MANLY LAGOON

FLOODPLAIN RISK MANAGEMENT STUDY & PLAN

NORTHERN BEACHES COUNCIL

DRAFT FOR PUBLIC EXHIBITION

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MANLY LAGOON FLOODPLAIN RISK MANAGEMENT STUDY

FINAL DRAFT FOR PUBLIC EXHIBITION

MARCH 2018

Project **Manly Lagoon Floodplain Risk Management Study**	Project Number **115006**
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Cover photo (left): Manly Lagoon (Courtesy of Office of Environment and Heritage)
(right): Manly Lagoon Reserve Playground - Queenscliff, April 2015 (Courtesy of CNDoz via www.flickr.com/photos/cndoz/17015341977)

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FOREWORD

The NSW State Government's Flood Prone Land Policy provides a framework to ensure the sustainable use of floodplain environments. The Policy is specifically structured to provide solutions to existing flooding problems in rural and urban areas. In addition, the Policy provides a means of ensuring that any new development is compatible with the flood hazard and does not create additional flooding problems in other areas.

Under the Policy, the management of flood liable land remains the responsibility of local government. The State Government subsidises flood mitigation works to alleviate existing problems and provides specialist technical advice to assist Councils in the discharge of their floodplain management responsibilities.

The Policy provides for technical and financial support by the Government through five sequential stages:

1. ***Data Collection***
2. ***Flood Study***
   - Determine the nature and extent of the flood problem.
2. ***Floodplain Risk Management Study***
   - Evaluates management options for the floodplain in respect of both existing and proposed development.
3. ***Floodplain Risk Management Plan***
   - Involves formal adoption by Council of a plan of management for the floodplain.
4. ***Implementation of the Plan***
   - Construction of flood mitigation works to protect existing development, use of Local Environmental Plans to ensure new development is compatible with the flood hazard.

EXECUTIVE SUMMARY

Background

The following Stage 4 report comprises an overview of the work that has been undertaken by WMAwater on the Manly Lagoon Floodplain Risk Management Study and Plan. It builds on the Stage 3 report and, in accordance with the Brief, it additionally includes a discussion of:

- hydraulic and hazard categorisation;
- future development scenarios;
- review of climate change;
- flood damages assessment; and
- emergency management.

The Study, which follows on from the Manly Lagoon Flood Study (Reference 1), has been undertaken in accordance with the NSW Government's Flood Prone Land Policy and the Floodplain Development Manual (Reference 2). A full assessment of the existing flood risk in the catchment has been carried out, including flood hazard across the catchment, over-floor flooding of residential, commercial and industrial properties, road flooding and emergency response during a flood event. A range of measures aimed at managing this flood risk were also assessed for their efficacy across a range of criteria, which allowed certain options to be recommended, forming the basis of the Floodplain Risk Management Plan for the area.

In May 2016, Pittwater, Manly and Warringah Council's merged to form the Northern Beaches Council. As such, Manly Lagoon catchment now falls within one Council Local Government Area. The area which previously fell within Warringah Council's LGA is herein referred to Northern Beaches Central, and that within the previous Manly Council LGA is Northern Beaches South. At present, each separate Council's planning and policy guidance is being retained and therefore remains relevant to the current study.

Existing Flood Environment

The catchment is predominantly urbanised with industrial, commercial and residential development. There are three major commercial centres within the catchment – Warringah Mall, Balgowlah Industrial Estate, and Stockland Balgowlah. The floodplain of the lagoon itself is primarily open space, comprising of golf courses, parks and reserves. Manly Dam is located in the upper catchment, and has a catchment area of approximately 500 ha comprising predominantly bushland. This accounts for approximately one quarter of the total Manly Lagoon catchment area.

Flooding within the Manly Lagoon catchment can result from either elevated ocean conditions, catchment flooding, or a combination of both, however catchment flood events represent the dominant flooding mechanism in the catchment. Whilst ocean derived flooding will cause

inundation for properties close to the lagoon, the extent and severity of flooding is significantly less than the catchment derived event of corresponding probability.

Floodplain Risk Management Options

The Floodplain Risk Management Study includes an investigation of possible options for the management of flood risk in the Study Area. These included flood modification works such as the construction of levees and retarding basins, drainage upgrades and channel modifications, as well as planning measures and response modification options. The measures were assessed for their ability to reduce flood risk while also considering their economic, social and environmental impact. A multi-criteria matrix assessment was used to directly compare the options. The options recommended arising from this assessment and hence recommended for evaluation in the FRMP are shown in Table 1. Further details of these options are found in Section 9.

