald Hills Creek, Brighton Creek and Pine River floodplain.
- There are a number of roads in many of the catchments that may become inundated during a flood – cars can be swept away from only a minor amount of fast flowing water. Roads which have at least a 50% chance of flooding in any given year are identified in the catchment profiles. Remember, if it's flooded, forget it – never drive through or enter floodwaters.
- Some catchments contain critical infrastructure routes – these are routes which are utilised for emergency access or evacuation during and following a natural disaster. Where these routes exist within a catchment, they have been identified in the catchment profiles.
- The majority of creeks are made up of a number of tributaries. A tributary is a smaller stream or creek which flows into a larger creek.

Brisbane has 38 major creek catchments and 630 kilometres of waterways.

The combined catchment area of the creeks and rivers flowing into Moreton Bay is 21,220 square kilometres.



BREAKFAST/ENOGGERA CREEK CATCHMENT PROFILE

The Breakfast/Enoggera Creek catchment covers an area of 80 km² and is located in the north-western suburbs of Brisbane, starting in the Brisbane State Forest in the D'Aguiar Range and eventually joining the Brisbane River at Newstead.

The catchment contains four major creeks – Enoggera Creek, Breakfast Creek, Ithaca Creek and Fish Creek – which flow through the suburbs of The Gap, Ashgrove, Bardon, Red Hill, Enoggera, Paddington, Newmarket, Wilston, Windsor, Kelvin Grove, Herston, Spring Hill, Fortitude Valley, Albion, Lutwyche, Clayfield, and Bowen Hills.

The Breakfast/Enoggera Creek catchment has a long history of significant flood events. Records indicate that flooding has occurred in the catchment in February 1931, June 1967, February and April 1972, January 1974, April 1989, May 1996, May 2009 and January 2013.

To manage flooding in the catchment, the following floodplain management measures have been implemented:

- Enoggera Dam constructed in 1866 and subsequent spillway works in 1973 and 1976
- two sections of Breakfast Creek straightened in the lower reaches in 1931
- in 2011, maintenance dredging of the area of the creek between Bowen Bridge Road and Kelvin Grove Road began
- 20 properties purchased by Council under the Voluntary House Purchase Scheme since 2006
- a Creek Flooding Alert Service established for the Herston and Windsor areas
- four rainfall gauges and four stream level gauges installed to monitor the rainfall and stream level heights throughout the catchment.



There are three critical infrastructure routes that traverse the Breakfast/Enoggera Creek catchment: Bowen Bridge Road, Lutwyche Road and the Inner City Bypass.

The following roads located in the Breakfast/Enoggera Creek catchment have at least a 50% chance of flooding in any given year: Bowman Parade, Carwoola Street, Hilder Road, Quirk Street, Glenrosa Road, Gresham Street and Kenwyn Road. Remember, if it's flooded, forget it – never drive through or enter floodwaters.

In the Breakfast/Enoggera Creek catchment, there are approximately 1000 buildings which have a 1% chance of being affected by creek flooding in any given year.

The waterway corridor along which the creek flows has generally been set aside as parkland and there are several natural assets within the catchment including D'Aguiar National Park, Enoggera Reservoir, Mt Coot-tha Reserve, Walton Bridge Reserve, Banks Street Reserve, Woolcock Park, Downey Park and Northey Street Markets.

BULIMBA CREEK CATCHMENT PROFILE

The Bulimba Creek catchment is the second largest of Brisbane's major creek systems with an area covering 125 km². The catchment is located to the south of the Brisbane River and extends from Calamvale in the south to Lytton in the north.

It is bounded in the west by ridges extending from Calamvale to Mt Gravatt and Mt Gravatt to Cannon Hill and in the east by ridges extending from Rochedale South to Wynnum West. The highest point of the catchment is Mt Gravatt. Flowing in a northerly direction, Bulimba Creek discharges directly into the Brisbane River about 6.5 km upstream of Moreton Bay.

The catchment consists of eight major tributaries which include: Bulimba Creek East, Bulimba Creek West, Mimosa Creek, Spring Creek, Salvin Creek, Phillips Creek, Tingalpa Creek and Lindum Creek.

Detailed records of flooding in Bulimba have been collected since the 1960s and areas adjacent to the lower reaches of Bulimba Creek have suffered frequent flooding. Historically the largest flood to have occurred in Bulimba Creek in recent times was January 1974. Sections of the upper catchment were heavily affected in the 2001 and 2004 flood events. More recently, the lower end of the catchment was affected by the Brisbane River flood of 2011. The summer of 2013 saw two significant flood events within the catchment.

