SHOALHAVEN CITY COUNCIL

Willinga Lake Flood Study and Floodplain Risk Management Study & Plan

Summary Report

January 2025

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Acknowledgement *of Country*

Walawaani (welcome),

Shoalhaven City Council recognises the First Peoples of the Shoalhaven and their ongoing connection to culture and country. We acknowledge Aboriginal people as the Traditional Owners, Custodians and Lore Keepers of the world's oldest living culture and pay respects to their Elders past, present and emerging.

Walawaani njindiwan (safe journey to you all)

This acknowledgment includes Dhurga language. We recognise and understand that there are many diverse languages spoken within the Shoalhaven.

Acknowledgements

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Shoalhaven City Council would further like to acknowledge the community of Bawley Point and Kioloa who have given their time in responding to project surveys, attending workshops and providing feedback on reports and materials.

Shoalhaven City Council has prepared this document with financial support from the Australian Government through the National Recovery and Resilience Agency's *Preparing Australian Communities Program – Local Stream*. Technical assistance has also been received from the NSW Government through the Department of Climate Change, Energy, the Environment and Water (DCCEEW) and the NSW State Emergency Service (SES). This document does not necessarily represent the opinions of the Australian Government, NSW Government or DCCEEW.

Report Structure

The reporting for the Willinga Lake Flood Study and Floodplain Risk Management Study and Plan is separated into three report volumes as follows:

- Volume 1: Flood Study Report
  - This report details the development of flood model development, calibration, design flood estimation and mapping for the study area.
- Volume 2: Floodplain Risk Management Study & Plan (FRMS&P)
  - This report details investigations into flood affectation, risk and impacts, the assessment of potential management measures, and the selection of recommended management measures to form a Floodplain Risk Management Plan.
- Volume 3: Flood Mapping Compendium.

This document provides a combined summary of the above report volumes. The above report volumes can all be viewed in the Document Library on the project's Get Involved webpage.

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1 Introduction

Willinga Lake is located within the Shoalhaven City Council Local Government Area (LGA) in the South Coast Region of New South Wales. The Willinga Lake catchment has an area of about 14 km^2 and is sparsely developed.

Willinga Lake is classified as an Intermittently Closed and Open Lake or Lagoon (ICOLL). It drains to the Tasman Sea via the ocean entrance at the southern end of North Beach, near the village of Bawley Point (*refer* **Figure 1-1**). The entrance is often closed off from the ocean by a sand. During periods of rain, water levels in the lake rise behind the closed berm until the water eventually spills over the berm, scouring a channel and re-opening the lake to the ocean. There have been reports from the community of historic occurrences of Bawley Point Road being inundated by floodwater when the Willinga Lake entrance was closed.

Figure 1-1 Willinga Lake entrance in closed (left) and open (right) conditions

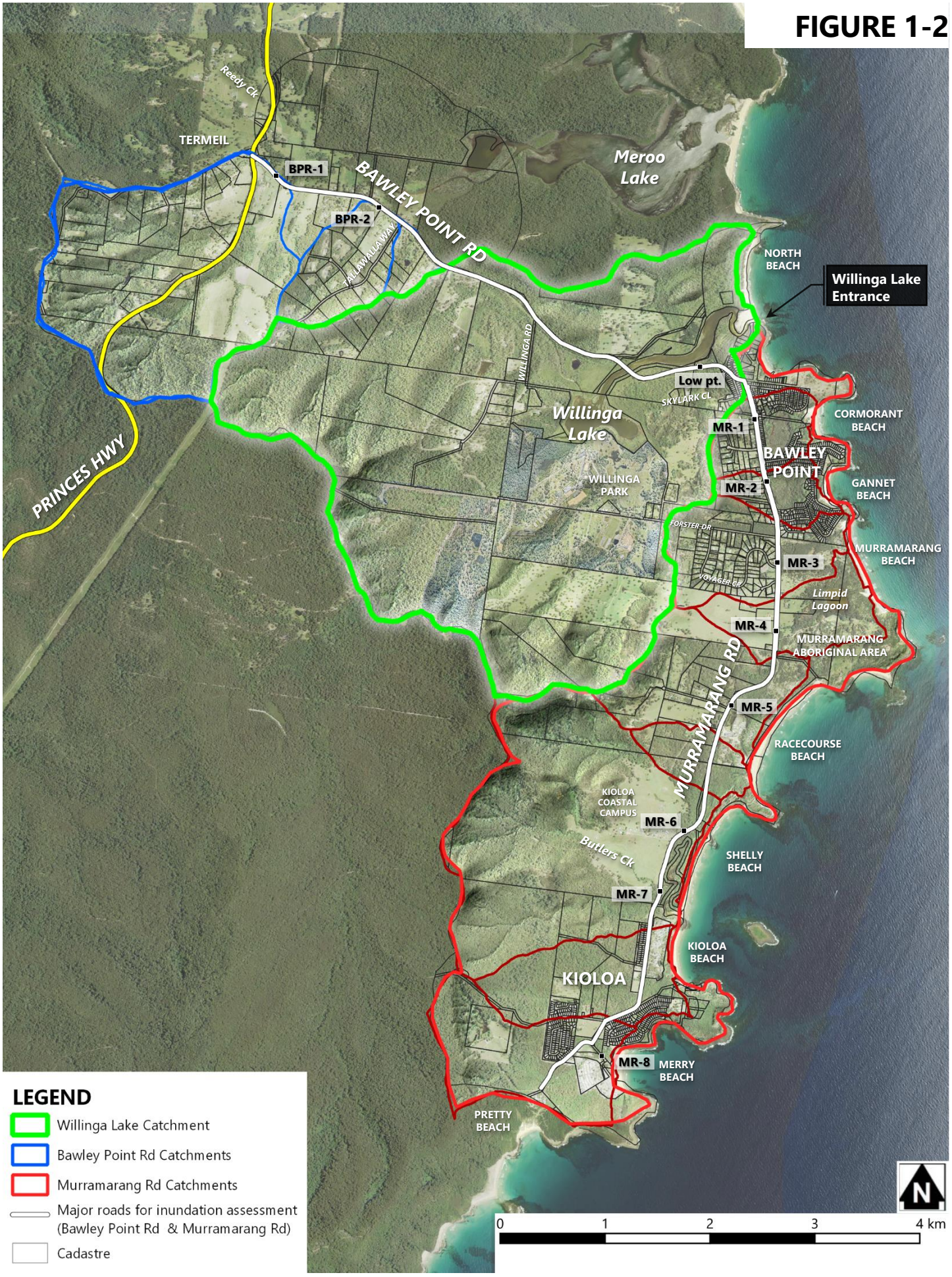
The study area also includes several smaller local catchments which drain across Bawley Point Road and Murramarang Road toward the ocean (*refer* **Figure 1-2**). Bawley Point Road and Murramarang Road provide the only reliable vehicular access to Bawley Point, Kioloa and Pretty Beach. Inundation of these roads has the potential to isolate the local communities including more than 1,000 properties and 11 businesses, as well as three holiday parks that contribute to a significant increase in population during holiday periods.

