

Northern Floodplain Risk Management Committee

Meeting Date: Monday, 11 August, 2025

Location: Email Meeting

Minutes Attachments

Index

NFM25.2 Broughton Creek Flood Study

Attachment 1 Presentation - Broughton Creek Flood Study - NFRMC -
11 August 2025.....3

Broughton Creek Flood Study

Presentation for Northern Floodplain Risk Management Committee

11 August 2025





Presentation Overview

1 Introduction

Introduction to the Broughton Creek Flood Study

2 Study Methodology

How we arrived at our findings

3 Outcomes

Modelled flood behaviour under current and future conditions

4 Flood Animation

Visualising flood behaviour over time

5 Community

What the Broughton Creek Flood Study means for the community

6 Accessing More Information

How community members can stay informed and involved

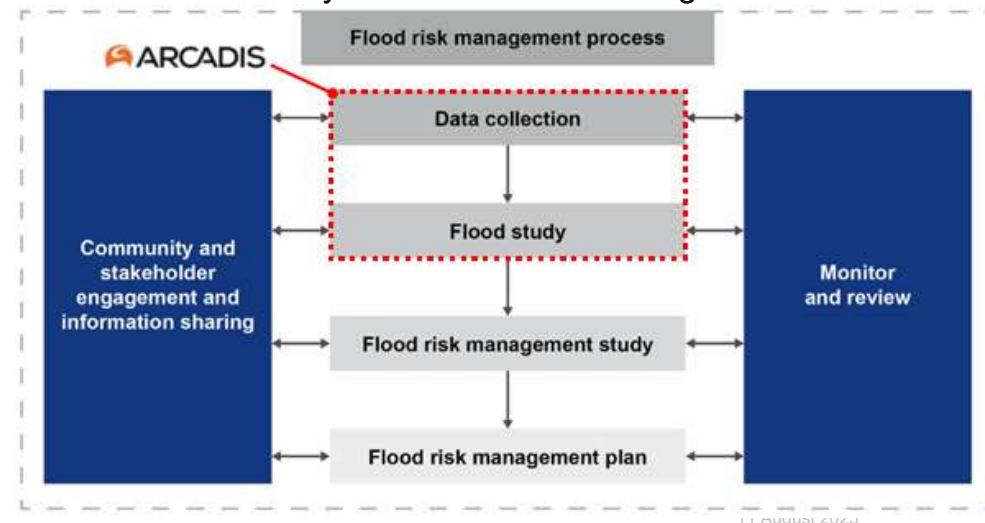
Introduction

Introduction to the Broughton Creek Flood Study

Key drivers of the Broughton Creek Flood Study



- Significant urban development and land use changes within the catchment.
- The release of updated national flood modelling guidelines (ARR2019).
- Berry to Bomaderry Upgrade & Town Creek Diversion
- Undertaken in accordance with the revised NSW Flood Prone Land Policy and Flood Risk Management Manual





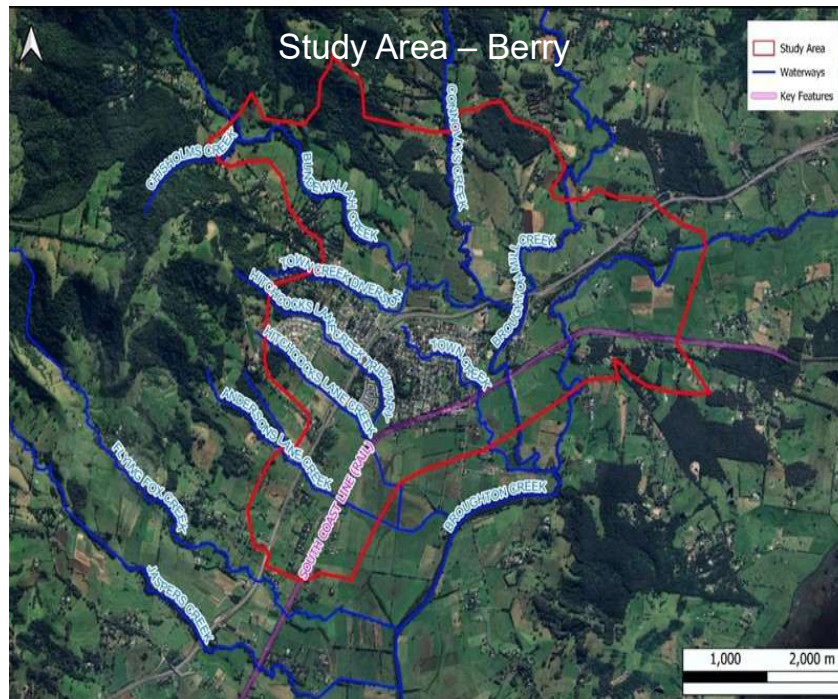
Objectives

The overall project provides an understanding of flood behaviour and associated risk.

