

Table 1: Kempsey CBD Floodplain Risk Management Plan

Option	Description	Benefits	Maintenance	Costs & Funding	Implementation Actions and Responsibility
High Priority					
Repair Levees to Design Height including upgrading the temporary flood barriers (Section 1.1.1)	Council survey found that the three main levees (Eden St, First Ln and RSL Levees) that project Kempsey are up to 200mm lower than their design height.	Minimal in terms of reduced damages, however will provide existing level of protection for longer in face of future climate change.	The necessary repair works should be added to Council's maintenance works schedule when possible.	Minimal additional cost to existing maintenance. Funded from Council	Council to program levee repairs into maintenance schedule.
Modifications to Wide Street/ Cooks lane Levee (Section 1.1.2)	Upgrading boarded sections of levee and consideration of raising to design height and minor extension.	No change to flood levels for upgrade works although they would reduce some Council burden during a flood as removes the need for placing boards during an event. Raising would provide some reduction in risk to the properties protected by the levee.	No additional maintenance burden anticipated.	Minimal cost Would be eligible for funding from the NSW Floodplain Management Program.	Council to schedule into maintenance works program.
Flood Warning (Section 1.1.3)	<ul style="list-style-type: none"> Conversion of all gauges in downstream catchment to AHD, Clarification on whether the Frederickton and Third Lane Gauges are still active and incorporate into the ENVIRONMON system Install additional gauges in the middle of the catchment Correlate Kempsey and Smithtown gauges upgrade the existing ENVIRONMON system to an improved system with improved capabilities if available or when developed 	Provide more robust and improved flood warning network	Maintenance requirements and responsibilities would be more clearly defined	\$50,000	Relevant gauge owners/operators
Evacuation Planning (Section 1.1.4)	<ul style="list-style-type: none"> Local Flood Plan to be reviewed no later than July 2017 Investigate system of managed entry to CBD during event 	Improve evacuation planning for future flood events	Nil	\$50,000 Time during an event	State Emergency Services Unclear who should manage
Flood Awareness and Preparedness (Section 1.1.5)	<ul style="list-style-type: none"> Develop a flood awareness program which also addresses the different levee overtopping scenarios 	Improve community awareness of all risks, including from rare events and levee overtopping	For program to be effective it would need to be repeated at regular intervals	Minimal Cost Council funded	Council to prepare material for program schedule events with SES.
Flood Planning Levels and Flood Planning Area (Section 1.1.6)	<ul style="list-style-type: none"> Revise FPL and FPA as per outcomes of this Study 	Latest information would be utilised. Would build some climate change resilience into planning system	Nil	Negligible costs Council funded	Council staff to implement
Revise LEP (land-use zoning) and DCPs (Section 1.1.7)	<ul style="list-style-type: none"> Review of floodway definition based on hydraulic modelling Define a Flood Planning Area based on 1% AEP flood levels plus 0.5m freeboard Council to consider minor changes to LEP and DCP 	Latest information would be utilised.	Nil	Council funded	Council staff to review and implement as required.
Voluntary House Purchase (Section 1.4.1)	Continuation and acceleration of current VP scheme	Significant reduction in risk to life and other intangible benefits.	Nil	\$6 Million. Council should develop a policy or strategy as to how this action might be funded in respect to Council's contribution, including prioritisation of any properties to be acquired and how any	Council should continue this program.