To manage flooding in the catchment, the following floodplain management measures have been implemented:

- Cleveland Rail bridge crossing upgraded in 1994
- Mimosa Creek de-weeded in 2008
- hydraulic structures such as the concrete channel near Bilan Street, Carina constructed in 1990



- seven properties purchased by Council under the Voluntary House Purchase Scheme since 2006
- a Creek Flooding Alert Service established for the Hemmant area
- twelve rainfall gauges and three stream level gauges installed to monitor the rainfall and stream level heights throughout the catchment, with records extending from 1972.

In the Bulimba Creek catchment approximately 700 properties are at risk of a flood event that has a 1% chance of occurring in any given year.

There are several significant natural assets in the Bulimba Creek catchment which include Wally Tate Park, Toohey Forest, Mt Gravatt Outlook Reserve, Belmont Hills Bushland Reserve, Whites Hill Bushland Reserve, Minnippi Parklands, Seven Hills Reserve, Murarrie Recreational Ground and Hemmant Recreation Reserve.

There is one critical infrastructure route that lies within the Bulimba Creek catchment, the Gateway Motorway. Other interim critical routes within the catchment include Belmont Road, Manly Road, Wondall Road and Randall Road.

CABBAGE TREE CREEK CATCHMENT PROFILE

The Cabbage Tree Creek catchment lies north of the Brisbane River and covers an area of 45 km² extending from Ferny Hills in the upper reaches of the catchment and joining with the mouth of Nundah Creek before flowing into Bramble Bay at Shorncliffe.

There are two main tributaries that form the Cabbage Tree Creek catchment; Cabbage Tree Creek and Little Cabbage Tree Creek. There are also several small tributaries including Carseldine Channel, Taigum Channel and Gertrude Street Drain.

Cabbage Tree Creek and its tributaries flow through the Brisbane suburbs of Everton Hills, Everton Park, Shorncliffe, Deagon, Sandgate, Taigum, Zillmere, Fitzgibbon, Boondall, Aspley, Carseldine, Bracken Ridge, Bridgeman Downs and McDowall.

The Cabbage Tree Creek catchment has experienced a number of historic flood events, including two events in January 1974 and another event in February 1992.

To manage flooding in the catchment, the following floodplain management measures have been implemented:

- regular channel maintenance regime involving desilting upstream and downstream of numerous hydraulic structures



- weed management between Beckett Road and Lemke Road including the removal of unwanted vegetation species and the planting of native trees
- three properties purchased by Council under the Voluntary Home Purchase Scheme since 2006
- a Creek Flooding Alert Service established for the Deagon Creek area
- six rainfall gauges and five stream level gauges installed to monitor the rainfall and stream level heights throughout the catchment.

There are several natural assets within the catchment including the Boondall Wetlands, D'Aguiar National Park, Fitzgibbon Parklands, Cherside Hills, Curlew Park, Bunyaville State Forest Park, Brisbane Entertainment Centre and the Mountain to Mangroves nature trail.

In the Cabbage Tree Creek catchment approximately 500 properties have a 1% chance of being affected by creek flooding in any given year.

There are two critical infrastructure routes that lie within the Cabbage Tree Creek catchment: Gympie Road and the Gateway Motorway. Other interim critical infrastructure routes within the catchment include Old Northern Road.

KEDRON BROOK

CATCHMENT PROFILE

The Kedron Brook catchment covers over 110 km² of land that extends from D'Aguilar National Park, downstream to the west of the Brisbane Airport at Nudgee, emptying into Moreton Bay as the Schulz Canal. Smaller creeks that flow into the brook along the way include Cedar Creek, Sandy Creek and Cannery Creek.

The Kedron Brook catchment includes 36 suburbs and a diverse mix of residential, commercial, industrial and community areas with over 30 parks and reserves adjacent to the creek and its tributaries, with uses ranging from conservation, open space, sports fields and golf courses.

Kedron Brook transforms from a natural waterway with large conservation areas, such as the Brisbane Forest Park to a highly-structured waterway. Finally, at the Gateway Motorway Deviation Bridge, the canal becomes the Kedron Brook Floodway – a wide-walled waterway flowing to its outfall into Moreton Bay, near Nudgee Beach.

The Kedron Brook catchment contains more than 130 km of bikeway which has been designed to provide a direct connection to the waterway. The bikeway crosses Kedron Brook waterway at 31 locations, making it susceptible to flooding.

To manage flooding in the catchment, the following floodplain management measures have been implemented:

- engineered saltwater channel constructed in the lower reaches of Kedron Brook
- eighteen properties purchased by Council under the Voluntary House Purchase Scheme since 2006
- a Creek Flooding Alert Service established for the Cannery Creek and Pound Creek areas
- four rainfall gauges and five stream level gauges installed to monitor the rainfall and stream level heights throughout the catchment.