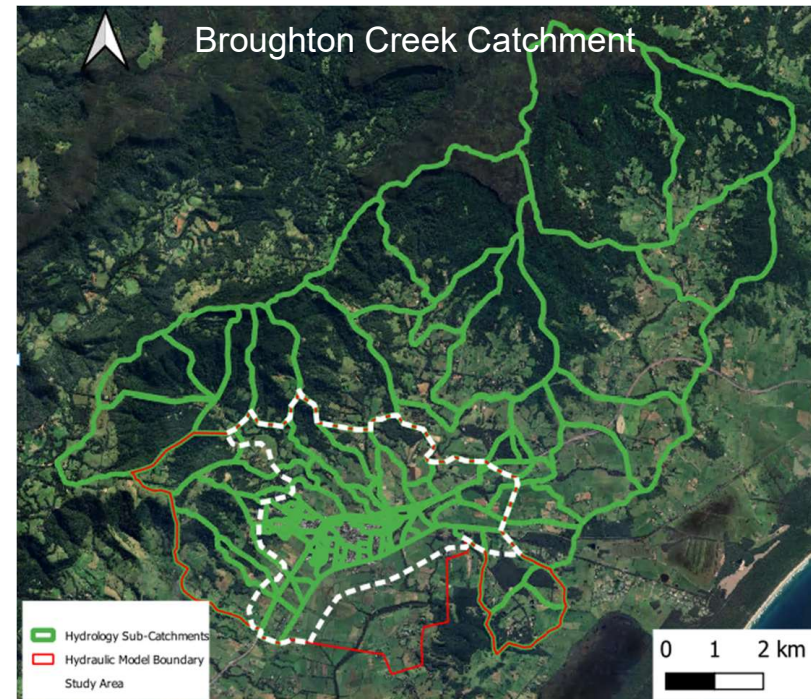
This study will enable and inform:

- Updates to government flood data
- State and Council decision-making
- Community education and flood awareness
- Future development
- Emergency planning and response
- Land-use planning
- Infrastructure planning

Study area and catchment



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6



Consideration of Flood Behaviour in the Broughton Creek Catchment

Major Creek Flooding

- **Broughton Mill Creek**
- **Broughton Creek**
- **Bundewallah Creek**
- Waterways which convey the majority of the catchment's runoff during storm events.
- Typically associated with critical storm durations ranging from 6 hours to 9 hours

Local Overland Flow and Minor Waterway Flooding

- **Town Creek**
- **Hitchcocks Lane Creek**
- **North Street Creek**
- **Bundewallah Creek**
- Prone to flash flooding during high intensity, short duration rainfall events.
- Typically, associated with critical storm durations up to 2 hours.

Tailwater Effects from the Lower Shoalhaven River

- Lower Shoalhaven River Flood Study (Cardno, 2022)
- Determined the extent of the tailwater influence **does not** extend upstream beyond the South Coast Rail Line.
- Additionally, sea level rise **does not** impact flood behaviour within the study area.

Study Methodology

How we arrived at our findings



Methodology



**Data collection and
Review**



Hydrological Modelling



Hydraulic Modelling



Methodology



**Model Calibration and
Validation**



**Flood Mapping and
Analysis**



**Reporting and
Consultation**

Outcomes

Modelled flood behaviour under current and future conditions

April 2024 Event and Annual Exceedance Probability Summary

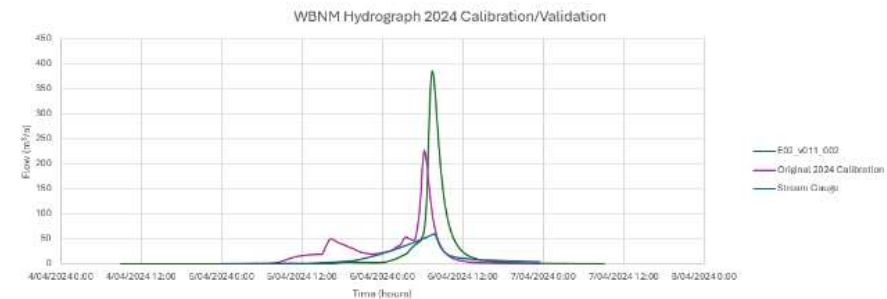
Rain Gauge Assessment

- An AEP assessment was performed to accurately evaluate the events severity and compare it with historical data
- **Berry WWTP – 50% AEP @ 135 mm**
- **Broughton Creek – 50% AEP @ 138 mm**
- **Broughton Vale – 1% AEP @ 393.5 mm**
- **Foxground – 20% AEP @ 155 mm**
- **Adjusted Overall Storm Rainfall – 279 mm**
- **Average Annual Exceedance Probability – 5%**

