NSW STATE EMERGENCY SERVICE

Richmond Valley

Local Flood Emergency Sub Plan

FloodSafe

RICHMOND VALLEY FLOOD EMERGENCY SUB PLAN

A Sub Plan of the Local Emergency Management Plan (EMPLAN)

Volume 1 of the Richmond Valley Council Flood Emergency Sub Plan

Endorsed by the Northern Rivers Local Emergency Management Committee

Endorsed Date……22/08/2023

AUTHORISATION

The Richmond Valley Council Flood Emergency Sub Plan is a sub plan of the Richmond Valley Council Local Emergency Management Plan (EMPLAN). It has been prepared in accordance with the provisions of the ***State Emergency Service Act 1989*** **(NSW)** and is endorsed by the Local Emergency Management Committee in accordance with the provisions of the ***State Emergency and Rescue Management Act 1989*** **(NSW)**.

Authorised

Signature: _____

NSW SES Local/~~Unit~~ Commander

Print Name: John Brown

Date: 22 August 2023

Endorsed

Signature: _____

Chair, Local Emergency Management Committee

Print Name: SCOTT TURNER

Date: 22/8/2023

VERSION HISTORY

Version Number	Description	Date
1	**Richmond Valley Local Flood Plan**	**26th July 2013**

AMENDMENT LIST

Suggestions for amendments to this plan should be forwarded to:

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NSW State Emergency Service
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Amendments in the list below have been entered in this plan.

Amendment Number	Description	Updated by	Date
1.1	**Minor changes G Burnage**	**T Ware**	**12.12.22**

DISTRIBUTION LIST

Available for general use and distribution on the NSW State Emergency Service website www.ses.nsw.gov.au

CONTENTS

1 OUTLINE AND SCOPE

1.1 PURPOSE

1.1.1 The purpose of this plan is to set out the multi-agency arrangements for the emergency management of flooding in the Richmond Valley Council Local Government Area (LGA).

1.2 AUTHORITY

1.2.1 This plan is written and issued under the authority of the *State Emergency and Rescue Management Act 1989* (NSW) ('SERM Act'), the *State Emergency Service Act 1989* (NSW) ('SES Act') and the NSW State Emergency Management Plan (EMPLAN).

1.2.2 This plan is a sub plan to the Northern Rivers Local Emergency Management Plan (EMPLAN) and is endorsed by the Northern Rivers Local Emergency Management Committee (LEMC).

1.3 ACTIVATION

1.3.1 This plan does not require activation. The arrangements set out in this plan are always active.

1.3.2 The Northern Rivers Emergency Management Plan (EMPLAN) is active at all times in anticipation of the need to coordinate support and resources requested by combat agencies, including the NSW State Emergency Service (NSW SES).

1.4 SCOPE

1.4.1 The area covered by this plan is the Richmond Valley Council LGA. The Richmond Valley Council LGA and its principal towns, villages, rivers and creeks are shown in Appendix A.

1.4.2 The Council area is in the NSW SES North Eastern Zone and for emergency management purposes, is part of the North Coast Emergency Management Region.

1.4.3 The plan sets out the Richmond Valley Council level emergency management arrangements for prevention, preparation, response and initial recovery for flooding in the Richmond Valley Council LGA.

1.4.4 In this plan a flood is defined as a relatively high-water level which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with drainage before entering a watercourse, and/or coastal inundation resulting from super-elevated sea levels and/or waves (including tsunami) overtopping coastline defences.

1.4.5 The arrangements for dealing with episodes of coastal erosion by severe weather, are described in the NSW State Storm Sub Plan.

1.4.6 The arrangements for the emergency management of tsunami are dealt with in the NSW State Tsunami Emergency Sub Plan.

1.5 GOALS

1.5.1 The primary goals for flood emergency management in NSW are:

a. Protection and preservation of life.

b. Establishment and operation of flood warning systems.

c. Issuing of community information and community warnings.

d. Coordination of evacuation and welfare of affected communities.

e. Protection of critical infrastructure and community assets essential to community survival during an emergency incident.

f. Protection of residential property.

g. Protection of assets and infrastructure that support individual and community financial sustainability and aid assisting a community to recover from an incident.

h. Protection of the environment and conservation values considering the cultural, biodiversity and social values of the environment.

1.6 KEY PRINCIPLES

1.6.1 The protection and preservation of human life (including the lives of responders and the community) is the highest priority.

1.6.2 Evacuation is the primary response strategy for people impacted by flooding.

1.7 ROLES AND RESPONSIBILITIES

1.7.1 General responsibilities of emergency service organisations and functional areas are set out in the NSW State EMPLAN and NSW State Flood Sub Plan.

1.7.2 Specific roles and responsibilities for agencies, functional areas and organisations in relation to flooding within Richmond Valley Council are detailed within this plan, Appendix B and Appendix C.

1.7.3 Any agency with agreed responsibilities in this plan that are temporarily unable, or no longer able to fulfil their responsibilities in response operations must as soon as possible notify:

a. The NSW SES Incident Controller (for local or zone level responsibilities during response operations).

b. The NSW SES Zone Duty Commander (for regional level responsibilities outside of response operations).

1.8 PLAN MAINTENANCE AND REVIEW

1.8.1 NSW SES will maintain the currency of this plan by:

a. Ensuring that all supporting emergency services and functional areas, organisations and officers mentioned in it are aware of their roles and responsibilities.

b. Conduct a minimum of one exercise every five years or within two years of the plan being reviewed.

c. Reviewing the contents of the plan:

- When there are changes which alter agreed plan arrangements.
- When changes to land use strategic plans and policies increase the population at risk.
- After a flood including recommendations from after action reviews, reports, or inquiries.
- As determined by the NSW SES Commissioner.

d. The plan is to be reviewed no less frequently than every five years or after a significant flood event.

1.9 SUPPLEMENTARY DOCUMENTS

1.9.1 Supplementary and supporting material of the Local Flood Emergency Sub Plan is maintained on the NSW SES website Flood, Storm and Tsunami Plans including:

a. Flood Plan Glossary.

b. NSW SES Resupply Flowchart.

2 OVERVIEW OF NSW FLOOD HAZARD AND RISK

2.1 THE FLOOD THREAT

2.1.1 NSW SES maintains information on the nature of flooding and effects of flooding on the community in the Richmond Valley Council LGA.

3 PREVENTION/MITIGATION

3.1 INTRODUCTION

3.1.1 The Flood Risk Management Manual outlines the NSW Government's Flood Prone Land Policy which details the framework for managing flood prone land in New South Wales. Incorporation of floodplain risk management into land use planning is one of the key means to limit the exposure to flood risks to our communities and help build long term resilience to future flood events.

3.2 LAND USE PLANNING

3.2.1 **Strategy:** Effective land use planning is a key focus for minimising the impacts of flooding. NSW SES will work with land use planning and consent authorities to inform and influence the consideration of the risks arising from flood, storm and tsunami, to prevent the creation of intolerable impacts of these hazards on the community.

Actions:

a. NSW SES will provide strategic input about land use planning matters which have or will create significant flood risk to life and/or property due to flooding.

b. NSW SES will provide responses to land use planning proposal referrals that have or will create significant flood risk to life and/or property due to flooding.

3.3 FLOODPLAIN RISK MANAGEMENT

3.3.1 **Strategy**: Advocate for consideration of emergency management in decision making to reduce risks to the existing community and minimise the growth in future, continuing and residual risk due to development through input to the floodplain management program.

Actions:

a. NSW SES will provide coordinated and consistent emergency management advice to councils and other agencies in relation to the management of land that is subject to flooding or coastal inundation.

b. NSW SES will provide advice, support, technical resources and training for NSW SES representatives to contribute effectively on local Floodplain Management Committees.

4 PREPARATION

4.1 INTRODUCTION

4.1.1 Preparation includes arrangements or plans to deal with an emergency or the effects of an emergency.

4.2 FLOOD EMERGENCY PLANNING

4.2.1 **Strategy**: NSW SES develop, review and maintain Flood Emergency Sub Plans.

Actions:

a. Develop and review this NSW SES Local Flood Emergency Sub Plan as required. Local Flood Emergency Sub Plans outline the specific arrangements for management of flood events within an LGA and may include cross boundary arrangements.

b. Review plans as per Section 1.8.

4.2.2 Local EMPLAN Consequence Management Guides (CMG's) for flood are not required for communities covered by NSW SES Local Flood Emergency Sub Plans however may be utilised in place of Local Flood Emergency Sub Plan if agreed to by NSW SES.

4.3 FLOOD INTELLIGENCE SYSTEMS

4.3.1 **Strategy**: NSW SES develop and maintain a flood intelligence system to identify flood behaviour, its impact on the community and required response actions.

Actions:

a. Gather and assess flood information for the full range of flood types and severities.

b. Collect, collate, and assess information on the characteristics of communities at risk and the potential effects of flooding on communities at risk.

c. Share flood intelligence information with supporting agencies.

4.4 DEVELOPMENT OF WARNING SYSTEMS

4.4.1 **Strategy**: Develop, maintain and prepare systems for the provision of flood warnings and associated warning services.

Actions:

a. All levels of government work in partnership to develop and maintain flood warning infrastructure.

b. NSW SES will maintain a list of the requirements for flood warnings for flood gauges in NSW (including flood classifications, warning times required and key statistics) and can be found in the supplementary document to the NSW State Flood Plan (see Section 1.9).

c. NSW SES will recommend new warning services and changes to warning alert levels for gauges to the NSW and ACT Flood Warning Consultative Committee.

d. The State Government, in partnership with Local Government, is responsible for developing and maintaining flash flood warning systems for local catchments where required.

e. NSW SES develops and maintains warning and flood information products by:

- Utilising flood intelligence data.
- Developing warning and flood information products.
- Continuously reviewing warning and flood information products.
- Consulting with affected communities, key stakeholders, Dam Safety NSW and the NSW and ACT Flood Warning Consultative Committee and maintains Operational Readiness.
- Participating in the development of public information and warning systems.

f. Gauge owners adequately maintain flood warning gauges and systems, including those identified in the 'Service Level Specification' maintained by the Bureau of Meteorology (Bureau) and those identified in the 'Provision and Requirements for Flood Warning in New South Wales' maintained by NSW SES.

4.5 BRIEFING, TRAINING AND EXERCISING

4.5.1 **Strategy**: Ensure NSW SES, supporting agencies, functional areas and the community are prepared and familiar with the strategies and arrangements within the Flood Emergency Sub Plan and supporting documents.

Actions:

a. NSW SES will consult stakeholders throughout the development of plans.

b. NSW SES will inform stakeholders of content changes after revisions.

c. NSW SES will ensure their facilities and resources are maintained and operationally ready.

d. NSW SES will train personnel for their expected flood operation roles.

e. NSW SES will regularly brief stakeholders on the exercise arrangements contained in the NSW Flood Emergency Sub Plan.

4.6 COMMUNITY RESILIENCE TO FLOODING

4.6.1 **Strategy**: NSW SES provides and maintains a flexible volunteer workforce to support community resilience.

Actions:

a. Ensure ongoing recruitment and training of a diverse range of volunteers.

b. Ensure pre-planning to facilitate the management of spontaneous volunteers and community members during a flood.

4.6.2 **Strategy**: NSW SES works with individuals, communities, businesses and government agencies to build flood resilience.

Actions:

a. Partner with and engage communities to understand and manage the risks associated with floods, including providing business continuity guidance (NSW SES Business FloodSafe), family preparedness (NSW SES Home FloodSafe) and other engagement strategies.

b. Collate, assess and disseminate flood information to the community.

c. Collaborate with individuals, businesses, government agencies and communities when developing flood intelligence, preparedness and response information.

d. Plan for floods collaboratively with communities through community and stakeholder participation and engagement.

e. Collaborate with community sector and recognise the needs of individuals within communities who have an increased susceptibility during floods.

5 RESPONSE

5.1 INTRODUCTION

5.1.1 Flood response operations will begin:

a. On receipt of a Bureau Severe Weather Warning or Thunderstorm Warning that includes heavy rain or storm surge; or

b. On the receipt of a Bureau Flood Watch or Flood Warning; or

c. On receipt of warnings for flash flood; or

d. When other evidence leads to an expectation of flooding.

5.2 INCIDENT MANAGEMENT ARRANGEMENTS

5.2.1 **Strategy**: Maintain effective control of flood operations across NSW.

Actions:

a. NSW SES uses the Australasian Inter-service Incident Management System (AIIMS) to manage the flood response.

b. Control of flood response will be at the lowest effective level and may be scaled to suit the incident.

c. The NSW SES State Controller (or delegate) will appoint Incident Controllers and establish Incident Control Centres (see NSW SES on map in Appendix A).

d. The NSW SES Incident Controller, in consultation with participating supporting emergency services and functional areas will determine the appropriate breakdown of an Area of Operations into Divisions and/or Sectors in accordance with the principles of AIIMS.

5.2.2 **Strategy**: Maintain Incident Control Centre(s).

Actions:

a. NSW SES will operate Incident Control Centre(s) as required.

b. The NSW SES Incident Control Centre(s) will:

- Control resources from NSW SES and coordinate resources of supporting emergency services and functional areas.
- Manage Request for Assistance (RFA) tasking and ensure they are actioned in a timely manner.
- Undertake response planning and determine future resourcing requirements.
- Coordinate information flow, including warnings, public information and social media.

5.2.3 **Strategy**: Provide effective liaison between NSW SES and supporting agencies or functional areas in accordance with Local EMPLAN.

Actions:

a. Supporting emergency services and functional areas should provide Liaison Officers to NSW SES Incident Control Centre(s) and/or Emergency Operation Centres as required.

b. NSW SES will provide Liaison Officer(s) to Emergency Operations Centres as required.

c. Where possible Emergency Operation Centres to be co-located with NSW SES Incident Control Centres for Flood Emergency Response.

5.2.4 **Strategy**: Coordinate resources and logistics support to ensure operational effectiveness.

Actions:

a. The NSW SES Incident Controller will notify agencies of potential access issues between locations, for the consideration of pre-deploying of resources.

b. NSW SES may request resources and logistics support directly from a supporting emergency service or functional area.

c. Wherever possible, supporting organisations are to provide their own logistic support in consultation with NSW SES where appropriate.

d. The NSW SES Incident Controller will control air support operations and may utilise supporting agencies in the management of aircraft.

5.3 USE OF INFORMATION AND COLLECTION OF INTELLIGENCE

5.3.1 **Strategy**: Ensure flood information is effectively utilised, communicated and collected during and after a flood.

Actions:

a. Information relating to the consequences of flooding, response strategies, situational awareness and operational updates will be distributed by NSW SES to supporting emergency services and functional areas listed under this Plan.

b. All supporting emergency services, functional areas and Council will accurately record and report information relevant to their activities and any real time flood information (including road closure information) to the NSW SES Incident Controller. This may be in the form of a combined Emergency Operations Centre (EOC) report, or direct from agencies where an EOC has not been established.

c. NSW SES may establish and operate a Joint Intelligence Unit to coordinate the collection, collation, interpretation, mapping, actioning and dissemination of information.

d. Reconnaissance, mapping, damage assessments, intelligence validation and post flood evaluation will be coordinated by NSW SES. This may occur post impact and continue into the recovery phase.

e. NSW SES may request Engineering to assist with the gathering of flood intelligence including (not limited to) maximum flood extents, peak flood heights, recording major flood damage at key high velocity locations and preparation of After-Flood Report.

5.3.2 **Strategy**: Ensure flood intelligence is incorporated into operational decision-making.

Action: NSW SES will use flood intelligence, official forecasts, warnings, and flood scenario products to undertake an assessment of the predicted impact of a flood and to inform operational decision-making.

5.4 PROVISION OF INFORMATION AND WARNINGS TO THE COMMUNITY

5.4.1 **Strategy**: Timely and effective warnings are distributed to the community.

Actions:

a. The Bureau issues public weather and flood warning products before and during a flood. These may include:

- Severe Thunderstorm Warnings - Broad-based - issued for the entire Australian State or territories affected highlighting broad areas where severe storms may occur within the next 3 hours.
- Severe Weather Warnings with reference to heavy rainfall and/or storm surge.
- Flood Watches.
- Flood Warnings.

b. Councils will use established flash flood warning systems where in place to provide warnings and information to NSW SES, key stakeholders and the community.

c. NSW SES Incident Controllers will issue the following NSW SES Flood Warnings aligning to the Australian Warning System:

- Advice
- Watch And Act
- Emergency Warning

d. NSW SES liaises with the Bureau to discuss the development of flood warnings as required.

e. NSW SES provides alerts and deliver flood information to affected communities using a combination of public information.

f. NSW SES may request supporting agencies redistribute NSW SES alerts and information, including through the provision of doorknocking teams.

g. Road closure information will be provided to the community through the following agencies/methods:

- Local Government Council websites.
- Transport for NSW 'Live Traffic' website: https://www.livetraffic.com/ or 'Transport InfoLine': 131 500. VMS messaging on roadways may also be used to advise motorists.

h. The Public Information and Inquiry Centre will be established by NSW Police Force where required to provide information regarding evacuees and emergency information. Contact details will be broadcast once the centre is established.

i. The Disaster Welfare Assistance Line will be established by Disaster Welfare Services where required to provide information on welfare services and assistance. Assistance line contact details will be broadcast once Disaster Welfare Services commence.

5.5 PROTECTION OF PROPERTY

5.5.1 **Strategy**: Coordinate the protection of property from destruction or damage arising from floods.

Action: NSW SES, supporting agencies, and community volunteers will assist the community (where resources are available, feasible and safe to do so) in:

a. The protection of properties including critical infrastructure through flood protection systems (e.g. sandbagging) to minimise entry of water into buildings.

b. The raising or moving of household furniture and commercial stock/equipment.

5.6 ROAD AND TRAFFIC CONTROL

5.6.1 **Strategy**: Coordinate the closing and re-opening of flood affected roads.

Actions:

a. Richmond Valley Council will coordinate the closure and reopening of council managed roads once inspections have been carried out by the relevant authority.

b. Transport for NSW will coordinate the closure and reopening of the state road network.

c. NSW Police Force may close and re-open roads but will normally only do so if the Richmond Valley Council or Transport for NSW have not already acted and if public safety requires such action.

d. NSW SES will assist with erecting road closure signs and barriers when time and resources permit.

5.6.2 **Strategy**: Coordinate traffic control measures in flood affected areas.

a. The NSW SES Incident Controller may direct the imposition of traffic control measures into flood affected areas in accordance with the provisions of the *State Emergency Service Act, 1989* and the *State Emergency Rescue Management Act, 1989.*

b. The NSW SES Incident Controller may request the Local Emergency Operations Controller provide suitable personnel to assist with traffic coordination.

5.7 PROTECTION OF ESSENTIAL SERVICES

5.7.1 Arrangements for the protection of local assets are outlined in the Local and Region EMPLAN's containing infrastructure inventories.

5.7.2 **Strategy**: Minimise disruption to the community by ensuring protection of infrastructure and supply of essential energy, utility services and lifelines.

Actions:

a. Transport Services Functional Area is to coordinate the provision of information about the assessment and restoration of transport network infrastructure.

b. Energy and Utility Services Functional Area is to coordinate the assessment and restoration of essential energy and utility services (not including telecommunications).

c. Telecommunications Services Functional Area is to coordinate the assessment and restoration of telecommunications and the Public Safety Network.

d. Engineering Services Functional Area is to:

- Coordinate the assessment and restoration of critical public buildings for example hospitals.
- Assessment and operation of flood protection levees.
- Protection of property.
- Construction and repair of levees.
- Water supply and sewerage operations.
- Other critical infrastructure.

e. Functional Areas and Council will keep NSW SES informed of the status of utilities and infrastructure.

5.8 EVACUATION

5.8.1 Evacuation is NSW SES's primary response strategy for managing the population at risk of flooding.

5.8.2 **Strategy**: Conduct planning to ensure all evacuation constraints are considered.

Actions:

a. Evacuations will take place when there is a risk to public safety. Circumstances may include:

- Evacuation of people when their homes or businesses are likely to flood.
- Evacuation of people who are unsuited to living in isolated circumstances, due to flood water closing access.
- Evacuation of people where essential energy and/or utility services are likely to fail or where buildings have been or may be made uninhabitable.

b. NSW SES will consider the following in evacuation decisions:

- Duration of evacuation.
- Characteristics of the community.
- Numbers requiring evacuation.
- Availability of evacuation routes and transport.
- The ability for existing levees or other flood protection works to fulfil their intended function.
- Time available for evacuation.
- Evacuee management requirements.
- Resources and delivery of evacuation information.
- Length of isolation.

c. NSW SES Incident Controllers, planning and intelligence officers will carefully consider the risks involved in conducting evacuations.

d. All evacuation decisions will be made as per the current NSW SES policies and procedures, and consistent with the NSW Evacuation Management Guidelines.

e. Potential Evacuation Centres are located in the Local EMPLAN.

f. NSW Police Force will coordinate the provision of overall security for evacuated areas.

5.8.3 **Strategy**: Evacuate people pre-emptively from dangerous or potentially dangerous places and or locations created by the flood hazard to safe locations away from the hazard.

a. NSW SES will control and coordinate the evacuation of affected communities.

b. The NSW SES Commissioner (or delegate) will warn communities to prepare for a possible evacuation, where circumstances allow such lead time.

c. The NSW SES Commissioner (or delegate) will order any necessary evacuations and provide information to the community about when and how to evacuate.

d. Support to evacuation operations may be requested from other emergency services and supporting agencies using arrangements in the local EMPLAN and supporting plans.

e. Health Services Functional Area will coordinate the evacuation of hospitals, and assist where appropriate with health centres and aged care facilities (including nursing homes) in consultation with NSW SES and Welfare Services and ensure that appropriate business continuity plans are developed for essential health infrastructure and are activated during the floods as per the NSW Health Services Supporting Plan (HEALTH PLAN, 2013).

In the event of an emergency impact of any magnitude or type affecting a Residential Aged Care Facility or private hospital facility, the decision making and resolution regarding the requirement to evacuate will be the responsibility of the facility management in consultation with the relevant combat agency.

f. School administration offices (Government and Private) will coordinate the evacuation of schools in consultation with NSW SES and Welfare Services, if not already closed.

g. Caravan Park proprietors will inform the NSW SES Incident Controller when caravan park evacuations have been completed.

h. People who are reluctant or refuse to comply with any Emergency Warning will be referred to NSW Police Force.

5.9 EVACUEE MANAGEMENT AND WELFARE

5.9.1 Research and experience in flood operations shows that most evacuees go to family, friends and commercial accommodation outside the impact area.

5.9.2 **Strategy**: Maintain the welfare of communities and individuals affected by the impact of a flood.

Actions:

a. NSW SES will provide initial welfare for evacuees where required but will hand the responsibility over to Welfare Services Functional Area as soon as possible. NSW SES will brief Welfare Services Functional Area at the earliest opportunity regarding the level of assistance required.

b. Welfare Services Functional Area will manage evacuation centres for affected residents and travellers in accordance with Welfare Services Functional Area Supporting Plan.

c. Schools Administration (Government and Private) will manage the safety of students directly affected by flooding and will work with NSW SES in the temporary closure of schools and will coordinate with NSW SES, Transport and Welfare Services in the management of school evacuees.

d. Disaster Victim Registration will be controlled and coordinated by NSW Police Force with the assistance of NSW SES and the Welfare Services Functional Area.

e. NSW SES will provide details of all residents assisted in evacuations to the Welfare Services Functional Area as early as possible.

f. Where the expected remaining number of evacuees and the duration of evacuation is assessed to be beyond the capability and capacity of the established evacuation centre arrangements the SEOCON may establish Major Evacuation Centres or Mass Care facilities.

g. The decision to establish Major Evacuation Centres or Mass Care Facilities will be made by NSW SES and SEOCON in consultation with members of the State Emergency Management Committee.

5.9.3 **Strategy**: Coordinate available and accessible health services for flood affected communities.

Action: The provision of environmental health advice, assessment of public health risks and coordination of immediate mental health support will be provided by Health Services Functional Area.

5.9.4 **Strategy**: Maintain the welfare of animals impacted by a flood.

Actions:

a. Agriculture and Animal Services Functional Area will coordinate the welfare of livestock, pets, companion animals and wildlife including support to primary producers, animal holding establishments and community members.

b. Agriculture and Animal Services Functional Area role will coordinate the evacuation, emergency care of animals and assessment, humane destruction and disposal of affected animals, and supply of emergency fodder, water and aerial support where necessary.

5.10 FLOOD RESCUE

5.10.1 **Strategy**: Control and coordinate flood rescue of people and domestic animals.

Actions:

a. NSW SES will perform flood rescue, where training and equipment is suitable and where a risk assessment has indicated that the risk to rescuers is acceptable.

b. Flood rescue operations will be conducted in accordance with the State Rescue Board NSW State Rescue Policy which sets out the framework, governance, responsibilities and requirements for the management and conduct of flood rescue in NSW.

c. NSW SES may request other supporting emergency services to undertake flood rescues on behalf of NSW SES. Agencies must be authorised/accredited to undertake flood rescue operations in accordance with State Rescue Board requirements, as prescribed by NSW SES. Supporting emergency services must supply information regarding rescues performed to NSW SES. Notification arrangements with NSW Police Force are outlined in the State Rescue Board NSW State Rescue Policy.

d. Rescue agencies will conduct rescue of domestic small and large animals as per the State Rescue Board NSW State Rescue Policy (and may include Large Animal Rescue of family horses and cows at a residence or property). The rescue of livestock (which includes commercial animals found on farming and breeding enterprises) will be coordinated through Animal and Agriculture Services Functional Area.

5.11 RESUPPLY

5.11.1 **Strategy**: Coordinate resupply to towns and villages isolated by flooding to minimise disruption to the community.

Actions:

a. NSW SES will advise communities and businesses if flood predictions indicate that areas are likely to become isolated, and indicative timeframes where possible.

b. Retailers should be advised to ensure sufficient stock is available for the duration of the flood.

c. When isolation occurs, NSW SES will establish loading points where retailers can instruct suppliers to deliver goods.

d. NSW SES will endeavour to support the delivery of mail to isolated communities but may not be able to do so according to normal Australia Post timetables.

e. NSW SES will assist hospitals with resupply of linen and other consumables where able.

f. NSW SES may request resupply assistance from supporting agencies.

g. NSW SES may conduct resupply operations as per the designated resupply plan for the event.

h. Where additional supplies are required Engineering Services Functional Area be requested to coordinate the supply of goods and services in response to and recovery from the emergency.

5.11.2 **Strategy**: Coordinate resupply to rural properties isolated by flooding.

Actions:

a. When requested, NSW SES will establish a resupply schedule and coordinate the resupply for isolated rural properties.

b. NSW SES will provide local suppliers with designated loading points. Resupply items are to be packaged by the supplier.

c. Isolated households unable to afford resupply items will be referred to Welfare Services Functional Area for assistance.

5.12 RETURN

5.12.1 **Strategy**: Coordinate the safe return of communities to flood affected areas when the immediate danger to life and property has passed.

Actions:

a. The NSW SES Incident Controller will determine when it is safe to progressively return in consultation with the relevant Emergency Operations Controller and supporting agencies considering the ongoing risk to public safety.

b. The NSW SES Incident Controller will specify the level of access to affected communities as the following:

- Not suitable for access; or
- Limited access by emergency services and response agencies; or
- Limited access by residents and/or business operators; or
- Full access.

c. The NSW SES Incident Controller will issue an Advice Warning advising 'Reduced Threat: Return with Caution' when the immediate danger to life and property has passed for areas.

d. NSW SES will facilitate the return of evacuees to their homes.

5.13 END OF RESPONSE OPERATIONS

5.13.1 **Strategy**: Conclude response operations.

Actions:

a. Response operations will conclude when:

- There is a reduced likelihood of additional flooding within the Area of Operation and flood waters have receded.
- All requests for assistance related to the flood have been completed.
- The need for warning and evacuation no longer exist.
- There is no further likelihood of rescuing people.
- Resupply is no longer required (resupply operations may occur concurrently with the recovery phase).

- Response to fire and hazardous material incidents have concluded (not including subsequent clean-up of contaminated sites).
- All affected areas have had a 'Reduced Threat: Return with Caution' issued.

5.14 POST IMPACT ACTIONS

5.14.1 **Strategy**: Learnings from the event are used to inform recovery and future events.

Actions:

a. NSW SES will continue to engage with communities after significant floods through convening one or more community forums, workshops or other opportunities to provide communities a chance to provide feedback, address any concerns and provide input into the recovery process. These will typically include other agencies such as the Bureau, Welfare Services and Richmond Valley Council representatives.

b. NSW SES will conduct After Action Reviews, at the conclusion of response operations, which will involve all stakeholders. Findings will be shared and incorporated into improved disaster resilience planning.

c. NSW SES will provide information and data throughout the emergency response to inform community recovery. A report will be developed at the request of the SERCON at the conclusion of the response within an area. Should a response summary report be required it will include the following:

- The emergency action plan in place at conclusion of the response emphasising any continuing activities including community meetings/ engagement activities.
- Resources allocated to the emergency response and associated exit strategies.
- Details of any areas or situations with potential to re-escalate the emergency.
- A recommendation for the conclusion of NSW SES as lead agency to transition to NSW Reconstruction Authority as the lead agency for Recovery.
- Any actions that are incomplete or outstanding.
- Damage Assessment Data and Information obtained throughout the response phase which will further support the long-term recovery of communities.

d. NSW SES will undertake/coordinate a comprehensive review of intelligence and plans following significant flood events.

5.14.2 **Strategy:** Participate in post flood data collection analysis.

Actions: NSW SES works with relevant stakeholders and Richmond Valley Council Council on post flood data collection analysis including review of flood intelligence where necessary.

6 RECOVERY OPERATIONS

6.1 INTRODUCTION

6.1.1 Recovery is the process of returning an affected community to its proper level of functioning after an emergency. It will generally commence simultaneously with the Response phase.

6.1.2 Recovery operations will be initiated and conducted as outlined in the NSW State EMPLAN and as further detailed in the NSW Recovery Supporting Plan.

6.2 NSW SES RECOVERY ROLE

6.2.1 **Strategy**: NSW SES will support recovery operations and established Recovery Committees.

6.2.2 **Actions**:

a. NSW SES will provide representation to Recovery Committees as required and may have an ongoing role in the Recovery phase.

b. NSW SES roles on Recovery Committees may include providing information about any continuing response, guidance on mitigation strategies and general advice and assistance to the committee as a subject matter specialist and/ or expert.

c. NSW SES will provide information to NSW Reconstruction Authority to support applications to Treasury for Natural Disaster Relief and Recovery Arrangements.

d. NSW SES, in conjunction with a Recovery Committee, will provide a service to support the information needs of a community immediately following a flood.

e. NSW SES and where required supporting agencies will assist with clean-up operations after floods, where possible when resources and personnel permit.

f. NSW SES may coordinate immediate relief in collaboration with SEOCON and SERCON.

