

Abstract

Reasons for the Study and Plan

Flooding problems within the Eastwood town centre and other areas within the Terry's Creek catchment are well documented. Significant flooding problems have been experienced in 1967, 1984 and 1989. It is estimated that over 70 houses or commercial properties experienced above floor flooding in the November 1984 flood.

A range of flood mitigation options were investigated some 17 years ago, in the Terry's Creek Catchment Management Study that was prepared for the Water Board. Since that time, there have been a number of other studies with an emphasis largely on structural options, including tunnelling, as a means of reducing Eastwood's flood problem. There have also been various planning initiatives undertaken by Council which have imposed restrictions on development because of the flood problems.

In May 2006, Bewsher Consulting was commissioned by the City of Ryde to assist its Floodplain Management Committee in preparing a Floodplain Management Study and Plan for Eastwood and Terry's Creek.

Responsibilities

The prime responsibility for planning and management of flood prone lands in NSW rests with local government. The NSW Government provides assistance on state-wide policy issues and technical support. Financial assistance is also provided to undertake flood and floodplain risk management studies and for the implementation of works identified in any subsequent floodplain risk management plan.

The Eastwood and Terry's Creek Floodplain Management Committee oversaw the Study. This committee includes Councillors and staff from the City of Ryde, and staff from Parramatta City Council, Hornsby Shire Council, Department of Environment, Climate Change and Water (DECCW), Sydney Water Corporation and the State Emergency Service (SES). A number of community representatives were also represented on the committee.

The Study Area

The study area, shown on Figure 1, includes that portion of Terry's Creek within the City of Ryde, from Terry Road to the creek's confluence with the Lane Cove River. The Eastwood town centre is located within the study area, and straddles the Main Northern Railway Line. In addition to the main creek, the study area includes all significant tributaries and many overland flow paths.

Some consideration has also been given to works that have previously been recommended within Parramatta City Council, where these works potentially impact on flooding within the City of Ryde. The potential for flooding of properties in Parramatta City Council and Hornsby Shire Council has also been considered immediately upstream and downstream of the railway crossing.

Reporting

The Study results have been presented in a number of reports as the study has progressed, including reports covering:

- the Flood Study (May 2008);
- Town Planning Considerations (July 2008); and the
- Floodplain Risk Management Study and Plan (this report).

Consultation Community consultation has been an important component of the project. Key elements of the consultation process have been as follows:

- regular meetings of the Eastwood & Terry's Creek Floodplain Management Committee;
- public review of the flood study results, including a public display during July and

- August 2007, an information day and feedback process; and
- public exhibition of the draft floodplain risk management study and plan, prior to formal consideration by Council.

Modelling of Flood Behaviour

Flood behaviour has been assessed using computer models. The catchment area and stormwater pipe network within the study area was modelled using the DRAINS hydrologic model. Catchment flows from the Parramatta and Hornsby Council portion of the catchment were generated using a less detailed RAFTS model. Flows from these models were input to a two dimensional TUFLOW hydraulic model to estimate flood depths and the extent of flood inundation.

The flood models were calibrated to the November 1984 flood. They were then used to simulate flood behaviour for a range of flood events, including a 5 year, 10 year, 20 year, 50 year, 100 year and Probable Maximum Flood (PMF).

Flood Risk Mapping & Development Controls

The area subject to flooding (up to the PMF) has been divided into three flood risk precincts (high, medium and low). Different development controls are proposed for the catchment, depending on the type of development and the flood risk precinct in which the development is located. The flood risk precincts comprise:

- The high flood risk area – where high flood damages, potential risk to life, or evacuation problems are anticipated. It is recommended that most development is restricted within this area.
- The medium flood risk area – where there is still a significant risk of flood damage, but where these damages can be minimised by the application of appropriate development controls.
- The low flood risk area – where the risk of flood damage is low. Most land uses would be permitted within this area (subject to other planning considerations). In addition to the flood risk precincts, an overland flow precinct has also been defined. This comprises shallow areas of inundation distant from major watercourses where less restrictive flood level and other controls apply.

The Flood Problem

A flood damages database has been prepared for the study area to quantify the flood problem and to assist in evaluating the economic merit of a range of flood mitigation measures.

The database includes details on 1,361 properties throughout the study area that could potentially be affected by flooding (up to a PMF flood). The database has further been divided into 9 geographical areas (shown on Figure 1) to help identify the spatial distribution of the flood problem over the study area.

Flood Mitigation Options Investigated

A total of 12 options were identified by the floodplain management committee for analysis. These options were initially assessed using performance in the 100 year flood and consideration of environmental and other factors. A short list of 6 options was identified for further economic assessment. An additional option for the Eastwood town centre was also investigated following the evaluation of these options. The options are shown in Table 3.