Shoalhaven City Council (Council) is responsible for land use planning within its LGA, including the management of flood risk. Council engaged Worley Consulting to undertake the *Willinga Lake Flood Study and Floodplain Risk Management Study and Plan* (FRMS&P).

The study has been undertaken in accordance with the NSW Government's *Flood Prone Land Policy*, the primary objective of which is to reduce the impact of flooding on individual owners and occupiers of flood prone land, and to reduce private and public losses caused by flooding.

The study provides an improved understanding of the potential impacts of floods on the local community and will inform the ongoing management of flood risk in the Willinga Lake catchment. This includes the provision of detailed flood intelligence to the NSW State Emergency Service (SES) and the public regarding flood risk and how to respond to floods.

FIGURE 1-2



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worley consulting

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OVERVIEW OF THE STUDY AREA

2 Background

2.1 The Need for Floodplain Risk Management

Floods are part of the Australian landscape. They occur in many parts of Australia, and their severity and causative mechanisms may vary widely between locations.

While floods have positive impacts such as providing inflows to water supplies, sustaining flood-dependent ecosystems and improving soil moistures and fertility for farming, where humans have occupied the floodplain they pose significant risk to life and property. Negative impacts of flooding include human fatalities and injuries, economic damage, environmental damage, and disruption of individuals' lives and the function of communities (AIDR 2017a).

Historically, flood damage in Australia is greater than that of any other natural hazard, and flood-related deaths are a continuing occurrence. There were reportedly 178 fatalities attributed to flooding in Australia between 2000 and 2015 (Haynes et al. 2016).

Despite the hazard posed, flooding is the most manageable natural disaster, as its behaviour and potential extent can be estimated and considered in decision making. In New South Wales, the management of flood liable land is governed by the NSW Government's Flood Prone Land Policy, the main objective of which is to reduce the impact of flooding and flood liability on owners and occupiers of flood-prone property and reduce public and private losses from flooding. The policy also recognises the benefits of the appropriate and sustainable use, occupation and development of flood-prone land.

Studies such as the Willinga Lake Flood Study and Floodplain Risk Management Study and Plan are undertaken to help local government make informed decisions about managing flood risk by using detailed flood models to quantify flood characteristics and investigating options to manage and alleviate flood risk including potential property, flood and response modification measures.

2.2 The NSW Floodplain Risk Management Process

Policy and practice are defined in the *Flood Risk Management Manual* (DCCEEW 2023a), which was gazetted in June 2023 to replace the *Floodplain Development Manual* (NSW Government 2005).

Under the Policy, the management of flood risk remains the responsibility of local government. The State Government provides financial and technical assistance to local government through its Floodplain Management Program which is administered by the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW).

The NSW Floodplain Risk Management Process consists of a number of stages as defined in the *Flood Risk Management Manual* and reproduced in **Figure 2-1**. The process is cyclical, and reviews may be triggered by various instances, for example the occurrence of significant flood events which provide additional data on flood behaviour, or the occurrence of significant changes to the catchment condition over time.

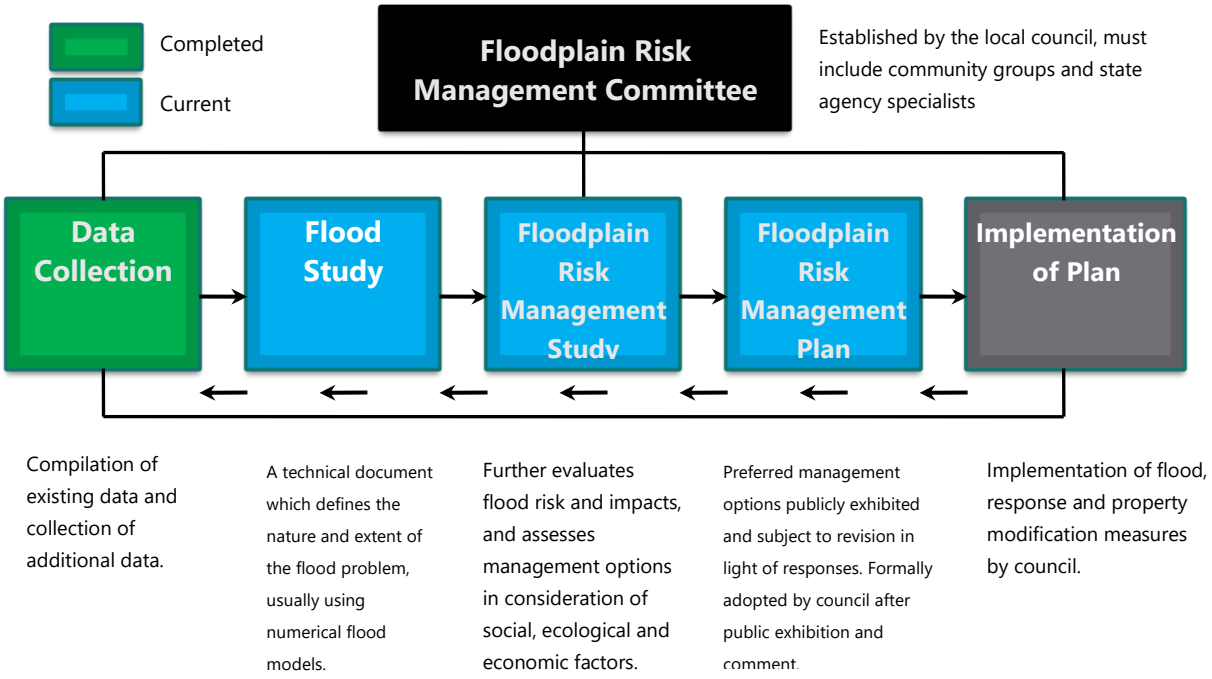


Figure 2-1 Stages of the NSW Floodplain Risk Management Process

2.3 Study Objectives

The overall objective of this study is to complete a comprehensive Flood Study and Floodplain Risk Management Study & Plan for the study area, and thereby provide an improved understanding of the potential impacts of floods on the local community and how flood risk may be better managed.