7 ABBREVIATIONS

For a full list of abbreviations refer to the NSW State Flood Plan - Abbreviations

8 GLOSSARY

Common emergency service terminology can be found within the Australian Disaster Resilience Glossary.

Readers should refer to EMPLAN Annex 9 – Definitions.

Refer to the NSW State Flood Plan for a complete glossary of terminology used throughout this plan and within NSW SES Flood Plans.

For a full list of definitions refer to the Supporting Document - State Flood Plan Glossary https://www.ses.nsw.gov.au/media/2650/glossary.pdf

9 Appendix A – Map of Richmond Valley Council Area

10 Appendix B – Roles and Responsibilities

AGENCY	RESPONSIBILITIES
NSW State Emergency Service	NSW SES is the designated Combat Agency for floods, storms and tsunami and controls response operations. NSW SES roles and responsibilities in relation to floods are outlined in the NSW State Flood Emergency Sub Plan.

AGENCY	RESPONSIBILITIES
Agriculture and Animal Services Functional Area	The roles and responsibilities for Agriculture and Animal Services are outlined in the Agriculture and Animal Services Supporting Plan and NSW State Flood Plan.
Australian Government Bureau of Meteorology	The roles and responsibilities for the Australian Government Bureau of Meteorology (Bureau) are outlined in the NSW State Flood Plan.
Richmond Valley Council	**Preparedness** • Establish and maintain floodplain and coastal risk management committees and ensure that key agencies are represented. • Develop and implement floodplain risk management plans in accordance with the NSW Government's Flood Prone Land Policy and the Flood Risk Management Manual. • Provide levee studies, flood studies and floodplain management studies to NSW SES. • Coordinate the development of warning services for catchments prone to flash flooding (small catchments), where appropriate. • Maintain council-owned flood warning networks and flood mitigation works. • Participate in NSW SES-led flood emergency planning meetings, to assist in the preparation of Flood Sub Plans. • Maintain a plant and equipment resource list for the council area. • Contribute to community engagement activities. **Response** • Subject to the availability of council resources, assist NSW SES with flood operations including: – Traffic management on council managed roads. – Provision of assistance to NSW SES (plant, equipment and personnel where able and requested). – Property protection tasks including sandbagging. – Assist with the removal of caravans from caravan parks.

AGENCY	RESPONSIBILITIES
	– Warning and/or evacuation of residents and other people in flood liable areas. – Provision of back-up radio communications. – Resupply of isolated properties. – Technical advice on the impacts of flooding. – Close and reopen council roads (and other roads nominated by agreement with Transport for NSW) and advise NSW SES, NSW Police Force and people who contact the council for road information. – Assist NSW SES to provide filled sandbags and filling facilities to residents and business in areas which flooding is expected. • Assist with making facilities available for domestic pets and companion animals of evacuees during evacuations. • Operate flash flood warning systems. • Operate flood mitigation works including critical structures such as detention basins and levees and advise NSW SES regarding their operation. • Manage and protect council-owned infrastructure facilities during floods. • Provide advice to NSW SES and the Health Services Functional Area during floods about key council managed infrastructure such as sewerage treatment and water supply. • Advise the Environmental Protection Authority of any sewerage overflow caused by flooding. • Work with NSW SES and NSW Department of Planning and Environment to collect flood related data during and after flood events. **Recovery** • Provide for the management of health hazards associated with flooding including removing debris and waste. • Ensure premises are fit and safe for reoccupation and assess any need for demolition. • Provide services, assistance and advice to State Government in accordance with the State Recovery Plan.
Caravan Park Proprietor(s)	• Ensure that owners and occupiers of movable dwellings are aware that the caravan park is flood liable by providing a written notice to occupiers taking up residence and displaying this notice and emergency management arrangement within the park. • Ensure that owners and occupiers of movable dwellings are aware that if they are expecting to be absent for extended periods, they should:

AGENCY	RESPONSIBILITIES
	– Provide the manager of the caravan park with a contact address and telephone number in case of an emergency. – Leave any movable dwelling in a condition allowing it to be relocated in an emergency (i.e.: should ensure that the wheels, axles and draw bar of the caravans are not removed and are maintained in proper working order). • Ensure that occupiers are informed of Flood Information. At this time, occupiers should be advised to: – Ensure that they have spare batteries for their radios. – Listen to a local radio station for updated flood information. – Prepare for evacuation and movable dwelling (cabins) relocation. • Ensure that owners and occupiers of caravans are aware of what they must do to facilitate evacuation and movable dwelling relocation when flooding occurs. • Coordinate the evacuation of people and the relocation of movable dwellings when floods are rising and their return when flood waters have subsided. Movable dwellings will be relocated back to the caravan park(s) by owners or by vehicles and drivers arranged by the park managers. • Secure any movable dwellings that are not able to be relocated to prevent floatation. • Inform NSW SES of the progress of evacuation and/or movable dwellings relocation operations and of any need for assistance in the conduct of these tasks.
Childcare Centres and Preschools	• When notified of possible flooding or isolation, childcare centres and preschools should. – Liaise with NSW SES and arrange for the early release of children whose travel arrangements are likely to be disrupted by flooding and/or road closures. – Assist with coordinating the evacuation of preschools and childcare centres.
Dams Safety NSW	The roles and responsibilities for Dams Safety NSW (formerly NSW Dam Safety Committee) are outlined in the NSW State Flood Plan.
Department of Defence	Arrangements for Defence Assistance to the Civil Community are detailed within the State EMPLAN (section 448).
Energy and Utilities Services Functional Area	The roles and responsibilities for Energy and Utilities Services are outlined in the Energy and Utility Services Supporting Plan (EUSPLAN). Roles and responsibilities in addition to the Supporting Plan are:

AGENCY	RESPONSIBILITIES
	• Assist NSW SES with identification of infrastructure at risk of flood damage where resources are available. • Facilitate local utility service distribution providers (electricity, gas, water, wastewater) to: – Provide advice to NSW SES of any need to disconnect power/gas/water/wastewater supplies or of any timetable for reconnection. – Advise NSW SES of any hazards from utility services during flooding and coastal erosion/inundation. – Advise the public with regard to electrical hazards during flooding and coastal erosion/inundation, and to the availability or otherwise of the electricity supply. – Clear or make safe any hazard caused by power lines or electricity distribution equipment. – Reconnect customers' electrical / gas / water / wastewater installations, when certified safe to do so and as conditions allow. – Assist NSW SES to identify infrastructure at risk of flooding for incorporation into planning and intelligence.
Engineering Services Functional Area	The roles and responsibilities for Engineering Services are outlined in the Engineering Services Supporting Plan and NSW State Flood Plan.
Environmental Services Functional Area	The roles and responsibilities for Environmental Services are outlined in the Environmental Services (ENVIROPLAN) Supporting Plan.
Floodplain Management Australia	The roles and responsibilities for Floodplain Management Australia are outlined in the NSW State Flood Plan**.**
Fire and Rescue NSW	The roles and responsibilities for Fire and Rescue NSW are outlined in the NSW State Flood Plan.
Forestry Corporation of NSW	The roles and responsibilities for Forestry Corporation of NSW are outlined in the NSW State Flood Plan.
Health Services Functional Area	The roles and responsibilities for Health Services are outlined in the Health Services (HEALTHPLAN) Supporting Plan and NSW State Flood Plan.
Local Emergency Operations Controller (LEOCON)	• Monitor flood operations. • If requested, coordinate support for the NSW SES Incident Controller.
Local Emergency Management Officer (LEMO)	• If requested by the NSW SES Incident Controller, advise appropriate agencies and officers of the start of response operations.
Manly Hydraulics Laboratory (MHL)	The roles and responsibilities for Manly Hydraulic Laboratory are outlined in the NSW State Flood Plan.
Marine Rescue NSW	The roles and responsibilities for Marine Rescue NSW are outlined in the NSW State Flood Plan.

AGENCY	RESPONSIBILITIES
NSW Ambulance	The roles and responsibilities for NSW Ambulance are outlined in the Health Services (HEALTHPLAN) Supporting Plan and NSW State Flood Plan.
NSW Department of Education, Association of Independent Schools of NSW, and National Catholic Education Commission	The roles and responsibilities for NSW Department of Education, Association of Independent Schools of NSW, and National Catholic Education Commission are outlined in the NSW State Flood Plan.
NSW Department of Planning and Environment (Environment and Heritage Group)	The roles and responsibilities for NSW Department of Planning and Environment (Environment and Heritage Group) are outlined in the NSW State Flood Plan (referred to as DPIE EES).
NSW Department of Planning and Environment (Water)	The roles and responsibilities for NSW Department of Planning and Environment (Water) are outlined in the NSW State Flood Plan.
NSW Food Authority	The roles and responsibilities for NSW Food Authority are outlined in the Food Safety Emergency Sub Plan.
NSW National Parks and Wildlife Services	The roles and responsibilities for NSW National Parks and Wildlife Services are outlined in the NSW State Flood Plan.
NSW Police Force	The roles and responsibilities for NSW Police Force are outlined in the NSW State Flood Plan.
NSW Rural Fire Service	The roles and responsibilities for NSW Rural Fire Service are outlined in the NSW State Flood Plan.
Owners of Declared Dams within or upstream of the LGA	The roles and responsibilities for Owners of Declared Dams are outlined in the NSW State Flood Plan.
Public Information Services Functional Area	The roles and responsibilities for Public Information Services are outlined in the Public Information Services Supporting Plan and NSW State Flood. Plan**.**
NSW Reconstruction Authority	The roles and responsibilities for NSW Reconstruction Authority are outlined in the NSW State Flood Plan.
SEOCON/SEOC	The roles and responsibilities for the SEOCON/SEOC are outlined in the NSW State Flood Plan**.**
Surf Life Saving NSW	The roles and responsibilities for Surf Life Saving NSW are outlined in the NSW State Flood Plan.
Telecommunications Services Functional Area	The roles and responsibilities for Telecommunications Services are outlined in the Telecommunications Services (TELCOPLAN) Supporting Plan.
Transport for NSW (TfNSW)	• Transport for NSW (TfNSW) coordinates information on road conditions for emergency services access.

AGENCY	RESPONSIBILITIES
	• Transport for NSW (TfNSW) coordinates the management of the road network across all modes of transport. • Transport for NSW (TfNSW) in conjunction will assist NSW SES with the evacuation of at-risk communities by maintaining access and egress routes. • Assist NSW SES with the communication of flood warnings and information provision to the public through Live Traffic and Social Media according to the VMS protocols and procedures. • Assist NSW SES with identification of road infrastructure at risk of flooding.
Transport Services Functional Area	The roles and responsibilities for Transport Services are outlined in the Transport Services Functional Area Supporting Plan and NSW State Flood Plan.
VRA Rescue NSW	The roles and responsibilities for VRA Rescue NSW are outlined in the NSW State Flood Plan.
Water NSW	The roles and responsibilities for Water NSW are outlined in the NSW State Flood Plan.
Welfare Services Functional Area	The roles and responsibilities for Welfare Services are outlined in the Welfare Services Functional Area Supporting Plan and NSW State Flood Plan.

11 Appendix C – Community Specific Roles and Responsibilities

Community Members	**Preparedness** • Understand the potential risk and impact of flooding. • Prepare homes and property to reduce the impact of flooding. • Understand warnings and other triggers for action and the safest actions to take in a flood. • Households, institutions and businesses develop plans to manage flood risks, sharing and practicing this with family, friends, employees and neighbours. • Have an emergency kit. • Be involved in local emergency planning processes. **Recovery** • Assist with community clean-up if required and able to do so. • Participate in After Action Reviews if required.
Aboriginal organisations or groups	• Act as the point of contact between NSW SES and the Bundjalung community. • Disseminate flood information, including flood and evacuation warnings, to the Bundjalung community.

NSW STATE EMERGENCY SERVICE

HAZARD AND RISK IN RICHMOND VALLEY

Volume 2 of the Richmond Valley Flood Emergency Sub Plan

Last Update: November 2023

FloodSafe

AUTHORISATION

The Hazard and Risk in Richmond Valley has been prepared by the NSW State Emergency Service (NSW SES) as part of a comprehensive planning process. The information contained herein has been compiled from the latest available technical studies.

Approved

Signature _____

NSW SES Coordinator Planning

Print Name: Michael Stubbs

Date: 14/11/2023

Approved

Signature: _____

NSW SES North Eastern Zone Commander/ Deputy Zone Commander

Print Name

Date: 20/11/2023

21/11/2023

Date Tabled at LEMC

CONTENTS

LIST OF TABLES

VERSION LIST

The following table lists all previously approved versions of this Volume.

Description	Date

AMENDMENT LIST

Suggestions for amendments to this Volume should be forwarded to:

Manager, Emergency Risk Manager

NSW State Emergency Service

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Amendments promulgated in the amendments list below have been entered in this Volume.

Amendment Number	Description	Updated by	Date

Document Issue: Version 3-02052016

THE FLOOD AND COASTAL EROSION THREAT

1.1 OVERVIEW

a. The Richmond Valley Local Government Area (LGA) is located in the Northern Rivers region of NSW, approximately 250 kilometres (km) south of Brisbane, and 700km north of Sydney. The area is bounded by Kyogle, Lismore and Ballina Council areas in the north, the Pacific Ocean to the east and Clarence Valley Council area to the south and west (1).

b. The LGA includes the townships and villages of Casino, Coraki, Woodburn, Broadwater, Rappville, Rileys Hill and Evans Head, as well as numerous rural localities including Backmede, Banyabba, Bentley, Bora Ridge, Bungawalbin, Busbys Flat, Camira, Clearfield, Clovass, Codrington, Coombell, Dobies Bight, Doonbah, East Coraki, Ellangowan, Esk, Fairy Hill, Gibberagee, Greenridge, Hogarth Range, Irvington, Kippenduff, Leeville, McKees Hill, Mongogarie, Mount March, Myrtle Creek, Naughtons Gap, New Italy, North Casino, Piora, Shannon Brook, Six Mile Swamp, Spring Grove, Stratheden, Swan Bay, Tabbimoble, Tatham, The Gap, Tomki, Upper Mongogarie, West Bungawalbin, Whiporie, Woodview, Wyan and Yorklea (1)

c. The land use is predominantly rural, with expanding residential areas and some industrial and commercial uses**.** The Richmond Valley LGA has a total land area of 3047.4 square km (km^2), with 11.5% of the LGA being National Parks, Nature Reserves or State Conservation Areas, including Mallanganee National Park, which is a World Heritage listed area. 16.1% of the LGA is State Forest.

d. The rural areas have scattered settlements, and can be divided into three areas. The rural north has large areas of grazing, cropping and plantations. The rural east is characterised by extensive floodplains and has grazing and cropping, including sugar cane and tea, as well as extensive areas of wetlands, national parks and forests. The rural west has undulating valleys, steep escarpments, floodplains and both cleared lands and extensively forested areas. It contains vast grazing areas and some cropping and plantation timber.

e. Settlement is based around the townships and villages, with the largest town being Casino, and smaller communities existing in Broadwater, Coraki, Evans Head, Rileys Hill, Woodburn and Rappville.

f. The Richmond Valley area has a has a humid subtropical climate with hot, wet and humid summers and drier winters. There is an average rainfall of up to 1100mm, with higher rainfall occurring in the months of December to April, and rainfall patterns varying based on proximity to the coast, with Casino averaging lower average rainfall than Woodburn or Evans Head (2).

g. Richmond Valley has an estimated population of 23,565 as of 2021 (3). Table 5 provides more detail regarding communities within the Richmond Valley.

h. The main transport routes in Richmond Valley are the Pacific Highway, Bruxner Highway and Summerland Way. The main North Coast railway line (Sydney – Brisbane) services both freight and passenger trains, with Casino Township being located on the line. The area is serviced by Casino Airport and Evans Head Aerodrome by air, however no regular passenger services operate within the LGA, with the nearest being in Ballina, with Lismore Regional Airport offering charter services, and acting as a base for emergency medical and rescue services (1).

1.2 LANDFORMS AND RIVER SYSTEMS

Richmond River Valley

a. The Richmond Valley Council area is part of the Richmond River catchment. The Richmond River catchment is located in the Northern Rivers regions and has a total catchment area of approximately 6900km² and drains to the ocean at Ballina. The upper reaches of the catchment drain the mountainous ranges near the NSW/QLD border, through Casino to its confluence with the Wilsons River at Coraki. It continues south downstream of Coraki to meet with Bungawalbin Creek, a major tributary. It then winds in an easterly direction as it passes through Broadwater, Wardell and then meets the ocean at Ballina (4).

b. The Richmond River catchment is characterised by steep mountainous ranges in the upper catchment and extensive, low-lying floodplains in its lower reaches.

c. The Richmond River has a second outlet to the ocean within the Richmond Valley LGA at Evans Head via the Tuckombil Canal and the Evans River.

d. The Richmond River catchment has three main drainage basins; the Richmond River, Wilsons River and Bungawalbin Creek (4).

e. There are numerous smaller tributaries, gullies, drains and canals along the Richmond River within the Richmond Valley LGA which may have effects on flood behaviour or drainage. These include Black Gully, Oaky Creek, Tomki Creek, Shannonbrook, Middle Creek, Mongogarie Creek, Spring Creek, Bent Winged Bats Drain, Coraki Town Drain, West Coraki Canal, Bungawalbin Hall Canal, Flatly drain, Yorks Drain, Swampy Creek, Rocky Mouth Creek, Langs Hill Canal, McDonalds Creek, Rileys Hill Canal, Montis Gully, Rattle Gully, Eversons Creek, Andersons Gully and Boundary Creek Canal, Seelims Canal, Sandy Creek Canal, Sandy Creek No.1 and No.2 drains, Bora Ridge Canal, Haughwood Canal, Wades Canal, Boggy Creek, Ian Robertson's Drain, Bungawalbin Hall drain, Bungawalbin School drain, Reardons Canal, Thearles Canal, Campbells Canal, Rosolens Canal and Woodburn Town drain.

f. The Richmond River flattens out as it enters the Council area of Casino. The eastern side of Casino is an extensive floodplain as the major system of Shannonbrook enters at Tatham and continues to Coraki. There is a natural constriction in the river and floodplain at Broadwater, which holds floodwaters in the 'basin' between Broadwater, Woodburn and Coraki, also known as the Mid-Richmond (5).

Wilsons River

g. The Wilsons River has a steep catchment, and has two major tributaries of the Wilsons River and Leycester Creek, which combine in the Lismore LGA before flowing downstream to Coraki (5).

Bungawalbin Creek

h. The Bungawalbin Creek catchment starts as a series of steep mountain streams, which then flow into the floodplain at the headwaters of Bungawalbin Creek. The river and floodplain constrict downstream of Gibberagee and wind in a north easterly direction to meet Sandy Creek before entering the Richmond River (5).

i. The Bungawalbin area serves as a major flood storage basin for the Richmond River. Floodwaters are held here until water levels in the Richmond have receded to allow the catchment to drain. In some flood conditions, floodwaters from the Richmond can back up into the Bungawalbin (4).

j. There are a number of smaller tributaries, canals and drains along Bungawalbin Creek which may have minor effects on flood behaviour. These include Jacky Bulbin Creek, Yarringully Creek, Bora Gully, Sandy Creek, Ian Robertson Drain, Wades Canal, Boggy Creek, Reardons Drain and Haughwood Canal.

k. The tidal extent of Bungawalbin Creek is more than 88km upstream from the river entrance (4).

Evans River

l. Hydraulically linked to the Richmond River catchment is the relatively small catchment of the Evans River. Located between the towns of Woodburn and Evans Head, the Evans River drains a local catchment of approximately 90km^2. During moderate to major flood events, the Evans River receives flows from the Richmond River via defined waterways and overland flow (6).

m. The Tuckombil Canal is a manmade waterway that links the Evans River to Rocky Mouth Creek, two kilometres upstream of the confluence with the Richmond River at Woodburn. At the northern extent of the canal, the Tuckombil Canal Fixed Weir prevents tidal intrusion into Rocky Mouth Creek, whilst providing flood relief for the Richmond River (4). Flood flows are limited by a pinch point on the Evans River at Iron Gates.

n. Refer to Annex 1: River Basin Schematic.

Clarence River Valley

o. A small area in the South-East of the Richmond Valley LGA sits within the upper reaches of the Clarence River Basin.

p. The Clarence River is the largest coastal river in New South Wales in terms of both catchment area and discharge. The Great Dividing Range makes up the western boundary between Stanthorpe and Glen Innes, Baldblair, the Doughboy Ranges and the Dorrigo Plateau in the south make up the southern boundary, and the MacPherson Ranges make up the northern boundary.

q. The eastern boundaries are defined by coastal ranges from Coffs Harbour to just south of Wooli, and by the coast from Wooli to around 8 kilometres south-west of Evan's Head. The river enters the ocean between Yamba and Iluka.

r. The Clarence River catchment is comprised of four sections, with only one of these, the Esk River, falling within the boundaries of the Richmond Valley LGA.

s. The Esk River has a catchment area of 258km^2. It extends approximately 19km north from Iluka Road draining wetland area in Bundjalung National Park, in the Richmond Valley LGA. North Arm Creek drains into the Esk River around Esk Island before the Esk River meets the Clarence River at the Village of Iluka.

t. Whilst part of the Richmond Valley LGA falls within this river basin, there are minimal emergency management considerations associated with the Clarence River Basin within the LGA. For more detail see the Clarence Valley Flood Emergency Sub Plan (7).

1.3 STORAGE DAMS

a. There are no prescribed dams in the Richmond Valley LGA, however communities within the LGA are downstream of Toonumbar Dam. Toonumbar Dam is located on Iron Pot Creek, upstream of Casino.

Table 1: Prescribed Dams affecting Richmond Valley LGA; summary of information about each storage.

Toonumbar Dam (8)	
Owner / Operator	Water NSW
Description of Dam	Toonumbar Dam is a 44 m high earth and rockfill embankment constructed to store water for the benefit of riparian users and the future development of irrigation by private pumping from the stream. Its spillway is an ungated concrete lined spillway chute with flip bucket.
Location	Toonumbar Dam is located on Iron Pot Creek, 20km west of Kyogle, in the Richmond River Basin, within the boundaries of the Kyogle LGA.

Communities Downstream	Downstream communities are Ettrick, Doubtful Creek, Dobies Bight, Casino, Ghinni Ghi. Key consequences of a dambreak also include increased levels in Iron Pot Creek and Richmond River. Population at risk in a Sunny Day Failure ranges from 8 in a daytime failure, to 16 at night. Population at risk from a PMF failure ranges from 100 in a daytime failure and 145 at night.
Monitoring System	The monitoring systems are Hydraulic Piezometers, Seepage Points, Cross Arms, Pin Pairs, and Reservoir Level Gauge.
Warning System	WaterNSW will issue alerts to SES via SES State Operations.
Other	Approximate travel time for flood wave arrival from Toonumbar Dam to the confluence of Eden Creek and the Richmond River in a Sunny Day Failure is approximately 6 hours and 15 minutes, with the peak at 7 hours 45 minutes.
Alert Levels	White: Monitor conditions, check with downstream communities and alert units. Amber: Evacuation warnings and monitor. Red: Evacuation orders.

1.4 WEATHER SYSTEMS AND FLOODING

a. The majority of recorded floods in the Richmond Valley Council area have occurred seasonally in the early months of the year as the result of two distinct weather patterns; tropical cyclones and intense depressions close to the coast.

b. In the early months of the year, tropical cyclones originating near the equator may move south. While it is rare for a cyclone to enter north-eastern New South Wales, those that approach southern Queensland or which travel southwards past the coast of northern New South Wales may bring rain of sufficient intensity and duration to cause flooding. There are also occasions when a heavy rain area advances well ahead of the cyclone which may be 200 to 300 kilometres distant.

c. The most frequent origin of flooding rain events however, is the development of intense low pressure systems, or east coast lows, close to the coast. Generally, these systems maintain a supply of deep moisture as they move southwards in proximity to the coast.

d. These depressions may develop at any time but the flood rain events are most likely during that part of the year when sea surface temperatures are high and the air is humid. As tropical cyclones can also be expected at this time, most flood events in the Richmond River catchments occur in the first half of the year with a peak period from February to April.

e. Floods in the Mid Richmond River basin, originate from one or more sources. Rainfall over the Richmond River, Wilsons River or Bungawalbin Catchments and localised

rainfall that is unable to drain because of relatively flat topography, high embankments and/or constrictions caused by flood drainage structures (9).

1.5 CHARACTERISTICS OF FLOODING

a. Flooding often occurs as a result of rain which has fallen over the wider Richmond River catchment, sometimes outside the Council area. Significant rainfall over the Wilson's River catchment in Lismore has historically caused flooding in Coraki and Woodburn.

b. In the Upper-Richmond sector, the Richmond River enters the Council area at Fairy Hill. The river through Casino has high banks that tend to force the river to behave like a gorge with riverbed levels dropping over 8m through town. In large flood events, waters break the banks upstream of Casino and bypass the town via a large flow path to the south. On the downstream (eastern) side of Casino, the topography flattens out to form an extensive floodplain (10).

c. In the Mid-Richmond sector, flooding in the area is dominated by the three major inflows of the Richmond River, Wilsons River and Bungawalbin Creek.

d. There is a natural constriction in the river and floodplain at the township of Broadwater. This constriction acts to hold floodwaters in the extensive floodplain 'basin' between Broadwater, Woodburn and Coraki (10).

e. The Wilsons River and Leycester Creek combine at Lismore before the river winds downstream to Coraki. Runoff resulting from rain within the Wilsons River catchment concentrates at Lismore, often resulting in major flooding.

f. The Bungawalbin Creek catchment is initially a series of steep mountain streams which flow into the floodplain at the headwaters of Bungawalbin Creek. The creek flows along the edge of this floodplain between Myrtle Creek and Gibberagee along which a number of tributaries enter. The river and floodplain constrict approximately 15 kilometres downstream of Gibberagee at which point the creek and associated low floodplain areas wind in a north east direction meeting with a major tributary named Sandy Creek before entering the Richmond River.

g. A number of artificial structures along the Richmond River affect the movement of flood waters over the floodplain in large floods. Of particular interest is the effect of Tuckombil Canal (which diverts flood waters to the Evans River), Bagotville Barrage and the many levees throughout the region.

h. Refer to Annex 1: Richmond River Basin Schematic.

Table 2: Indicative Flow Travel Time for the Richmond and Wilsons Rivers* (11)

Locations	Travel Time
Kyogle to Casino	12 hours
Casino to Coraki	10 to 12 hours
Lismore to Coraki	12 to 15 hours
Coraki to Bungawalbin Junction	3 to 6 hours
Coraki to Woodburn	10 to 14 hours
Coraki to Broadwater	10 to 20 hours

**These times are indicative only, flood peak travel times can vary from flood to flood.*

1.6 FLOOD HISTORY

a. The February 1954 flood resulted from very heavy rain over the catchment over a two day period. The 1954 event caused major damage to the Casino area, including two major embankment breaks, and washing away a section of Irving Bridge. Until recently, the flood was the largest recorded at Bungawalbin Junction, Woodburn and Broadwater (4).

b. The March 1974 flood occurred as a result of Tropical Cyclone Zoe, with two main bursts of rainfall. The main concentration of rain fell on the Wilsons River and all along the eastern part of the Richmond River catchment. The resulting flooding at Coraki was, until 2022, the highest recorded, with extensive flooding occurring between Coraki and Ballina (4).

c. In January 2008, an east coast low pressure system caused heavy and constant rainfall centered over the Upper Richmond catchment, with heavy rainfall also occurring in the Wilsons River catchment. Major flooding occurred in parts of Casino, with moderate flooding across the Mid-Richmond downstream of Casino to Coraki, with minor flooding at Woodburn.

d. In May 2009, an east coast low pressure system caused heavy rainfall in the Richmond River catchment. The most intense rainfall was concentrated in the Wilsons River catchment, with some less intense falls into the Bungawalbin Creek catchment. The combination of large flows from the Wilsons River, Richmond River and Bungawalbin Creek led to significant flooding in the Mid-Richmond around Coraki. Rappville recorded one of its largest floods on record, and minor flooding occurred at Woodburn (4).

e. In March/April 2017, ex Tropical Cyclone Debbie led to heavy rainfall over the Richmond catchment, with much of this concentrated into a 24hour period. Whilst the flooding was most severe in Lismore, flooding occurred in Coraki and Woodburn due to high Richmond River levels from flows coming down from the Wilsons River.

f. The February/March 2022 flooding was the result of intense rainfall from a deep low pressure system. Rainfall within the Richmond River Catchment exceeded the 7-day average by 40-60%. In many areas within the Richmond Valley, flood levels exceeded previous historical records, with many communities within the region isolated for 5-7 days (12).

g. Another flood event in March/April 2022 occurred due to a low-pressure system off the northern NSW coast. Already saturated catchments responded quickly to the heavy rainfall. Major flooding was again experienced in many areas of the Richmond Valley.

Table 3: Flood History peak heights in the Richmond Valley LGA (12)

Flood Event	Casino Flood peak level	Coraki Flood peak level	Woodburn Flood peak level	Bungawalbin Flood peak level
February 1954	15.39m#	6.9m	-	-
March 1974	12.3m	7.01m	-	5.84m
April 1988	12.9m	6.68m	4.7m	5.43m
January 2008	16.21m	6.7m	4.03 m	5.73m
May 2009	13.9m	6.6m	3.97 m	5.6m
April 2017	12.98m	6.79m	4.04m	5.479m
February/March 2022	17.78*m	7.6m	7.17m	7.3m
March/April 2022	11.75m	6.8m	4.47m	5.53m

**manually surveyed level at gauge # level taken at manual Casino Bridge gauge 203907; other levels taken at Casino telemetered gauge 203004 - 558013.*

Flood design heights

h. Gauge heights for various gauges along the Richmond River are shown for a range of design flood levels in table 4. All heights are reported in local gauge datum.