In the Kedron Brook Catchment approximately 440 buildings are at risk of a flood event that has a 1% chance occurring in any given year.

There are significant natural assets in the catchment that are used by community members like Sparkes Hill, Grinstead Park, Kalinga Park, Nudgee Waterholes Reserve and the Boondall Wetlands.

Boondall Wetlands is an internationally recognised habitat for migratory wader birds in Moreton Bay.

There are a number of critical infrastructure routes that lie within the Kedron Brook catchment: Gympie Road, Lutwyche Road, Airport Link Tunnel, Southern Cross Way, East West Arterial Road, Airport Drive and the Gateway Motorway. Other interim critical infrastructure routes within the catchment include Old Northern Road, South Pine Road and Stafford Road.

NORMAN CREEK AND PERRIN CREEK CATCHMENT PROFILE

The Norman Creek and Perrin Creek catchments cover a combined area of almost 40 km².

The Norman Creek catchment is located to the south-east of the Brisbane CBD and its many tributaries form an integral part of the Brisbane suburbs of Annerley, Norman Park, East Brisbane, Woolloongabba, Greenslopes, Coorparoo, Camp Hill, Holland Park, Holland Park West, Mount Gravatt and Tarragindi. The Perrin Creek catchment is located to the east of the Brisbane CBD flowing through the suburbs of Morningside, Cannon Hill and Seven Hills before discharging to the Brisbane River.

Detailed records of flooding in Norman Creek have been collected since the 1960's; however more recently, flooding has been experienced in February 2010, January 2011, February 2012, January 2013 and twice during the summer of 2013. Records indicate that the Perrin Creek catchment experienced flooding in January 1974, April 1988, February 1992, May 1996 and January 2011.

To manage flooding in the catchments, the following floodplain management measures have been implemented:

- a number of waterway modification projects undertaken within the catchments, which include works such as channelisation, channel widening, channel diversion and clearing of vegetation
- two properties purchased by Council under the Voluntary House Purchase Scheme since 2006
- fifteen rainfall gauges and five stream level gauges installed to monitor the rainfall and stream level heights throughout the catchments, with records extending from 1974
- a Creek Flooding Alert Service established for the suburbs of Coorparoo, East Brisbane, Greenslopes and Woolloongabba.



There are approximately 600 properties in the Norman Creek catchment and 50 properties in the Perrin Creek catchment, which are within an area that has a 1% chance of being affected by flooding in any given year.

There are a number of key habitat areas in the Norman Creek catchment including the Toohey Forest, Tarragindi Hill Reserve, Wellers Hill Reserve, Stephens Mountain and Thornycroft Street Park. Perrin Creek is located within a highly urbanised catchment and the Seven Hills Bushland Reserve is a popular ecological asset within the catchment.

The following roads located in the Norman and Perrin Creek catchments have at least a 50% chance of flooding in any given year: Main Avenue, Deshon Street and Turbo Drive. Remember, if it's flooded, forget it – never drive through or enter floodwaters.

There are two critical infrastructure routes that lie within the Norman Creek catchment: the Pacific Motorway and Main Street/Ipswich Road.

NORTHERN CATCHMENTS

CATCHMENT PROFILE

The Northern catchments include Albany Creek, Bald Hills Creek, Brighton Creek, Pine River floodplain and South Pine River. It also includes adjacent coastal areas within the Brisbane City Council Local Government Area.

The total area of the Northern Catchments is approximately 28 km² and is located to the north of the Brisbane CBD.

The Albany Creek catchment consists of residential areas, sporting fields and densely vegetated areas. The Bald Hills Creek catchment comprises mostly residential areas and in the upper region widens through Harold Kielly and Gus Davies Park. The lower reaches are tidally affected, flowing through Tinchi Tamba Wetlands Reserve. The Brighton Creek catchment contains mostly residential development and is tidally affected, draining into Bramble Bay. The Pine River floodplain is sparsely populated and consists of mostly wetlands and vegetated areas. The South Pine River catchment consists primarily of sporting fields and sparsely vegetated areas with some areas of residential development.

The Northern catchments have experienced a number of flood events over the years including Bald Hills Creek in March 2001, Brighton Creek in 1974 and 2011, and Albany Creek in 1996, 2009 and 2010. The coastal region around Sandgate has historically been subject to storm surge inundation with events occurring in 1936, 1967, and in more recent times 1996 and 2013.

To manage flooding in the catchment, the following floodplain management measures have been implemented:

- drains and channels constructed in the upper reaches of Bald Hills Creek catchment to direct stormwater runoff away from residential developments
- earth-lined open channels constructed to collect stormwater in the section of creek between Grand Street and Hoyland Street



- Brighton Creek formalised into concrete-lined channels in the 1970s
- three rainfall gauges and a stream level gauge installed on Pine River to monitor the rainfall and stream level heights throughout the catchment.