***Note:** Most flood risk mitigation and planning measures (historically) target immunity for the 1% AEP flood event, which the April 2024 event exceeded

Radar Rainfall and Stream Gauge Assessment

- Broughton Mill Creek and Broughton Vale failed to capture the peak of the event
- Radar Rainfall up to 30% greater than gauged data
- Enabled to provide a more accurate calibration to an extreme event
- **Average Annual Exceedance Probability – 0.1% - 0.05 %**
 - **Based on FFA Analysis**





1% AEP Flood Flow Comparison – 2008, 2016, and 2025

Rain Gauge Assessment

- Outcomes of 2025 Flood Study compared:
 - Flood Flows and Flood Levels at Broughton Mill Creek, Broughton Creek, Bundewallah Creek, and Town Creek) against historic existing conditions model**
 - 2025 Flood Study: Existing, 2050, and 2100 Results**
- Updates to Design Rainfall Data (ARR1987 vs ARR2019)
- Removal of Artificial Calibration Factors
- Improved alignment through Climate Change

Flood Flow Comparison

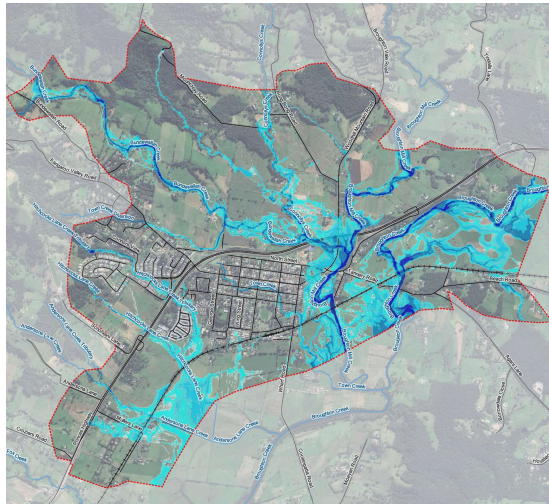
Flow Path	Peak Flow m³/s (Previous (2008))	Peak Flow m³/s (Updated (2016))	Peak Flow Existing m³/s (Arcadis)	Peak Flow 2050 m³/s (Arcadis)	Peak Flow 2100 m³/s (Arcadis)
Broughton Creek (U/S of Railway)	580	570	526.96 (540 min)	633.36 (540 min)	770.63 (270 min)
Broughton Mill Creek (U/S of Railway)	1060	970	671.74 (720 min)	806.51 (720 min)	1004.01 (180 min)
Bundewallah Creek (U/S of Broughton Mill Creek)	420	390	273.96 (720 min)	328.53 (720 min)	427.56 (120 min)
Town Creek (@ Victoria Street)	22	21	7.91 (120 min)	10.73 (60 min)	14.79 (030 min)

Flood Level Comparison

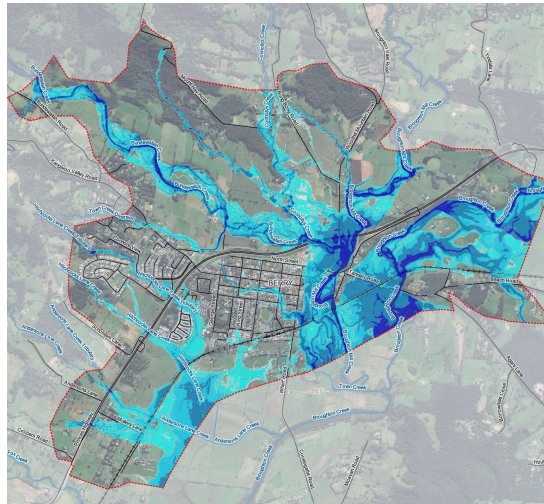
Flow Path	Cardno 2016 Level (m AHD)	Peak Level Existing (Arcadis) (m AHD)	Peak Level 2050 (Arcadis) (m AHD)	Peak Level 2100 (Arcadis) (m AHD)
Broughton Creek (U/S of Railway)	6.62	6.34	6.43	6.60
Broughton Mill Creek (U/S of Railway)	7.47	7.13	7.30	7.53
Bundewallah Creek (U/S of Broughton Mill Creek)	14.22	14.03	14.13	14.25
Town Creek (@ Victoria Street)	10.59	10.46	10.50	10.56