Table 4: Richmond River design flood levels (12)

Predicted Flood Frequency (AEP)	Casino Road Bridge Gauge (203907)	Casino Gauge (203004)	Coraki Gauge (203403)	Bungawalbin Junction Gauge (203450)	Woodburn Gauge (203412)	Broadwater Gauge (203415)
5% AEP	13.88m	16.37m	7m	5.6m	4.4m	3.2m
2% AEP	15.41m	17.66m	7.1m	6.1m	5m	4.3m
1% AEP	15.81m	17.94m	7.3m	6.5m	5.6m	4.9m
0.2% AEP	16.15m	18.28m	7.5m	7m	6.7m	6.2m
PMF	17.38m	19.29m	11m	10.97m	10.8m	10.2m

Figure 1: Monthly distribution of flooding at the Coraki Gauge (203403-58175) (13)

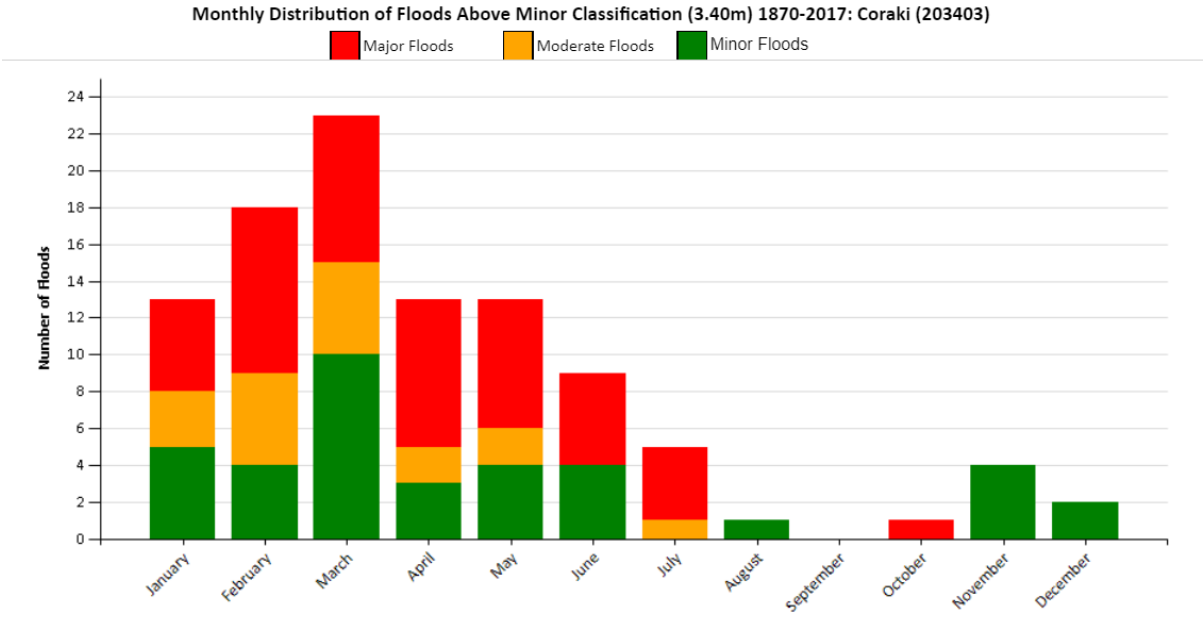


Figure 2: Monthly distribution of flooding at the Woodburn Gauge (203412-58061) (13)

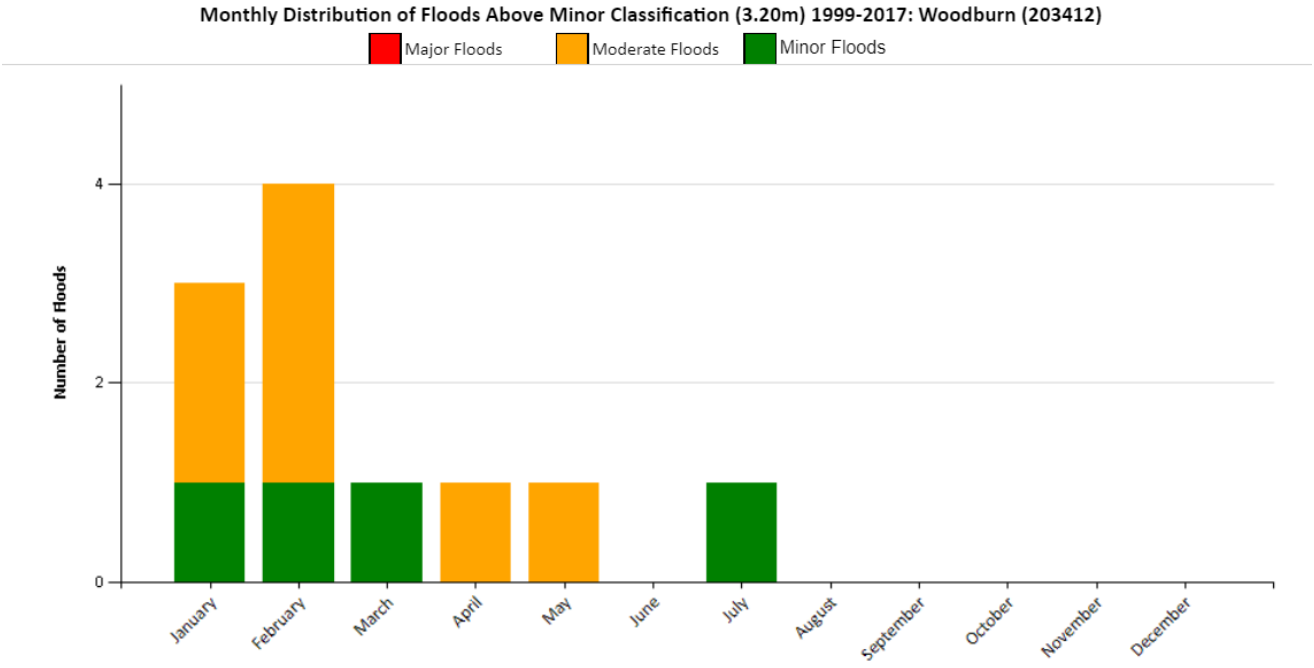


Figure 3: Monthly distribution of flooding at the Casino Road Bridge Gauge (203907-58179) (13)

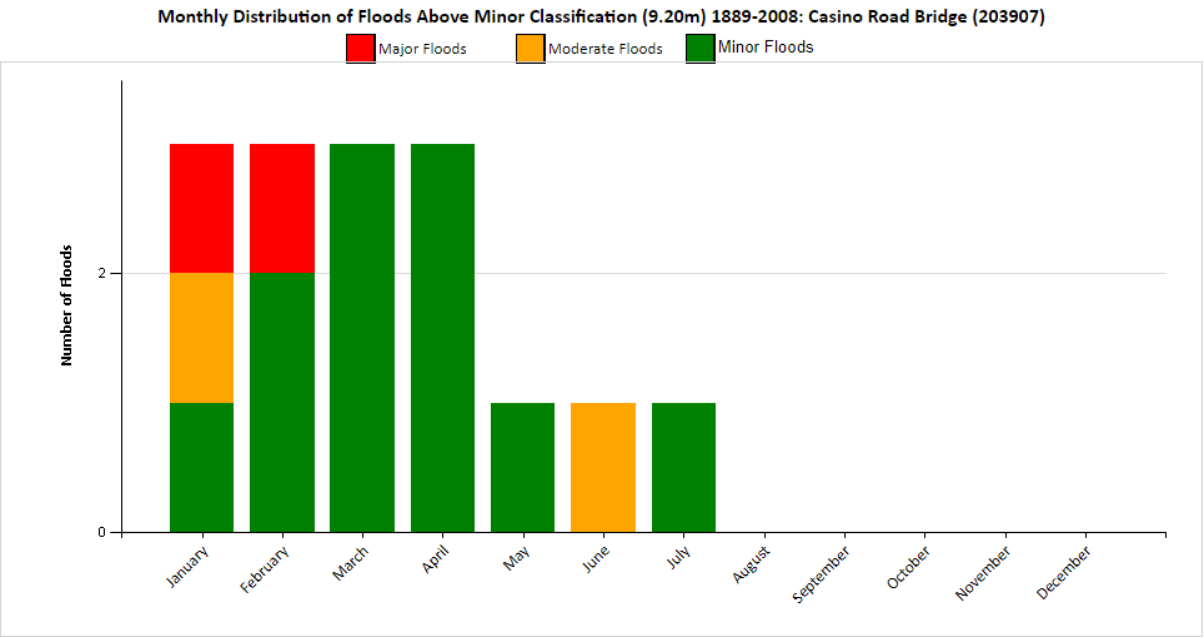
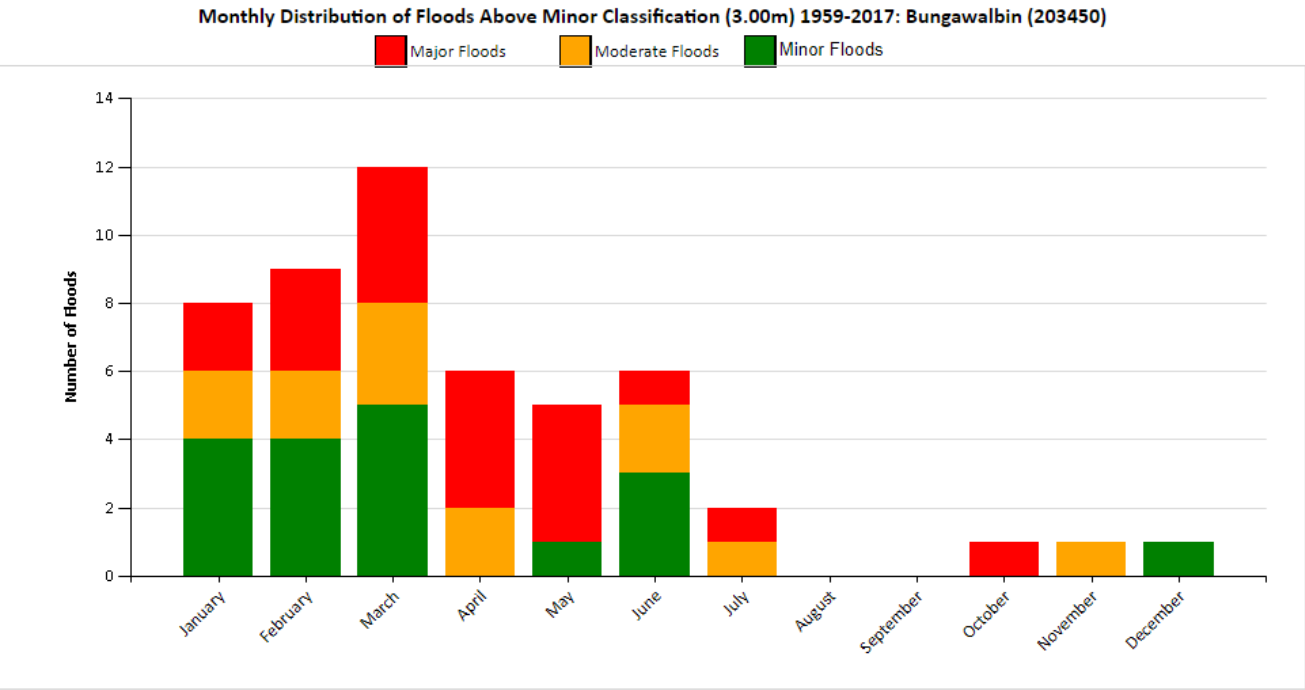


Figure 4: Monthly distribution of flooding at the Bungawalbin Gauge (203450-58184) (13)



1.7 FLOOD MITIGATION SYSTEMS

a. There are many historical, rural earth levees within the Richmond Valley LGA including East Coraki, Sandy Creek, Bungawalbin West, Bungawalbin East, Swan Bay, Breakfast Point, Tuckombil Levee. The major levee systems include:

i. Tuckombil levee located on the northern side of the Tuckombil Canal and the Evans River from Tuckombil Rd and Golf Links Rd.

ii. East Bungawalbin Levee located on the eastern side of Bungawalbin Creek, from downstream of the intersection of Moonem-New Italy Road and Bungawalbin-Whiporie Road to opposite the entrance of Bora Gully.

iii. The Bungawalbin West Levee is located on the western side of Bungawalbin Creek from upstream of Haughwood Canal downstream to the floodgates on Bora Creek.

iv. Swan Bay Levee along with Reardons, Thearles and Campbells canals protect major transport and evacuation routes in the Swan Bay area.

v. The Tuckurimba (or East Coraki) Levee, whilst located in the Lismore LGA, has important effects on flood behaviour in Coraki. It is located on the eastern banks of the Wilsons River between Baxters Lane and Coraki.

b. Each levee is further described within Part 2 - Specific Risk Areas.

c. The Tuckombil Canal– The Tuckombil Canal occurs between Rocky Mouth Creek and the Evans River 2 km upstream of the Evans River confluence with the Richmond River at Woodburn (14). The canal was excavated for flood mitigation purposes in the 1890's, and was deepened and widened in 1965 to its present dimensions. A temporary fixed concrete weir was installed in 2001 at the upstream end of the canal at 0.94mAHD, to prevent tidal interchange between the Evans and Richmond Rivers (4).

d. The Rocky Mouth Creek Floodgates are located on Rocky Mouth Creek and are designed to prevent floodwater from the Richmond River travelling up Rocky Mouth Creek and inundating low lying land upstream. They may also prevent salt water intrusion on agricultural land further upstream on the event of failure of the Tuckombil Canal fixed weir (12).

e. The Bagotville Barrage, whilst situated in the Ballina LGA, has an effect on water entering the Tuckean Broadwater.

f. The West Coraki Canal acts as an important release point for large bodies of water that exist on the large, low lying floodplain to the west of Coraki after major flooding (15).

1.8 EXTREME FLOODING

a. The extreme flood in the Richmond Valley LGA is likely to cause significant inundation in both the towns and rural areas.

b. The Probable Maximum Flood (PMF) is estimated to be 17.38m at the Casino Bridge gauge, 11m at the Coraki gauge, 10.8m at the Woodburn gauge and 10.2m at the Broadwater gauge (12).

c. At these levels and inundation or isolation would be widespread throughout the LGA.

1.9 COASTAL EROSION

a. The most severe problems of coastal erosion occur as a result of oceanic storm conditions associated with the passage of ex-tropical cyclones and east coast low-associated waves. The worst erosion is likely when severe weather conditions occur in conjunction with unusually high tides.

b. Evans Head is the only location within the Richmond Valley LGA that has been identified as potentially being affected by coastal erosion. However, at present, there are no major developments at risk (14).

2 EFFECTS ON THE COMMUNITY

2.1 COMMUNITY PROFILE

a. Richmond Valley Council area is made up of a number of communities that can be affected in a flood. For planning purposes, these can be categorised into sectors, which include;

1. **Casino-** The Casino sector includes Casino, North Casino, Stratheden, Fairy Hill, Backmede, Naughtons Gap, Spring Grove, Woodview, Piora, Shannon Brook, Leeville, Mongogarie, Upper Mongogarie, Coombell, Yorklea, Greenridge, Irvington, Tomki, Clovass, Greenridge and Tatham (part).
2. **Coraki-** The Coraki sector includes Coraki, West Coraki, Codrington, Ellangowan (part) and Tatham (part).
3. **Bungawalbin-** The Bungawalbin sector includes Busbys Flat, Kippenduff, Six Mile Swamp, Mount Marsh, Clearfield, Camira, Whiporie, Rappville, Myrtle Creek, Wyan, Ellangowan (part), Bora Ridge, Bungawalbin, West Bungawalbin, Tabbimoble, Gibberagee.
4. **Woodburn-** The Woodburn sector includes Swan Bay, Woodburn, New Italy, Doonbah, Evans Head, The Gap and Esk (part).
5. **Broadwater-** The Broadwater sector includes Broadwater and Rileys Hill.

b. Table 5 shows the 2021 Census ‘usual resident’ counts for key statistics for the Richmond Valley Local Government Area. Note these vary slightly from the sector areas due to census availability. More detailed information on areas within each sector can be found in sections 2.2 to 2.6, Specific Risk Areas.

Table 5: Census of Housing and Population data 2021 (3)

Census Description	Richmond Valley LGA (A)	Casino Sector	Coraki Sector
Total Persons	**23565**	**15064**	**1776**
Aged 0-4 yrs	1188	798	72
Aged 5-14 yrs	3128	2151	217
Aged 65 + yrs	5918	3688	432
Of Indigenous Origin	1858	1336	149
Who do not speak English well	27	20	17
Have a need for assistance (profound/severe disability)	1863	1225	127
Living alone (Total)	2581	1632	149
Living alone (Aged 65+)	1393	875	61
Residing in caravans, cabins or houseboats or improvised dwellings	266	78	4
Occupied Private Dwellings (Households)	**8825**	**5619**	**589**
No Motor Vehicle	466	335	22
Caravan, cabin, houseboat or improvised dwell	167	58	0
Rented via State or Housing Authority	191	175	4
Rented via Housing Co-Op or Community Church Group	91	55	3
Unoccupied Private Dwellings	**852**	**375**	**47**
Average persons per occup dwelling	**2.4**	**2.7**	**2.75**
Average vehicles per occup dwelling	**1.9**	**2.3**	**2.6**

Census Description	Bungawalbin Sector	Woodburn Sector	Broadwater Sector
Total Persons	**791**	**4554**	**851**
Aged 0-4 yrs	45	202	35
Aged 5-14 yrs	91	506	110
Aged 65 + yrs	172	1305	212
Of Indigenous Origin	52	269	47
Who do not speak English well	0	0	0
Have a need for assistance (profound/severe disability)	65	323	66
Living alone (Total)	63	572	104
Living alone (Aged 65+)	21	317	48
Residing in caravans, cabins or houseboats or improvised dwellings	0	82	72
Occupied Private Dwellings (Households)	**217**	**1841**	**338**
No Motor Vehicle	0	89	8
Caravan, cabin, houseboat or improvised dwell	0	48	57
Rented via State or Housing Authority	0	17	0
Rented via Housing Co-Op or Community Church Group	0	33	0
Unoccupied Private Dwellings	**54**	**337**	**25**
Average persons per occup dwelling	**2.4**	**2.42**	**2.4**
Average vehicles per occup dwelling	**2.1**	**2.04**	**2.05**

SPECIFIC RISK AREAS - FLOOD

Richmond River Valley

2.2 CASINO

2.2.1 Community Overview

a. The Casino sector includes the larger township of Casino, as well as numerous smaller settlements and areas of rural land.

b. In the Casino sector, the Richmond River flows in a general north-south direction from its source in the McPherson Ranges on the Queensland-New South Wales border, and the Richmond Ranges at the foot of the Great Dividing range, and passes through Casino before reaching its confluence with the Wilsons River at Coraki (10).

c. Casino township is located on the Upper Richmond River. The total population of Casino is approximately 10,930. It has 19.5% of the population under 15 years of age and 26% over 65. 10.8% of the population is Indigenous (16).

d. Smaller, rural areas within the Casino sector are Stratheden, Fairy Hill, Backmede, Naughtons Gap, Spring Grove, Woodview, Piora, Shannon Brook, Leeville, Mongogarie, Upper Mongogarie, Coombell, Yorklea, Greenridge, Irvington, Tomki, Clovass, Greenridge and Tatham (part).

2.2.2 Characteristics of flooding

a. Flooding in Casino is primarily riverine flooding from the Richmond River due to rainfall over the Richmond River or Eden Creek catchments, or from localised rainfall not able to drain due to high embankments (17). Localised flooding can also occur during periods of intense rainfall, due to limitations within the stormwater network. When the river is in flood, this is exacerbated as the main town drain cannot discharge efficiently into the river.

2.2.3 Flood Behaviour

a. The river through Casino is a gorge with high banks and exposed rock beds and river bed levels that drop 8m through the town**.** In large flood events, waters break the banks upstream of Casino and bypass the town via a large flow path to the south.

b. As flow velocity increases, there may be back up of flow from the Richmond River into Black Gully. At further increases in velocity, there is breakout flow to the south via Black Gully, which then joins with Oaky Creek and Shannon Brook (12). Breakout flows may also occur downstream of the railway bridge in Casino and travels north easterly before rejoining the Richmond River at the eastern end of Casino.

2.2.4 Classification of Floodplain

a. For emergency management purposes, the Casino sector can be further broken down into subsectors for floodplain classification in a PMF event. These classifications are as follows;

Table 6: Subsector Flood Emergency Response Classifications in the Casino sector

Object ID	Subsector Name	Classification	Population Estimate	Dwelling Estimate	Vehicle Estimate
42418	Casino A	Rising Road Access	291	120	22
41712	Casino B	Overland Escape Route	222	145	261
41714	Casino C	High Flood Island	990	449	808
42442	Casino D	Rising Road Access	498	246	443
42786	Casino E	Rising Road Access	431	194	349
45198	Casino East A	Low Flood Island	81	37	66
43586	Casino F	Low Flood Island	165	80	144
42423	Casino G	Indirectly Affected Area	2669	1211	2180
42795	Casino H	Rising Road Access	1318	574	1033
43587	Casino I	Low Flood Island	96	44	79
42787	Casino J	High Flood Island	355	133	239
42788	Casino K	High Flood Island	N/A	N/A	
42789	Casino L	Rising Road Access	205	81	146
43987	Casino M	Low Flood Island	657	304	66
43986	Casino N	Rising Road Access	2925	1454	2617
44793	Casino O	Overland Escape Route	9	3	5
44791	Casino O West	Low Flood Island	13	5	9
45208	Casino P	Overland Access	12	4	7
44792	Casino South A	Overland Escape Route	47	20	36
45200	Casino West A	Overland Escape Route	43	18	32
44796	Clovass A	Overland Escape	42	14	25
45202	Dobies Bight and Woodview	Overland Escape Route	162	63	113
45195	Greenridge A	Overland Access	246	88	158
45199	Irvington A	Overland Access	70	24	43
405	Low lying parts of Wharf St Casino	Low Flood Island	153	75	135
44795	North Casino A	Overland Escape Route	8	3	5
44794	North Casino B	Rising Road Access	3	1	2
45201	Tatham (North) B	Overland Escape Route	43	19	34
45190	Tatham A	Low Flood Island	33	14	25
45196	Tatham B	Low Flood Island	10	4	7
44790	Tomki A	Overland Access	62	21	38
45194	Woram A	Overland Escape	63	26	47

2.2.5 Inundation

a. The Casino Road Bridge gauge is utilised in this area, with Bureau of Meteorology forecasting to this gauge (203907 - 58179). Another gauge exists in Casino at Queen Elizabeth Park (203004 - 558013).

b. Water tends to initially back up in the small gullies that exist on the river bank through Casino, with initial inundation noticed in Lennox St, Gilby St, West St, Diary St, Barker St, Gitana St, Windsor Ave, Hartley St, Queen Elizabeth Park and East St, Wharf St, Wheat St, Riverside Ln, Park Ln, Kent St, Country Ln, Stapleton Ave and Canterbury St.

c. In a 5% event, (13.88m on the Casino Bridge gauge), the majority of the Casino township is unaffected, with some inundation of property experienced in Dobies Bight (1 property), Fairy Hill (1 property) , Greenridge (1 property), Irvington (2 properties), Leeville (2 properties) and Tatham (7 properties).

d. In a 2% AEP event (15.41m at the Casino Bridge gauge), Casino township has the highest number of inundated properties in the Richmond Valley due to its higher population density, with depths ranging from 0.25-1m (12).

e. In a 1% AEP (15.81m at the Casino Bridge gauge), notable overtopping of the riverbank into Casino would cause a large number of properties to be inundated above floor level (12). Depths are modelled to be 1-2m in the vicinity of Fergusson and Canterbury Streets, and around Colley Park. Depths are modelled to be between 2-4m in the vicinity of Lennox St and Stapleton Ave (12).

f. In the 0.2% AEP and PMF (16.14m and 17.4m at the Casino Bridge gauge), large parts of Casino would be inundated, with the number of inundated properties higher than other suburbs in the sector due to its larger population (12).

Table 7: Estimated number of properties inundated above habitable floor level in Casino township related to the Casino Bridge gauge – (203907/58179) (12)

Casino Bridge Gauge Height (m)	No. Properties with Over floor Flooding in Casino
13.88m (5% AEP)	3
15.41m (2% AEP)	230
15.81m (1% AEP)	700
16.15m (0.2% AEP)	1533
17.38m (PMF)	2333

Table 8: Estimated number of properties inundated above habitable floor level in the Casino Sector related to selected design flood event (12).

Design Event (%AEP)	No. Properties with Over floor Flooding in the Casino Sector
5% AEP	17
2% AEP	265
1% AEP	748
0.2% AEP	1621
PMF	2573

2.2.6 Isolation

a. **Casino**- The following gauge heights given for sequence of inundation refer to the Casino Bridge Gauge (203907 -58179).

b. The first areas to become isolated would be areas to the west of Gays Hill along Sextonville Rd from levels equivalent to 12.5m at the Casino Gauge (17).

c. From approximately 13.8 m, some areas to the east of Casino may become isolated as the Casino-Coraki Road is cut off in the vicinity of Oakey Creek. Summerland Rd may also be cut off to the south, causing isolation to the south side of Casino. The Bruxner Highway to the East of Casino may also experience inundation of up to 0.3m.

d. At approximately 15.1m at the Casino Bridge Gauge, Bruxner Highway may be cut off to the west of Casino township and properties on the south side of town to the west of the railway line may become isolated.

e. At levels over 15.81m at the Casino Bridge gauge most areas of Casino are likely to be isolated as major access routes are cut with over road depths ranging from 0.3 to >1m (12).

f. There are a number of rural communities which have single road access and may be easily isolated by road closures during a flood event. These include Ainwsorth Rd at Mongogarie, Backmede Rd at Backmede, Coombell Rd in Coombell, Elfords Rd in Dobies Bight, Ellems Bridge Rd in Piora, Gooleys Rd in Stratheden, Hancocks Rd in Piora, Junors Rd in Backmede, Shannonbrook Rd in Shannonbrook, Strongs Rd in Fairy Hill, and Upper Cherry Tree Rd and Upper Mongogarie Rd in Upper Mongogarie (1).

2.2.7 Flood Mitigation Systems

a. There are no identified flood mitigation systems in the Casino sector.

2.2.8 Dams

a. Whilst there are no dams situated in the Casino sector, some downstream properties in Casino may be affected by a dambreak of Toonumbar Dam, which is located in the Kyogle LGA.

b. Response arrangements in the event of a dam safety alert are outlined in the Toonumbar Dam Safety Emergency Plan, with response based on the level of alert issued. Further detail can be found in Table 1.

2.2.9 At Risk Facilities

a. The facilities that are at risk of flooding and/or isolation within the Richmond Valley LGA including schools, childcare centres, hospitals, aged and infirm, infrastructure and caravan parks are shown in Annex 2.

2.2.10 Other Considerations

a. There may be increased visitors to the sector during events such as Beef Week in Casino in May, Primex in Casino in June and the Casino Show in October.

2.3 CORAKI

2.3.1 Community Overview

a. The Coraki Sector includes the larger settlement of Coraki, parts of East Coraki along Oakland Rd and East Coraki Rd, as well as smaller settlements and areas of rural land including West Coraki, Codrington, part of Tatham and the northern part of Ellangowan.

b. Coraki village is located at the confluence of the Richmond River and Wilsons River. The total population of Coraki and West Coraki is approximately 1471 with approximately 1155 of those living within the village area of Coraki and the remainder scattered across more rural settlements. It has 14.8% of the population under 15 years of age and 26.4% over 65. 10.6% of the population is Indigenous (18).

c. Part of East Coraki is included in the Richmond Valley LGA. East Coraki has a population of approximately 222.

2.3.2 Characteristics of flooding

a. The source of flooding in Coraki has historically varied from flood to flood. Flooding can occur from riverine flooding from the Richmond River and/or Wilsons River, as well as from local catchment flooding from one or all of the surrounding creeks, which include Seelems Creek and Bungawalbin Creek.

b. Local flooding in the Bungawalbin Creek system can cause extensive rural inundation south-west of Coraki.

2.3.3 Flood Behaviour

a. Downstream of Casino, the topography flattens into an extensive floodplain, and the Richmond River is joined by the major system of Shannon Brook at Tatham, and continues through towards Coraki. The Richmond River is then joined by the Wilsons River at Coraki, and then doubles in width downstream (4).

b. During small to medium sized floods the Tuckurimba (or East Coraki) Levee will cause floodwaters on the upstream side of the Wilsons River to be held up, with downstream remaining flood free (19). When the levee is overtopped, lower East Coraki, then Buckendoon and Green Forest floodplains in will fill.

c. In a 1% AEP flood (approx. 7.3m at the Coraki gauge), the majority of the Coraki township is classified as a H5 Hazard Classification, meaning it is considered unsafe for people and vehicles. The majority of the Coraki township is classified as floodway in this event (12).

2.3.4 Classification of Floodplain

a. For emergency management purposes, the Coraki sector can be further broken down into subsectors for floodplain classification in a PMF event, these classifications are as follows;

Table 9: Subsector Flood Emergency Response Classifications in the Coraki sector

Object ID	Subsector Name	Classification	Population Estimate	Dwelling Estimate	Vehicle Estimate
44393	Codrington A	Overland Escape	104	37	66
45193	Codrington B	Overland Access	74	31	56
44789	Coraki (West) A	Overland Escape Route	59	21	38
45630	Coraki A	Low Flood Island	425	188	338
45631	Coraki B	Low Flood Island	185	90	162
44819	Coraki C	High Flood Island	514	201	361
44825	Coraki Caravan Park and Foreshore	Low Flood Island	2	1	2
41622	Coraki E	Low Flood Island	71	23	41
41632	Coraki F	Low Flood Island	45	16	29
41980	Coraki G	Low Flood Island	34	14	25

2.3.5 Inundation

a. The Coraki gauge (203403 - 58175) is utilised in this sector.

b. Coraki is the most affected suburb for inundation to property in Richmond Valley at the most frequent modelled design flood event (5% AEP, or 7m at the Coraki gauge, with depths ranging from 0.25-4m (12). See table 10 below.

c. In both a 2% AEP event (7.14m at the Coraki gauge) and a 1% AEP event (7.3m at the Coraki gauge), properties in Coraki would be significantly affected, with large portions of the township inundated by depths of up to 2-4m (12).

d. At 3.2m at the Coraki gauge, just under the minor flood level, water reaches the top of the riverbank near Coraki Caravan Park. At 3.8m it reaches the crossroads inside the park, and water will be over Coraki-Ellangowan Rd between Springville Rd and the Coraki Cemetery (20).

e. 6m at the Coraki gauge is the approximate height the river begins to break out across Richmond Terrace at Allwood St, threatening low-lying adjacent properties.

f. Between 6-6.5m some rural properties are cut off from Coraki and Coraki-Woodburn Rd is closed to all vehicles, with approx. 12 rural properties at Swan Bay cut off from both Woodburn and Coraki.

g. At 7.01m at the Coraki Gauge the majority of Coraki would be inundated; including Coraki township and East Coraki in the Lismore LGA.

Table 10: Estimated number of properties inundated above habitable floor level in Coraki and east Coraki related to the Coraki MHL gauge (12)

Coraki Gauge Height (%AEP)	No. Properties with Over floor Flooding in Coraki and East Coraki
7m (5% AEP)	25
7.1m (2% AEP)	88
7.3m (1% AEP)	163
7.5m (0.2% AEP)	252
11m (PMF)	397

Table 11: Estimated number of properties inundated above habitable floor level in the Coraki Sector related to selected design flood event (12).