There are significant natural assets in the Northern catchments which include the Tinchi Tamba Wetlands. There are also large areas of state forest and national park.

There are two critical infrastructure routes that lie within the Northern catchments: the Gateway Motorway and the Gympie Arterial Road. There is also an interim critical infrastructure route, the Deagon Deviation.

In the Northern catchments it is estimated that there are approximately 400 buildings within an area which has a 1% chance of being affected by creek flooding in any given year. There are also approximately 480 buildings within an area which has a 1% chance of being affected by coastal flooding in any given year.

The following roads located in the Northern catchments have at least a 50% chance of flooding in any given year: Wendon Way, Beams Road, Camelot Place, Albany Creek Road, Gateway Motorway, Hoyland Street, Bracken Ridge Road, Queens Parade and Townsend Street. Remember, if it's flooded, forget it – never drive through or enter floodwaters.

NORTH BAYSIDE CATCHMENT

CATCHMENT PROFILE

The North Bayside catchment, lying north-east of the Brisbane CBD, consists of the Nundah/Downfall Creek and Nudgee Creek catchments, which flow to an area of Moreton Bay known as Bramble Bay.

Nundah/Downfall Creek catchment covers an area of 35 km² and its tributaries flow through the Brisbane suburbs of Everton Park, McDowall, Chermside West, Stafford Heights, Kedron, Wavell Heights, Chermside, Aspley, Geebung, Zillmere, Virginia, Boondall, Banyo, Nudgee and Nudgee Beach. Nudgee Creek is a small tidal mangrove-lined creek located adjacent to Nundah Creek and flows through the suburbs of Nudgee and Nudgee Beach.

The North Bayside catchment has experienced a number of historic flood events, including a mix of creek events and storm tide flood events. The lower portion of the catchment is particularly susceptible to tidal flooding with numerous storm tide events having caused flooding of the wetland areas and stormwater networks within the lower portion of the catchment. Some notable events within the catchment occurred in January 1974, January 1994, March 2001, June 2003, May 2009, October 2010, January 2013 and May 2015.

To manage flooding in the catchment, the following floodplain management measures have been implemented:

- flashing warning lights installed in the Groth Road/Parthenia Street area and Trouts Road area
- concrete lined channels constructed at Murphy Road, Bilsen Road, Maundrell Terrace, Rode Road and Parton Street
- a sea wall constructed at Nudgee Beach
- backflow prevention devices installed in areas which are susceptible to tidal flooding
- three properties purchased by Council under the Voluntary House Purchase Scheme since 2006.



There are two critical infrastructure routes which traverse the North Bayside catchment: Gympie Road and the Gateway Motorway.

The following roads located in the North Bayside catchment have at least a 50% chance of flooding in any given year: Trouts Road, Rode Road, Maundrell Terrace, Sandgate Road Southbound off-ramp, Marban Street, Webster Road, Newman Road, Zillmere Road, Groth Road, Sandgate Road, Copperfield Street, Bilsen Road and Nudgee Road. Remember, if it's flooded, forget it – never drive through or enter floodwaters.

A few sections of the North Bayside catchments remain in their natural condition and there are several natural assets within the catchment including the 7th Brigade Park, Raven Street Reserve, Boondall Wetlands, Nudgee Recreation Reserve, Zillman Waterholes and the Mountain to Mangroves Nature Trail.

In the North Bayside catchment there are approximately 480 buildings which have a 1% chance of being affected by creek flooding in any given year. There are less than 20 buildings that lie within an area which has a 1% chance of being affected by coastal flooding in any given year.