The short tunnel option looked at diverting flow from upstream of Terry Road through a 3.8m diameter tunnel direct to a small basin in the lower part of Eastwood Park. The main objective was to reduce the flow carried by Terry's Creek through the town centre. This option reduces flood levels through the town centre by 0.4 to 0.6m in a 100 year flood, and reduces the present value of all flood damage by \$3.2M. However, flood levels downstream of the railway line increase marginally due to reduced travel times and results in an increase in flood damage of \$0.4M. The net benefit is \$2.8M and the estimated cost is \$13M. This option is not favoured due to its poor benefit/cost ratio of 0.2 and the increase in downstream flood levels.

The basin at Mobbs Lane and the culvert upgrade at Terry Road are two options that have been proposed in a report prepared for Parramatta City Council. Both options have been reviewed due to their potential impact on flood behaviour through the current study area.

The basin is likely to reduce flood levels whilst the culvert upgrade could potentially increase flood levels. Model results indicate a reduction in flood levels of 0.1 to 0.2m through Eastwood in a 100 year flood due to the combined measures, but an increase of around 0.1m in more frequent floods (5 year and 10 year events). This is due to the basin becoming less effective in smaller floods whilst the impact of the culvert upgrade became more pronounced. It is recommended that a basin at Mobbs Lane be pursued with Parramatta City Council, with possible cost sharing arrangements between both Councils and the DECCW.

Amplification of the Terry Road culvert can not be recommended without further consideration of the impacts in smaller floods.

Drainage improvements were investigated along Abuklea Road and in the vicinity of the TG Milner Sportsground. The initial scheme included doubling the size of the existing drainage pipeline behind properties in Abuklea Road, but provided limited benefits. Further stormwater drainage improvements have been proposed for this area (see Table 4 for potential drainage improvements in this area and others).

Debris control measures to prevent blockage of the railway culvert and the Progress Avenue culverts were investigated. The present value of all flood damage could be reduced by approximately \$0.5M if the potential for blockage of these structures is eliminated. The measures are envisaged to incorporate bollards around the perimeter of the railway culvert, and structural fencing along the boundary of the open channel upstream of the Progress Avenue culverts. This measure has an estimated cost of the order of \$50,000 and a benefit/cost ratio considerably greater than 1.0. These works are recommended. The final stage of a drainage augmentation scheme at First Avenue in the eastern town centre was included in the flood model. Results indicated that flooding of a number of commercial properties along Rowe Street could be alleviated by these works, with the present value of all flood damages reduced by approximately \$0.6M. The cost of the final stage of works has been estimated at \$1.3M, which provides a benefit/cost ratio of 0.5. As this is the final stage of a major drainage augmentation scheme, completion of this final stage is recommended.

The options recommended above only partially reduce flooding through the Eastwood town centre. Further evaluation of drainage augmentation measures in this area was subsequently undertaken. A scheme was identified including:

- modification of the existing drain upstream of Progress Avenue, including the option to cover this drain;
- new twin box culverts from Glen Street Reserve to Eastwood Park, under Lakeside Road; and
- an inlet headwall in Glen Street Reserve.

The drainage augmentation measures reduce the 100 year flood by up to 1.0 to 1.1m through the town centre, reducing the depth of flooding to less than 0.3m. The estimated cost is \$8.5M, and the present value of flood benefits estimated at \$4.6M. This provides a benefit/cost ratio of 0.5, which is a substantial improvement over the other tunnel options investigated. Given the reduced risk to personal safety this option could be considered more favourably. It would also remove many of the flooding constraints on future redevelopment of the town centre. The option has been included in the recommended Floodplain Management Plan.

Stormwater Drainage Problems

A large focus of the current study has been based on addressing the flood problems in the Eastwood town centre. However, the total flood damage from this area represents only 30% of the flood damage experienced throughout the wider study area (based on the present value of flood damage in Table 2). Most of the other flooding problems are related to stormwater drainage and overland flow problems along the tributaries that lead to Terry's Creek. The majority of flooding problems are related to surface flows that are less than 0.5m in depth. Flood behaviour within these areas is very much influenced by local conditions, including fences, structures, the accuracy of the ALS survey, and assumed floor levels of potentially affected buildings. Further investigations will be required in several areas to determine the most appropriate stormwater drainage improvements. Table 4 lists some provisional stormwater drainage improvement measures. These works are subject to detailed assessments, but are anticipated to include:

- formalisation of overland flow paths;
- amplification of stormwater pipe lines; and

- potential relocation of buildings that currently restrict overland flow paths.