Design Event (%AEP)	No. Properties with Over floor Flooding in the Coraki Sector
5% AEP	28
2% AEP	92
1% AEP	170
0.2% AEP	269
PMF	433

2.3.6 Isolation

a. From the minor flood level of 3.8m at the Coraki gauge, some access roads may be inundated, such as Coraki-Ellangowan Rd between Springville Rd and the Coraki cemetery.

b. The Box Ridge community, located on the southwest side of Coraki, adjacent to the Coraki Golf Club, is isolated from Coraki by floodwaters on Kardinia St near Spring Street at a level of 3.73mAHD, this may occur at events more frequent than the most frequent modelled event of a 5%AEP. A 5% AEP event would see floodwaters reach 4.75mAHD at Kardinia St and 7m at the Coraki gauge.

c. At the major flood level of 5.7m at the Coraki gauge, some rural properties are cut off from Coraki and Coraki-Woodburn Rd is closed to all vehicles, and Coraki-Casino Rd is closed to all traffic by 6.5m.

d. Coraki becomes isolated by 6.55m at the Coraki gauge, with significant flooding occurring (20).

2.3.7 Flood Mitigation Systems

a. Whilst the Tuckurimba Levee is situated within the Lismore LGA, it provides protection to properties on the eastern side of the Wilsons River near Coraki, where

the Richmond Valley LGA borders the Lismore LGA. However, this also has an effect on the height of floodwaters to the west of the levee, causing increased peak levels in the town of Coraki. Until the levee is breached, floodwaters are prevented from flowing into the Tuckean Swamp to the east, bypassing Coraki (12).

b. Floodwaters from the Wilsons River break the riverbank at the Western end of Baxters Lane at 6.18m at the Tuckurimba Gauge (558076). This flow causes minor inundation of farmland through the Tuckean. Once this water reaches 6.58m the Tuckurimba levee will overtop, with the extent of flooding being dependent on the duration of overflow (21).

c. Major floodgates are located at the West Coraki Canal, which enters the Richmond River on its Western Bank and drains a large, low lying area from Codrington to the north, to the west of Coraki and south to Sandy Creek (15).

d. The Coraki Town drain acts to reduce inundation time after flooding, it services around 1.5km^2 of land within the village which includes residential dwellings, the main access routes of Queen Elizabeth Drive and access in and out of aged care and health facilities (22).

2.3.8 Dams

a. There are no identified downstream dam effects in the Coraki Sector.

2.3.9 At Risk Facilities

a. The facilities that are at risk of flooding and/or isolation within the Richmond Valley LGA including schools, childcare centres, hospitals, aged and infirm, infrastructure and caravan parks are shown in Annex 2.

2.3.10 Other Considerations

a. No additional considerations have been identified.

2.4 BUNGAWALBIN

2.4.1 Community Overview

a. The Bungawalbin Sector includes the larger settlement of Rappville, as well as numerous smaller settlements and areas of rural land.

b. Rappville is located south of Casino and to the West of Woodburn, and lies within the Bungawalbin Creek catchment, with Myrtle Creek, one of its main tributaries, passing through the southern aspect of the major area of settlement. The population of Rappville is approximately 142. It has 17.6% of the population under 15 years of age and 33% over 65. 12.7% of the population is Indigenous (3).

c. Other areas within the sector include Busbys Flat, Kippenduff, Six Mile Swamp, Mount Marsh, Clearfield, Camira, Whiporie, Myrtle Creek, Wyan, Ellangowan (part), Bora Ridge, Bungawalbin, West Bungawalbin, Tabbimoble and Gibberagee.

2.4.2 Characteristics of flooding

a. The Bungawalbin Creek catchment covers an area of approximately 1500km^2. Rainfall within the catchment can influence flooding in the Mid-Richmond area of Coraki, Woodburn and Broadwater (23).

b. Flooding in this sector occurs primarily from the Richmond River, Bungawalbin Creek and its tributaries.

2.4.3 Flood Behaviour

a. The Bungawalbin area serves as a major flood storage basin for the Richmond River. Floodwaters from the Bungawalbin are held until the water level in the Richmond River has receded sufficiently to allow the catchment to drain. In some flood events, flood waters from the Richmond may back up into the Bungawalbin (4).

b. The tidal extent of Bungawalbin Creek is more than 88km upstream from the river entrance.

2.4.4 Classification of Floodplain

a. For emergency management purposes, the Bungawalbin sector can be further broken down into subsectors for floodplain classification in a PMF event, these classifications are as follows;

Table 12: Subsector Flood Emergency Response Classifications in the Bungawalbin sector

Object ID	Subsector Name	Classification	Population Estimate	Dwelling Estimate	Vehicle Estimate
44389	Bungawalbin A	Overland Escape Route	150	54	97
44797	Bungawalbin (West)	Rising Road Access	173	83	149

2.4.5 Inundation

a. In the Bungawalbin sector, the Bungawalbin gauge (203450 - 58184) is utilised for forecasting and warning purposes (23), (24). Gauges also exist at Rappville (203030 – 558015) on Myrtle Creek.

b. Table 13 below shows the number of inundated properties expected for the range of design flood events in the Bungawalbin Sector. It should be noted that this table does not include data for Rappville. Bungawalbin (2 properties) and Bora Ridge (2 properties) begin to experience inundation of property at a 2% AEP event, with other areas such as Ellangowan, Myrtle Creek and Gibberagee experiencing some inundation of property in a 1%AEP.

Table 13: Estimated number of properties inundated above habitable floor level in the Bungawalbin Sector* related to selected design flood event (12).

Design Event (%AEP)	No. Properties with Over floor Flooding in the Bungawalbin Sector
5% AEP	0
2% AEP	4
1% AEP	12
0.2% AEP	21
PMF	60

Data may not capture all properties within the flood extent due to limitations in floor level database, should be used as a guide only.

2.4.6 Isolation

a. Rural properties in the vicinity of Bungawalbin, Bora Ridge and Boggy Creek are vulnerable to prolonged periods of isolation due to major flooding. This may begin to occur from 4.5m at the Bungawalbin gauge. By 5m at the gauge the levee will overtop, and inundation of rural areas will occur. Boggy Creek Rd, Ellangowan Rd and other local roads will close as a result of the overtopping, isolating rural properties (25).

b. Rappville is located on Myrtle Creek in the upper catchment of Bungawalbin Creek. Rappville becomes isolated by flood waters crossing Wyan Rd and Rappville Rd to the villages west and east respectively in minor to moderate flooding.

2.4.7 Flood Mitigation Systems

Table 14: Levees in Bungawalbin; summary of information

East Bungawalbin Levee	
Location	A historical earth levee in the Bungawalbin catchment area, the levee runs from downstream of the intersection of Moonem-New Italy Road and Bungawalbyn-Whiporie Road to opposite the entrance of Bora Creek.
Type of Levee (ring etc)	Partial earth levee.
Owner	Rous County Council has maintenance responsibility for this levee, however does not own it.
Design Height and freeboard	Not known. Historic earth levee
Overtopping Height	Overtopping occurs at approximately 4.5-5m at the Bungawalbin gauge.
No. of properties protected	The levee directly protects 15 residential properties along the eastern side of Bungawalbin Creek as well as maintains access for a further 89 properties. Access routes for the rural communities of Swan Bay and Bungawalbin.
Known low points	Before the levee is overtopped near Boggy Creek Rd, the land side of the levee has begun to fill with floodwaters from the Creek upstream. The first low point of the levee is upstream of the previous breaches at Boggy Creek Rd, and is the first area to inundate and block Bungawalbin-Whiporie Rd.
Location and sequence of inundation	Following initial overtopping upstream, Bungawalbin-Whiporie Rd, near its intersection with Boggy Creek Rd will overtop, resulting in filling of the Bungawalbin East floodplain and then the Swan Bay Basin area.
Consequences of levee overtopping or failure	Extensive inundation of the Boggy Creek area and closure of many local roads, including Boggy Creek Rd, Bungawalbin-Whiporie Rd and Reardons Lane. The duration of inundation following a breach or levee failure will be of greater duration than a levee overtopping in a major flood.
Deficiencies	The levee has previously breached upstream of Boggy Creek Rd. In the area where the breaches occurred, Bungawalbin Creek runs close to the levee and the creek bank has continued to slump, including the section of rock armouring. This leaves the levee vulnerable to further breaches.

a. Floodgates are operated by Rous County Council at the natural break out point for floodwaters at the junction of Boggy Creek and Bungawalbin Creek. Two pipes are located through the Bungawalbin eastern levee and floodgated on the downstream side. The sluice window can be lowered before flood events to protect upstream areas from riverine inundation (26)

b. There are a number of small historic earth levees along Sandy Creek and the western side of Bungawalbin Creek at Bora Ridge. One levee joins high ground on Springville Road to the natural levee on Sandy Creek, another joins high ground on Haughwoods Road to a series of levees along the west side of Bungawalbin Creek downstream from opposite Boggy Creek Road.

2.4.8 Dams

a. There are no identified downstream dam effects in the Bungawalbin sector.

2.4.9 At Risk Facilities

a. The facilities that are at risk of flooding and/or isolation within the Richmond Valley LGA including schools, childcare centres, hospitals, aged and infirm, infrastructure and caravan parks are shown in Annex 2.

2.4.10 Other Considerations

a. No additional considerations have been identified within this sector.

2.5 WOODBURN

2.5.1 Community Overview

a. The Woodburn sector includes the larger townships of Woodburn and Evans Head, as well as numerous smaller settlements and areas of rural land.

b. In the mid-Richmond area, the Richmond River continues south downstream of Coraki until it meets Bungawalbin Creek, a major tributary. The Richmond River then continues in a south easterly direction to Woodburn, where it turns and flows north easterly passing Broadwater and then into the Ballina Shire where it meets the ocean (10).

c. **Woodburn** is located on the banks of the Richmond River, where the Richmond Valley LGA borders with Lismore. North Woodburn is located within the Lismore LGA, with the main settlement of Woodburn located within the Richmond Valley Council area. The population of the suburb of Woodburn within the bounds of the Richmond Valley Council area is approximately 743. It has 18.6% of the population under 15 years of age and 17.8% over 65. 5.5% of the population is Indigenous (27).

d. **Evans Head** is a coastal town, located at the mouth of the Evans River, on the eastern side of the Richmond Valley LGA (14). The population of Evans Head is approximately 2907. It has 14.5% of the population under 15 years of age and 30.5% over 65. 5.6% of the population is Indigenous (28).

2.5.2 Characteristics of Flooding

a. **Woodburn:** At Woodburn, Richmond River floods generally result in the largest flood levels, however, floodwater generated within the Bungawalbin catchment can impact on communities in the Woodburn area in advance of Richmond flooding. Furthermore, a significant, isolated rainfall event over the Bungawalbin catchment has the potential to cause flooding at Woodburn, however due to a sparse network of gauges in the Bungawalbin catchment, the hydrology is poorly understood (23).

b. **Evans Head:** Evans Head may be affected by Evans River flooding. There are three potential sources of flooding along the Evans River. Most flood events in the Evans River catchment will involve a combination of these sources.

   i. Local catchment runoff caused by high intensity, short duration rainfall causing localised flooding.

   ii. Storm surge events caused by tropical cyclones or low-pressure systems resulting in flooding of low-lying areas.

   iii. Richmond River overflow as floodwaters in the Richmond River and Rocky Mouth Creek cause overtopping of the Tuckombil Canal Fixed Weir, causing levels in the Evans River to rise (6).

2.5.3 Flood Behaviour

a. **Woodburn:** In a 5% AEP event, peak flood velocities in the Woodburn township range from <0.2m/s to 0.5m/s, with depths ranging from <0.25m to 1-2m.

b. In a modelled 1% AEP event, flood function in the majority of Woodburn is floodway, with flood depths of 2-4m (12).

c. **Evans Head:** The floodplains of the Richmond and Evans Rivers are linked, and during floods the Evans River receives floodwater from the Richmond via defined waterways and overland flow. The Evans River provides a shorter flowpath for floodwaters to drain from the Mid-Richmond basin to the Pacific Ocean at Evans Head (6). The Tuckombil Canal provides a formalised connection between the two rivers, via Rocky Mouth Creek.

d. In the Evans River catchment, the approximate travel time of a significant flood peak (of a 1% AEP magnitude) between the Tuckombil Canal Fixed Weir and Evans Head is around 5 hours (6).

e. **Rocky Mouth Creek-** Peak flood levels at Rocky mouth Creek, which will then enter the Tuckombil Canal are driven by backwater from the Richmond River as well as breakout flow from Bungawalbin Creek (12).

2.5.4 Classification of Floodplain

a. For emergency management purposes, the Woodburn sector can be further broken down into subsectors for floodplain classification in a PMF event, these classifications are as follows;

Table 15: Subsector Flood Emergency Response Classifications in the Woodburn sector

Object ID	Subsector Name	Classification	Population Estimate	Dwelling Estimate	Vehicle Estimate
41642	Doonbah A	Rising road access	2	1	2
42427	Doonbah B	Low Flood Island	76	46	83
46011	Evans Head B	High Flood Island	611	320	58
44798	Evans Head C	Rising Road Access	617	371	668
46012	Evens Head A	High Flood Island	1964	1274	2293
44799	New Italy	Overland Escape Route	N/A	N/A	
43187	Swan Bay A	Low Flood Island	52	18	32
44388	Swan Bay B	Overland Escape Route	256	89	160
41991	Woodburn A	Low flood island	496	214	385
41992	Woodburn B	Low flood island	76	35	63
41993	Woodburn C	High Flood Island	N/A	N/A	
46014	Woodburn D	Low Flood Island	21	17	30
41996	Woodburn E	Low Flood Island	12	5	9
41999	Woodburn G	Flooded 5%AEP	29	13	23

42001	Woodburn I	Overland Escape Route	46	18	32
42002	Woodburn J	Low Flood Island	41	16	29
42004	Woodburn K	Overland Escape Route	3	1	2
44800	Woodburn L	High Flood Island	N/A	N/A	

2.5.5 Inundation

a. The Woodburn gauge (203412 – 58061) is utilised in this sector (23).

b. The number of properties expected to be inundated above habitable floor level for various flood heights are shown in Table 16. Woodburn is the suburb most affected by the most frequently modelled event within this sector (5% AEP).

c. Swan Bay may experience inundation of property from a 5%AEP flood event (approximately 1 property). In a 1% AEP event, this increases to approximately 17 properties in Swan Bay and 8 properties in Doonbah (12).

d. **Woodburn:** At 3.4m on the Woodburn gauge, some roads may begin to close, including the Woodburn-Coraki Rd, at its low point halfway between Woodburn and Coraki (29).

e. At 3.95m water begins to inundate the hall in River St, and flows across the Woodburn to Kilgin Rd in North Woodburn, inundating the lower levels of 6-7 elevated houses in Banks St. By this height, many rural areas are already affected by inundation or isolation, including Boggy Creek, Swan Bay and properties along Bungawalbin-Whiporie Rd.

f. At 4m, water flows into the northern end of Banks St, closing Bilgin Rd in North Woodburn.

g. At 4.12m water crosses Sussex St and flows under raised sections of houses in northern sections of Woodburn. At 4.14m, Rocky Mount Creek breaks its banks and inundates lower areas under houses in Southern Woodburn around the cemetery.

h. At major flood height of 4.2m, the majority of elevated houses in Woodburn will have water in the lower levels.

i. At 4.32m the Memorial Hall experiences over-floor flooding, and by 4.4m approximately 20 houses and businesses along River St are flooded. By 5.12m approximately 90% of Woodburn is inundated.

j. The 2022 flooding peaked at 7.17m at the Woodburn gauge, causing significant property damage throughout the area.

k. **Evans Head:** Up to a modelled 1% AEP event, the majority of Evans Head township is outside the flood extent. Low lying areas of Evans head including the harbour, Ocean Drive and Bundjalung Rd may experience inundation from this event.

l. Inundation of property in Evans Head is not modelled to occur until a 1% AEP event (2 properties). In a 0.2% AEP event, 14 properties are expected to experience above floor inundation, and up to 33 properties may be impacted in a PMF (12).

m. Inundation in the Evans Head area will be influenced by tides. Storm surge is a risk for the township of Evans Head, however the majority of the township is above the 1% AEP storm surge level (6).

Table 16: Estimated number of properties inundated above habitable floor level in Woodburn township related to the Woodburn gauge (12)

Woodburn Gauge Height (m)	No. Properties with Over floor Flooding in Woodburn
4.4m (5% AEP)	15
5m (2% AEP)	63
5.6m (1% AEP)	131
6.7m (0.2% AEP)	262
10.8m (PMF)	300

Table 17: Estimated number of properties inundated above habitable floor level in the Woodburn Sector related to selected design flood events (12)

Design Flood Event (%AEP)	No. Properties with Over floor Flooding in the Woodburn Sector
5% AEP	16
2% AEP	72
1% AEP	158
0.2% AEP	339
PMF	437

2.5.6 Isolation

a. **Woodburn-** It is estimated that approximately 90% of Woodburn will be completely isolated at flood heights corresponding to 5.07m on the Woodburn Gauge.

b. In a modelled 5% AEP event, equivalent to 4.4m at the Woodburn Gauge, flood depths affecting main access routes for Woodburn range from 0.3m to >1m (12). This includes Woodburn-Coraki Rd, Tuckurimba Rd and Woodburn-Evans Head Rd.

c. Communities to the south and south-west of Woodburn, including New Italy and Swan Bay may experience isolation. This may begin to occur from 3.7-3.95m at the Woodburn gauge.

2.5.7 Flood Mitigation Systems

a. Major floodgates are located at Skinners Canal, Rocky Mouth Creek and the Woodburn Town Drain. Smaller gated drains and canals in the sector are Yorks Drain, Wagners Canal and Langs Hill Canal.

b. The Swan Bay levee along with Reardons, Thearles and Campbells canals service roughly 20km^2 of land that is used agriculturally to grow sugar cane, tea tree, pecans and graze cattle. The infrastructure services around 10 residential dwellings and protects vehicle access to the Swan Bay residential estate which has more than 52 residential dwellings. The network of infrastructure protects major transport and evacuation routes of Reardons Lane, Swan-Bay New Italy Road and Coraki-Woodburn Road. The Swan Bay levee and canals protect the area from minor and moderate flooding and reduces the length of inundation after flooding. The infrastructure delivers both economic and social benefits by minimising damage to agriculture and increasing the safety of people living in the area (30). The height of the levee is estimated at 2.5-5mAHD based on LIDAR data.

c. The Tuckombil Canal levee is a historical earth levee along the Tuckombil Canal in the upper reach of the Evans River, along both sides of the canal but continuing along the north bank to Golf Links Road. Its height ranges from 3.8mAHD at Golf Links Rd, Doonbah, to 4mAHD at the canal.

d. The upstream Tuckurimba Levee can help protect Coraki and Broadwater in smaller flooding events, as until the levee is overtopped, it prevents floodwaters from flowing into the Tuckean Swamp (12).

2.5.8 Dams

a. No consequences of dam failure identified.

2.5.9 At Risk Facilities

a. The facilities that are at risk of flooding and/or isolation within the Richmond Valley LGA including schools, childcare centres, hospitals, aged and infirm, infrastructure and caravan parks are shown in Annex 2.

2.5.10 Other Considerations

a. The population in the coastal town of Evans Head is estimated to increase by an additional 50% during peak holiday periods (1).

2.6 BROADWATER

2.6.1 Community Overview

a. The Broadwater Sector includes the larger township of Broadwater as well as Rileys Hill to the west.

b. In the Broadwater sector, the Richmond River passes Woodburn and flows north easterly, passing Broadwater, and then into the Ballina Shire where it meets the ocean (10).

c. Broadwater is located at the north-eastern border of the Richmond Valley LGA boundary, where there is a natural constriction in the River and floodplain (5). The population of Broadwater is approximately 524. It has 16% of the population under 15 years of age and 24.4% over 65. 4.2% of the population is Indigenous (31).

d. Rileys Hill has a population of approximately 181. It has 21.5% of the population under 15 years of age and 26% over 65. 9.9% of the population is Indigenous.

2.6.2 Characteristics of Flooding

a. Flooding in Broadwater can be the result of Richmond River, local catchment or ocean storm tide dominated flood, or a combination of the three.

2.6.3 Flood Behaviour

a. At Broadwater, water can enter the Tuckean Broadwater after waters break the length of the levee in the upper-Richmond area, the Tuckean Swamp and the large floodplain then starts to fill. Water then flows out the Bagotville Barrage into the Tuckean Broadwater and downstream. A series of one-way floodgates exist to provide one way drainage from the Tuckean Swamp.

b. Flood flow times between Woodburn and Broadwater can range between 5-20 hours depending on flood conditions and tidal conditions.

2.6.4 Classification of Floodplain

a. For emergency management purposes, Broadwater sector can be further broken down into subsectors for floodplain classification in a PMF event, these classifications are as follows;

Table 18: Subsector Flood Emergency Response Classifications in the Woodburn sector

Object ID	Subsector Name	Classification	Population Estimate	Dwelling Estimate	Vehicle Estimate
41627	Broadwater A	Low Flood Island	209	157	282
41636	Broadwater B	Low Flood Island	153	78	140
41629	Broadwater C	Low Flood Island	81	44	79
41981	Broadwater E	Rising Road Access	3	3	5

42415	Broadwater East	Overland Escape Route	12	7	13
46437	Broadwater East A	Low Flood Island	21	11	20
42416	Broadwater Headland	High Flood Island	5	2	3
42417	Broadwater National Park	Rising Road Access	N/A	N/A	
41628	Broadwater Quarry A	High Flood Island	N/A	N/A	
41635	Rileys Hill A	Low Flood Island	16	7	12
41637	Rileys Hill C	Low Flood Island	122	56	100

2.6.5 Inundation

a. In the Broadwater sector, the Broadwater gauge (203415) may provide flood intelligence, however it is not a Bureau of Meteorology forecasting or warning. Upstream gauges at Bungawalbin (203450 – 58184) and Woodburn (203412 – 58061) may be utilised for warning purposes (23). Gauges also exist at Rocky Mouth Creek (203432 – 558054) and Evans Head (203462 – 558048) (12).

b. The number of properties expected to be inundated above habitable floor level for various flood heights are shown in Table 19 (12).

c. At 3m at the Broadwater gauge, the river begins to break the banks along Wharf St between Mathers Lane in the south and Rattle Creek in the north. Water begins to fill the lower basin area of the township between the old Pacific Highway and Cooks Hill (32).

d. Between 3.2-3.3m at the Broadwater gauge, Rileys Hill Rd becomes impassable both north and south of Rileys Hill, resulting in approximately 200 people being isolated.

e. 3.3m at the Broadwater gauge is the approximate height at which Evans Head Broadwater Rd may close east of Sunrise Caravan Park, resulting in the closure of the last road out of Broadwater.

f. At 3.63m at the Broadwater gauge, approximately 16 properties will be impacted by inundation, these are located along Fisher St, Fletcher St, Byrnes St and George Street.

g. At 4.33m at the Broadwater gauge the majority of Broadwater is impacted, with approximately 75-78 properties inundated around Rileys Hill Rd, Pitt St, Little Pitt St, George St and Wharf St.

h. 4.86 at the Broadwater gauge is the height at which the Broadwater SES Unit begins to be inundated, and 5.13m is the floor height of the Broadwater Community Centre, which is a listed evacuation centre.

i. 6.04m at the Broadwater gauge would see 150-180 properties in Broadwater inundated above floor.

Table 19: Estimated number of properties inundated above habitable floor level in the Broadwater sector related to selected design flood events (12)

Design Flood Event (%AEP)	No. Properties with Over floor Flooding in the Broadwater sector
5% AEP	3
2% AEP	81
1% AEP	124
0.2% AEP	192
PMF	225

2.6.6 Isolation

a. Multiple road closures may occur causing isolation in areas of Broadwater. There are multiple road closure points along Rileys Hill Rd, and Broadwater-Evans Head road may experience closure at approximately 2.8mAHD, causing loss of potential evacuation routes.

b. Disruption to access by main arterial roads in and out of Broadwater becomes significant from a 2% AEP event (equivalent to 4.3m at the Broadwater Gauge). Depths of flooding range from 0.3m to >1m over Paringa Drive, Blackwall Drive and parts of the Pacific Motorway (12).

2.6.7 Flood Mitigation Systems

a. Other major floodgates are located at the West Coraki Canal, Skinners Canal, Rocky Mouth Creek and the Woodburn Town Drain. Smaller gated drains and canals exist at Seelem Canal, Bora Ridge Canal, Ian Robinsons Drain, Campbells Canal, Yorks Drain, Bungawalbin Hall Canal, Wagners Canal, Langs Hill Canal, McDonalds Creek, Rileys Hill Canal, Eversons Creek and Andersons Gully.

b. The upstream Tuckurimba Levee may help protect Coraki and Broadwater in smaller flooding events, as until the levee is overtopped, it prevents floodwaters from flowing into the Tuckean Swamp (12).

2.6.8 Dams

a. No consequences of dam failure identified in the Broadwater sector.

2.6.9 At Risk Facilities

a. The facilities that are at risk of flooding and/or isolation within the Richmond Valley LGA including schools, childcare centres, hospitals, aged and infirm, infrastructure and caravan parks are shown in Annex 2.

2.6.10 Other Considerations

a. No additional considerations have been identified in this sector.

ROAD CLOSURES AND ISOLATED COMMUNITIES

2.7 ROAD CLOSURES

a. Table 20 lists roads liable to flooding in the Richmond Valley LGA. Road locations are shown on Maps 3-8; Richmond Valley Town Maps.

b. In an event corresponding to a 5% AEP, there would be significant disruptions with many localised stretches of roads being inundated. By a 1% AEP flood, the majority of key roads in the LGA are affected by deep inundation of a depth greater than one metre (12).

c. It is important to note many roads may close due to localised rainfall events independent of riverine flooding.

Table 20: Roads liable to flooding in Richmond Valley LGA.

Road	Closure location	Consequence of closure	Alternate Route	Indicative gauge and/or design height
Casino				
Casino-Coraki Road	Tatham	Access between Casino and Coraki is cut off	Nil. Coraki Rd-Bruxner Highway also affected.	Occurs prior to a 5% AEP (13.88m at Casino Bridge gauge 203907)
Casino-Coraki Road	Near Oaky Creek	Access between Casino and Coraki is cut off	Coraki Rd-Bruxner Highway	From approx. 14m at the Casino Bridge gauge 203907 (17)
Casino-Coraki Road	North of Coraki	Access between Casino and Coraki is cut off	Coraki Rd-Bruxner Highway	6.5m at the Coraki gauge (203403)
Johnston St	Near Walker St/ Casino Roadhouse	Affects access out of Low lying areas to the east of Casino	Local roads may be able to be used as alternate route	17.2m at the Casino telemetered gauge (203004)
Bruxner Highway	Near Black Gully and Sextonville Rd	Affects access in and out of Casino to the West.	Nil	Approx 5%AEP (13.88m at Casino Bridge gauge 203907)
Summerland Way	South of Casino near Ellangowan Rd	Affects access in and out of Casino from the south.	Nil	Occurs prior to a 5%AEP event (13.88m at Casino

				Bridge gauge 203907)
Summerland Way	North of Casino at Lagoon Creek Bridge	Affects access in and out of Casino from the north.	Other local roads may also experience inundation.	Bridge deck is approx. 35.9mAHD.
Centre St	Between Hare St and Johnston St	May affect access within Casino Township	Local roads may be utilised	Occurs prior to 15.41m at the Casino Bridge Gauge (203907)
Coraki				
Queen Elizabeth Drive	Near Yabsley St, Coraki	May affect access in and out of Coraki to the North	Nil	4.4mAHD
Coraki-Ellangowan Rd	Between Coraki Cemetery and Springville Rd	Isolates rural properties to the west from Coraki	Nil	3.8m at the Coraki gauge (203403)
Queen Elizabeth Drive	Between Allwood and Grenfell Streets, Coraki	May affect access in and out of Coraki	Nil	3.8mAHD
Adams Street	Between Parkes and Martin Streets, Coraki	May affect access from the eastern to western side of Coraki.	Other local roads may be used, however may also be vulnerable to closure.	6mAHD
East Coraki Bridge	Access to East Coraki Bridge via Ferry Rd/East Coraki Rd	Access between East Coraki and Coraki may be affected.	Nil	5.2mAHD
Woodburn Coraki Road	Multiple locations	Access between Woodburn and Coraki/Casino is cut off.	Oakland Rd until access to east Coraki bridge is closed.	Large stretches inundated in a 5% AEP event. Closed to all vehicles between 6-6.5m at the Coraki gauge (203403).
Woodburn/ Broadwater				
River St	Near Court St (Woodburn Bridge)	Access to Woodburn bridge is lost.	Nil	3.014mAHD
River St	Richmond St intersection, Woodburn	Access out of Broadwater may be lost.	Nil	3.05m at the Woodburn gauge (203412)
Rileys Hill Rd	Multiple locations either side of Rileys Hill	Rileys Hill becomes isolated	Nil	3.2-3.3m at the Broadwater

				Gauge (203415)
Woodburn Evans Head Rd	May be multiple closure points between River St and Pacific Motorway, and Near Woodburn-Evans Head Golf Club	Access from Woodburn towards Evans Head may be lost.	Nil	Closure occurs before a 5%AEP (4.4m at the Woodburn gauge 203412). May close earlier due to localised rainfall.
Broadwater Rd	Broadwater Bridge	Access over Richmond River via Broadwater bridge is lost	-	-
Broadwater Evans Head Rd	Near George St	Access to Evans Head in the south may be cut off	Nil.	Approx 3.3m at the Broadwater Gauge (203415).
Pacific Highway	South of Tuckombil Canal	Access out of Woodburn may be affected.	-	Closure occurs by 2% AEP (5m at the Woodburn Gauge 203412)
Pacific Highway	To the East of Woodburn	Access between Woodburn and Broadwater may be lost	River St/Langs way would also be cut off.	Closure occurs by 2% AEP (5m at the Woodburn Gauge 203412)

2.8 SUMMARY OF ISOLATED COMMUNITIES AND PROPERTIES

a. Table 21 lists communities liable to isolation and potential periods of isolation. Information presented here is based on historical data and modelled events and does not reflect the duration of isolation expected in larger and extreme events.