Peak Flood Depth

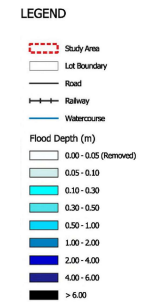
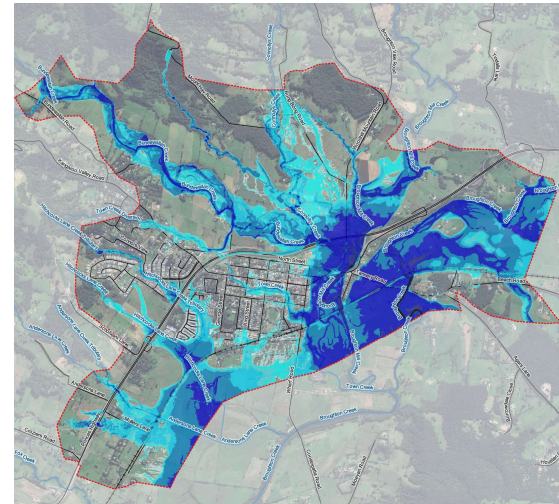
50% AEP Event



1% AEP Event

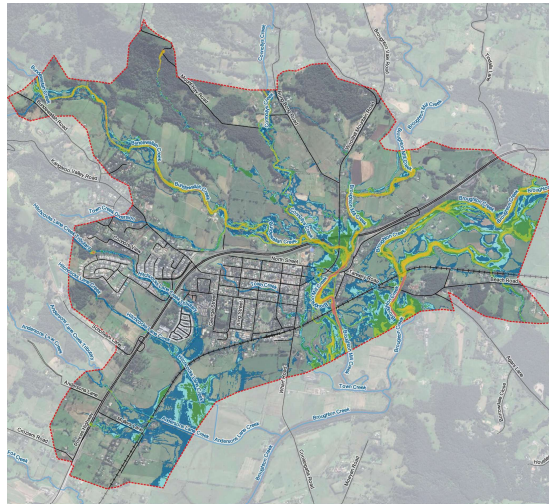


Probable Maximum Flood

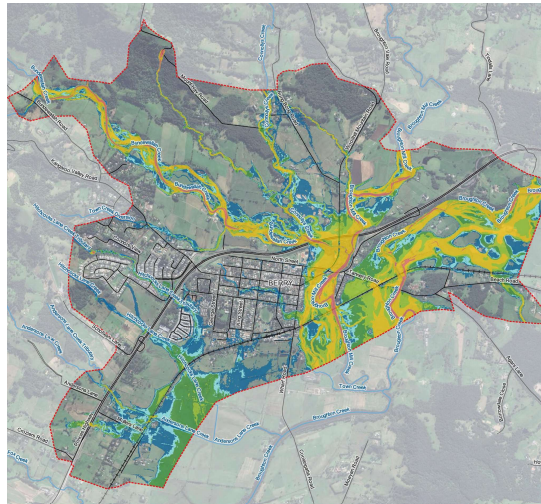


Peak Flood hazard

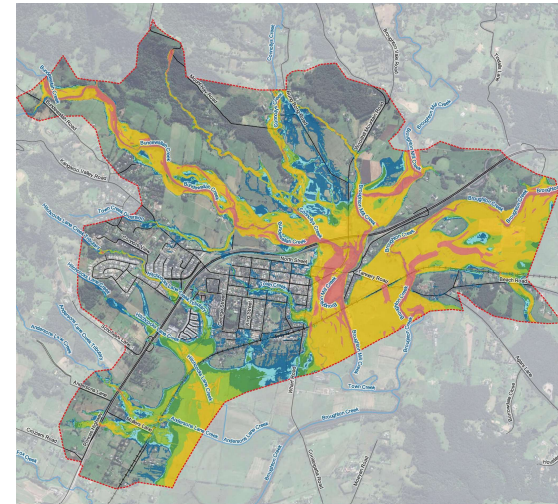
50% AEP Event














1% AEP Event



Probable Maximum Flood



LEGEND

-  Study Area
 -  Lot Boundary
 -  Road
 -  Railway
 -  Watercourse
- Flood Hazard (AIDR 2014)
-  H1 - Generally safe for vehicles, people, and buildings
 -  H2 - Unsafe for small vehicles
 -  H3 - Unsafe for vehicles, children, and the elderly
 -  H4 - Unsafe for vehicles and people
 -  H5 - Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust buildings subject to failure
 -  H6 - Unsafe for vehicles and people. All building types considered vulnerable to failure

Community

What the Broughton Creek Flood Study means for the community



The Broughton Creek Flood Study...