OXLEY CREEK CATCHMENT PROFILE

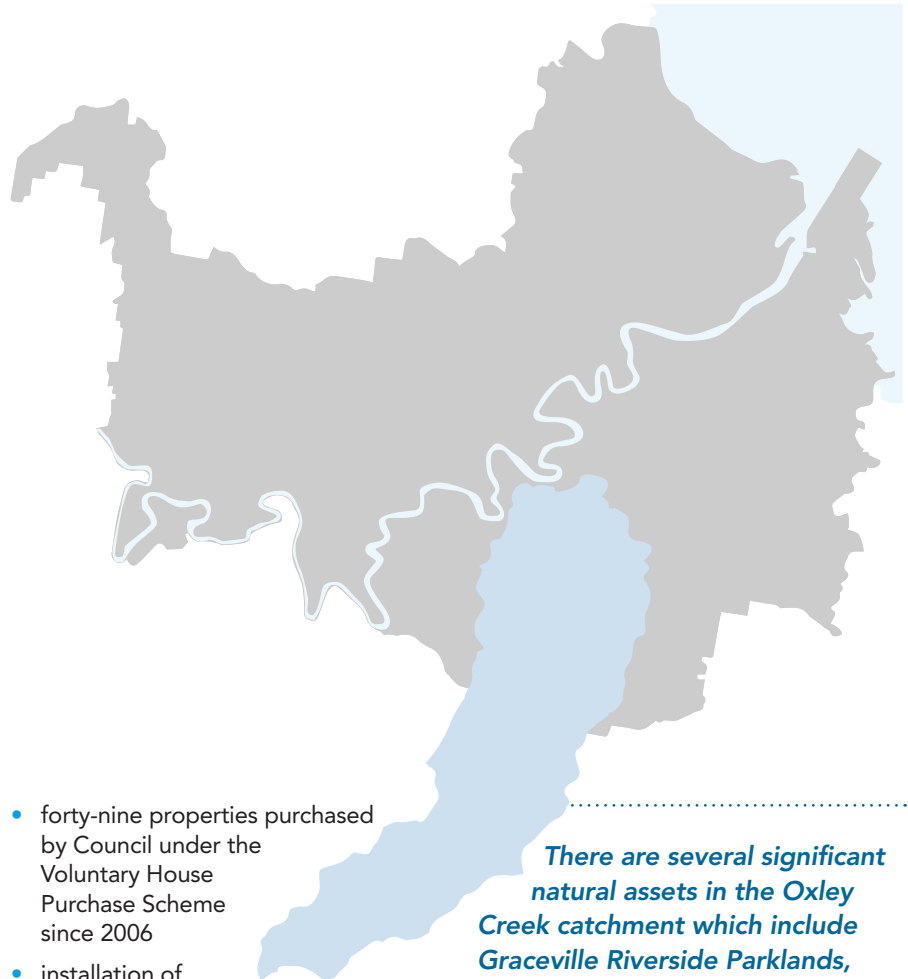
The Oxley Creek catchment lies south of the Brisbane CBD and consists of Oxley Creek and four major tributaries, covering an area of 260 km². The tributaries include Blunder Creek, Stable Swamp Creek, Rocky Waterholes Creek and Moolabin Creek which flow through the southern suburbs of Brisbane.

Oxley Creek is a major tributary to the Brisbane River and travels through the suburbs of Larapinta, Paralla, Willawong, Acacia Ridge, Oxley, Sherwood and Rocklea. Blunder Creek is the largest of the tributaries rising in Logan City. In Brisbane, it winds through bushland until King Avenue in Willawong, joining Oxley Creek at about 1 km upstream of the Ipswich motorway. Stable Swamp Creek rises in Sunnybank Hills, joining Oxley Creek at Rocklea after flowing through low swampy land downstream of Ipswich Road. Rocky Waterholes Creek flows through Salisbury and Rocklea while Moolabin Creek drains the suburbs of Tarragindi and Yeerongpilly.

Oxley Creek has a long history of flooding. In recent times local catchment flooding has occurred in April 1990, May 1996, May 2009 and October 2010. The 2009 and 2010 events affected low-lying areas in Oxley, Rocklea and Durack. In January 2011 Oxley Creek was affected by the Brisbane River flood. Backflow from the Brisbane River flooding also occurred in 1974 in conjunction with localised flooding.

To manage flooding in the catchment, the following floodplain management measures have been implemented:

- flood mitigation program in the early 1980s which included dredging of the lower Oxley Creek and Blunder Creek
- high-flow bypass installed and maintained on Oxley Creek at Sherwood Road
- channelisation of some sections of waterway, especially in Stable Swamp Creek by replacing natural waterway with flood mitigation channels



- forty-nine properties purchased by Council under the Voluntary House Purchase Scheme since 2006
- installation of flashing warning lights at Muriel Avenue and Marshall Road to identify when the roads are flooded a Creek Flooding Alert Service established for the suburbs of Corinda and Rocklea.

There are several significant natural assets in the Oxley Creek catchment which include Graceville Riverside Parklands, Strickland Terrace Park, Oxley Creek Common, Spring Mountain Reserve, Les Atkinson Park, C.J. Greenfield Complex Park and Blunder Creek corridor.

There are several critical infrastructure routes that lie within the Oxley Creek catchment including Logan Motorway, Beaudesert Road and Kerry Road.

In the Oxley Creek catchment there are approximately 750 buildings within an area that has a 1% chance of being affected by flooding in any given year.

The following roads located in the Oxley Creek catchment have at least a 50% chance of flooding in any given year: Bowhill Road, Blunder Road, Paradise Road, Cliveden Avenue, Oxley Road, Pratten Street, Granard Road, Gow Street, Lucy Street, Evesham Street, Chale Street and Muriel Avenue. Remember, if it's flooded, forget it – never drive through or enter floodwaters.