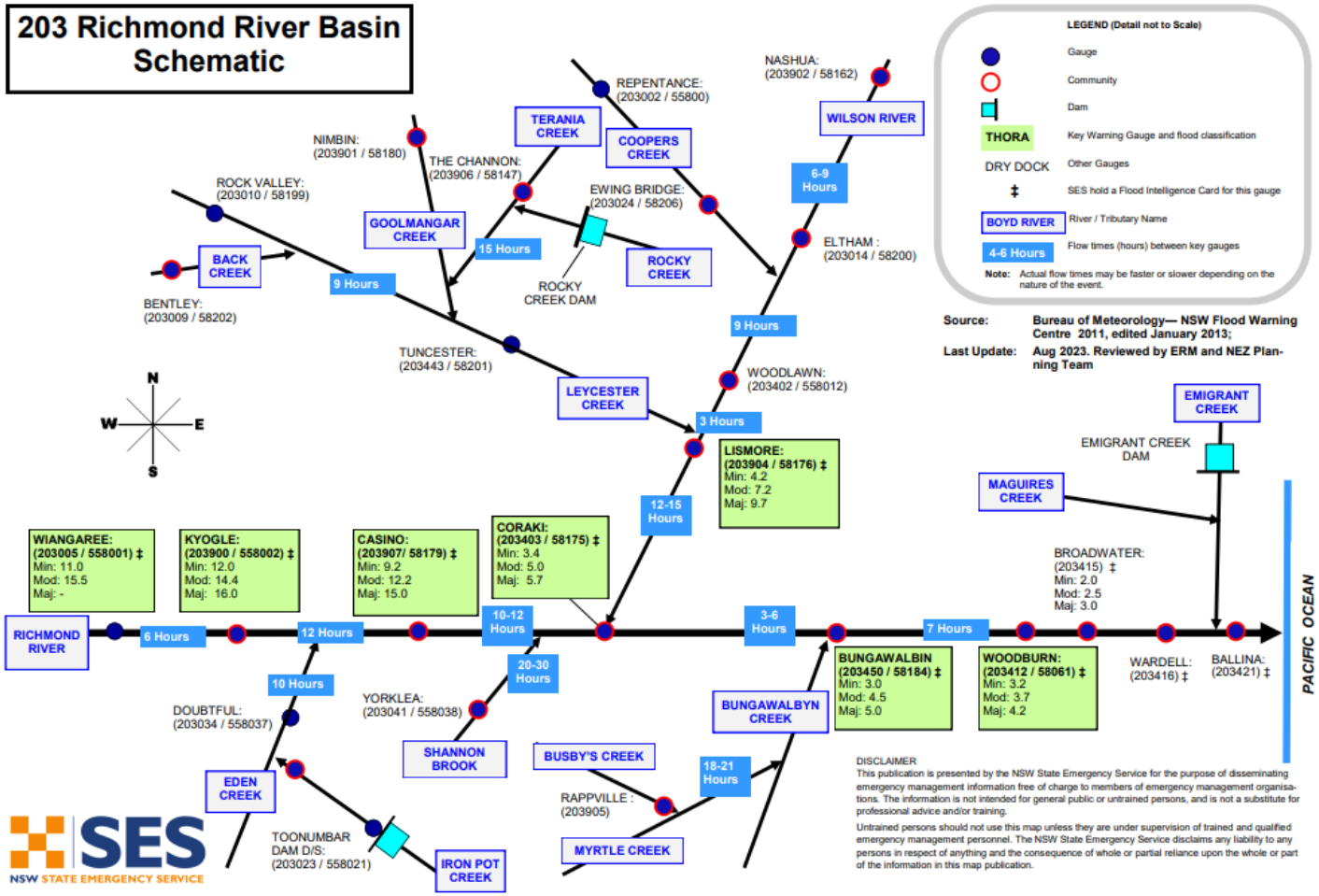
b. Multiple communities within the Richmond Valley may be vulnerable to isolation as a result of flooding.

Table 21: Potential Periods of Isolation for communities in the Richmond Valley LGA during a Major flood.

Town / Area (River Basin)	Population/ Dwellings	Flood Affect Classification	Approximate period isolation	Days								NOTES
				1	2	3	4	5	6	7	8	
Casino	9968pp, 4561 dwellings	Most parts of Casino have rising road access	0-2 days									
Coraki	1155 pp, 480 dwellings	Low Flood Island	2-7 days									2-7 days over major flood level, at which most roads would be cut. Resupply via helicopter or boat may be required.
Woodburn	678pp, 294 dwellings	Low Flood Island	0-5 days									0-5+ days over major flood level. At 4.3mAHD 90% of Woodburn would be isolated. Resupply via helicopter or boat may be required.
Broadwater	524pp, 258 dwellings	Low Flood Island	5-7 days									Resupply via helicopter or boat may be required.
Rileys Hill	181pp, 73 dwellings	Low Flood Island	5-7 days									Resupply via helicopter or boat may be required.
Swan Bay	Swan Bay 357pp, 121 dwellings	Low Flood Island	3-5 days									Isolation can occur after Bungawalbin levee overtops.
New Italy	249pp, 105 dwellings	Overland Escape Route	3-5 days									Isolation can occur after Bungawalbin levee overtops.
Rappville	87pp, 36 dwellings	High Flood Island	2-7 days									Rural areas outside the village area may experience longer periods of isolation.
Bungawalbin & Bora Ridge	150pp, 54 dwellings	Overland Escape Route	5 days to 2+ weeks									Rural properties can experience long term isolation after major flooding. (1-2 weeks or more)

Note: Periods of isolation are a guide only. Liaison with the Local Commander and communities/residents involved is essential during periods of potential and actual isolation.

ANNEX 1: RICHMOND RIVER BASIN SCHEMATIC



ANNEX 2: FACILITIES AT RISK OF FLOODING AND/OR ISOLATION

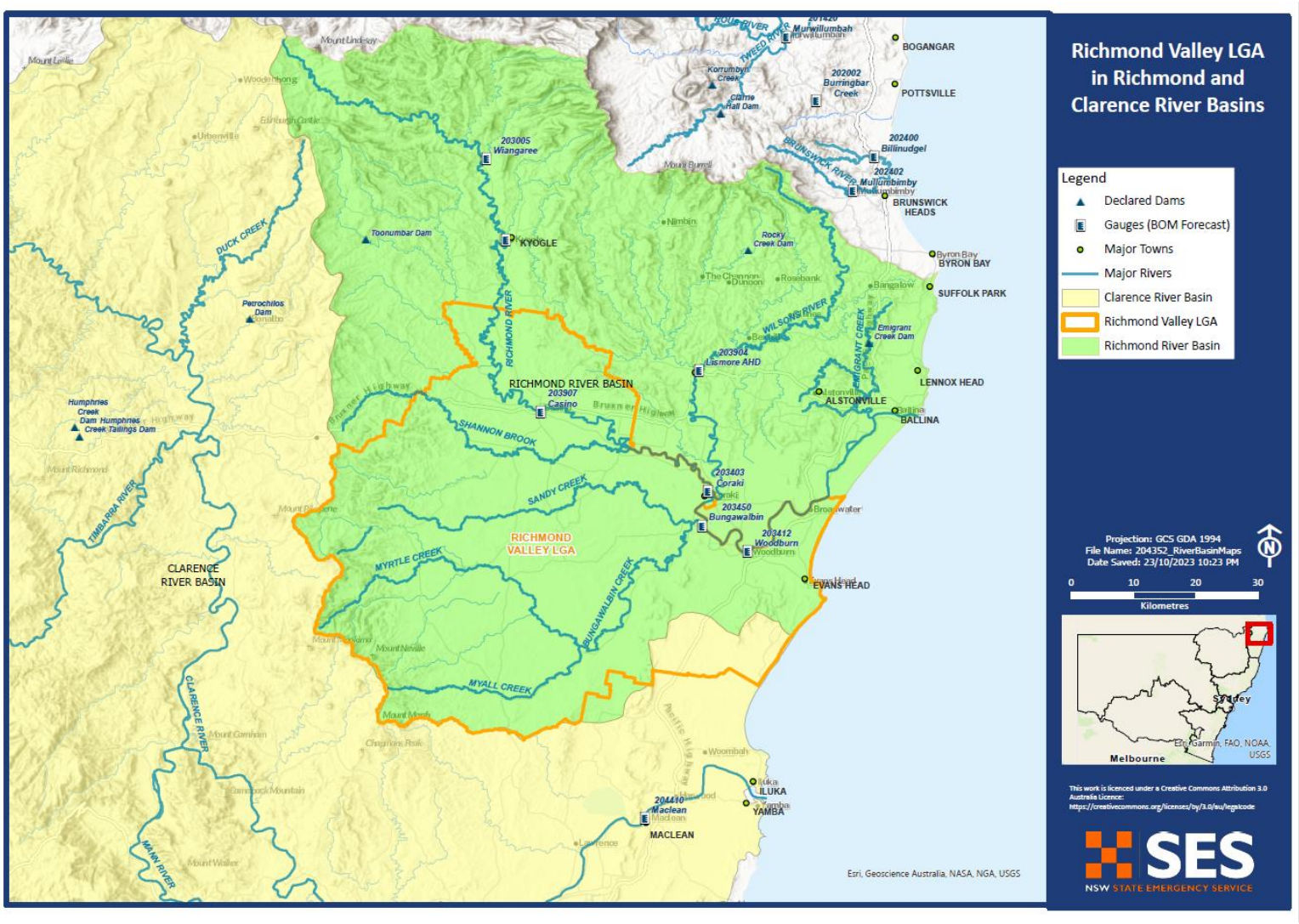
Richmond Valley

Facility Name	Street	Suburb	Comment
Schools			
*Broadwater Public School	Pacific Highway	Broadwater	45 students, 3 staff. Is a Low Flood Island, may experience inundation. *Destroyed in 2022 flood events, currently relocated to Evans Head
St Mary's Catholic College	Canterbury Street	Casino	379 students, 60 staff. Has Rising Road Access to the north, may experience inundation.
Casino Public School	31 Walker St	Casino	685 students, 52 staff. Has Rising Road Access to the north, may experience inundation.
Casino West Public School & Outside School Care	84A Hotham St	Casino	227 students, 22 staff. Has Rising Road Access, may experience inundation in an extreme flood.
St Mary's Primary School Casino	Centre St	Casino	421 students, 40 staff. Has Rising Road Access to the north, may experience inundation.
Woodburn Public School and Outside School Care	20-32 Woodburn St	Woodburn	125 students, 11 staff. Is located at a Low Flood Island, may experience inundation.
St Joseph's Primary School	20 Coraki Rd	Woodburn	159 students, 22 staff. Is located on a Low Flood Island, may experience inundation.
Coraki Public School	50 Adams St	Coraki	94 students, 9 staff. Is located on a High Flood island, may be isolated, may experience some inundation. Floor level 7.54mAHD.
St Josephs Primary School	Adams St	Coraki	77 students, 14 staff. . Is located on a High Flood island, may be isolated, may experience some inundation.
Leeville Public School	9375 Summerland Way	Leeville	50 students, 5 staff. May experience inundation, has overland access.
Rappville Public School	5-7 Lyons St	Rappville	Schools grounds may experience inundation.

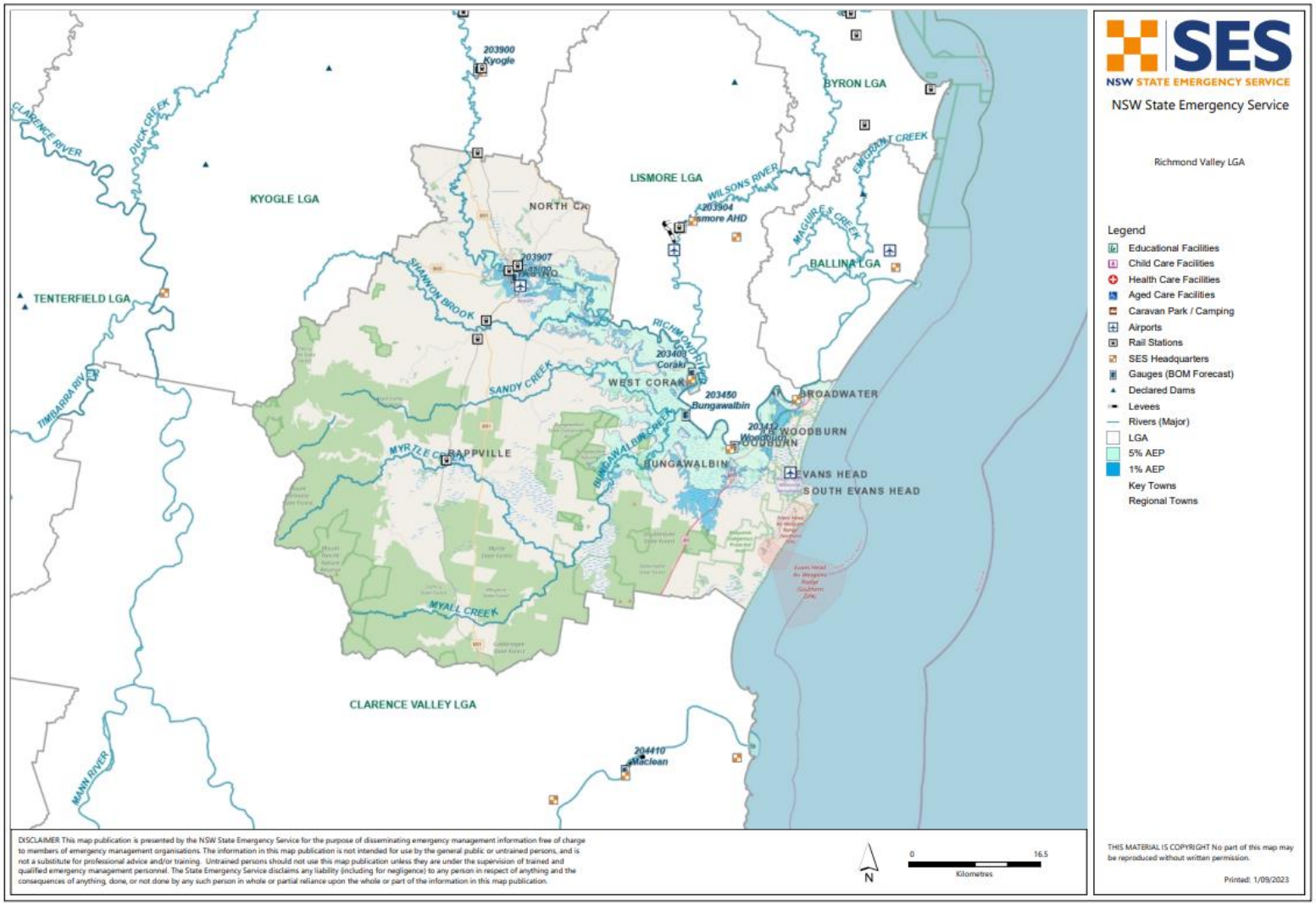
Child Care Centres			
Kookaburra Early Learning	108 Johnston St	Casino	71 children, 20 staff. Is located on a Low Flood Island, may experience inundation.
St Mary's Community Preschool	57 North St	Casino	40 children, 9 staff. Has Rising Road Access to the north, may experience inundation.
Baptist Church Casino Christian Community Preschool	137 Canterbury Rd	Casino	60 children, 12 staff. Has Rising Road Access to the north, may experience inundation.
Casino Early Intervention/ Jumbunna Community Preschool	60 High St	Casino	59 children, 15 staff. Rising Road Access, may experience inundation in an extreme event.
Casino Public School Djanangum Preschool	River St	Casino	May experience inundation.
CWA Preschool Coraki	Richmond Terrace	Coraki	25 children, 5 staff. Is located on a High Flood Island, may experience isolation or inundation in rarer events.
Woodburn-Evans Head Preschool Woodburn	Woodburn St	Woodburn	25 children, 7 staff. Is located on a Low Flood Island, may experience inundation.
Bentley Community Preschool	Bentley Rd	Bentley	May experience inundation or isolation.
Facilities for the aged and/or infirm			
Casino & District Memorial Hospital and Ambulance Station	Hotham/ Canterbury St	Casino	29 acute beds, 7 emergency beds. Has rising road access to the north and west, however and grounds may be inundated in a PMF.
Coraki Campbell Health One	Surry St	Coraki	Can be a High Flood Island, may become isolated.
Southern Cross Care – St Michaels Residential Aged care	62 Centre St	South Casino	73 residents, 28 staff. May become a High Flood Island, experience isolation.
The Whiddon Group Community care	24 Gitana St	Casino	64 residents, 25 staff. Has Rising Road Access to the north and west, may experience inundation. Adjoins Casino hospital.
UPA Richmond Lodge	67 Barker St	Casino	30 residents, 20 staff. Has Rising Road Access to the north, may experience inundation.
Baptist care Mid-Richmond Centre	Surry St	Coraki	49 residents, 20 staff. May become a High Flood Island, experience isolation.

Utilities and infrastructure			
Coraki Sewage Treatment Plant		Coraki	May experience inundation
Rileys Hills Sewage Treatment Plant		Coraki	May experience inundation
Casino Sewage Treatment Plant	Spring Grove Rd	Casino	May experience inundation
Essential Energy – Casino Depot	Swanson Lane	South Casino	May experience inundation
Casino Telephone Exchange	Simpsons Pde	Casino	May experience inundation from 24-24.5mAHD
Casino Sub-station	Ellangowan Rd	Casino	May experience inundation in events less frequent than 1% AEP
Woodburn Fibre Access Node	Wagner St	Woodburn	Is located on a Low flood Island in larger events and becomes isolated in more frequent events. Relies upon battery backup when mains power is lost for extended period.
Mckees Hill Substation	Cnr Rogersons Rd & Coopers Rd	Casino	
Broadwater Telecommunications Tower	Quarry rd	Broadwater	
New Italy Telecommunications Tower	Reardons Lane	New Italy	
Camping Ground / Caravan Parks			
Broadwater Sunrise Caravan Park	8 Broadwater-Evans Head Rd	Broadwater	Is located on a Low Flood Island, may experience inundation in larger flood events.
Broadwater Stop Over Tourist Park	1-5 Pacific Highway	Broadwater	Is located on a Low Flood Island, may experience inundation in larger flood events..
Coraki Caravan Park	81 Richmond Terrace	Coraki	Is located on a Low Flood Island, may experience inundation.
Casino Showground	Summerland Way	Casino	Becomes a Low Flood Island, may experience inundation.
Discovery Parks Casino	115 Johnston St	Casino	Is located on a Low Flood Island, may experience inundation.
Big 4 Casino Resort	69 Light St	Casino	Has an overland escape route, may experience inundation in a PMF.
Browns Caravan Park	58-60 Hare St	Casino	Has Rising Road Access to the east, may experience inundation in a PMF.
Riverside Village	570 Woodburn – Evans Head Rd	Evans Head	Has Rising Road Access, may experience inundation.

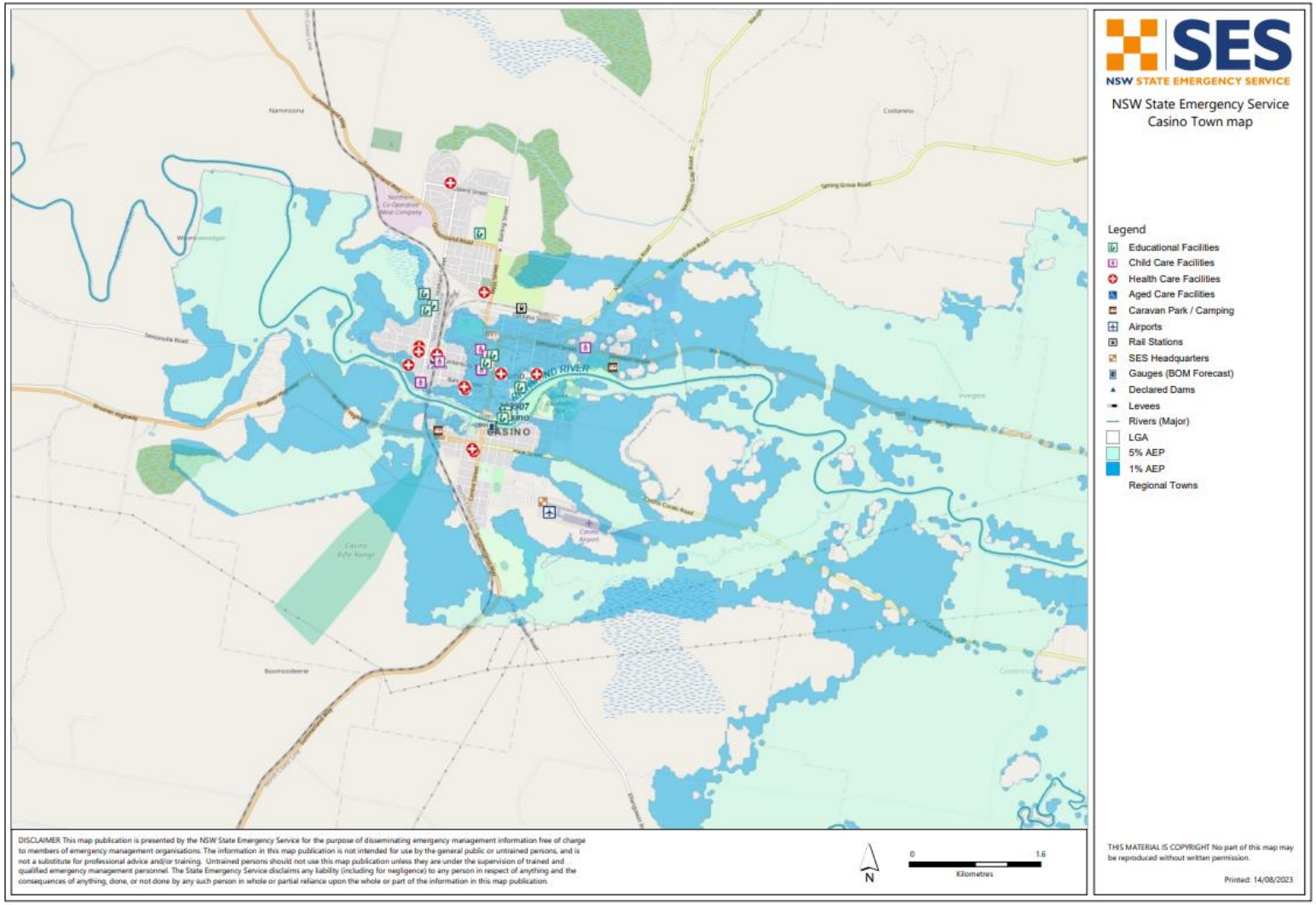
MAP 1: RICHMOND AND CLARENCE RIVER BASINS



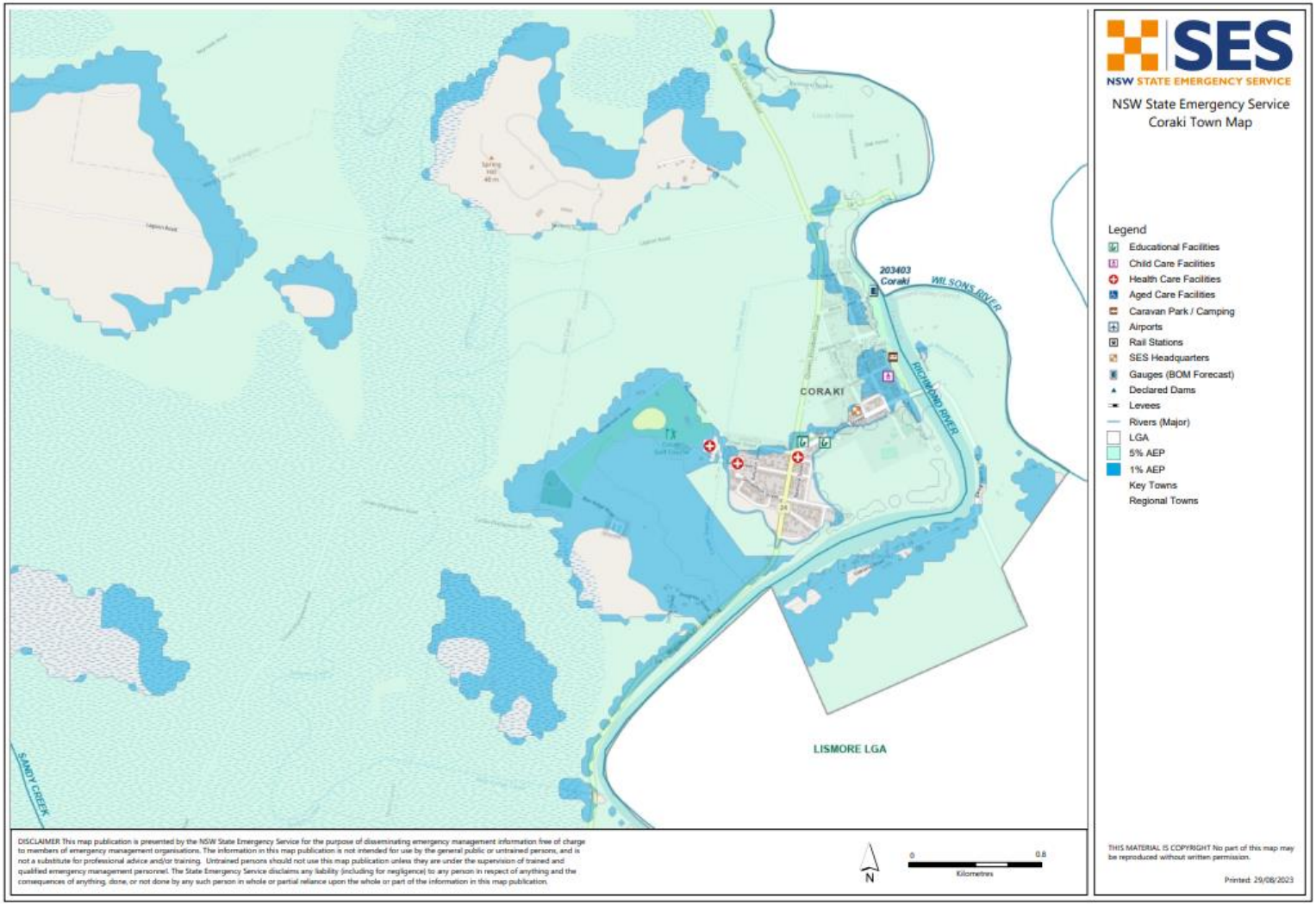
MAP 2: RICHMOND VALLEY LGA TOWN MAP



MAP 3: CASINO TOWN MAP

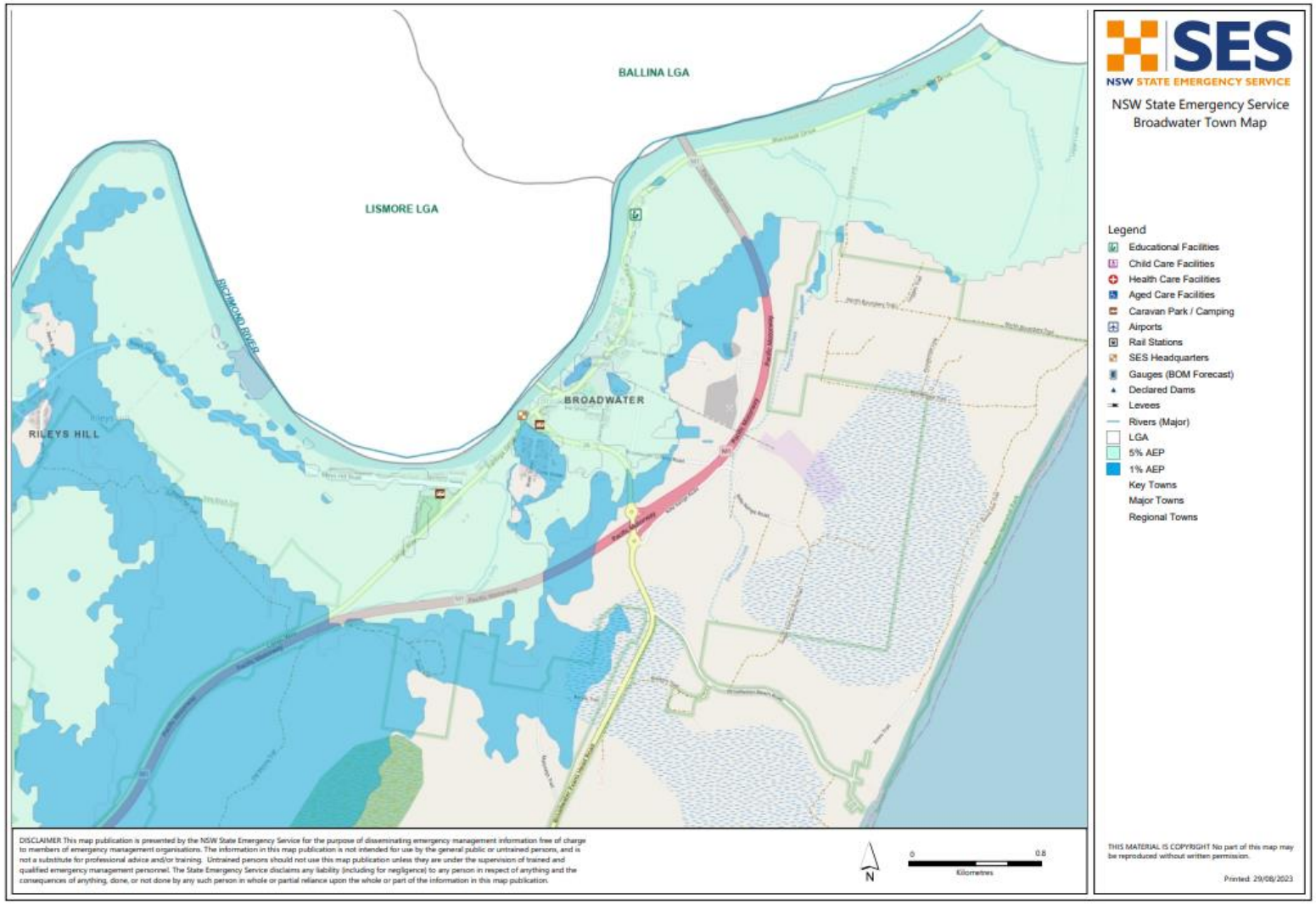


MAP 4: CORAKI TOWN MAP

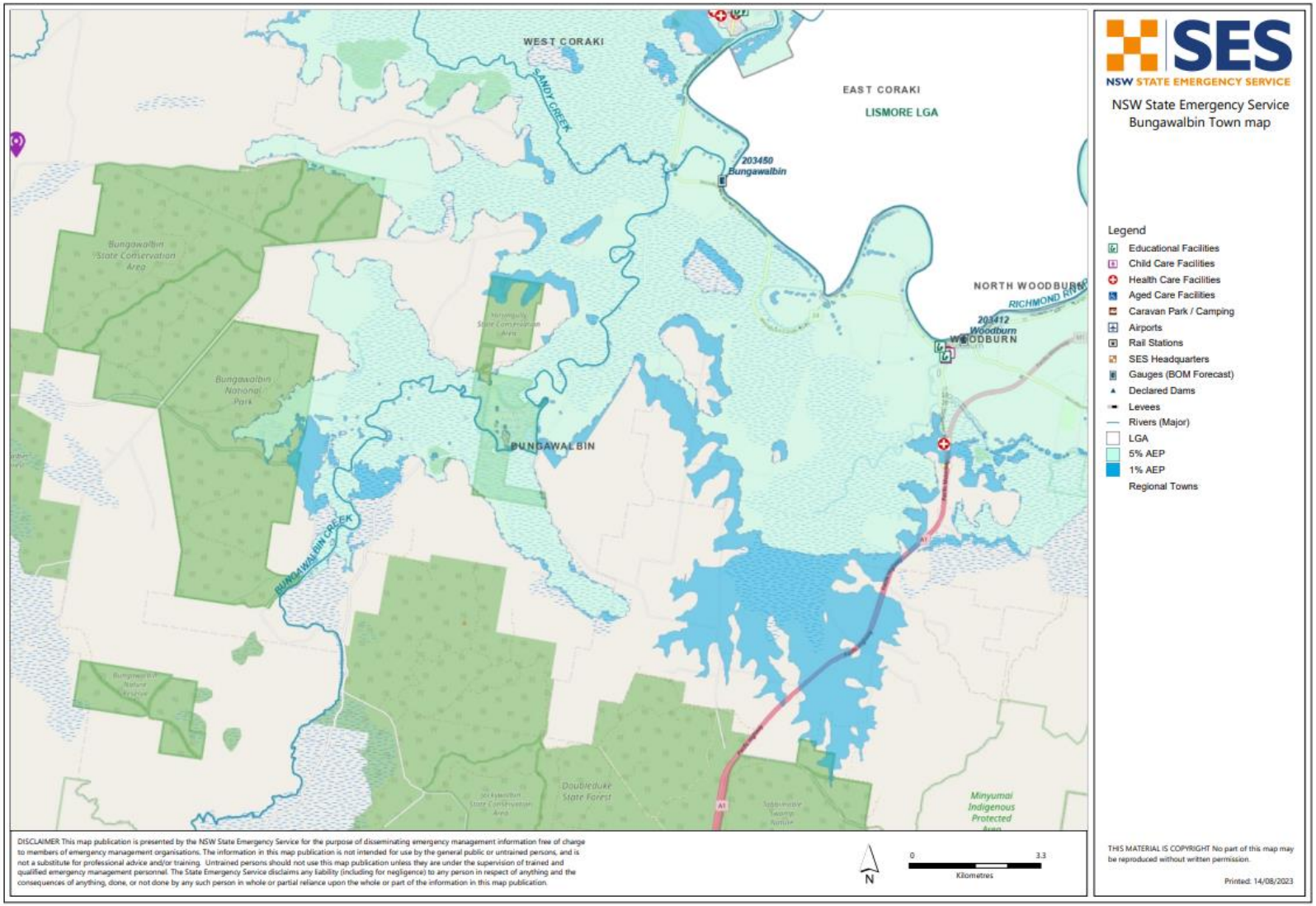


MAP 5: WOODBURN TOWN MAP

MAP 6: BROADWATER TOWN MAP



MAP 7: BUNGAWALBIN TOWN MAP



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RICHMOND VALLEY FLOOD WARNING SYSTEMS AND ARRANGEMENTS

Chapter 1 of Volume 3 (NSW SES Response Arrangements for Richmond Valley) of the Richmond Valley Flood Emergency Sub Plan

Last Update: March 2024

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LIST OF TABLES

1. GAUGES MONITORED BY THE NSW SES CASINO, CORAKI, WOODBURN AND BROADWATER LOCAL HEADQUARTERS

Table 1: Gauges monitored by the NSW SES Casino, Coraki, Woodburn and Broadwater Local Headquarters

Gauge Name	Type	AWRC No.	Bureau Gauge No.	Stream	Flood level classification in metres			Special Reading Arrangements	Owner
					MIN	MOD	MAJ		
Casino Road Bridge*†‡	Manual	203907	058179	Richmond River	9.2	12.2	15		Richmond Valley Council
Casino†‡	Automatic	203004	558013	Richmond River	11.9	14.9	17.7		Water NSW
Coraki*†‡	Automatic	203403	058175	Richmond River	3.4	5.0	5.7		DPE
Bungawalbin*†‡	Automatic	203450	058184	Richmond River	3.0	4.5	5.0		DPE
Woodburn*†‡	Automatic	203412	058061	Richmond River	3.2	3.7	4.2		DPE
Broadwater†‡	Manual	203415	-	Richmond River	2.0	2.5	3.0		SES

Notes: The Bureau of Meteorology provides flood warnings for the gauges marked with an asterisk (*).
NSW SES Local Flood Advices are provided for the gauges marked with a single cross (†).
The NSW SES holds a Flood Intelligence Card for the gauges marked with a double cross (‡)

2. DISSEMINATION OPTIONS FOR NSW SES FLOOD INFORMATION AND WARNING PRODUCTS

As the combat agency for flood, storm and tsunami NSW SES has a statutory responsibly to issue warnings and public information to affected communities (NSW SES Act s 8). Warnings include advice about options and likely impacts of an event. The Incident Controller is accountable for preparing and disseminating accurate warning products during an incident.