Phase 1 of the study defines flood behaviour in the study area based on the latest topographic data, modelling techniques and technology, and guidance provided in ARR 2019. This includes the provision of design flood levels, depths, discharges, velocities, hazard, hydraulic categories and other information relevant to the management of flood risk.

Phase 2 of the study assesses the potential impacts of flooding on the community and investigates options to improve management of flood risk including flood, property and response modification options.

Phase 3 of the study comprises of the development of a plan recommending implementation of the preferred measures as determined by a multi-criteria analysis including economic assessment and community feedback.

Phase 1 is detailed in **Volume 1: Flood Study Report** while phases 2 and 3 are detailed in the **Volume 2: Floodplain Risk Management Study & Plan Report**.

2.4 Relevant Manuals and Guidelines

The Flood Study and FRMS&P has been prepared in accordance with the *NSW Flood Prone Land Policy*, the *Flood Risk Management Manual* (DCCEEW 2023a), and Australian Rainfall and Runoff: A Guide to Flood Estimation 2019 (ARR 2019).

3 Willinga Lake Flood Study

3.1 Defining Flood Behaviour

The objective of the flood study was to provide a detailed understanding of flood behaviour in the study area. This involved the development and calibration of new flood models which were used to investigate 'design flood conditions' and produce associated flood mapping.

Design flood conditions are estimated from hypothetical design rainfall events that have a particular statistical probability of occurrence as defined in *Australian Rainfall and Runoff: A Guide to Flood Estimation* (*ARR 2019*). These design floods are used by Council and other agencies to understand flood risk and help plan for the occurrence of flooding.

The probability of a design event occurring can be expressed in terms of percentage Annual Exceedance Probability (AEP), which also provides a measure of the relative magnitude of the flood event. The new flood models were used to simulate a range of design flood events including frequent floods (*e.g. the 50% AEP event*), infrequent floods (*e.g. the 5% AEP event*), rare floods (*e.g. the 1% AEP flood*) and an extreme flood (*i.e. the Probable Maximum Flood or 'PMF'*).

Design flood mapping for 'existing conditions' within the Willinga Lake catchment is presented in **Volume 3: Flood Mapping Compendium**, including peak flood level, depth, velocity and hazard maps.

3.2 Summary of Findings

Willinga Lake

Willinga Lake is bordered by a considerable area of flat, low-lying land with elevations primarily between about 1 and 2 metres above mean sea level (*i.e. above 0 mAHD*). The low point of Bawley Point Road near Skylark Close has an elevation of 1.92 mAHD. Beyond this low-lying area the land rises steeply out of the floodplain (*refer* **Figure 3-1**).

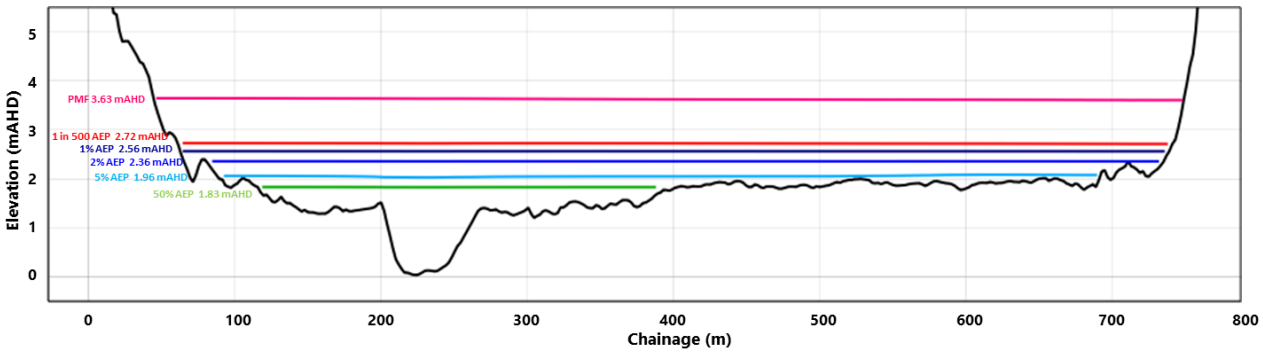


Figure 3-1 Terrain & peak flood level cross-section through the floodplain

As a function of this terrain, a significant area of land is inundated even in frequent floods and the flood extent increases rapidly until levels of about 2 mAHD are reached (*refer* **Figure 3-2**). The extent and depth of inundation in these relatively frequent floods is strongly influenced by the condition of the Willinga Lake entrance berm which typically has a crest elevation in the range of 1.6 to 1.9 mAHD when closed.

Bawley Point Road would first be inundated by floodwaters from Willinga Lake in the 5% AEP event, though it would experience minor flooding in the 10% AEP event driven by runoff from the local catchment in the vicinity of Skylark Close.

Peak flood velocities in the Willinga Lake floodplain are low across the full range of events, only exceeding 1 m/s within the entrance channel and locally elsewhere in the PMF. Modelling found moderate rates of rise and moderate to long durations of flooding (*e.g., Bawley Point Road is inundated for 9 hours in the 1% AEP*).