SOUTH BAYSIDE CATCHMENT

CATCHMENT PROFILE

The South Bayside catchment lies east of the Brisbane CBD and consists of the Lota Creek and Wynnum Creek catchments, which flow to Moreton Bay. The catchment covers an area of 18 km².

Lota Creek is a predominantly natural waterway which flows through the Brisbane suburbs of Chandler, Gumdale, Ransome, Wakerley, Manly and Lota before discharging to Moreton Bay at Fig Tree Point. Wynnum Creek is predominantly defined by a constructed channel which flows through the suburbs of Wynnum, Wynnum West and Manly West before discharging to Moreton Bay at Breakwater Park.

The South Bayside catchment has experienced a number of historic flood events, including a mix of creek events and storm tide flood events. The largest recorded historic creek flood event within the South Bayside region occurred in June 1967, affecting both Wynnum and Lota creeks. Other notable creek flood events occurred in May 1996 and February 2008 in Lota Creek as well as in March 2013 in Wynnum Creek.

The coastal region around Wynnum and Manly has historically been subjected to storm tide inundation with notable events being recorded in October 1935, 1936 and January 1950. In 2013, ex-cyclone Oswald caused storm tide flooding along the Wynnum and Manly esplanades.

To manage flooding in the catchment, the following floodplain management measures have been implemented:

- a Creek Flooding Alert Service established for the suburbs of Wynnum and Wynnum West
- three properties purchased by Council under the Voluntary House Purchase Scheme since 2006
- four rainfall gauges and two stream level gauges installed to monitor the rainfall and stream level heights throughout the catchments



- the Wynnum-Manly, Wynnum West and Wakerley Neighbourhood Plans recognise the need for development to not result in adverse stormwater impacts to properties and to protect the hydrological value of natural asset areas.

The following roads located in the South Bayside catchment have at least a 50% chance of flooding in any given year: Muriel Avenue, Empire Avenue, Herbert Street, Hindes Street, Beneteau Place, Whites Road, Alexander Street, Greencamp Road, Watervale Parade, Molle Road, Formosa Road, Grassdale Road, Dianthus Street, New Cleveland Road, London Road, Boston Road, Charleton Street, Warriewood Street, Daisy Street, Stradbroke Avenue and Wondall Road. Remember, if it's flooded, forget it – never drive through or enter floodwaters.

In the South Bayside catchment approximately 500 buildings lie within an area which has a 1% chance of being affected by creek flooding in any given year. There are also approximately 100 buildings that are within an area which has a 1% chance of coastal flooding in any given year.

A few sections of the South Bayside catchments remain in their natural condition and there are several natural assets within the catchment including the Bayside Parklands, Sleeman Sports Complex grounds, Ransome Bushlands, Wynnum Foreshore, Whyte Island and Elanora Park.

TINGALPA CREEK CATCHMENT PROFILE

The Tingalpa Creek catchment covers an area of approximately 117 km² falling within three local government areas – Brisbane, Logan and Redland councils. The Tingalpa Creek catchment is located to the south-east of the Brisbane CBD.

Tingalpa Creek rises in Venman Bushland National Park at Mount Cotton and the Brisbane Koala Park in Burbank. It then flows a short distance through Sheldon to Leslie Harrison Dam. Below the dam, the creek continues through Capalaba West, Birkdale and Ransome before spilling out to an area of Moreton Bay known as Waterloo Bay.

The Tingalpa Creek landscape ranges from wide mangrove-lined tidal reaches at its mouth, to small meandering streams in its middle and upper reaches.

The Tingalpa Creek catchment has experienced a number of historic flood events, including a mix of creek flooding and storm tide flood events. Notable events occurred in the catchment during January 2013, January 2015, February 2015 and May 2015.

To manage flooding in the catchment, the following floodplain management measure has been implemented:

- five rainfall gauges installed to monitor rainfall throughout the catchment.



In the Tingalpa Creek catchment, there are approximately 60 properties within an area that has a 1% chance of being affected by creek flooding in any given year. There are also approximately 40 properties that are within an area which has a 1% chance of storm tide flooding in any given year.

Much of the Tingalpa Creek catchment has been preserved and protected in its natural state and there are several natural assets within the catchment including the Bayside Parklands, Tingalpa Creek Reserve, Ransome Bushland and Brisbane Koala Bushland.

The roads which cross Tingalpa Creek have been constructed to allow them to remain free from flooding during the more frequent creek flood events. The road crossings in Tingalpa Creek have less than a 1% chance of flooding in any given year. Remember, if it's flooded, forget it – never drive through or enter floodwaters.