2.1 DISSEMINATION OF WARNINGS:

NSW SES disseminates warnings through the following platforms: (Please note that this is not an exhaustive list and not all the following may be used during any or all events)

- NSW SES Website
  - www.ses.nsw.gov.au
- HazardWatch
  - HazardWatch is currently online at www.hazardwatch.gov.au .
  - Warnings are automatically updated/removed as managed through this platform.
- Hazards Near Me NSW App
- Doorknocking
- Emergency Alert
- Social Media
  - The following are some social media accounts:
    - Facebook (@NSWSES)
    - Facebook (@Northern Rivers NSW SES)
    - Facebook (@NSW SES Casino Unit)
    - Facebook (@NSW SES Coraki Unit)
    - Facebook (@NSW SES Woodburn Unit)
    - Facebook (@NSW SES Broadwater Unit)
    - Facebook (Local community pages, Local business pages)
    - Twitter (@NSWSES
    - Instagram (@NSWSES)
- Community Meetings

Television Stations:

Station	Location
ABC TV (Channel 2, 20 & 21)	Northern NSW
ABC NEWS, (Channel 24)	Northern NSW

NBN (Channel 8, 81)	Northern NSW
SBS (Channel 3)	Northern NSW
WIN/10 (Channel 5)	Northern NSW
Seven West (Channel 6, 61)	Northern NSW
SkyNews (Channel 53)	Northern NSW

Radio Stations:

Station	Location	Frequency	Modulation
ABC Radio	North Coast	738 AM 94.5 FM	
ABC News	Richmond / Tweed Grafton / Kempsey	98.5 FM Channel; 204	
COW FM	Casino	107.9 FM	
	Coraki	88.9 FM	88.9 FM
	Evans Head	87.6 FM	Vision Christian Radio
ABC North Coast	Richmond/Tweed	94.5 FM	
ABC Classic	Richmond/Tweed	95.3 FM	
triple j	Richmond/Tweed	96.1 FM	
Radio National	Richmond/Tweed	96.9 FM	
ABC News	Richmond/Tweed	98.5 FM	

Digital/On-Line Services

- Streaming Services
- Podcasts
- YouTube Channels

Other Agencies:

Stakeholders include:

- Chamber of Commerce
- Business Owners
- NFP's
- NDIS and Community Care Providers
- Aged Care Providers
- Emergency Services

- Schools and Child Care
- Richmond Valley Council
- Rous County Council
- NSW Health
- Media Outlets
- Others where appropriate

RICHMOND VALLEY: NSW SES LOCALITY RESPONSE ARRANGEMENTS

Chapter 2 of Volume 3 (NSW SES Response Arrangements for Richmond Valley) of the Richmond Valley Flood Emergency Sub Plan

Last Update: March 2024

AUTHORISATION

NSW SES Locality Response Arrangements in Richmond Valley has been prepared by the NSW State Emergency Service (NSW SES) as part of a comprehensive planning process.

Approved

NSW SES North Eastern Zone Coordinator Planning (Michael Stubbs)

Date: 01/03/2024

Approved

NSW SES North Eastern Zone Commander (Joanna JONES)

Date: 01/03/2024

Tabled at LEMC

Date: 05/03/2024

Document Issue: V3.2-07042014

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SECTOR OVERVIEW

Table 1: Overview of Sectors in the Richmond Valley LGA.

These Sectors provide further detail of the planned response strategies within Communities in the Richmond Valley LGA.

Sector Name	Community	Sector Basis	Total properties	Properties potentially at risk
Casino	Stratheden, Fairy Hill, Backmede, Naughtons Gap, North Casino, Spring Grove, Woodview, Casino, Piora, Upper Mongogarie, Mongogarie, Shannon Brook, Leeville, Yorklea, Naughtons Gap, Irvington, Tomki, Clovass, Greenridge, Tatham.	Casino has rising road access	6750	2555 properties at risk of over floor flooding.
Coraki	Codrington, Coraki, East Coraki	Coraki is a low flood island	599	420 properties at risk of over floor flooding.
Bungawalbin	West Coraki, Ellangowan, Coombell, Busbys Flat, Wyan, Kippenduff, Rappville, Clearfield, Myrtle Creek, West Bungawalbin, Bungawalbin, Mount Marsh, Whiporie, Gibberagee, Bora Ridge, Tabbimoble.	Bungawalbin has an overland escape route	322	69 properties at risk of over floor flooding. Most of the Bungawalbin Sector is vulnerable to isolation.
Woodburn	Woodburn, Swan Bay, Doonbah, Evans Head, New Italy, The Gap, Esk.	Woodburn is a low flood island	2460	437 properties at risk of over floor flooding. New Italy and Swan Bay are at risk of isolation.
Broadwater	Broadwater, Rileys Hill	Broadwater is a low flood island	366	225 437 properties at risk of over floor flooding.

1. CASINO SECTOR

1.1. CASINO RESPONSE ARRANGEMENTS

Refer to Volume 2: Hazard and Risk in Richmond Valley for more information about this Sector/Community.

Sector Description	The Casino Sector includes the suburbs of Stratheden, Fairy Hill, Backmede, Naughtons Gap, North Casino, Spring Grove, Woodview, Casino, Piora, Upper Mongogarie, Mongogarie, Shannon Brook, Leeville, Yorklea, Naughtons Gap, Irvington, Tomki, Clovass, Greenridge, Tatham.		
Hazard	Casino is affected by riverine flooding from the Richmond River as well as localised overland flow due to limitations in the stormwater system. Increased river levels may also be observed due to a dam failure at Toomumbar Dam.		
Flood Affect Classification	Casino has Rising Road Access		
At risk properties	2555	**Total number of properties within Sector/Community**	6750
Sector Control	The SES Incident Controller will nominate a Sector Commander to control evacuations in this sector. The NSW SES will conduct evacuations in this sector with assistance from NSW Police, Fire and Rescue NSW, and NSW Rural Fire Service (RFS) volunteers.		

Key Warning Gauge Name

Name	AWRC No.	Min (m)	Mod (m)	Maj (m)
Casino Road Bridge	203907	9.2	12.2	15
Casino	203004	11.9	14.9	17.7

General Strategy	• Evacuation of at-risk population. • Self-evacuation to friends/family outside of the impact area. • Establishment of an Assembly Area/Evacuation Centre at Casino Community and Cultural Centre or Casino High School or other nominated centre where evacuees are able to gather while flood situation is monitored.
Key Risks / Consequences	• Closure of evacuation routes, and isolation of rural/outlying areas from the Casino township. • Inundation of a large number of dwellings. • Potential of isolation to supplies for thousands of people in a large flood event for a number of days. • Potential loss of life from rapid and potentially high velocity flooding inundation.
Information and Warnings	• Flood Watch (BoM) • Flood Warnings (BoM) • AWS Advice • AWS Watch and Act • AWS Emergency Warning • Sequenced door knocking of evacuation sector

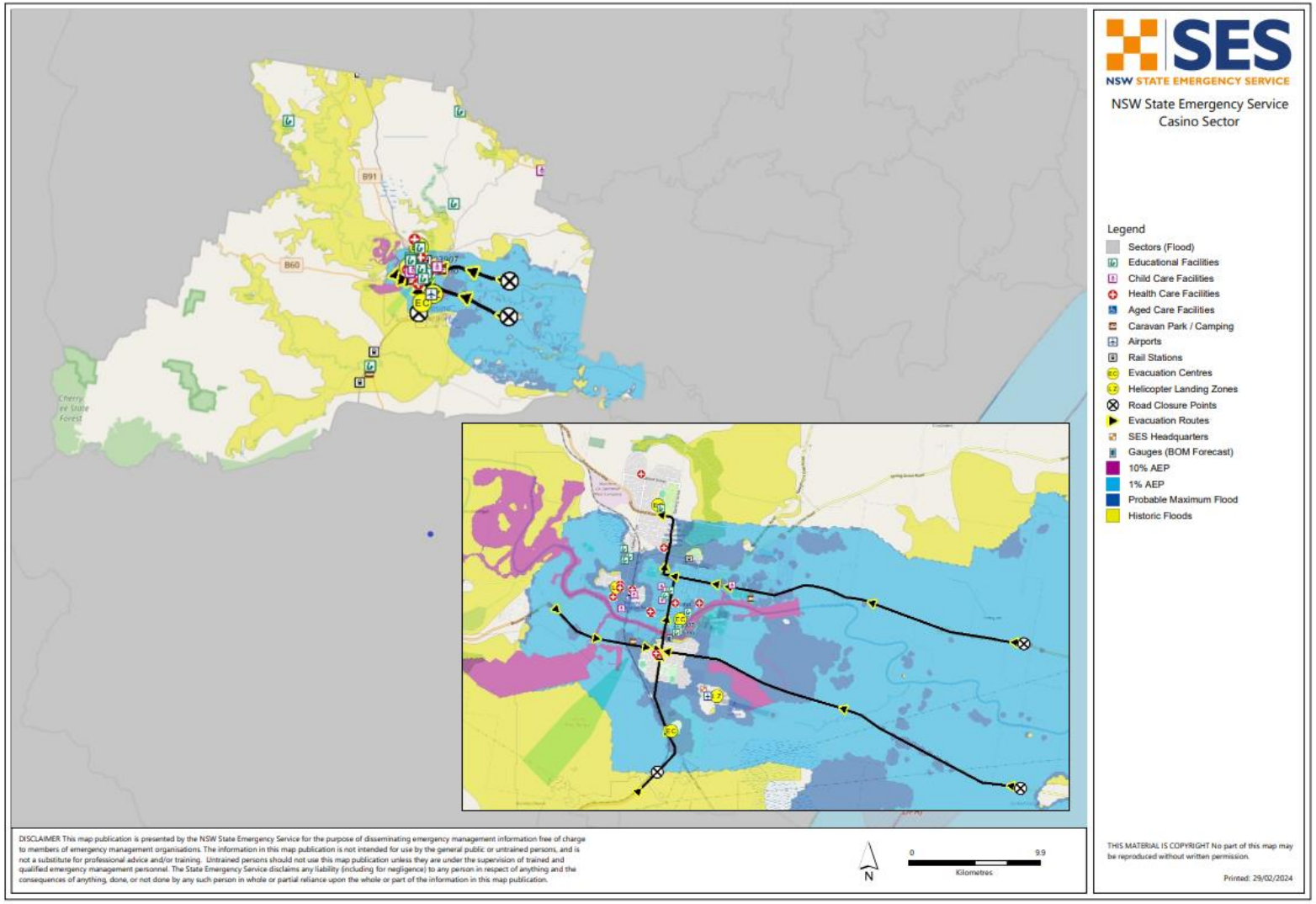
	• Media announcements (including social media) • Emergency Alerts (SMS, landlines) • Standard Emergency Warning Signal
	• Door knocking suitable for smaller areas or a sequential approach to evacuation to complement messaging sent out through the Australian Warning System. • In larger scale evacuations warnings may be accompanied by lights and sirens and evacuation messaging over P.A system on SES vehicles along affected streets.
Property Protection	***Specific property protection measures:*** • Relocation of livestock. • Relocation of farm machinery and valuable goods • Control of surface water through sandbagging measures. • Assist in the lifting of furniture to residents in need. • Monitoring integrity of dwellings surrounded by flood waters.
	Assistance with property protection: • Refer to Chapter 4: Caravan Park Arrangements • Self-serve sandbag stations may be set up at nominated locations to assist with property protection.
	Protection of essential infrastructure: Essential infrastructure for Casino may suffer inundation in major flood events, however, generally does not require protection in events below a 1% AEP. • Water supply: One filtration plant, one raw pumping station, four reservoirs, one distribution pump station. The main water supply for Casino has a backup generator, however this needs to be manually operated. • The Casino sewerage treatment plant suffered damage in the 2022 floods, with remediation works ongoing. • McKees Hill substation is critical component to local electricity grid and is outside the PMF extent. Cnr Rogersons and Cooper Rd, Casino. A Substation is also located at 20 Ellangowan Rd. • Main telecommunications exchange is at 61 Simpson Pde Casino.
Evacuation and/or Isolation Triggers	Evacuation may be considered due to flood conditions that are expected to cause; ▪ Inundation of property. ▪ Closure of primary evacuation routes. ▪ Failure of essential services
Evacuation Triggers	Evacuation or warning triggers based on Bureau of Meteorology flood height predictions at the **Casino Road Bridge Gauge (203907**); **1.) Prediction to reach and exceed 12.5m:** Riverine inundation at this level is limited to the areas around East St and Wharf St . **2.) Prediction to reach and/or exceed 13.88m at the Casino Road Bridge Gauge:** At this height, some over floor inundation of property is expected in Tatham, Irvington and Greenridge (subsector Casino Outer East), and main access routes along the Bruxner Highway and Casino Coraki Rd may already be lost, with further inundation expected as river levels rise.

	Access along Summerland way south of Casino may be lost at this height. Some low-level inundation of property may be expected in low lying areas of the Casino township from this height (Subsectors low lying Casino and Wharf St.) **3.) Prediction to reach and or/exceed 15m at the Casino Road Bridge Gauge:** At this level, floodwater would begin to impact roads in the CBD area, with over-floor inundation of property increasing. Bruxner Highway may be cut to the west of Casino township by this height isolating properties to the west of the railway (Subsector Casino A). **4.) Prediction to reach and or/exceed 15.8m at the Casino Road Bridge Gauge:** Approximately 700 properties in the Casino township may experience over floor inundation, with most major access routes out of the township cut.
Sequencing of evacuation	• Evacuation of vulnerable facilities such as (e.g. aged care facilities, schools, and child-care facilities) will require a higher priority. • Outside of the identified sequenced evacuation areas, a number of residences and properties may need to be evacuated during periods of significant flooding. These properties would be dealt with on a case by case situation. **1.) For Prediction 1:** Based on monitoring and assessment of conditions, Watch and Act or Emergency Warning Messaging may need to be considered for properties in low lying Wharf St subsector (GEMS ID 405). **2.) For Prediction 2:** Evacuation of low-lying properties in Casino Outer East subsector (GEMS ID 61920) may be considered due to closure of access routes, further evacuation may need to be considered if heights are expected to rise. Emergency Warning may be considered for low-lying properties along the river in remainder of Low-lying Wharf St subsector (GEMS ID 405) and Low-Lying Casino subsector if heights are expected to rise (GEMS ID 63135). The South of Casino subsector (GEMS ID 63138) may be isolated from Casino, requiring Watch and Act messaging, however widespread inundation of property is not expected at this height. Casino West A (GEMS ID 45200) and Dobies Bight and Woodview (GEMS ID 45202) and Casino Outer North (GEMS ID 65349) subsectors may experience isolation and some inundation of low-lying areas. **3.) For Prediction 3:** Casino A subsector (GEMS ID 63144) may become isolated, with some evacuations necessary in low lying areas. **4.) For Prediction 4:** Based on assessment of local conditions, Low lying properties in CBD subsector (GEMS ID 64403) and Casino South (GEMS ID 64404) may require evacuation.
Evacuation Routes	• **Subsectors east of Casino Township:** Bruxner Highway towards Casino, then Casino township route. • **Subsectors West of Casino township:** Bruxner Highway towards Casino, then Casino township route. • **Subsectors South of Casino township:** Summerland Way towards Casino then Casino township route. • **Casino township**: Local roads to Johnson or Centre St to West St, towards Casino High School or other nominated centre.
Evacuation Route Closure	The following key road closures may be expected to occur by the following heights at the **Casino Road Bridge Gauge**. • Bruxner Highway and Casino Coraki Rd to the East of Casino: By approx. 13.88m. • Bruxner Highway to the West of Casino: By approx.15m.

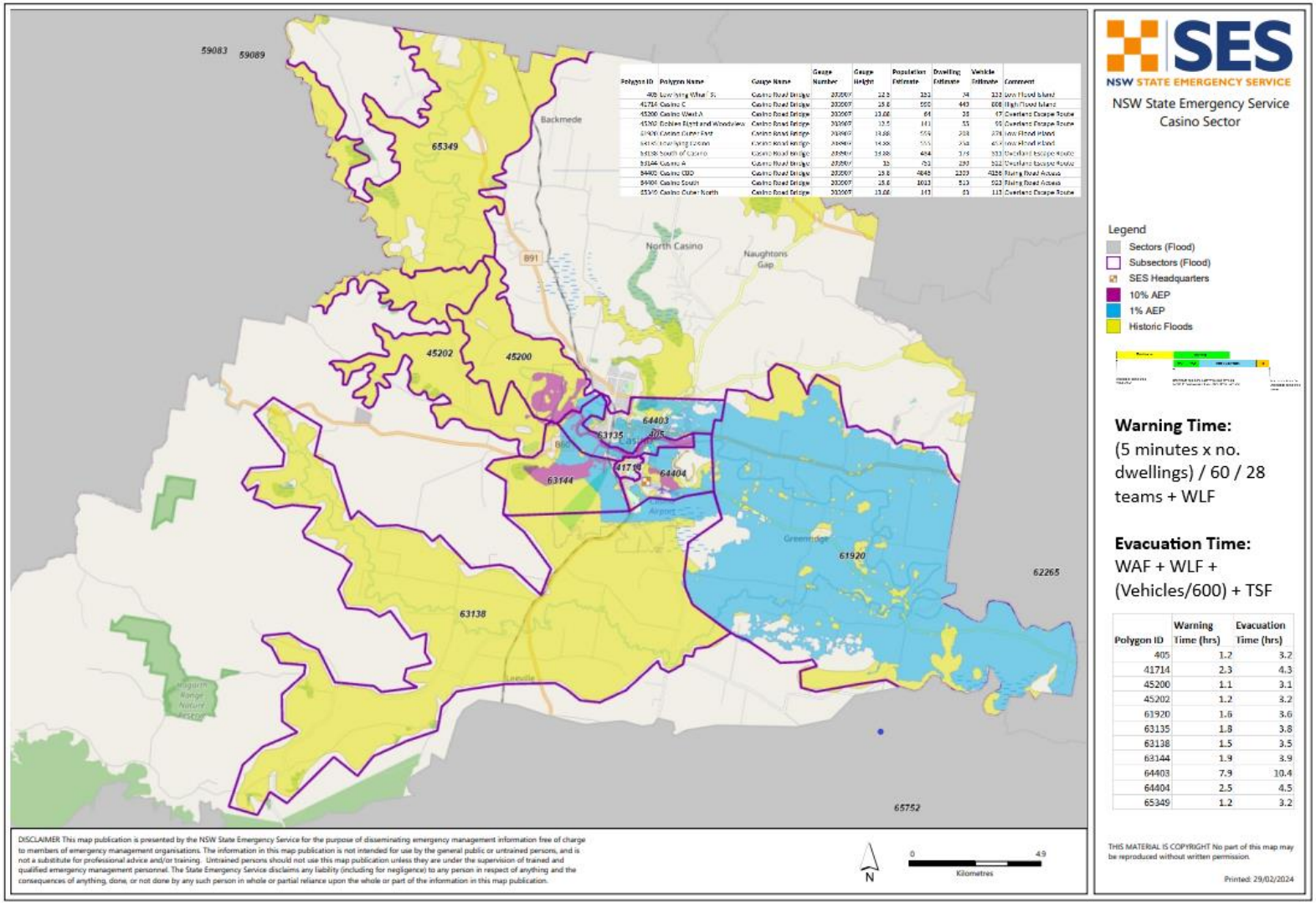
	• Summerland Way: By approx. 13.88m Other closures may occur due to stormwater flooding, independent of the gauge heights listed above.
Method of Evacuation	• Primarily self-evacuation by private transport to higher ground within Casino or North Casino. • Primarily self-evacuation by private transport to nominated evacuation centres/assembly areas (Casino High School or Casino Community and Cultural Centre) • In large events, buses may be organised to transport people from assembly areas to nominated evacuation centres.
Evacuation Centre/Assembly Point	**The only nominated evacuation centre completely outside the PMF extent is Casino High School:** 90 Queensland Rd, Casino. Centres which may be suitable in smaller events: • **Casino Community and Cultural Centre:** Suitable up to a 1% AEP. Floor level of 24.28mAHD, however is within the flood extent for a PMF and access roads may be inundated prior to this level. • **Casino Showgrounds:** May be suitable in events equivalent to a 1%AEP or less. May become inundated in a PMF.
Large scale evacuations	• When large-scale evacuations are likely, the NSW SES Incident Controller will liaise with the LEOCON and request support of the EOC as required. Large scale evacuations would be unlikely in this sector but if required additional locations will be identified. • Additional locations may be identified in large scale evacuations, or if existing evacuation centres are flood affected or isolated. • Assembly areas may be utilised on higher ground.
Rescue	• The flood rescue management process adopted will be determined by the Incident Controller, based on the scale of the flood rescue operations. • The Incident Controller may declare a flood rescue area of operations and establish a flood cell to assist with the management of flood rescues. • All Flood Rescue Operations will be undertaken as per the State Rescue Policy.
Resupply	• Resupply is unlikely to be required in this sector in events more frequent than a 1% AEP. • If resupply is required, it will be provided by the NSW SES through the 132500 call out system.
	Table 21, in Volume 2 of this Flood Emergency Sub Plan provides information about isolated communities in the Richmond Valley area and potential periods of isolation.
Aircraft Management	***Helicopter Landing Points:*** Suitable landing points are located at: • *Casino Hospital: 28.86020° S, 153.03502° E* The majority of the Hospital site is modelled to be flood free up to and including the PMF. • *Casino Airport: 28.88083° S, 153.05889° E*

	The majority of the airport site is modelled to be flood free up to the 1%AEP. The eastern half of the site is in the flood extent from a 0.2%AEP.
	Airports: • Casino Airport is used for light aircraft and non-commercial passenger movements. • It has two parallel runways, one sealed and one unsealed. • The airport is a NON-certified Aerodrome and is NOT licensed with CASA, with Landing Zone status only.
Other	Special considerations relating to evacuation: • Closure of schools - coordinated through the Department of Education and Training. • The evacuation of domestic animals, horses and livestock to the appropriate facility to be managed by Department of Primary Industries and Local Land Services. • Closure of licensed premises. All hotels and licensed clubs will be closed if required. • Security. Police patrols to be established to maintain law and order after evacuation has occurred. • The NSW SES will use flood boats, aircraft, community contacts and other agencies to monitor the safety of individuals, where feasible. • These arrangements will stay in place until the "Return with Caution" is provided by the NSW SES to residents to return to their premises.

1.2. CASINO SECTOR MAP



1.3. EVACUATION PLANNING



2. CORAKI SECTOR

2.1. CORAKI RESPONSE ARRANGEMENTS

Refer to Volume 2: Hazard and Risk in Richmond Valley for more information about this Sector.

Sector Description	The Coraki sector includes the suburbs of Coraki, Codrington and part of East Coraki that falls within the Richmond Valley LGA.		
Hazard	Coraki is affected by Riverine Flooding from the Richmond and Wilsons Rivers. It is also affected by flooding from Bungawalbin Creek, and other local catchments including Seelems Creek.		
Flood Affect Classification	The majority of Coraki is a Low Flood Island, with a small high flood island in the area to the south-western side of the town.		
At risk properties	All properties at risk of isolation Risk of over-floor inundation in a PMF: Coraki: 374 Codrington: 23 East Coraki: 23	**Total number of properties within Sector/Community**	597

Sector Control	The SES Incident Controller will nominate a Sector Commander to control evacuations in this sector. The NSW SES will conduct evacuations in this sector with assistance from NSW Police, Fire and Rescue NSW, and NSW Rural Fire Service (RFS) volunteers.

Key Warning Gauge Name	**Name**	**AWRC No.**	**Min (m)**	**Mod (m)**	**Maj (m)**
	Coraki	203403	3.4	5	5.7

General Strategy	• Evacuation of at-risk population. • Self-evacuation to friends/family outside of the impact area. • Establishment of an Assembly Area/Evacuation Centre at Coraki Public School where evacuees are able to gather while flood situation is monitored.
Key Risks / Consequences	• Closure of evacuation routes. • Inundation of a large number of dwellings. • Potential of isolation to supplies for thousands of people in a large flood event for a number of days. • Potential loss of life from rapid and potentially high velocity flooding inundation.
Information and Warnings	• Flood Watch (BoM) • Flood Warnings (BoM) • AWS Advice • AWS Watch and Act • AWS Emergency Warning • Sequenced door knocking of evacuation sector • Media announcements (including social media) • Emergency Alerts (SMS, landlines)
	Door knocking is the initial method of warning, which complements the alerts sent out via the Australian Warning System.