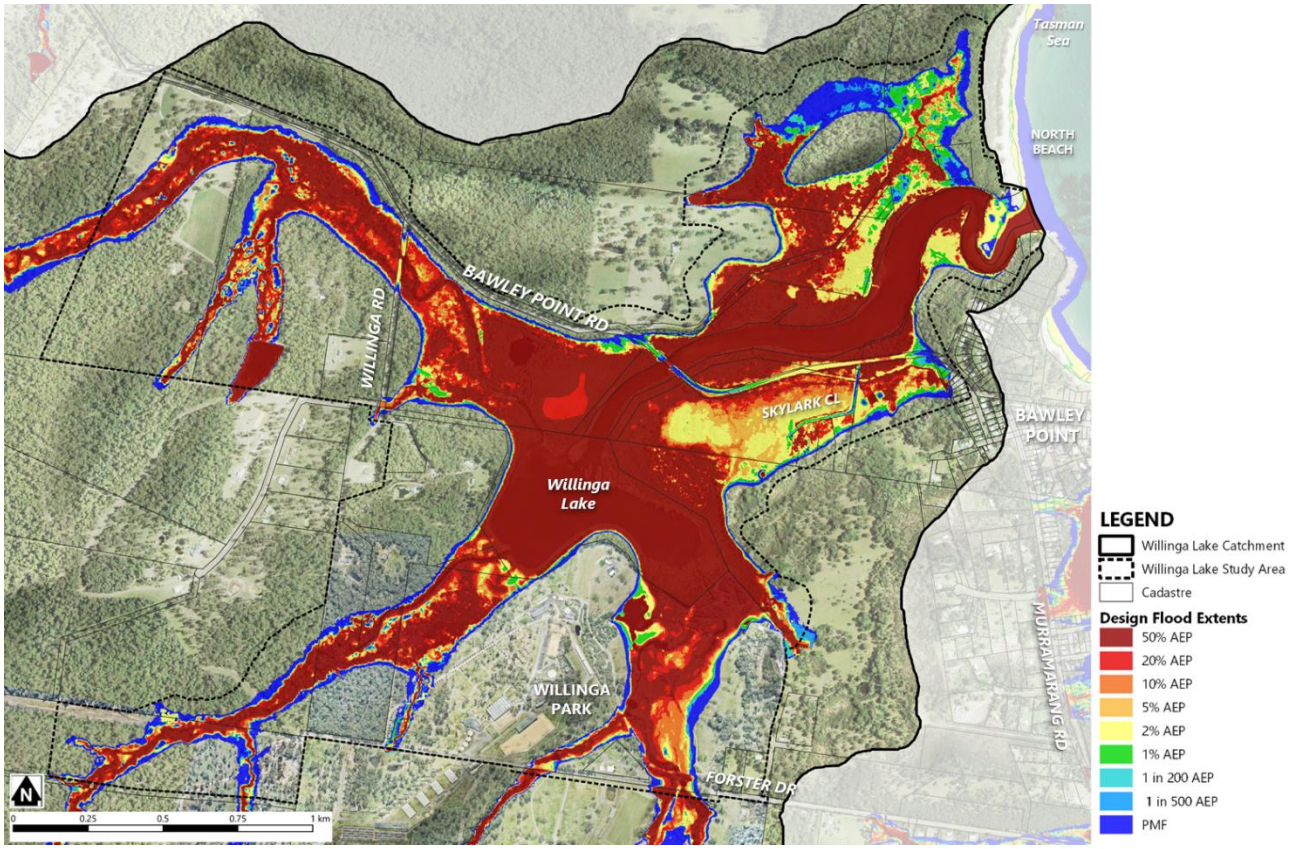


Figure 3-2 Simulated Design Flood Extents for the Willinga Lake Study Area

Bawley Point Road Local Catchments

Local catchment flooding of Bawley Point Road is also relatively 'flashy', driven by short durations of intense rainfall. Model results indicate that a location along Bawley Point Road about 300 to 400 m south-east of the Princes Highway (*refer* **Figure 3-4**) would be inundated in events as frequent as the 50% AEP.

Along with Willinga Lake driven flooding of Bawley Point Road near Skylark Close, hazardous flood conditions at this location would result in the most extensive, frequent, and longest duration isolation of local communities from the Princes Highway and associated services and emergency responders.

Murramarang Road Local Catchments

There are several local catchments which drain across Murramarang Road toward the ocean via minor creeks and lagoon-like watercourses which lie behind the sand dunes of the various beaches from Cormorant Beach in the north through to Merry Beach in the south.

It was found that inundation along Murramarang Road can be quite widespread and frequent, however flood depth, hazard and duration are generally lower than along Bawley Point Road. While this may result in the

compartmented isolation of the various pockets of development and tourist facilities from one another, and from the main settlement of Bawley Point, inundation of Murramarang Road is unlikely to be critical in isolating these areas from the Princes Highway.

3.3 Assessment of the Potential Impacts of Climate Change

While projections vary, there is a general consensus that climate change will alter the severity of flooding through sea level rise (SLR) and an increase in the intensity of heavy rainfall events. Quantifying the potential impacts of climate change on flooding allows current decisions to consider future changes in flood risk.

Shoalhaven City Council has adopted SLR benchmarks of 0.23 m by 2050 and 0.85 m by 2100. These benchmarks have been adopted to assess the potential impact of seal level rise on flooding in the study area.

Overall, the investigated rainfall and sea level rise projections indicate that climate change would be expected to have a significant adverse impact on flooding in the study area.

The 2050 projections would increase peak flood levels by 0.25 to 0.4 m in Willinga Lake across a range of flood magnitudes, and would increase peak flood levels along minor watercourses by 0.05 to 0.45 m.

The 2100 projections would increase peak flood levels by 0.8 to 0.9 m in Willinga Lake across a range of flood magnitudes, and would increase peak flood levels along minor watercourses by 0.05 to 0.75 m.

3.4 Model Calibration to the November 2023 Storm

Calibration is an important step in the flood modelling process that confirms that the models can reproduce observations and measurements from historical flood events.

In late November 2023 a deep low-pressure system centred over southern New South Wales brought several days of widespread rain (*BoM, 2023*). The Willinga Lake rainfall gauge recorded 168 mm of rain over a 30 hour period from 1:30 pm on 28 November 2023. This storm was selected as the model calibration event.

In response to the rainfall, water levels in Willinga Lake began to rise on the afternoon of the 28th of November, reaching a peak level of about 1.7 mAHD at around 4:00 pm on the 29th. Water levels then dropped rapidly indicating that the entrance berm had been overtopped and begun to scour out.

Anecdotal reports suggest that the water level in Willinga Lake came close to reaching the asphalt along the northern edge of Bawley Point Road near Skylark Close, while the roadway was inundated by local catchment flooding at a location about 400 metres south-east of the Princes Highway (*refer* **Figure 3-4**).

Model calibration was assessed by inputting recorded rainfall to the flood models and comparing flood levels simulated by the models with water levels recorded by the Willinga Lake gauge. The results of the November 2023 calibration to recorded water level data is presented in (*refer* **Figure 3-3**). A comparison was also made to a photograph of local catchment driven inundation of Bawley Point Road (*refer* **Figure 3-4**).

The model achieved an excellent match to the timing, shape and peak of the recorded flood level hydrograph. The calibration results provide confidence in the ability of the developed flood models to replicate actual flood behaviour in the study area.