ACHIEVEMENTS IN CATCHMENT FLOODPLAIN MANAGEMENT PLANNING

WHAT HAVE WE ACHIEVED SINCE 2011?

Much work has been undertaken since the adoption of the *FloodSmart Future Strategy*, to ensure that Brisbane is working towards becoming a more resilient city; a city which is safe, confident and ready. Council has embraced the integrated approach promoted by the strategy, applying the four flood risk management tools to deliver floodplain management projects across the city.

Land Use Planning

Shaping the city's built form to increase our resilience to flooding.

Brisbane City Plan 2014 is Council's plan for the future development of Brisbane. It guides how land in Brisbane can be used and developed. It also helps plan for infrastructure to support growth and create a more diversified economy while continuing to protect our city's enviable way of life.

As part of City Plan 2014, a new hazard-based **Flood Overlay Code** was introduced, to ensure that development adequately considers the natural hazard of flooding.

Flood Planning Areas were defined for the Brisbane River, creek flooding and overland flow to guide future development in flood prone areas.

Since the adoption of the Flood Overlay Code many practical outcomes have been realised:

- properties raised to achieve acceptable flood immunity



Flood Overlay – creek/waterway

- developments designed in a way that maintain the conveyance of flood waters through a site
- essential electrical services suitably located to ensure public safety and minimise flood recovery following a flood.

Council allocates funding to consider the purchase properties with a 50% chance (or greater) of flooding in any year. More than 100 properties that were at risk of very frequent flooding have been purchased under the **Voluntary Home Purchase Scheme** since 2006, at a cost of \$55 million.

Flood Awareness and Information

Promoting community understanding of flooding to promote readiness.

Council has improved the ways in which it makes information available to residents and businesses and now has a range of awareness tools available online.

The **FloodWise Property Report** shows the risk and type of flooding at a property and can be used to ensure that new habitable floor levels are in accordance with the requirements of *Brisbane City Plan 2014*.

Flood Awareness Maps launched in 2013 provide an indication of the likelihood of a flood occurring from one or more sources: creek, river, overland flow and storm tide.

The **Flooding in Brisbane Guides** are designed to help residents and businesses prepare for flooding and outline simple things they can do to be prepared.

Council has written to vulnerable facilities identified as being located within the floodplain to inform them of the risks they may be exposed to.



Brisbane River CBD

Flood Mitigation Infrastructure

Maintaining and investing in flood mitigation assets to support the city's economic growth.

Council has invested over \$87 million since 2011 with the aim of minimising flooding impacts in local catchments by constructing major and local drainage infrastructure, obtaining drainage easements and acquiring land.

Following on from technical investigations, 44 backflow prevention devices have been installed to help minimise water flowing back up stormwater pipes.



Backflow prevention device

Flood Emergency Management

Further develop our capacity to respond to and recover from flood events.

Council launches the **All Hazards Brisbane Ready for Summer Campaign** at the start of each summer to raise the awareness of severe weather. Severe weather, such as storms can result in flooding from the Brisbane River, local creeks, storm surges along coastal areas and overland flow flooding. As part of the campaign residents are provided with advice on how to minimise the risks to people and property.

Rainfall and stream height information is gathered from almost 80 telemetry gauges located near creeks across the city which feed into Council's new state-of-the-art telemetry system. Council's **Creek Flooding Alert Service** makes use of this information to issue alerts when rain or flow levels in nearby creeks indicate that properties may be at risk of flooding.

Council provides Brisbane residents with a free **Early Warning Alert Service** to notify them of severe thunderstorms, destructive winds and potential flooding. The alerts are location based, so residents only receive warnings if their registered residential address may be impacted. As of 30 June 2016, there were over 125,000 registered subscribers to the service.

Council invested in improved Disaster Management training incorporating multi-agency training and exercising, evacuation centre planning, management of volunteers, and engagement with isolated communities.



Disaster Management training

FUTURE FLOODPLAIN MANAGEMENT PLANNING OPPORTUNITIES

WHAT IS COUNCIL CONSIDERING FOR THE FUTURE?

Catchment floodplain management planning allows us to better understand the consequences of flooding and identifies potential floodplain management opportunities which could be implemented in the short, medium or long term by Council, businesses and the public.

The opportunities which have been identified include an integrated mixture of land use planning, flood emergency management, flood information and awareness and flood mitigation infrastructure. Some of the opportunities which have been identified are likely to be applicable across many creek catchments on a city-wide scale, while others target specific areas of interest. Examples of potential opportunities that Council may consider are presented below.