Table 1 Recommended Floodplain Risk Management Options

Option ID	Description	Reference
LV02	Clearview Place Levee	9.2.1.2
MD01	Investigation into Manly Dam Airspace Availability	9.2.8.1
PM03	Flood Proofing	9.4.3
PM04	Land Use Zoning	9.4.4
PM05	Flood Planning Levels	9.4.5
PM06	Flood Planning Area	9.4.6
PM07	Changes to Planning Policy	9.4.7
PM08	S149 Certificates	9.4.8
RM01	Emergency Planning	9.3.1
RM02	Flood Warning	9.3.2
RM04	Road Closures, Early Notifications	9.3.4
RM05	Community Education and Awareness	9.3.5

1. INTRODUCTION

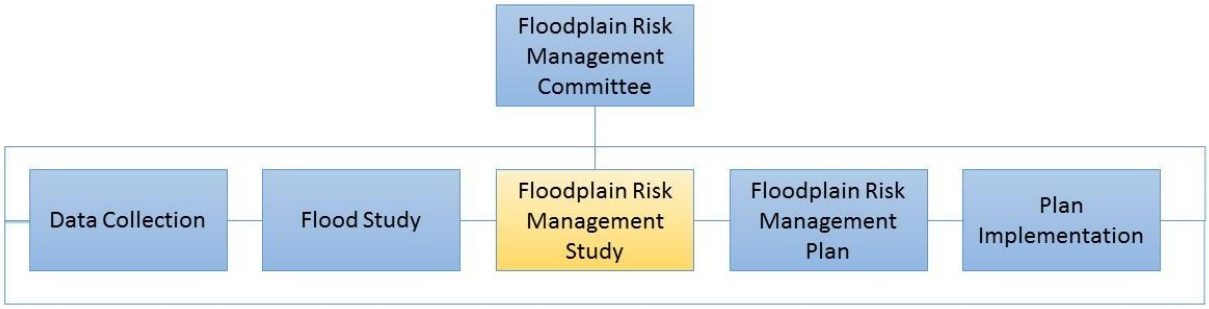
1.1. Study Area

The Manly Lagoon catchment is located in the recently formed Northern Beaches Local Government Area, comprising land within Northern Beaches Central (previously Warringah Council LGA) and Northern Beaches South (previously Manly LGA), as shown in Figure 1. The catchment encompasses an area of approximately 18 km^2, whilst the lagoon itself is relatively small, with a surface area of approximately 0.1 km^2. The lagoon is located in the east of the catchment, with its entrance to the Tasman Sea at Queenscliff Beach. Manly Lagoon is fed primarily by Burnt Bridge Creek, Brookvale Creek and Manly Creek as well as receiving inflows from a large number of stormwater drains. The Manly Creek sub-catchment includes inflows from Manly Dam and Curl Curl Creek.

1.2. The Floodplain Risk Management Process

As described in the Floodplain Development Manual (Reference 2) the floodplain risk management process is formed of sequential stages as shown in Diagram 1:

Diagram 1: Floodplain Risk Management Process



The Manly Lagoon Catchment Coordinating Committee (MLCCC) is acting as the Floodplain Risk Management Committee. As described in the Floodplain Development Manual, the role of the Committee is to assist Council undertaking the floodplain risk management process, and acts as both a focus group and forum during the process.

The Manly Lagoon Flood Study was completed in 2013 by BMT-WBM (Reference 1). The Floodplain Risk Management Study and Plan (FRMS&P) are being undertaken for the catchment in two phases:

Phase I – Floodplain Risk Management Study in which the floodplain management issues confronting the study areas are assessed, management options investigated and recommendations made. Specific objectives for this phase include:

- Identifying innovative solutions to the management of flood hazards within the study area.
- Provide recommendations regarding the trigger level at which reactive mechanical opening of the closed entrance should be undertaken.
- Assess the economic impact of flooding.
- Review and discuss strategies for raising the awareness of flood risk and the level of flood preparedness in the catchment.

Phase II – Draft Floodplain Risk Management Plan which is developed from the floodplain risk management study and details how flood prone land within the study areas is to be managed moving forward. The primary aim of the Plan is to reduce the flood hazard and risk to people and property in the existing community and to ensure future development is controlled in a manner consistent with the flood hazard and risk at this time and ensuring that such plans are informed to a degree by climate change sensitivity.

The Plan consists of prioritised and costed measures for implementation. The Draft Plan is included in Section 10.