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				acquired land will be managed (community gardens cycleway links etc).	
House Raising (Section 1.4.2)	Contact those on the list for VP and review the list periodically	Reduce flood damages during an event. BCR (<5% AEP) = 1.42	Nil	\$70,000 per dwelling/grant.	Subject to landowner taking up this option.
\$149 Certificates (Section 1.1.8)	<ul style="list-style-type: none"> Reissue s149 certificates to all affected by the revised FPA. Issue 149(5) at same time as 149(2) at no additional cost in order to promote flood awareness 	Improve flood awareness and education amongst existing and new residents. May help to accelerate voluntary house purchase / house raising schemes	Nil	Council funded	Council to investigate and implement action as required.
Review of Lower Macleay flood mitigation scheme (Section 1.1.9)	<ul style="list-style-type: none"> Review of lower Macleay flood mitigation scheme 	Improved flood impacts	Nil	Low cost	Council
Medium Priority					
Levee at South Kempsey or similar (Section 1.2.1)	An open drain runs through South Kempsey and joins the Macleay River just downstream of the railway line. A small earthen embankment currently runs along the river bank. This could be increased to 8.6m AHD to prevent backwater flooding in events up to the 5% AEP	In the 10% and 5% AEP events 25 and 30 residential properties respectively are no longer subject to yard inundation. In the 5% AEP event 8 houses are no longer flooded above floor level. AAD reduced by \$67,553. BCR: 2.89	Levees require regular, ongoing maintenance by Council which would already be undertaken on the earthen embankment. Some additional burden might arise from the upgrade but this is considered to be negligible and easily absorbed into Council's existing maintenance schedule.	\$500,000 Would be eligible for funding from the NSW Floodplain Management Program.	Council should look to progress design and undertake necessary site investigations to confirm feasibility. Alternate flood mitigation measure possible for same benefit.
Floodgate at Gladstone Street (Section 1.2.2)	<ol style="list-style-type: none"> Placement of a floodgate on the railway underpass on Gladstone Street to prevent backwatering into West Kempsey. Use of existing Kemp Street playing fields to establish protective measures (earth levee) for the more frequent flood events less than 5% AEP. 	Flooding in the area west of Gladstone Street underpass would be reduced by approximately 1m in a 5% AEP event. No reduction in larger events. AAD reduced by \$108,555, with up to 26 properties experiencing reduced flooding. Structural viability of option needs to be investigated. 11 properties no longer flooded above floor in the 10% AEP event. BCR: 8	There would be an ongoing maintenance requirement to ensure the long-term performance of the floodgate.	\$200,000 Would be eligible for funding from the NSW Floodplain Management Program.	Council should look to progress design and undertake necessary site investigations to confirm technical and operational feasibility.
Low Priority					
Clearance of Floodways (Section 1.4.3)	Accelerate plan to remove buildings, particularly houses, in areas designated as floodway.	Significant reduction in risk to life and other intangible benefits. Limited benefit in terms of reduction in flood levels. BCR: 0.4	Nil	\$12 Million Eligible for Floodplain Management Program funding	Ongoing program.
Flood Refuge Mounds (Section 1.4.4)	Areas of artificially elevated ground to be used as temporary evacuation for communities / stock / assets. Suitable for locations in the floodplain up- and down-stream of Kempsey clear of floodways and major flow paths.	Used as a temporary refuge in minor frequent flood events.	Some maintenance required by individual property owners to ensure long-term stability of mounds but no burden to Council	Minimal – cost of fill material only, however unlikely to be eligible for funding under NSW Floodplain Management Program, usually funded by the individual proponent	Landowner to apply to Council to establish flood refuge mounds. Council to investigate creation of policy and procedure for flood refuge mounds.
Flood Proofing (Section 1.3.1)	<ul style="list-style-type: none"> Retrofitting flood proofing for commercial properties in the CBD Flood proofing requirements for all new development 	No change to flood levels, will reduce individual damages.	No additional maintenance burden.	Costs borne by individuals. Most economic when undertaken at time of construction/renovation	Council should undertake an awareness program to promote flood proofing to existing

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Flood Access (Section 1.3.2)	Raise Belgrave Street and South West Rocks Road	Provide improved access to affected residents during a flood, reducing risk to life. BCR <1	No additional maintenance burden.	Grant and Council funded if available. Belgrave approximately \$740,000 and South West Rocks Road \$500,000.	commercial properties and ensure development controls stipulate the requirement for future commercial development located in flood prone areas. Prepare Feasibility Study in first instance.
Levees (Section 1.3.3)	<ul style="list-style-type: none"> • Eden Street Boat Ramp low point • Review of Lower Madeay Flood Mitigation works 	<ul style="list-style-type: none"> • Improved immunity • Improved recovery time 	Nil	Low cost	Council