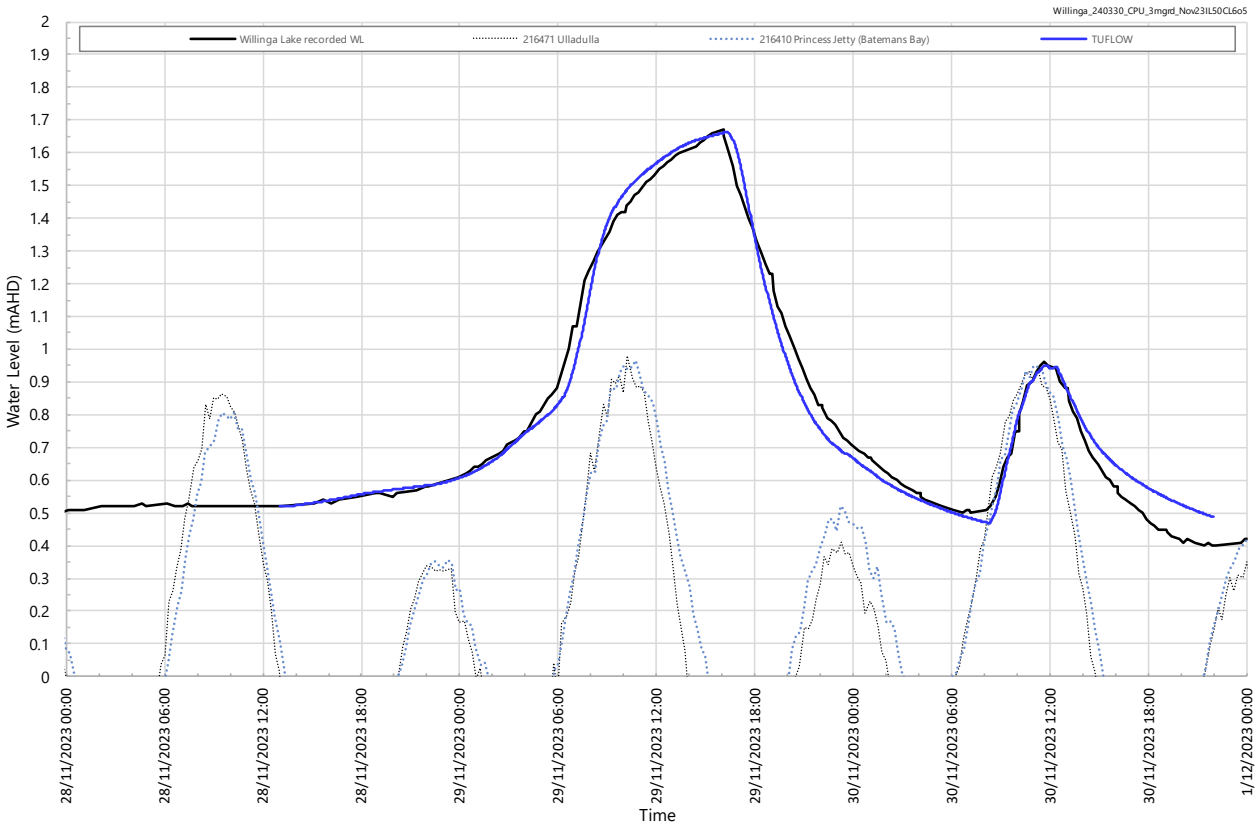


Figure 3-3 Comparison of recorded and simulated flood levels for November 2023 event

Figure 3-4 Comparison of model results to photo of Bawley Point Road near Princes Highway

4 Willinga Lake Floodplain Risk Management Study

4.1 Overview

The objective of the Willinga Lake Floodplain Risk Management Study was to evaluate flood risks in the study area and identify possible measures to manage these risks. The findings from this assessment informed the recommendations in the Floodplain Risk Management Plan.

4.2 Assessment of Property Affectation

Design flood levels were interrogated against a property database to provide an assessment of buildings expected to be flooded above floor. Results of the analysis are discussed in the following.

Above Floor Flooding by Design Flood Event

- Overall, the level of affectation is low. Only 1 building is expected to be flooded above floor in the 10% AEP event, 6 buildings flooded above floor in the 1% AEP event and 11 buildings flooded above floor in the 1 in 500 AEP event.
- In the PMF 86 buildings are expected to be flooded above floor level of which 62 would be holiday cabins located within the various holiday parks.

Above Floor Flooding by Catchment

- Only two residential buildings within the Willinga Lake catchment are flooded above floor in the 1% AEP event. No additional buildings are affected even in the PMF.
- Only one building in the Bawley Point Road local catchments is expected to be flooded above floor level, and only in the PMF event.
- The highest concentration of above floor flooding occurs in the Murramarang Road local catchments. Most affected buildings are holiday cabins located within the various holiday parks – particularly at Kioloa Beach and Merry Beach. A handful of residential properties are also affected adjacent to the watercourses behind Cormorant Beach and Gannet Beach.

Depth of Above Floor Flooding

- Expected depths of above flood flooding are typically low.
- In events up to and including the 1 in 500 AEP magnitude the average depth of above floor flooding is around 0.10 m and the maximum depth at any property does not exceed 0.30 m.
- In the PMF event the average depth of above floor flooding would be expected remain below 0.30 m while one property would experience above floor flooding to a depth of about 1 metre.

An estimate was also made of the adverse economic impacts that private and public property owners would experience due to flooding. It was found that expected flood damages are low owing to the sparse development in much of the study area.

4.3 Flood Risk Management Measures

4.3.1 Approaches to Managing Flood Risk

Floodplain risk management measures can be separated into the following categories:

- Land use planning and property modification measures.
  - These measures include flood planning controls for future development to ensure that land uses are compatible with flood risk. They can also include voluntary house raising and purchase, or flood-proofing of buildings, which can act to reduce flood damages.
- Response modification measures.
  - These typically include emergency response management measures, flood predictions and warnings, and community flood awareness and preparedness.
- Flood modification measures.
  - These are typically structural works, such as culvert upgrades, flood protection levees, flood detention basins or bypass floodways, which act to reduce flood damages.

4.3.2 Land Use Planning and Property Modification

A key objective of this study is to provide improved flood information to support land use planning activities in the study area. Effective land use planning can help ensure that the flood risk posed to a community does not increase moving into the future.

A review of existing planning instruments was undertaken and an array of new flood planning maps were prepared leading to the recommendation of four flood risk management measures relating to land use planning. These have been incorporated into the Floodplain Risk Management Plan (*refer* **Table 5-1**).