- Provides vital **up-to-date** and reliable flood intelligence
- Is an integral step in the flood risk **management** process
- Allows the **next steps** in flood risk management planning
- Gives flood information to SES and **emergency services**
- Identifies **high hazard** locations and evacuation routes
- Allows for better **emergency preparedness and response**
- Will inform **future development** and infrastructure

Consequences of flooding on the community

- Residential
 - Commercial
 - Industrial
-
- Structural Damages
 - Internal Damages
 - External Damages
 - Intangibles (Displacement, Injury, Loss of Life, and Disruption)

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Properties Affected by Flooding above Flood Level

AEP	Existing climate conditions	2050 climate conditions	2100 climate conditions
PMF	104	132	176
1%	33	41	61
10%	12	16	27
20%	8	11	18

Average Annual Damages

AEP	Existing Climate Conditions	2050 Climate Conditions	2100 Climate Conditions
PMF	\$19,165,922	\$27,143,951	\$36,614,200
1%	\$4,155,532	\$5,830,766	\$9,259,986
10%	\$1,901,235	\$2,675,679	\$3,528,137
20%	\$1,080,770	\$1,812,886	\$2,645,725
50%	\$574,105	\$697,424	\$1,137,078
AAD	\$846,723	\$1,207,732	\$1,808,851
Increase on existing conditions	--	\$361,008	\$962,127
Increase %	--	42.6%	113.6%

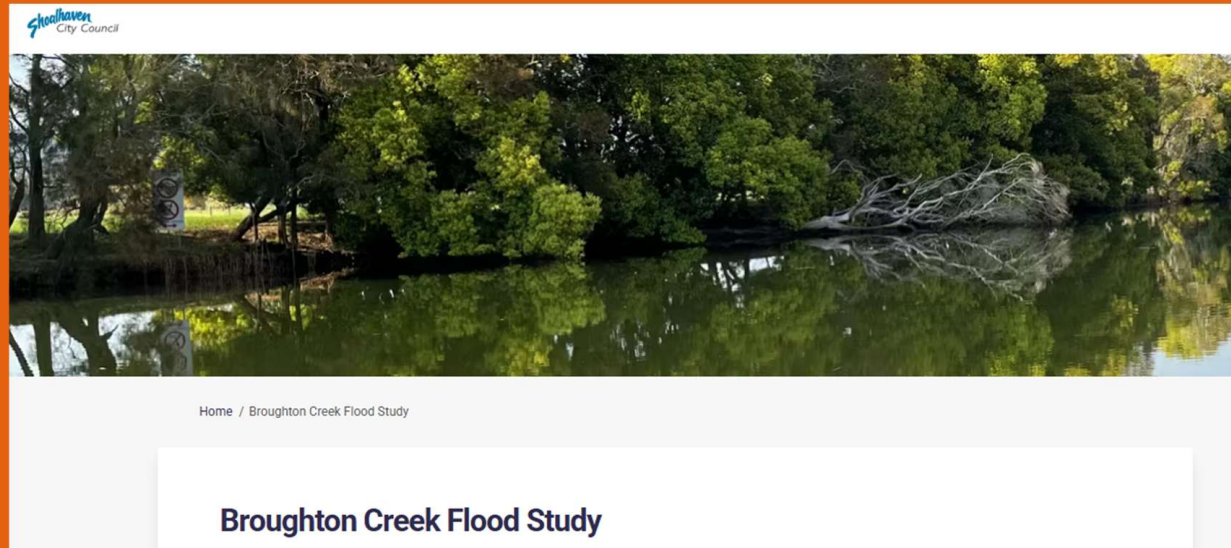
11 August 2025

20

Accessing More Information

How community members can stay informed and involved

Get Involved



<https://getinvolved.shoalhaven.nsw.gov.au/broughton-creek-flood-study>