

Appendix J. Design Flood Levels in the Maria River Floodplain

J.1 Overview

This study focussed on the assessment of flooding in the Lower Macleay valley. While parts of the Maria River and Connection Creek floodplain were represented in the TUFLOW model, inclusion of the broader Maria River floodplain and catchment, which is within the Hastings River catchment, was outside the scope of the study. Parts of the Maria River floodplain are in Kempsey LGA. The TUFLOW model extends some way into the Maria River floodplain in order to capture the whole Lower Macleay floodplain. The boundary between floodplains is approximately defined by slightly higher floodplain surface levels and a constriction in the width of the floodplain just to the south of Crescent Head Road.

Design flood levels were estimated separately for the Maria River floodplain between the TUFLOW model southern extent and the Kempsey LGA/Port Macquarie-Hastings LGA boundary based on interpretation of the results from this study and the *Hastings River Flood Study* (Patterson Britton and Partners, 2006), undertaken for Port Macquarie-Hastings Council.

Aside from the Maria River floodplain, there is also a separate floodplain area immediately to the west of Point Plomer, which is affected by backwater flooding in Limeburners Creek from the Hastings River. Design flood levels were also estimated for this area based on the Hastings River Flood Study modelling.

J.2 Approach

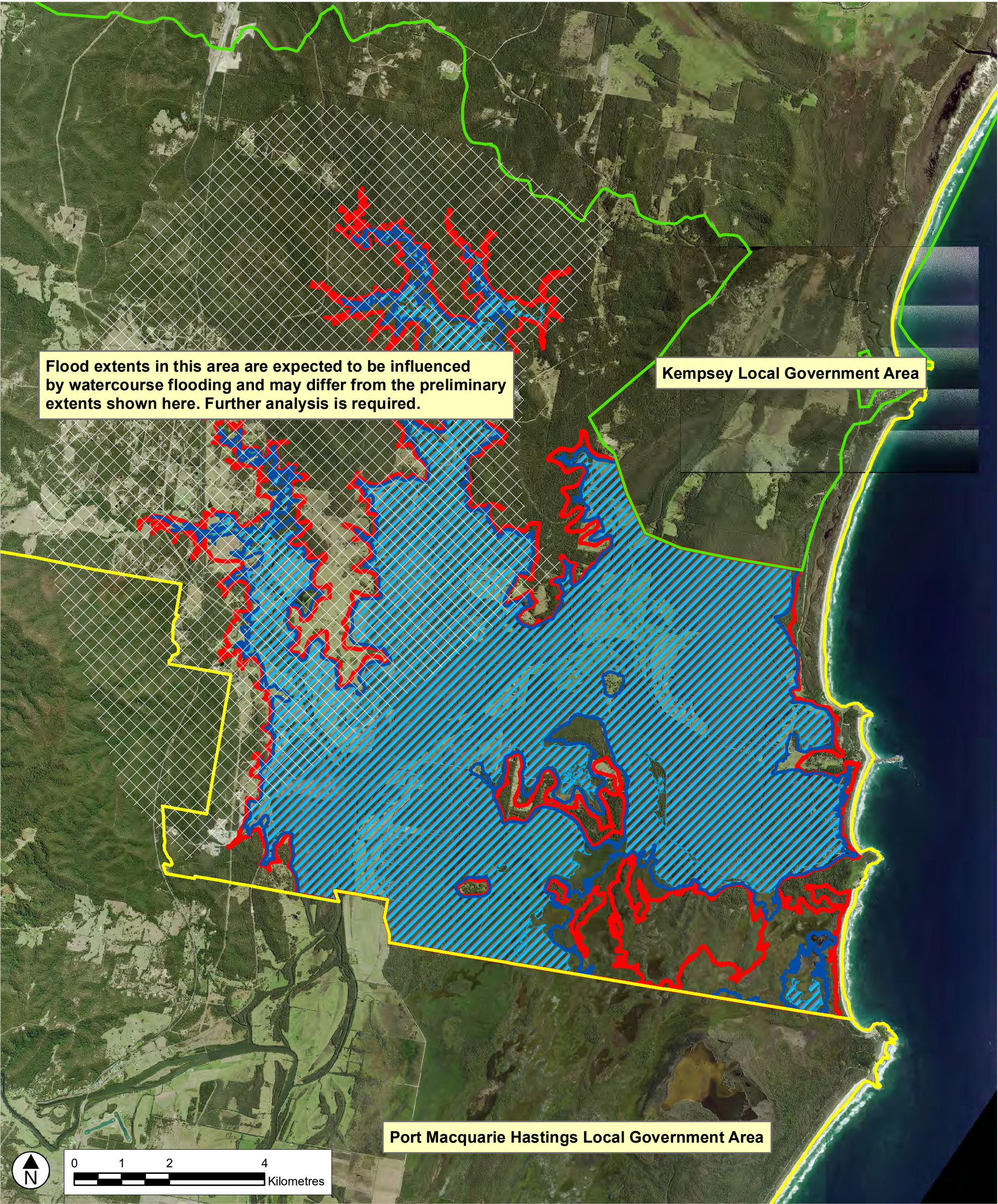
The water level boundary input into the Lower Macleay TUFLOW model was extracted from flood modelling for the *Hastings River Flood Study* (Patterson Britton and Partners, 2006), undertaken in modelling software named RMA-2. These modelling results were provided by Port Macquarie-Hastings Council for use in this study.