4.3.3 Flood Emergency Response Management

Bawley Point Road and Murramarang Road provide the only vehicular access routes from the Princes Highway to Bawley Point, Kioloa and Merry Beach. Inundation of these roads has the potential to isolate the local communities, businesses, and tourist facilities. Thus, emergency response is one of the primary issues affecting the study area from a flooding perspective.

Detailed information on flood behaviour and impacts in the study area has been made available as a result of this FRMS&P and should be considered by SES in their planning and incorporated into the Local Flood Plan as appropriate. This includes analysis of the frequency, hazard and duration of road inundation.

Flood modelling has confirmed that the critical road inundation locations that would result in isolation of the local communities, businesses and tourist facilities of the study area are Bawley Point Road about 400 metres south-east of the Princes Highway (BPR-1) and Bawley Point Road adjacent to Willinga Lake near Skylark Close. Hazardous flood conditions at these locations would result in the most extensive, frequent, and longest duration isolation from the Princes Highway and associated services and emergency responders. Accordingly, road and culvert upgrades have been recommended at these locations to improve the immunity of the primary flood evacuation route (*e.g. refer* **Figure 4-1**).

Inundation along Murramarang Road can be widespread and frequent, however flood depth, hazard and duration are lower than along Bawley Point Road and no road upgrades have been recommended.

Several flood risk management measures relating to emergency response management have been recommended including update of the Local Flood Plan, adoption of Minor, Moderate and Major flood warning levels for the Willinga Lake gauge, and provision of signage at 10 locations where flooding can become hazardous to motorists. These have been incorporated into the Plan (*refer* **Table 5-1**).

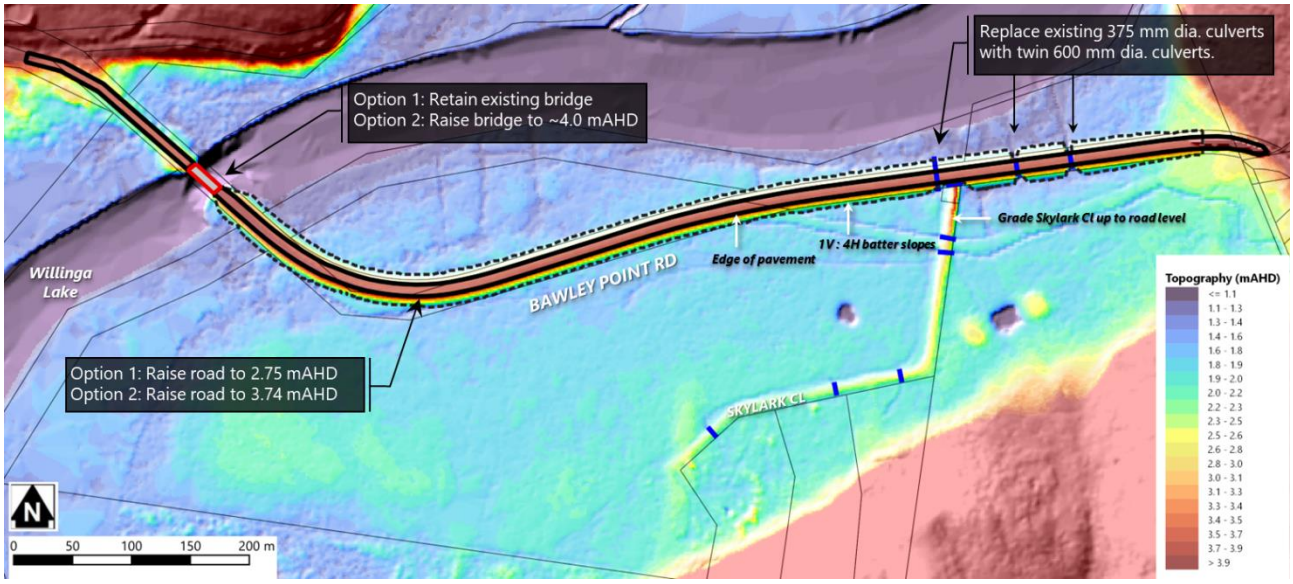


Figure 4-1 Bawley Point Road at Willinga Lake flood evacuation upgrade concept

4.3.4 Assessment of Flood Modification Measures

The Willinga Lake catchment presents various challenges in terms of identifying and implementing flood modification measures that would be effective and economically viable. The volume dominated nature of flooding means that it is difficult to materially modify flood behaviour by detaining, diverting or augmenting flood flows, while the sparse development means that flood damages, and thus the potential economic benefits of mitigation measures, are low.

The potential to implement a range of common flood modification approaches in the catchment was assessed, however only 'entrance management' was found to warrant more than a high-level assessment.

It is recommended that an interim Entrance Management Policy be prepared for Willinga Lake to prevent potential long duration inundation of Bawley Point Road in the scenario that water levels rise but the entrance berm does not naturally overtop and scour. This would be a temporary measure until such time that Bawley Point Road can be raised.

5 Floodplain Risk Management Plan

Various measures have been recommended for inclusion in the Floodplain Risk Management Plan to manage and reduce the risk to life and property posed by flooding in the study area. This includes six recommendations relating to Land Use Planning and Property Modification (*focused on the Willinga Lake catchment*), six recommendations relating to Flood Emergency Response Management, and one recommended Flood Modification Measure.

An implementation schedule for the measures recommended for adoption as part of the Plan is presented in **Table 5-1**. An overview of the recommended measures is provided spatially in **Figure 5-1**.

The schedule includes an indication of the following.

- The recommended actions for implementation of the proposed floodplain risk management options.
- Estimates of the capital and ongoing costs for each measure.
- A priority classification
  - High: these measures would generally provide a significant reduction and would require a relatively low effort and cost to implement.
  - Medium: these measures would generally provide a significant reduction in risk but require a significant effort and cost to implement.
  - Low: these measures may still provide significant reduction in risk but are difficult to implement due to high capital cost, low economic viability, or other obstacles.
- The timing of commencement for each option according to short term (less than 2 years), medium term (less than 5 years) or longer-term priorities (up to 10 years or more).

Implementation of the Floodplain Risk Management Plan will be the responsibility of Council.