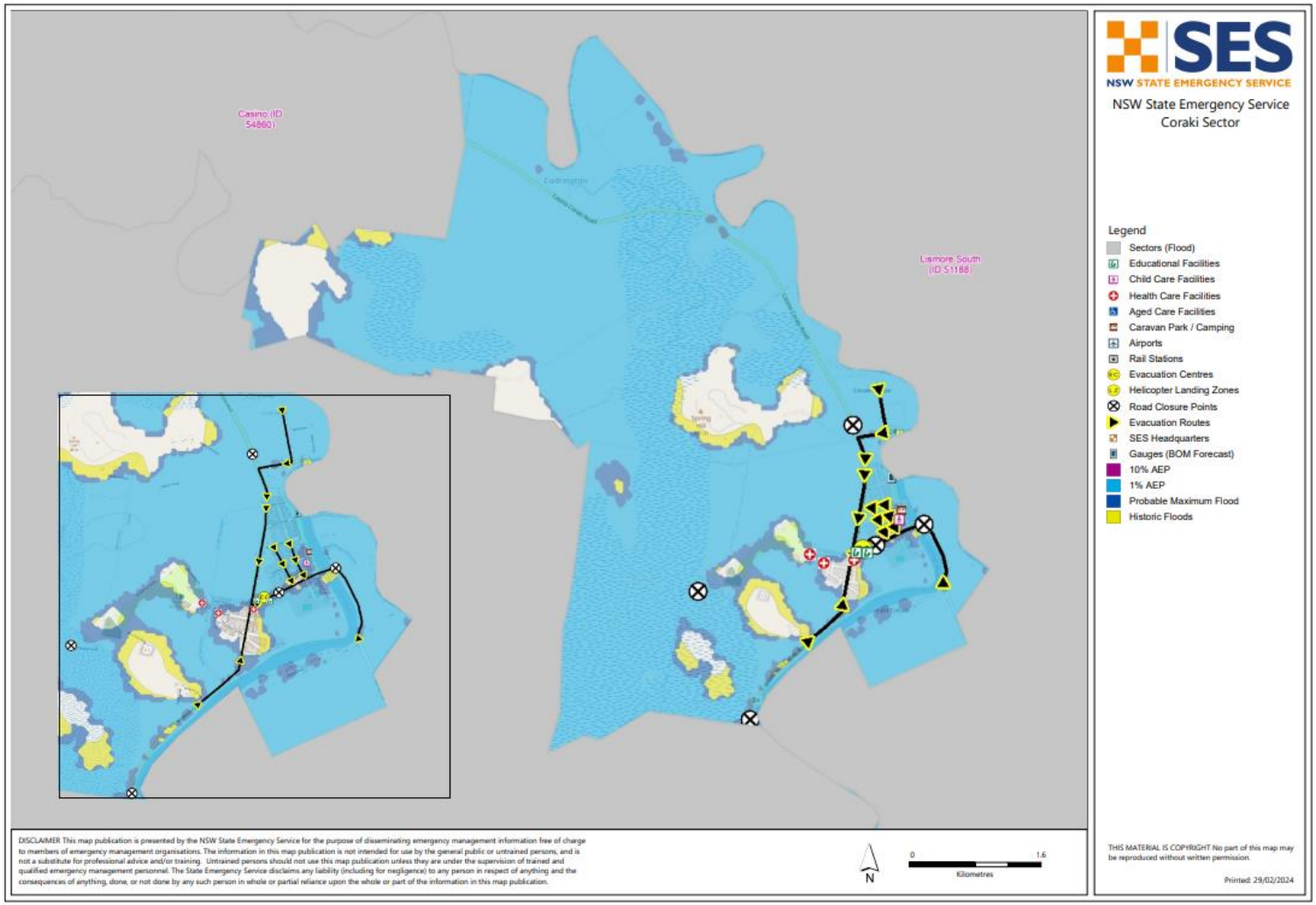
	A sequenced approach to door knocking will be considered following the evacuation sequencing outlined below. In larger scale evacuations warnings may be accompanied by lights and sirens and evacuation messaging over P.A system on SES vehicles along affected streets.
Property Protection	***Specific property protection measures:*** • Relocation of livestock. • Relocation of farm machinery and valuable goods • Control of surface water through sandbagging measures. • Assist in the lifting of furniture to residents in need. • Monitoring integrity of dwellings surrounded by flood waters.
	Assistance with property protection: • Refer to Chapter 4: Caravan Park Arrangements
	Protection of essential infrastructure: The Coraki Sewerage Treatment Plant is located on Box Ridge Rd, Coraki. Mapping suggests it is not inundated in events up to and including a 0.2% AEP, however it suffered inundation in 2022 floods and so needs to be monitored. The sewerage treatment plant may become inaccessible in large flood events, causing it to become non-operational due to lack of remote operating ability.
Evacuation and/or Isolation Triggers	• Inundation of property • Closure of key evacuation routes • Failure of essential services • Isolation
Evacuation Triggers	It is important to consider the source of flooding, as the dominance of Wilsons River, Richmond River or Bungawalbin Creek may affect inundation in Coraki, and this needs to be continually monitored. Evacuation or warning triggers based on Bureau of Meteorology flood height predictions at the **Coraki Gauge (203403**); 1. **Prediction to reach and/or exceed 3.8m:** Water covers the cross roads/access point for of the Coraki Caravan Park. lower level vans of the Coraki Caravan Park to be relocated to higher ground on Richmond Terrace. 2. **Prediction to reach and/or exceed 5m:** Water inundates the Coraki Caravan Park all vans should be evacuated to higher ground prior to this point. 3. **Prediction to reach and exceed 6m:** Approximate height at which water flows over Richmond Terrace and low lying properties may be affected. Casino-Coraki Rd may close to all traffic from this height. The closure of Casino Coraki Road may isolate Codrington from Coraki, and is progressively inundated. If this occurs in conjunction with heights approximately 14m at the Casino Road Bridge gauge, indicating closure of Casino Coraki Road from Codrington to Casino. 4. **Prediction to reach and/or exceed 6.3-6.5m:** Access into Coraki may be lost for East Coraki via approach to East Coraki Bridge. Consider prepare to isolate or evacuation messaging for this height depending on predicted heights and assessment of access and approach to bridge. Prior to 7.3m, over floor inundation is only expected in a small number of properties in East Coraki (3).

	5. Prediction to reach and or/exceed 6.55m: Coraki is isolated by road and flooding occurs around Allwood St, Bridge St, Grenfell St, Martin St, Minto St, Unions St, Queen Elizabeth Drive and Coraki Bowling Club and Sports Fields. 6. **Prediction to reach and or/exceed 7m:** The majority of Coraki is inundated at this height, including the Box Ridge Community, Coraki township and East Coraki.
Sequencing of evacuation	• Evacuation of vulnerable facilities such as (e.g. aged care facilities, schools, and child care facilities) will require a higher priority. • Outside of the identified sequenced evacuation areas, a number of residences and properties may need to be evacuated during periods of significant flooding. These properties would be dealt with on a case by case situation. 1.) **For prediction 1 and 2**: Emergency Warning evacuation messaging for Coraki Caravan Park and Foreshore subsector (GEMS ID: 44825). 2.) **For prediction 3**: Consideration of Emergency Warning Messaging for **low lying** properties in Richmond Terrace subsector (GEMS ID: 60203). Consideration of Emergency Warning for Codrington subsector (GEMS ID 60209) based on assessment of conditions and predicted heights. **3.) For prediction 4**: Watch and Act or Emergency Warning Messaging for East Coraki subsector (GEMS ID 59825), depending on predicted heights. 4.) **For prediction 5:** Emergency Warning for low lying parts of Coraki B1 (GEMS ID 60207) and B2 (GEMS ID 59879) subsectors . 5.) **For prediction 6:** Emergency Warning for Coraki West (GEMS ID 60210) Subsectors and **low-lying** areas of Coraki C1 subsector (GEMS ID 60208).
Evacuation Routes	• Subsectors Coraki Caravan Park, Richmond Terrace and Coraki B1: Local roads to Adams St to Coraki Public School. • Coraki East: East Coraki Rd to East Coraki bridge, Adams St to Coraki Public School • Codrington: Casino Coraki Rd, Forest St, Dawson St to Queen Elizabeth Drive OR, Yabsley St, Bridge St to Adams St to Coraki Public School.
Evacuation Route Closure	• Access from East Coraki Rd to the East Coraki bridge may close from approx. 6.3-6.5m at the Coraki gauge. • Local roads in Coraki close progressively from 6-6.5m at the Coraki gauge. • Access in and out of Coraki is isolated by road from approximately 6.5m at the Coraki gauge.
Method of Evacuation	• Primarily self-evacuation by private transport to high parts of Coraki. • Primarily self-evacuation by private transport to identified assembly or evacuation area.
Evacuation Centre/Assembly Point	• People should be encouraged to stay with friends/relatives in high areas in the vicinity of Donaldson St, Belmore St, Thomas Crescent, Surry Street and Autumn Street. Note these areas may become isolated with further river rises. • Where this is not possible the nominated assembly area is the **Coraki Public School, Adams St Coraki**. This can be used as an assembly point in the short term, but could also double as an evacuation centre should the need arise. This

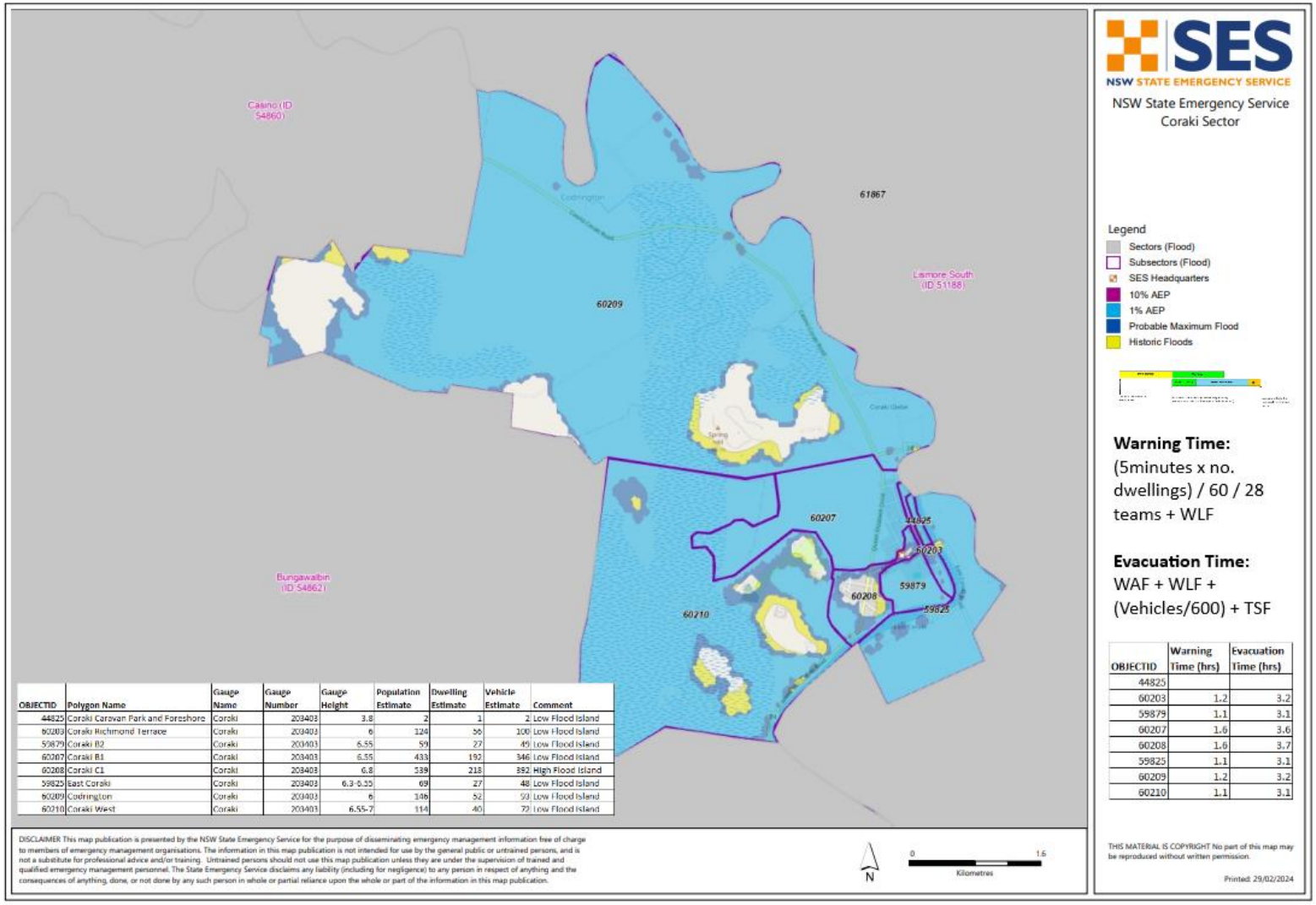
	centre is suitable up to a 0.2% AEP, however this facility is within the flood extent for a PMF. • Other potential evacuation centres include St Josephs Primary School, Adams St Coraki. • At heights corresponding to the modelled PMF, the only high ground in Coraki is in the area bounded by of Donaldson St, Surry St, Autumn St and Belmore St which becomes a High Flood Island and is primarily residential.
Large scale evacuations	• All nominated evacuation centres in Coraki are within the PMF extent. The only area of available high ground is in the area bounded by of Donaldson St, Surry St, Autumn St and Belmore St which becomes a High Flood Island and is primarily residential. • If this area is likely to be required, consideration of pre-positioning of temporary shelter and supplies should be given.
Rescue	• The flood rescue management process adopted will be determined by the Incident Controller, based on the scale of the flood rescue operations. • The Incident Controller may declare a flood rescue area of operations and establish a flood cell to assist with the management of flood rescues. • All Flood Rescue Operations will be undertaken as per the State Rescue Policy.
	In large scale events, access into Coraki by road is cut off by approximately 6.5-7m at the Coraki gauge, which may needs to be considered when determining rescue capability and resourcing.
Resupply	Resupply will be provided by the NSW SES through the 132500 call out system. Vulnerable facilities which may require resupply includes the Baptist Care Aged Care Home, Surry St Coraki.
	All of Coraki is vulnerable to isolation in a major flood event, with isolation by road occurring from approximately 6.5m.
	Table 21, in Volume 2 of this Flood Emergency Sub Plan provides information about isolated communities in the Richmond Valley area and potential periods of isolation.
Aircraft Management	***Helicopter Landing Points:*** There is limited availability of helicopter landing points in Coraki. The closest designated landing points are located at: • *Woodburn: 29.07394°S 153.3382° E* The Woodburn landing site may be in the flood extent for a 1%AEP, with depths of 0.1m-5m. • *Casino Hospital: 28.86020° S, 153.03502° E* The majority of the Hospital site is modelled to be flood free up to and including the PMF. • *Casino Airport: 28.88083° S, 153.05889° E* The majority of the airport site is modelled to be flood free up to the 1%AEP. The eastern half of the site is in the flood extent from a 0.2%AEP.

	Airports: • The are no airports within the Coraki sector.
Other	Special considerations relating to evacuation: • Closure of schools - coordinated through the Department of Education and Training. • The evacuation of domestic animals, horses and livestock to the appropriate facility to be managed by Department of Primary Industries and Local Land Services. • Closure of licensed premises. All hotels and licensed clubs will be closed if required. • Security. Police patrols to be established to maintain law and order after evacuation has occurred. • The NSW SES will use flood boats, aircraft, community contacts and other agencies to monitor the safety of individuals, where feasible. • These arrangements will stay in place until the "Return with Caution" is provided by the NSW SES to residents to return to their premises.

2.2. CORAKI SECTOR MAP



2.3. EVACUATION PLANNING



OBJECTID	Polygon Name	Gauge Name	Gauge Number	Gauge Height	Population Estimate	Dwelling Estimate	Vehicle Estimate	Comment
44825	Coraki Caravan Park and Foreshore	Coraki	203403	3.8	2	1	2	Low Flood Island
60203	Coraki Richmond Terrace	Coraki	203403	6	124	56	100	Low Flood Island
59879	Coraki B2	Coraki	203403	6.55	59	27	49	Low Flood Island
60207	Coraki B1	Coraki	203403	6.55	433	192	346	Low Flood Island
60208	Coraki C1	Coraki	203403	6.8	539	218	392	High Flood Island
59825	East Coraki	Coraki	203403	6.3-6.55	69	27	48	Low Flood Island
60209	Codrington	Coraki	203403	6	146	52	93	Low Flood Island
60210	Coraki West	Coraki	203403	6.55-7	114	40	72	Low Flood Island

OBJECTID	Warning Time (hrs)	Evacuation Time (hrs)
44825		
60203	1.2	3.2
59879	1.1	3.1
60207	1.6	3.6
60208	1.6	3.7
59825	1.1	3.1
60209	1.2	3.2
60210	1.1	3.1

3. BUNGAWALBIN SECTOR

3.1. BUNGAWALBIN RESPONSE ARRANGEMENTS

Refer to Volume 2: Hazard and Risk in Richmond Valley for more information about this Sector/Community.

Sector Description	Includes the suburbs of West Coraki, Ellangowan, Coombell, Busbys Flat, Wyan, Kippenduff, Rappville, Clearfield, Myrtle Creek, West Bungawalbin, Bungawalbin, Mount Marsh, Whiporie, Gibberagee, Bora Ridge, Tabbimoble.		
Hazard	Flooding from Bungawalbin Creek and isolation		
Flood Affect Classification	Bungawalbin has an Overland Escape Route.		
At risk properties	69 properties *West Coraki (8), Ellangowan (5), Bora Ridge (13), Myrtle Creek (7), Bungawalbin (22), Coombell (1), Gibberagee (13)*	**Total number of properties within Sector/Community**	324
Sector Control	The SES Incident Controller will nominate a Sector Commander to control evacuations in this sector. The NSW SES will conduct evacuations in this sector with assistance from NSW Police, Fire and Rescue NSW, and NSW Rural Fire Service (RFS) volunteers.		

Key Warning Gauge Name	**Name**	**AWRC No.**	**Min (m)**	**Mod (m)**	**Maj (m)**
	Bungawalbin	203450	3	4.5	5

General Strategy	• Evacuation of at-risk population. • Self-evacuation to friends/family outside of the impact area. • Establishment of an Assembly Area at Woodburn, Goonellabah or Casino, where evacuees are able to gather while flood situation is monitored.
Key Risks / Consequences	• Early inundation of key access routes. • Overtopping of rural levees. • Potential loss of life from rapid and potentially high velocity inundation. • Inundation of a number of dwellings. • Potential isolation of hundreds of people estimated to be for a number weeks in larger flood events.
Information and Warnings	• Flood Watch (BoM) • Flood Warnings (BoM) • AWS Advice • AWS Watch and Act • AWS Emergency Warning • Sequenced door knocking of evacuation sector • Media announcements (including social media) • Emergency Alerts (SMS, landlines) • Standard Emergency Warning Signal

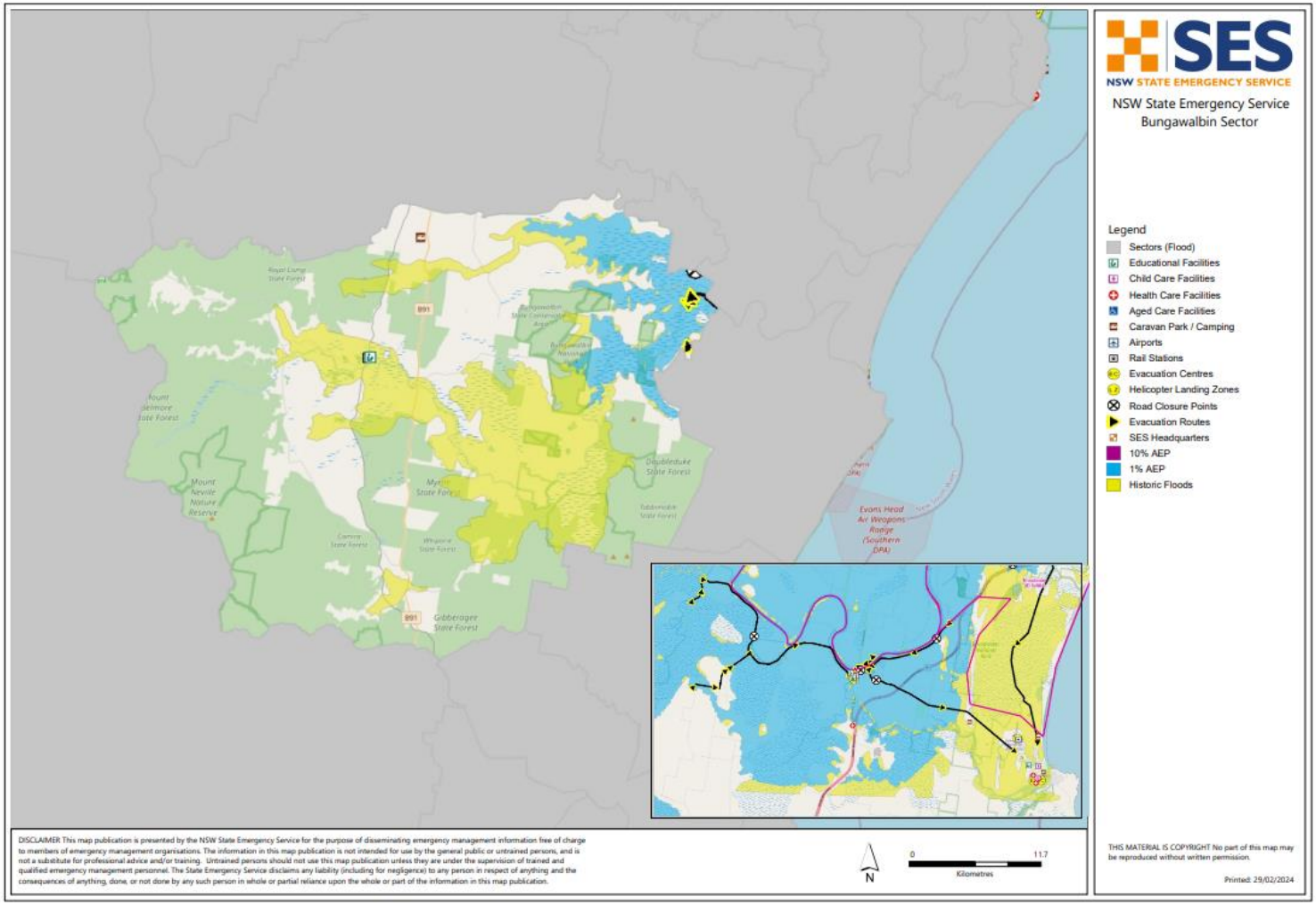
	Due to the geography of the sector, door knocking may not always be possible in larger flood events.
Property Protection	***Specific property protection measures:*** • Monitoring rising flood waters. • Relocation of furniture and valuable goods. • Relocation or lifting shop/business fittings and stock. • Control of surface water through sandbagging measures. • Relocation of livestock. • Relocation of farm machinery and valuable goods • Monitoring integrity of dwellings surrounded by flood waters.
	Assistance with property protection: • Refer to Chapter 4: Caravan Park Arrangements • Self-serve sandbag stations may be set up at nominated locations to assist residents with property protection.
	Protection of essential infrastructure: There is no identified essential infrastructure requiring protection within this sector. Electricity Supply: A significant portion of the Bungawalbin area is not supplied with mains electricity. There is a Zone Substation located near Rappville which is located outside the currently modelled PMF extent. Many rural properties within this sector are not on a town water supply and may be on septic systems for sewerage.
Evacuation and/or Isolation Triggers	• Inundation of property • Closure of main evacuation routes causing medium to long term isolation
Evacuation Triggers	Evacuation or warning triggers based on Bureau of Meteorology flood height predictions at the Bungawalbin Gauge (203450); **1.) Prediction to reach and exceed 4.5m at the Bungawalbin Gauge:** Warning of extensive flooding to be considered for all subsectors leading to isolation and potential inundation if heights are expected to rise. **2.) Prediction to reach and/or exceed 5m at the Bungawalbin gauge:** This is the expected height at which the East Bungawalbin levee overtops, inundating Bungawalbin-Whiporie Rd, Boggy Creek Rd, Ellangowan Rd and Reardons Lane. Overtopping may result in more extensive filling of Bungawalbin East and Swan Bay Basin areas. **3.) Prediction to reach and/or exceed 6m at the Bungawalbin Gauge:** Inundation of property may occur from this height in Bungawalbin and Bora Ridge. Further over-floor inundation may occur in West Bungawalbin and Ellangowan by 6.5m. Outside of the Bungawalbin Gauge Forecast areas, the following areas are to be considered.

	West Coraki: **4.) 5% AEP event:** Inundation of high depths may be experienced in this area during the 5% AEP event. This area does not fall within the forecast reference area for a gauge, however *as a guide only*, this may be equivalent to approximately 7m at the Coraki gauge or 5.6m at the Bungawalbin Gauge. **Rappville** **5.) 5% AEP event:** Areas to the west of the North Coast Rail Line may experience inundation in this event, inundation east of the Rail Line is modelled to be limited to areas adjacent to Myrtle Creek.
Sequencing of evacuation	1.) **For Prediction 1:** If flood levels are predicted to exceed this level, a Watch and Act Prepare to Evacuate should be considered for all subsectors due to periods of isolation expected. 2.) **For Prediction 2:** Emergency Warning Evacuation Messaging to be considered for all subsectors if predictions for floods reaching this height are received.
Evacuation Routes	***Evacuation routes towards identified evacuation centres may include:*** • **To Woodburn/Evans Head:** Bungawalbin-Whiporie Rd or Boggy Creek Rd and Reardons Lane towards Woodburn then Woodburn Evans Head Rd to Evans Head. ***Alternate options may include*** • **To Casino:** Summerland way or Casino Coraki Rd. • **To Goonellabah**: Tuckarimba Rd to Wyrallah Rd, Tucki Rd and Robson Rd to Tregeagle Rd to Goonellabah
Evacuation Route Closure	Most main access roads become inundated early in a flood event. Whilst exact gauge to closure heights are not known, some key roads which may close, limiting access towards Woodburn/Evans Head, Goonellabah or Casino include; • Bungawalbin-Whiporie Rd • Woodburn Coraki Rd • Boggy Creek Road • Reardons Lane • Swan Bay New Italy Rd • Summerland Way • Wyrallah Rd • Myall Rd and Myall Creek Rd
Method of Evacuation	• Primarily self-evacuation by private transport to high ground. • Primarily self-evacuation by private transport to identified assembly or evacuation area.
Evacuation Centre/Assembly Point	There are no identified evacuation centres within the Bungawalbin Sector. The preferred option is evacuation to Woodburn/Evans Head, Casino or Goonellabah based on assessments of road conditions and flood conditions in these areas.

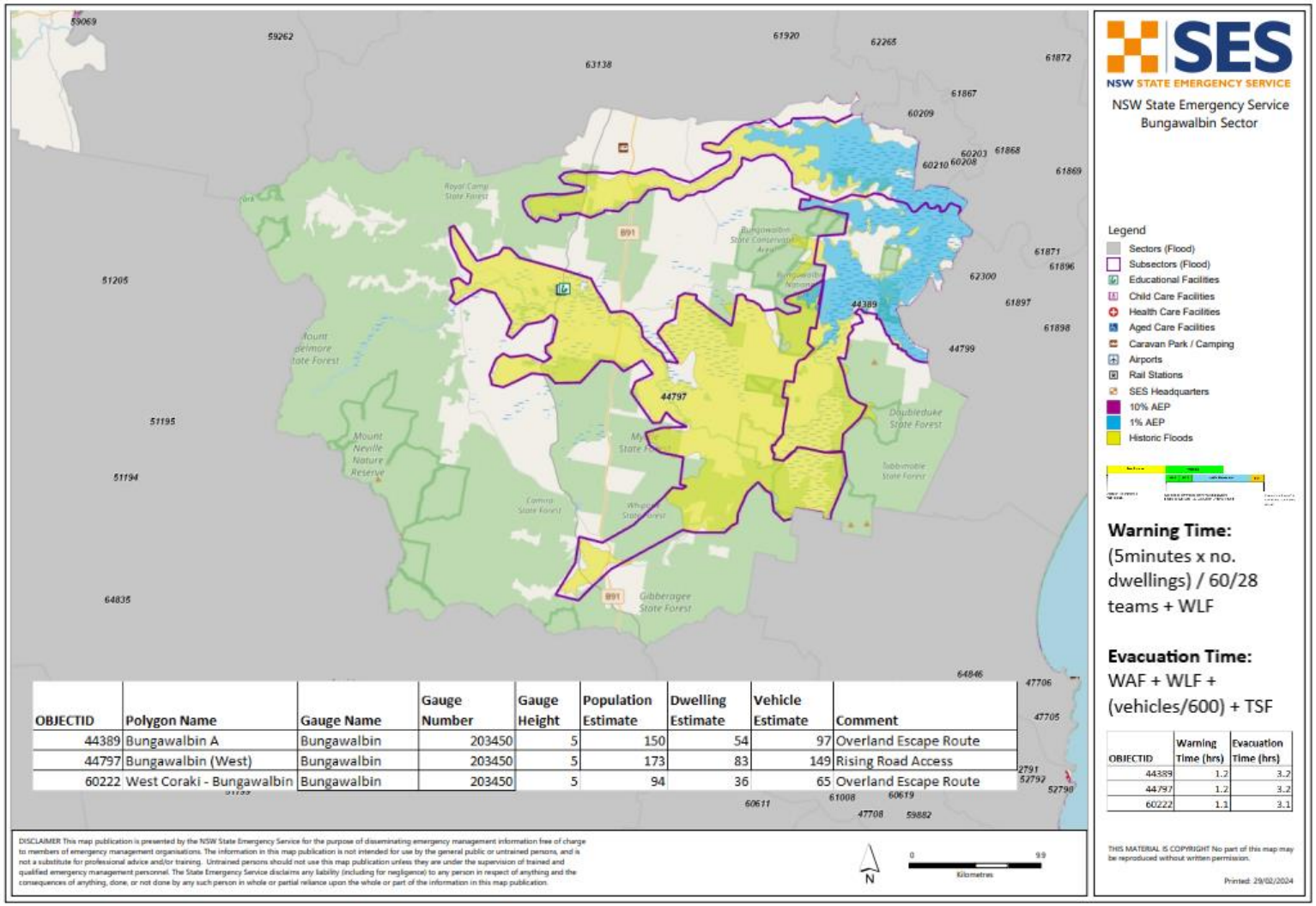
Large scale evacuations	In a large scale event, consideration of evacuation of Bungawalbin should be given early in an event due to prolonged periods of isolation, and early road closures.
Rescue	• The flood rescue management process adopted will be determined by the Incident Controller, based on the scale of the flood rescue operations. • The Incident Controller may declare a flood rescue area of operations and establish a flood cell to assist with the management of flood rescues. • All Flood Rescue Operations will be undertaken as per the State Rescue Policy.
	Access roads within this sector are likely to close early in an event and remain inundated for a number of days to weeks.
Resupply	Resupply is highly likely to be required in this sector, due to a high risk of prolonged isolation.
	There are a number of communities which may require resupply. • Bora Ridge: Approx 41 properties • Bungawalbin: Approx 64 properties • Rappville: Approx 63 properties • West Bungawalbin: Approx 18 properties • Whiporie: Approx 51 properties Outside of the identified areas, a number of individual rural properties may also require resupply and will be dealt with on a case by case basis.
	Table 21, in Volume 2 of this Flood Emergency Sub Plan provides information about isolated communities in the Richmond Valley area and potential periods of isolation.
Aircraft Management	***Helicopter Landing Points:*** There are no designated landing zones in the Bungawalbin sector. The nearest are located at. • *Woodburn: 29.07394°S 153.3382° E* The Woodburn landing site may be in the flood extent for a 1%AEP, with depths of 0.1m-5m. • *Casino Hospital: 28.86020° S, 153.03502° E* The majority of the Hospital site is modelled to be flood free up to and including the PMF. • *Casino Airport: 28.88083° S, 153.05889° E* The majority of the airport site is modelled to be flood free up to the 1%AEP. The eastern half of the site is in the flood extent from a 0.2%AEP. Suitable landing points in the sector may be determined based on local conditions.
	Airports: The are no airports located within this sector.
Other	Special considerations relating to evacuation:

	• Closure of schools - coordinated through the Department of Education and Training. • The evacuation of domestic animals, horses and livestock to the appropriate facility to be managed by Department of Primary Industries and Local Land Services. • Closure of licensed premises. All hotels and licensed clubs will be closed if required. • Security. Police patrols to be established to maintain law and order after evacuation has occurred. • The NSW SES will use flood boats, aircraft, community contacts and other agencies to monitor the safety of individuals, where feasible. • These arrangements will stay in place until the "Return with Caution" is provided by the NSW SES to residents to return to their premises.

3.2. BUNGAWALBIN SECTOR MAP



3.3. EVACUATION PLANNING



OBJECTID	Polygon Name	Gauge Name	Gauge Number	Gauge Height	Population Estimate	Dwelling Estimate	Vehicle Estimate	Comment
44389	Bungawalbin A	Bungawalbin	203450	5	150	54	97	Overland Escape Route
44797	Bungawalbin (West)	Bungawalbin	203450	5	173	83	149	Rising Road Access
60222	West Coraki - Bungawalbin	Bungawalbin	203450	5	94	36	65	Overland Escape Route

4. WOODBURN SECTOR

4.1. WOODBURN RESPONSE ARRANGEMENTS

Refer to Volume 2: Hazard and Risk in Richmond Valley for more information about this Sector.