The Hastings River flood modelling assumed a “glass wall” at the LGA boundary, preventing Hastings River floodwaters from overflowing into the Macleay floodplain. Catchment inflows from the Maria River catchment were input into the Hastings River model at this boundary location. The modelling results indicate that peak flooding in the Maria River is dictated by backwater flooding from the Hastings River, as demonstrated by the flat water surface profile from the Maria River/ Wilson River junction northward to the model and LGA boundary. Given the flat nature of the Maria River floodplain it is reasonable to assume that the backwater flooding extends further north to Connection Creek in Kempsey LGA.

The design flood levels for various flood event AEP's is provided in Table J-1 for the Maria River floodplain and for the Limeburners Creek backwater area behind Point Plomer. The estimated design flood level extents are shown on Figure J-1.

Table J-1 Preliminary design flood levels Maria River floodplain in Kempsey LGA (source: Hastings River Flood Study, Patterson Britton and Partners (2006))

Event AEP	Design Flood Level (m AHD)	
	Maria River Floodplain	Limeburners Creek Backwater
0.2EY	2.40	Not assessed
5%	2.92	1.88
1%	3.72	2.50
0.2%	4.51	Not assessed
PMF	6.90	6.32



Legend

- 5% AEP Flood Extent
- 1% AEP Flood Extent
- PMF Extent
- Lower Macleay TUFLOW Model Extent
- Local Government Area Boundary

LIMITATIONS: This mapping is based on data and assumptions identified in the Lower Macleay Flood Study prepared by Jacobs. Jacobs does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

			A3
SHEET	1 of 1		GDA 1994 MGA Zone 56
TITLE	Estimated Design Flood Extents Maria River Floodplain		
PROJECT	Lower Macleay Flood Study		
DRAWN	PROJECT #	MAP #	REV VER
LC	IA176800	FIGURE J-1	1 1
CHECK	DATE		
AH	11/09/2019		

J.3 Validation

The estimated design flood levels in the Maria River floodplain are expected to be conservative. The glass wall boundary at the northern end of the Hastings River flood model prevents floodwaters from overflowing into the Lower Macleay floodplain. The flood levels are expected to be slightly lower if overflows were allowed.

Flows into and out of the Lower Macleay floodplain were reviewed to understand if the Lower Macleay floodplain flood levels would be overestimated. Peak flows in the 1% AEP from the Maria River into the Lower Macleay are around 1,000m³/s, while peak flows from the Macleay River into the floodplain at Upper Belmore are around 7,000m³/s

There is a culvert and floodgate outlet of the floodplain to the ocean at Big Hill, consisting of 12 x 1.8m x 2.1m culverts. The road crossing over the culverts is at about 5m AHD. The culvert capacity is estimated to be approximately 100m³/s, which is a minor flow compared to the flood flows from the Maria River and Macleay River floodplains. Hence, the culvert outflows are not expected to significantly lower peak flood levels in this area.

The Maria River and Pipers Creek valleys enter the Maria River coastal floodplain from the west. While the backwater flooding from the floodplain extends up these valleys it is expected that catchment flows from these valleys would influence the flood behaviour in the valleys with potentially higher design flood levels. Further assessment is required to refine the design flood levels due to the effects of the catchment inflows.

J.4 Recommendation for Future Refinement of Maria River Design Flood Levels

Further detailed modelling is recommended to better define design flood conditions in the Maria River floodplain area, between the Lower Macleay model southern boundary and the Kempsey local government area boundary with Port Macquarie Hastings local government area, in the vicinity of Point Plomer. While an estimate of the design flood levels and extents has been prepared based on available data the future modelling assessment should provide more detailed information on flood behaviour, flood hazard etc. It is recommended that this further modelling be undertaken in the subsequent Lower Macleay Floodplain Risk Management Study (FRMS) which could include extension of the hydrologic and hydraulic modelling to cover the Maria River. As a part of the future modelling updates, flooding scenarios such as a rare flood event in the Maria River (e.g. 1% AEP) coinciding with a frequent flood event in the Macleay River (e.g. 0.2EY), and vice versa, should be analysed to maximise the flood gradient in this area to determine the sensitivity of flow velocities and flood hazard.