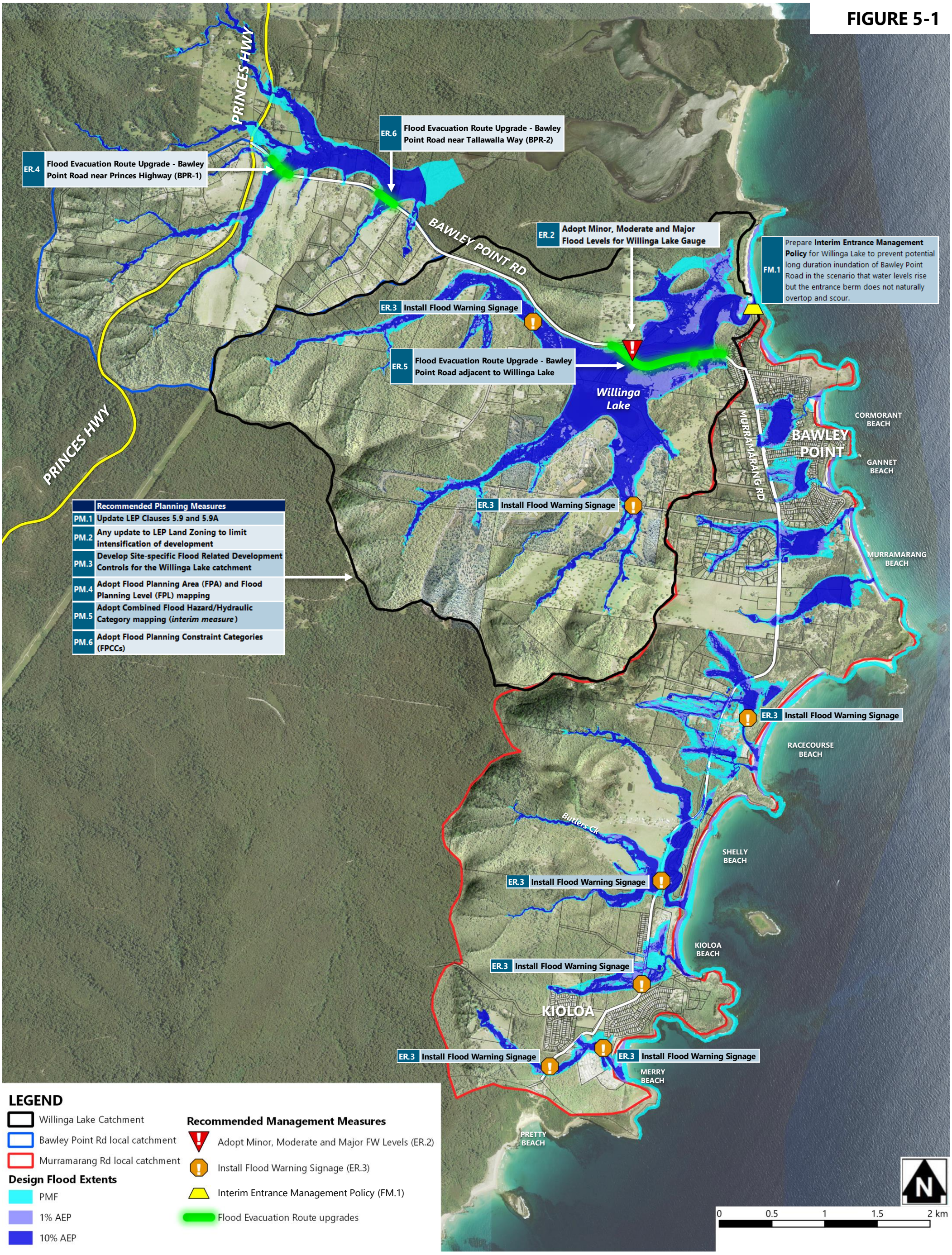
Funding for the implementation of options will generally be coordinated by Council, using Council funds and monies from grant applications to DCCEEW under the NSW Floodplain Management Program and, in the case of entrance management, NSW Coastal and Estuary Grants Program.

It is envisaged that NSW State Emergency Services would contribute funding towards initiatives involving flood intelligence information.

Table 5-1 Floodplain Risk Management Plan implementation schedule

ID	Recommended Measures	Priority	Timeframe
	Recommended Planning Measures		
PM.1	**Update LEP Clauses 5.9 and 5.9A** These clauses allow for the repair or replacement of lawfully erected dwellings that have been damaged or destroyed by a natural disaster, but do not state whether the associated development application must comply with the current LEP and DCP, or with standards applicable when the original dwelling was approved. It is recommended that this be clarified during update of the LEP.	Medium	Medium
PM.2	**Updated LEP Land Zoning to limit intensification of development** The planned future update of the LEP may include changes to existing land zoning. In consideration of the evacuation difficulties affecting the study area it is recommended that the zoning does not allow for intensification of development until such time that evacuation issues have been improved.	Medium	Medium
PM.3	**Develop Site-Specific Flood Related Development Controls for Willinga Lake catchment** It is recommended that site-specific flood related development controls be developed for the Willinga Lake catchment and incorporated into the planned DCP update. This is to include a control to limit subdivision of land that would become isolated due to the inundation of Bawley Point Road. It should also include a control to set minimum non-habitable floor levels.	High	Short
PM.4	**Adopt Flood Planning Area (FPA) and Flood Planning Level (FPL) mapping** It is recommended that the Flood Planning Level and Flood Planning Area for the Willinga Lake catchment be adopted per the definitions and mapping in this FRMS&P. This would involve FPLs and FPAs for up to three different time horizons depending on the development type, with consideration given to the potential implications of climate change.	High	Short
PM.5	**Adopt Combined Flood Hazard/Hydraulic Category mapping** It is recommended that the Combined Flood Hazard/Hydraulic Category mapping presented in **Volume 3** of this FRMS&P be adopted to direct the application of planning controls defined in the existing Schedule 2 matrix in Chapter G9 of Shoalhaven DCP 2014. This would be interim measure until the DCP is updated to reflect the Flood Planning Constraint Category approach.	High	Short
PM.6	**Adopt Flood Planning Constraint Categories (FPCCs)** It is recommended that FPCCs for the Willinga Lake catchment per the definitions and mapping in this FRMS&P be adopted to direct the application of planning controls. This would require update of various aspects of the DCP and would thus be incorporated into the planned update.	High	Medium
	Recommended Emergency Response Measures		
ER.1	**SES Data Transfer and Documentation Update** All relevant data be transferred to the SES for incorporation into their flood intelligence database and update of the Local Flood Plan.	High	Short
ER.2	**Adopt Minor, Moderate and Major Levels for Willinga Lake Gauge** It is recommended that the levels presented be adopted by BoM and SES and added to BoM river height reporting subject to Bureau Flood Warning Consultative Committee (FWCC) approval.	High	Short
ER.3	**Install Flood Warning Signage** It is recommended that, where it is not already present, flood depth markers and warning signage be placed at all road locations which would be subject to hazardous flood conditions (≥H2) in events up to and including the 1 in 500 AEP. This would include 10 locations.	Medium	Medium
ER.4	**Flood Evacuation Route Upgrade - Bawley Point Road near Princes Highway (BPR-1)** This measure would involve works to improve the flood immunity of Bawley Point Road at a location about 400 metres south-east of the Princes Highway. It would involve road raising and an increase in existing culvert capacity. It is recommended that an investigation and design process be initiated to enable the future implementation of this measure when funding is available.	Medium	Long
ER.5	**Flood Evacuation Route Upgrade - Bawley Point Road adjacent to Willinga Lake** This measure would involve works to improve the flood immunity of Bawley Point Road adjacent to Willinga Lake over a span of approximately one kilometre the Bawley Point Road Bridge to Shearwater Crescent. It is recommended that an investigation and design process be initiated to enable the future implementation of this measure when funding becomes available.	Medium	Long
ER.6	**Flood Evacuation Route Upgrade - Bawley Point Road near Tallawalla Way (BPR-2)** This measure would involve works to improve the flood immunity of Bawley Point Road at a location about 170 m west of Tallawalla Way. While the flood hazard at this location is generally low, minor upgrade would be required to achieve a consistent level of flood immunity along Bawley Point Road. It is recommended that an investigation and design process be initiated.	Low	Long
	Recommended Flood Modification Measures		
FM.1	**Entrance Management** It is recommended that an interim Entrance Management Policy be prepared for Willinga Lake to prevent potential long duration inundation of Bawley Point Road in the scenario that water levels rise but the entrance berm does not naturally overtop and scour. Funding could potentially be sought under the NSW Coastal and Estuary Grants Program.	Medium	Medium