Land Use Planning

- A series of flood resilient development plans including neighbourhood plans, master plans, structure plans and precinct plans. These would support local values whilst addressing flood risk in a specific area and adopting a long-term approach to improving community flood resilience through development.
- Extension of the existing Voluntary Home Purchase Scheme to allow commercial properties in flood-prone areas to be eligible for buy back.
- A new Flood Resilience Rebate Scheme to assist households undertake eligible works, including voluntary home raising, ensuring their property is more resilient to flooding.
- Planning for sea level rise by undertaking adaption planning to identify a strategy for areas affected by storm tide flooding.
- A review of the flood planning levels for coastal areas which would allow Council to gather an understanding of the benefits and costs associated with altering the current flood planning level.

Flood Awareness and Information

- Targeted community engagement with residents and business located within flood risk areas to help improve the safety and resilience of those most at risk of flooding. Households and businesses would be encouraged to be better prepared for flood events through engagement and promotion of household emergency plans and business continuity plans.
- Flood awareness signage located close to major creeks to enhance the community's connection to the creek and tell a wider story of water in Brisbane. By including information such as historical flood levels, the community would be reminded that floods can happen and have happened in the past.
- Local flood wardens in areas which become isolated by flood waters. These wardens would act as champions in their community, monitoring and distributing



Flood Awareness Map

information when it is likely that isolation may occur.

- Improved access to flood information to facilitate the expansion of Brisbane's Early Warning Alert Service as well as the creation of flood specific online educational tools, games and innovative applications.
- Targeted community awareness for communities affected by storm surge, similar in nature to Council's All Hazards Brisbane Ready for Summer Campaign.



Brisbane River CBD

Flood Mitigation Infrastructure

- Targeted channel works to improve conveyance of flood waters which could involve widening of the creek bed, culvert upgrades, raising or decommissioning bridges, restoration of natural channels, steepening, raising or lowering of channel banks.
- Stormwater harvesting to assist in reducing peak flows in small and frequent flood events and flood storage in the form of detention basins to assist in reducing flood levels downstream.
- Extension of Council's existing backflow prevention device program to provide targeted flood relief to areas affected by backflow flooding from creeks.



Construction of stormwater infrastructure

- Construction of new sea walls or modification of existing sea walls to provide additional protection to properties affected by storm tide flooding.
- Road crossing upgrades to assist in improving the flood immunity of targeted sections which in turn could improve emergency access or evacuation during a flood event.

Flood Emergency Management

- Expanding the existing Creek Flood Alert Service, allowing commercial properties in areas affected by flooding to register and receive alerts when rain or flow levels in nearby creeks indicate that properties may be at risk of flooding.
- Improvements to storm tide alerts and warnings which would allow residents and businesses to be prepared for potential storm tide flooding.
- Variable message boards and flashing lights identifying flooded roads to assist in deterring traffic from entering flood waters. During storm season the message boards could also be used to display flood safety messaging.

WHAT DOES COUNCIL DO WITH THE OPPORTUNITIES ONCE THEY HAVE BEEN IDENTIFIED?

Brisbane City Council is the largest local government in Australia, delivering a broad program of works throughout our city and suburbs. The process of catchment floodplain management planning is just one part of the work Council undertakes.

The floodplain management opportunities have been identified initially in isolation from Council's broad program of works. The next step is to consider these opportunities alongside all of Council's other competing priorities – this will be undertaken through Council's annual budget process which considers and prioritises all of Council's work in order to maximise value for the community.

Together with our partners, the floodplain management opportunities will be implemented through a range of delivery plans, projects and actions including when scheduling new flood mitigation infrastructure, during updates to planning schemes (including during Neighbourhood Planning processes), planning new emergency response measures such as flashing lights on flooded roads and when developing new flood information and awareness tools.

HOW YOU CAN BE PREPARED

We all have a role to play in managing flood risk in our local area.

Council has a range of free tools and information to help residents understand their property's potential flood risk and how to be prepared.

- Interactive Flood Awareness Map – Identify the flood risk for your local area, including:
 - Flood Awareness Map – Download a printable Flood Awareness Map for your locality
 - Interactive Flood Source Map – Identify the type or sources of flooding that may affect your locality
 - Interactive Historical Flood Map – Learn about the history of Brisbane's major river floods.
- FloodWise Property Report – Download a FloodWise Property Report for flood information relating to purchasing, building or renovating your home.
- Council's Early Warning Alert Service – Sign up to receive free alert messages for severe weather.
- Responding to a flood threat web page - Understand how to respond to a flood, including the locations of Council depots where sandbags are provided for collection.
- Flooding in Brisbane guides for both residents and businesses help you prepare for flooding and help minimise the impact to your home, family, property or business if flooding does occur.
- For more information visit www.brisbane.qld.gov.au/beprepared, your nearest Council regional business centre or call Council on (07) 3403 8888.