Additional measures have been recommended for Area 7, including additional inlet pits in Brabyn Street, improvements to the culvert in Jim Walsh Park, and a feasibility study into a potential detention basin in Jim Walsh Park.

Planning Issues

Existing planning controls related to flooding have been reviewed during the course of these investigations.

A number of flood related controls have been proposed for the study area, which would be implemented through a flood risk management chapter to be included in the City-wide DCP.

The DCP chapter outlines a common preamble, principles and objectives that would apply to all catchments within the City of Ryde. Specific controls for Eastwood and Terry's Creek, as determined during the course of the floodplain management study, are included in a matrix of prescriptive controls (included as Figure 2). Other matrices would be developed and appended to the DCP chapter as studies and plans on other catchments are completed.

Many of the measures included in the proposed DCP chapter formalise procedures that are currently applied by officers from Council. Some changes that have been recommended include:

- increase of freeboard from 0.3m to 0.5m (except in the overland flow precinct);
- limited controls on residential development above the 100 year flood, to satisfy freeboard allowance and vertical evacuation requirements;
- more comprehensive car parking and driveway access requirements;
- varying controls based on sensitivity of landuse to flood risk;
- providing concessions to encourage existing floodprone properties to redevelop in a flood-sensitive manner.

The study has also recognised that there may be locations beyond the limit of the 100 year flood (plus freeboard) where controls on residential development may be required in some rare circumstances (eg basement carparks, vertical evacuation). In accordance with the Department of Planning's January 2007 Guideline, Council will need to seek approval from the State Government to impose controls in this area.

The Recommended Floodplain Management Measures

The draft Eastwood and Terry's Creek Floodplain Risk Management Plan is shown on Figure 3 and summarised in Table 5.

It is important to note that not all flooding problems in the study area have been alleviated. A complete solution to the flooding problem is not cost effective from a floodplain management perspective. However, problems can be reduced gradually over time as sensible redevelopment occurs. There may also be some scope to completely alter the drainage regime through the town centre in association with major redevelopment proposals.

Timing and Funding

The total cost of implementing all the recommended measures is approximately \$14.4M.

This includes an amount of \$8.5M for drainage augmentation measures through the town centre. It is envisaged that the Plan would be implemented progressively over a 5 to 10 year time frame.

The timing of the proposed works will depend on the overall budgetary commitments of Council and the availability of funds from other sources (eg State Government, potential Section 94 contributions, private sector contributions etc).

[Eastwood & Terrys Creek Floodplain Risk Management Study & Plan - Main Report October 2009](#)

Name: Eastwood & Terrys Creek Floodplain Risk Management Study & Plan - Main Report October 2009

Protocol: WWW:DOWNLOAD-1.0-http--download

Function: download

Unique resource identifier

Code ea4f0ffc-877c-416a-8c5e-05add43485b6

Presentation form

Edition 27/06/2017

Dataset language English

Metadata standard

Name ISO 19115

Edition 2016

Dataset URI <https://datasets.seed.nsw.gov.au/dataset/ea4f0ffc-877c-416a-8c5e-05add43485b6>

Purpose Land and Resource Management

Status On going

Spatial representation

Type vector

Spatial reference system

Code identifying the spatial reference system 4283

Topic category

Keyword set	
keyword value	
Originating controlled vocabulary	
Title	ANZLIC Search Words
Reference date	2008-05-16
Geographic location	
West bounding longitude	151.066337
East bounding longitude	151.109594
North bounding latitude	-33.797827
South bounding latitude	-33.761277
NSW Place Name	Eastwood
Vertical extent information	
Minimum value	-100
Maximum value	2228
Coordinate reference system	
Authority code	urn:ogc:def:cs:EPSG::
Code identifying the coordinate reference system	5711
Temporal extent	
Begin position	
End position	N/A
Dataset reference date	
Resource maintenance	
Maintenance and update frequency	As needed
Contact info	
Contact position	Data Broker
Organisation name	Ryde City Council
Full postal address	cityofryde@ryde.nsw.gov.au
Email address	cityofryde@ryde.nsw.gov.au
Responsible party role	pointOfContact
Limitations on public access	

Responsible party

Contact position	Data Broker
Organisation name	Ryde City Council
Full postal address	cityofryde@ryde.nsw.gov.au
Email address	cityofryde@ryde.nsw.gov.au
Responsible party role	pointOfContact

Metadata point of contact

Contact position	Data Broker
Organisation name	Ryde City Council
Full postal address	cityofryde@ryde.nsw.gov.au
Email address	cityofryde@ryde.nsw.gov.au
Responsible party role	pointOfContact

Metadata date 2024-03-25T07:20:42.989389

Metadata language