FIGURE 5-1



Prepared by:

Shoalhaven City Council

worley consulting

WILLINGA LAKE FLOODPLAIN RISK MANAGEMENT PLAN
RECOMMENDED MANAGEMENT MEASURES

6 Community Consultation

The primary objective of the study is to better understand and reduce the impacts of flooding on the community. The community therefore plays a vital role in the project. The consultation process has provided an opportunity for the community and other stakeholders to collaborate in the development of the FRMS&P.

Community consultation activities have included the maintenance of a project Get Involved website, an initial community drop-in session, and distribution of an initial online community questionnaire. As part of the questionnaire residents were asked to indicate if they would support a range of potential flood risk management strategies in the area. Results are summarised in **Figure 6-1**.

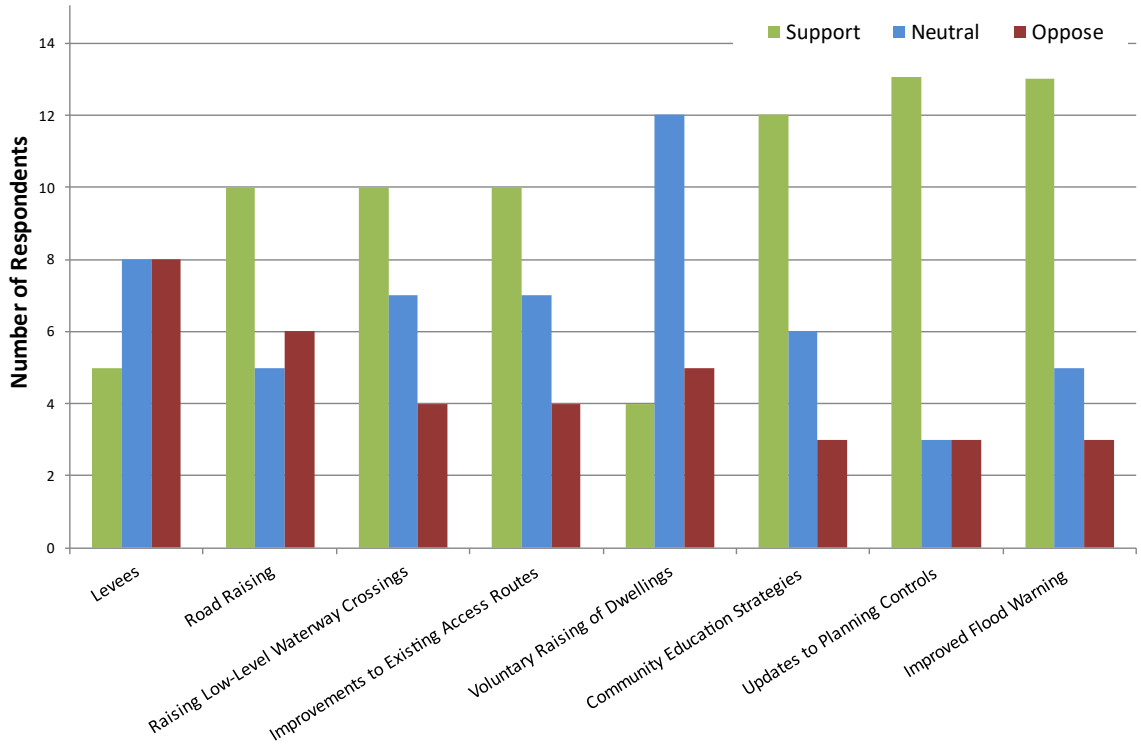


Figure 6-1 Community support for potential flood risk management strategies

The greatest level of community support is shown for improved flood warning, updates to planning controls and community education strategies. The community also generally supported road raising and improvements to existing access routes. The construction of levees received the greatest level of opposition.

The Draft **Volume 1: Flood Study**, **Volume 2: Floodplain Risk Management Study & Plan** and **Volume 3: Flood Mapping Compendium** are now on Public Exhibition to provide an opportunity for the community to provide feedback on the study.

After the public exhibition period all comments will be reviewed, and the various reports will be updated and finalised. The final reports will be provided to Council for adoption, after which they will be used by Council to manage the identified flood risks present in the Willinga Lake catchment.

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Rev	Description	Originator	Reviewer	Worley Approver	Revision Date
Rev B	Summary Report	LT / LC	LC	CRT	23/01/2024
		L to / L Collins	L Collins	C Thomas	