Sector Description	The Woodburn sector includes the suburbs of Woodburn, Swan Bay, Doonbah, New Italy, The Gap and the northern part of Esk and areas of Tabbimoble to the East of the Pacific Highway.		
Hazard	Woodburn is affected by Riverine flooding from the Richmond River as well as flooding from Bungawalbin Creek via overland flow and increase in Richmond River flood levels. Evans Head may be affected by Riverine flooding from the Evans River as well as Storm Surge.		
Flood Affect Classification	Woodburn is a Low Flood Island Evans Head is a High Flood Island		
At risk properties	Woodburn: 300 The Gap: 2 New Italy: 8 Evans Head: 33 Doonbah: 37 Swan Bay: 57	**Total number of properties within Sector/Community**	2460
Sector Control	The SES Incident Controller will nominate a Sector commander to control evacuations in this sector. The NSW SES will conduct evacuations in this sector with assistance from NSW Police, Fire and Rescue NSW, and NSW Rural Fire Service (RFS) volunteers.		

Key Warning Gauge Name	**Name**	**AWRC No.**	**Min (m)**	**Mod (m)**	**Maj (m)**
	Woodburn	203412	3.2	3.7	4.2

General Strategy	• Evacuation of at-risk population. • Self-evacuation to friends/family outside of the impact area. • Establishment of an Assembly Area/Evacuation Centre where evacuees are able to gather while flood situation is monitored.
Key Risks / Consequences	• Closure of evacuation routes. • Inundation of a large number of dwellings. • Potential of isolation to supplies for thousands of people in a large flood event for a number of days. • Potential loss of life from rapid and potentially high velocity flooding inundation.
Information and Warnings	• Flood Watch (BoM) • Flood Warnings (BoM) • AWS Advice • AWS Watch and Act • AWS Emergency Warning • Sequenced door knocking of evacuation sector • Media announcements (including social media) • Emergency Alerts (SMS, landlines) • Standard Emergency Warning Signal

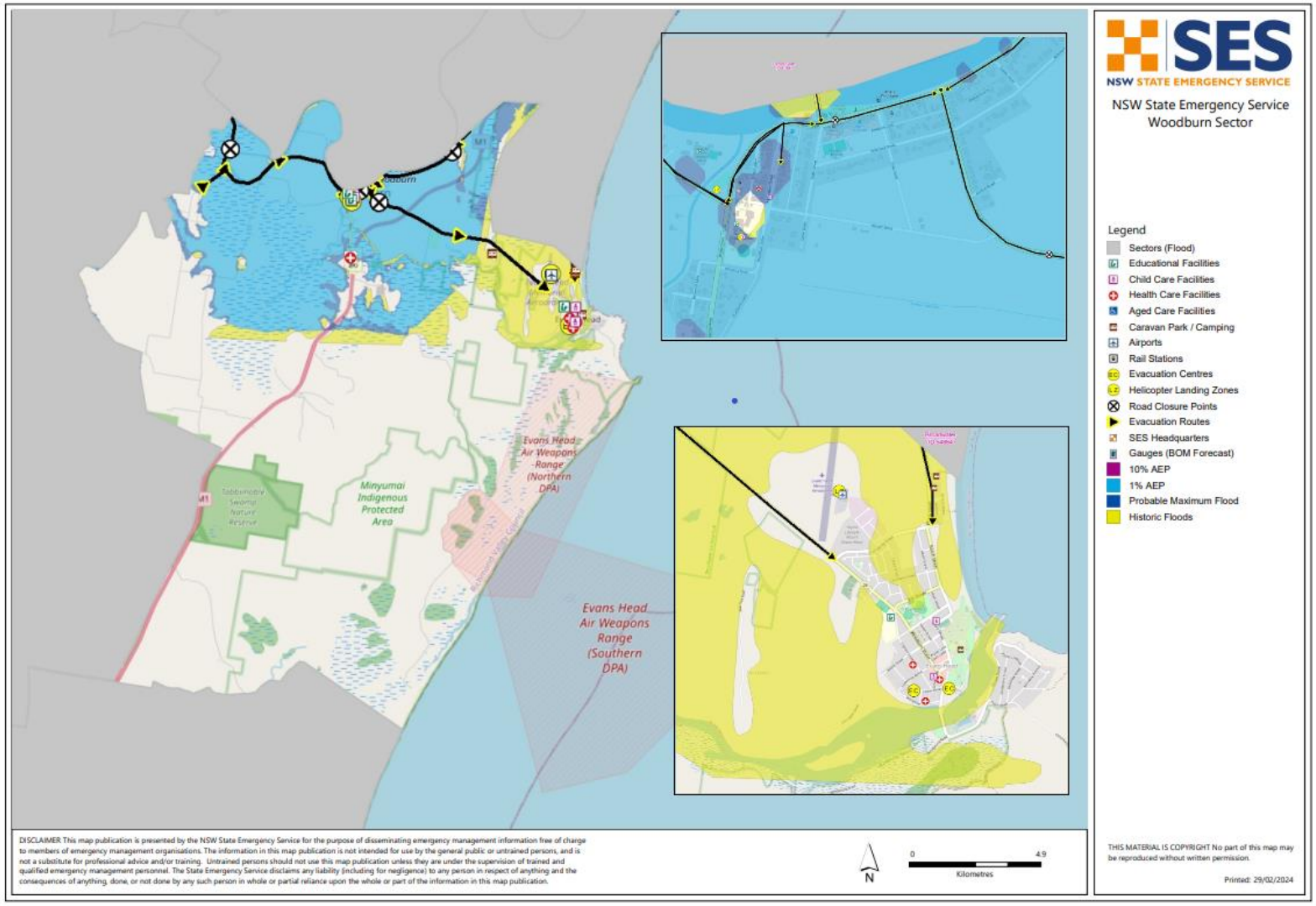
	• Door knocking is the initial method of warning, which complements the alerts sent out via the Australian Warning System. • A sequenced approach to door knocking will be considered following the evacuation sequencing outlined below. • In larger scale evacuations warnings may be accompanied by lights and sirens and evacuation messaging over P.A system on SES vehicles along affected streets.
Property Protection	***Specific property protection measures:*** • Relocation of livestock. • Relocation of farm machinery and valuable goods • Control of surface water through sandbagging measures. • Assist in the lifting of furniture to residents in need. • Monitoring integrity of dwellings surrounded by flood waters.
	Assistance with property protection: Refer to Chapter 4: Caravan Park Arrangements
	Protection of essential infrastructure: The Woodburn sewage transport system includes four pumping stations together with a network of rising mains and gravity reticulation mains. Electricity Supply Zone Substation is located at Pacific Hwy & Tuckombil Road, Woodburn.
Evacuation and/or Isolation Triggers	• Inundation of property • Closure of key evacuation routes • Failure of essential services • Isolation
Evacuation Triggers	**Woodburn gauge** 1. **Prediction to reach and/or exceed 3.95m:** Isolation and inundation is occurring in the Swan Bay area. Woodburn Coraki Rd may close from this height between Swan Bay and Woodburn. 2. **Prediction to reach and/or exceed 4.12-4.14:** Individual at-risk, low-lying properties in Sussex, Richmond and Donaldson St's may require doorknocking and monitoring if further rises are expected. 3. **Prediction to reach and exceed 4.2m:** Access towards Woodburn and Evans Head may be lost via River St for areas east of Woodburn Evans Head Rd. 4. **Prediction to reach and/or exceed 4.3m:** Access to Evans Head is lost via Woodburn Evans Head Rd. At this level approx. 15 properties in Woodburn and 1 property in Swan Bay may experience over floor inundation. 5. **Prediction to reach and/or exceed 5.6m**: By 5.6m, approx. 131 properties in Woodburn, 17 properties in Swan Bay, 8 in Doonbah and 2 in Evans Head may experience over floor inundation.

	Note: For predictions of flood levels expected to exceed a 0.2% AEP, or approx. 6.7m at the Woodburn Gauge, messaging for the Evans Head subsectors may need to be considered based on monitoring of conditions. Evans Head Outer subsector (GEMS ID 61903) is modelled to be in the flood extent from this level, Evans Head A (GEMS ID 46012) is not modelled to experience inundation until a PMF, limited data is available on flood consequence**.**
Sequencing of evacuation	1. **For prediction 1:** Swan Bay Subsector (GEMS ID 62300). Watch and Act prepare to Isolate or Emergency Warning Evacuation messaging depending on predicted river levels. 2. **For prediction 3**: Consider Emergency Warning messaging for evacuation of Woodburn subsector A1 (GEMS ID 61896) then Woodburn B1 (GEMS ID 61897) and Woodburn C1 (GEMS ID 61898), and Doonbah (GEMS ID 62301) if flood levels are expected to rise. 3. Based on monitoring of conditions, for predictions 4 and 5, Watch and Act Prepare to Isolate messaging for the for New Italy (GEMS ID 44799) subsector due to expected road closures.
Evacuation Routes	There are two scenarios for evacuation at Woodburn. Due to the limitation in suitable evacuation centres, evacuation to Evans Head is the preferred option (Scenario 1). Where access to Evans Head is no longer possible due to road closures, evacuation should be to Woodburn Public School (Scenario 2). **Scenario 1:** Local roads to Woodburn Evans-Head Rd to Assembly Area at Evans Head Senior Citizens Centre or nominated Evans Head evacuation centre. **Scenario 2:** River St or Woodburn Coraki Rd to Uralba St, to Woodburn Public School.
Evacuation Route Closure	• Woodburn-Coraki Rd between Swan Bay and Woodburn: Low point in road 3.1mAHD, may close from approx. 3.95-4m at the Woodburn gauge. • River St: Approx 4.2m • Woodburn Evans Heads Rd: Approx 4.3m
Method of Evacuation	• Primarily self-evacuation by private transport to higher ground within the Woodburn sector. • Primarily self-evacuation by private transport to nominated evacuation centres/assembly area in Evans Head.
Evacuation Centre/Assembly Point	If flood heights are expected to exceed major flood level or isolation is expected for a prolonged period, preferred locations are in Evans Head, with an initial assembly area at Evans Head Senior Citizens Hall, 23 Cedar St, Evans Head or other nominated evacuation centre in Evans Head. If access to Evans Head is no longer possible, Woodburn Public School is the area of highest ground. It should be noted that evacuation to Evans Head may no longer be possible from approx. 4.2-4.3m due to road closures.

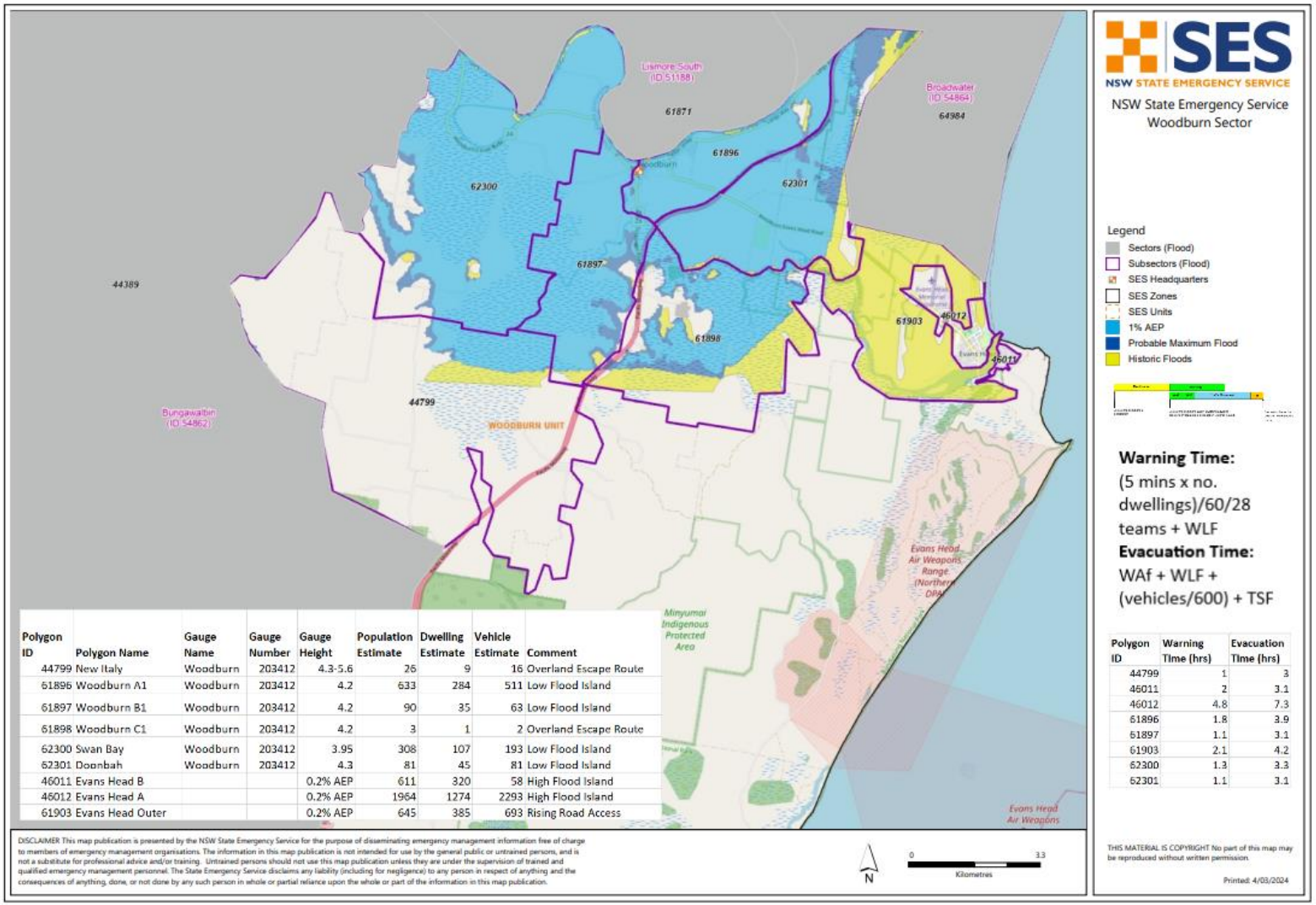
	Woodburn Memorial Hall, which is identified as an assembly area in the Northern Rivers EMPLAN has a floor level of 3.8mAHD, and is likely to be flood impacted in major floods, with high hazard in a 1%AEP. Designated evacuation centres in Evans Head are not within the flood extent until the PMF. At this level, areas of highest ground within Evans Head is represented by subsector Evans Head B.
Large scale evacuations	• When large-scale evacuations are likely, the NSW SES Incident Controller will liaise with the LEOCON and request support of the EOC as required. Large scale evacuations would be unlikely in this sector but if required additional locations will be identified. • Additional locations may be identified in large scale evacuations, or if existing evacuation centres are flood affected or isolated. • Assembly areas may be utilised on higher ground.
Rescue	• The flood rescue management process adopted will be determined by the Incident Controller, based on the scale of the flood rescue operations. • The Incident Controller may declare a flood rescue area of operations and establish a flood cell to assist with the management of flood rescues. • All Flood Rescue Operations will be undertaken as per the State Rescue Policy. • In major floods, parts of the Woodburn sector may only be accessible via boat or helicopter.
	In larger flood events, the Swan Bay and New Italy areas are susceptible to isolation. There are approximately 100 properties in New Italy and 121 in Swan Bay, many of which may require resupply in a major flood event. Resupply may occur via points of designated high ground in these areas.
	Table 21, in Volume 2 of this Flood Emergency Sub Plan provides information about isolated communities in the Richmond Valley area and potential periods of isolation.
Aircraft Management	***Helicopter Landing Points:*** Suitable landing points are located at: • *Woodburn: 29.07394°S 153.3382° E* The Woodburn landing site may be in the flood extent for a 1%AEP, with depths of 0.1m-5m. • *Evans Head: 29.10130 S 153.42034 E* Not modelled to be within the flood extent until a PMF.
	Airports: • The Evans Head Aerodrome has one sealed asphalt runway

	• The airport is a NON certified Aerodrome and is NOT licensed with CASA, with Landing Zone status only. • It has no runway lighting and is suitable for daytime operations only.
Other	Special considerations relating to evacuation: • Closure of schools - coordinated through the Department of Education and Training. • The evacuation of domestic animals, horses and livestock to the appropriate facility to be managed by Department of Primary Industries and Local Land Services. • Closure of licensed premises. All hotels and licensed clubs will be closed if required. • Security. Police patrols to be established to maintain law and order after evacuation has occurred. • The NSW SES will use flood boats, aircraft, community contacts and other agencies to monitor the safety of individuals, where feasible. • These arrangements will stay in place until the "Return with Caution" is provided by the NSW SES to residents to return to their premises.

4.2. WOODBURN SECTOR MAP



4.3. EVACUATION PLANNING



5. BROADWATER SECTOR

5.1. BROADWATER RESPONSE ARRANGEMENTS

Refer to Volume 2: Hazard and Risk in Richmond Valley for more information about this Sector/Community.

Sector Description	The Broadwater Sector includes the suburbs of Broadwater and Rileys Hill.		
Hazard	Richmond River Riverine Flooding, Storm Surge or local catchment flooding. The severity of flooding at Broadwater can be influenced by the dominance of flood levels in the Wilsons River, Richmond River and Bungawalbin Creek.		
Flood Affect Classification	Broadwater is a Low Flood Island		
At risk properties	Broadwater: 203	**Total number of properties within Sector/Community**	Broadwater 329
Sector Control	The SES incident Controller will nominate a Sector commander to control evacuations in this sector. The NSW SES will conduct evacuations in this sector with assistance from NSW Police, Fire and Rescue NSW, and NSW Rural Fire Service (RFS) volunteers.		

Key Warning Gauge Name

Name	AWRC No.	Min (m)	Mod (m)	Maj (m)
Broadwater	203415	2	2.5	3
Woodburn	203412	3.2	3.7	4.2

General Strategy

- Evacuation of at-risk population.
- Self-evacuation to friends/family outside of the impact area.
- Establishment of an Assembly Area/Evacuation Centre in Evans Head where evacuees are able to gather while flood situation is monitored.

Key Risks / Consequences

- Closure of evacuation routes.
- Inundation of a large number of dwellings.
- Potential of isolation to supplies for thousands of people in a large flood event for a number of days.
- Potential loss of life from rapid and potentially high velocity flooding inundation.

Information and Warnings

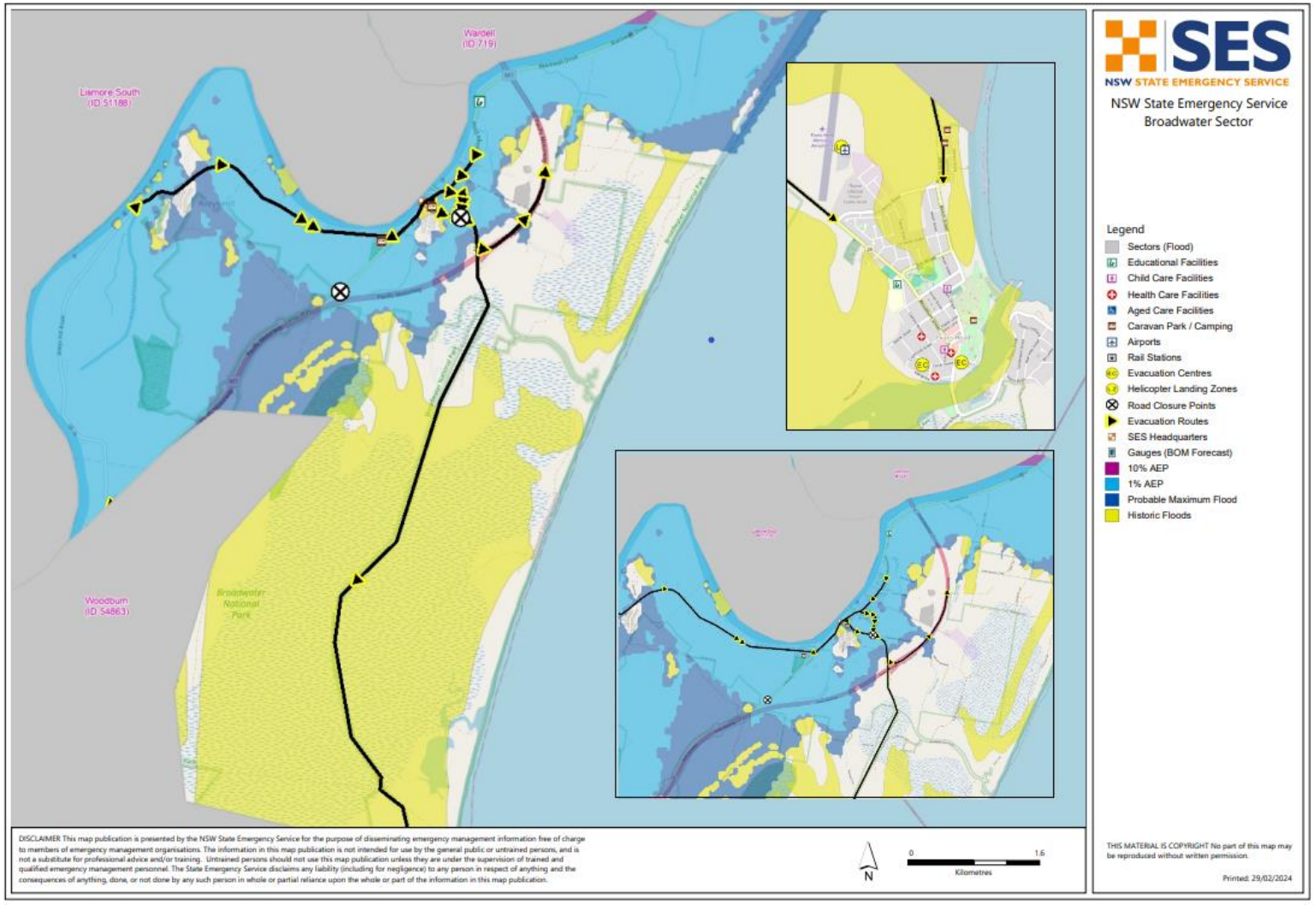
- Flood Watch (BoM)
- Flood Warnings (BoM)
- AWS Advice
- AWS Watch and Act
- AWS Emergency Warning
- Sequenced door knocking of evacuation sector
- Media announcements (including social media)
- Emergency Alerts (SMS, landlines)
- Standard Emergency Warning Signal

	• Door knocking is the initial method of warning, which complements the alerts sent out via the Australian Warning System. • A sequenced approach to door knocking will be considered following the evacuation sequencing outlined below. • In larger scale evacuations warnings may be accompanied by lights and sirens and evacuation messaging over P.A system on SES vehicles along affected streets.
Property Protection	***Specific property protection measures:*** • Relocation of livestock. • Relocation of farm machinery and valuable goods • Control of surface water through sandbagging measures. • Assist in the lifting of furniture to residents in need. • Monitoring integrity of dwellings surrounded by flood waters.
	Assistance with property protection: Refer to Chapter 4: Caravan Park Arrangements
	Protection of essential infrastructure: • Water supply is through a distribution system to Broadwater and Rileys Hill through Langs Hill Reservoir. • Sewage to Broadwater is serviced through a pressure sewer system with sewage transferred by pump and rising main to Evans Head Sewerage Treatment Plant for treatment. Individual sewerage components may be liable to damage in major floods, and requires liaison with Richmond Valley Council.
Evacuation and/or Isolation Triggers	Evacuation may be considered due to: • Inundation of property. • Closure of primary evacuation routes. • Failure of essential services
Evacuation/ Isolation Triggers	Broadwater gauge is not a Bureau of Meteorology forecast gauge, and predictions to the Woodburn Gauge may be utilised for warning purposes, with consideration of targeted warning to Broadwater upon receipt on Moderate or Major Flood warning for the Woodburn Gauge. Evacuation or other messaging will be considered when: 1.) **Heights expected to reach and exceed 3.2m at the Broadwater Gauge:** Rileys Hill Rd becomes impassable either side of Rileys Hill, isolating up to 200 people. At this height approximately 2 properties in Broadwater and 1 in Rileys Hill may be experiencing over flood inundation. 2.) **Heights expected to reach and exceed 3.3m at the Broadwater Gauge**: Evans Head Broadwater Rd may close east of the Sunrise Caravan Park, isolating Broadwater from Evans Head. Progressive over-floor inundation occurs at levels rise, and by 3.6m, approximately 16 properties may be experiencing above floor inundation along the old Pacific Highway (River St), Fischer, Fletcher, Byrnes and George Steets.

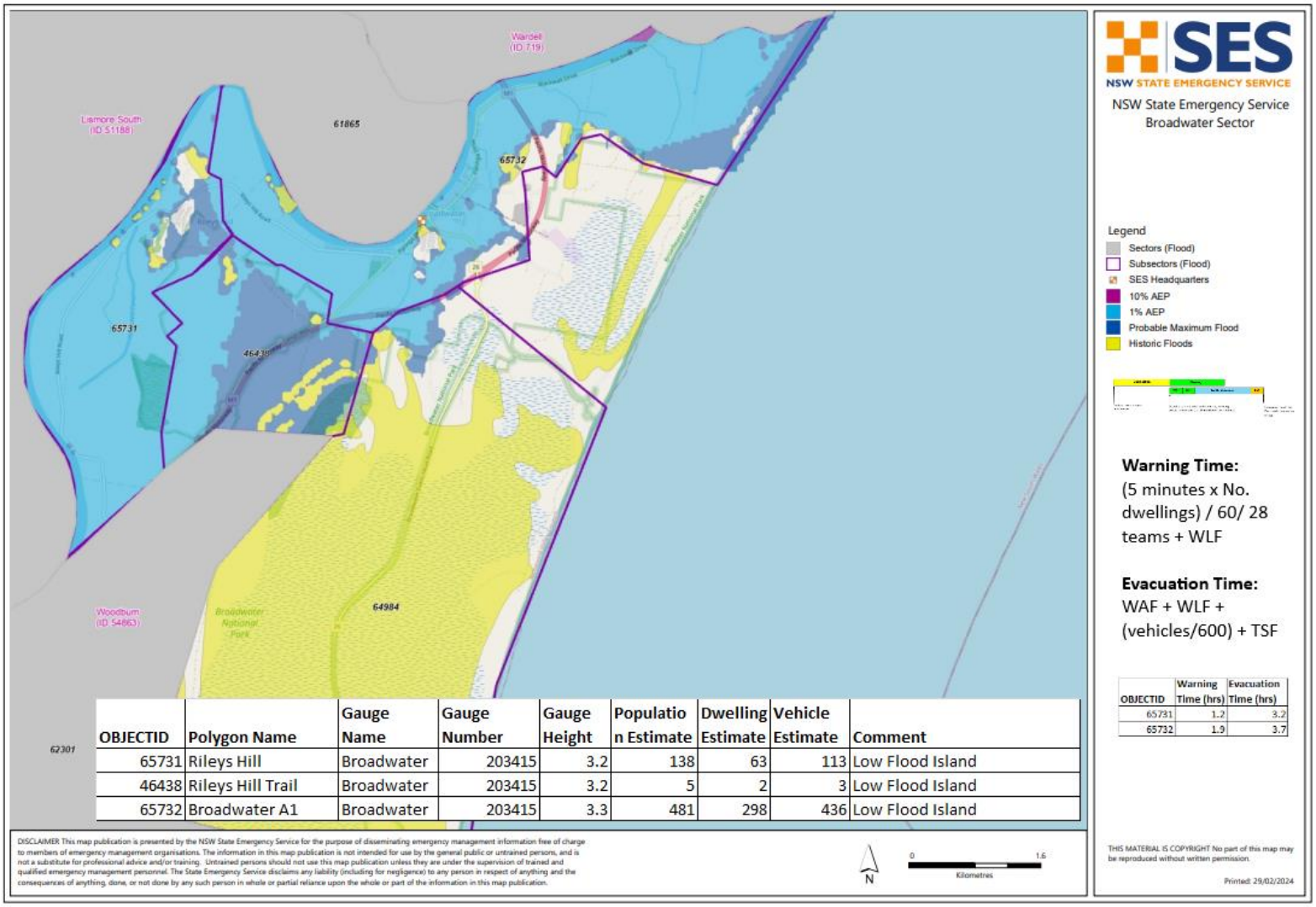
	3.) **Heights expected reach and/or exceed 4.3m at the Broadwater Gauge:** Significant over-floor inundation of property may occur at this height in Broadwater (78 properties), with some inundation (3 properties) in Rileys Hill.
Sequencing of evacuation	**For Prediction 1**: Emergency Warning Messaging for Rileys Hill subsector (GEMS ID 65731) and Rileys Hill Trail (GEMS ID 46438). **For Prediction 2:** Emergency Warning Messaging for evacuation of Broadwater A1 subsector (GEMS ID 65732).
Evacuation Routes	**For Rileys Hill:** Rileys Hill Rd to Broadwater-Evans Head Rd. **For Broadwater:** Local roads to Broadwater Evans Head Rd towards Evans Head Senior Citizens Centre or other nominated evacuation centre in Evans Head. **Alternate Route via Pacific Motorway:** The Broadwater-Evans Head Road on and off ramps for the Pacific Motorway are modelled to close later in an event than Broadwater Evans Head Rd (between 3-7 hours later in a 2%-1% AEP). Northbound immunity of the Pacific Motorway between Broadwater and Ballina is between 5% and 1% AEP and evacuation towards evacuation centres to the north, including Alstonville or Ballina may be a viable option.
Evacuation Route Closure	• Rileys Hill Rd closes at approx. 3.2m at the Broadwater Gauge. • Broadwater-Evans Head Rd closes from approx.. 3.3m at the Broadwater gauge.
Method of Evacuation	Primarily self-evacuation by private transport to higher ground within Evans Head. Primarily self-evacuation by private transport to nominated evacuation centres/assembly areas (Evans Head Senior Citizens Hall or other nominated centre in Evans Head)
Evacuation Centre/Assembly Point	There is no designated evacuation centre in Broadwater suitable in floods greater than a 5% AEP. Broadwater Community Hall is the only designated Assembly Area in Broadwater. It is not suitable as an evacuation centre and will be within the flood extent for events larger than a 5% AEP. The most appropriate Evacuation Centres are in Evans Head, with initial Assembly at Evans Head Senior Citizens Hall. Evacuation is essential before the closure of Broadwater Evans Head Rd. Alternate locations in Alstonville or Ballina may be determined if evacuation via the Pacific Motorway is determined to be the most viable option based on local conditions.
Large scale evacuations	• When large-scale evacuations are likely, the NSW SES Incident Controller will liaise with the LEOCON and request support of the EOC as required. Large scale evacuations would be unlikely in this sector but if required additional locations will be identified. • Additional locations may be identified in large scale evacuations, or if existing evacuation centres are flood affected or isolated. • Assembly areas may be utilised on higher ground.

Rescue	• The flood rescue management process adopted will be determined by the Incident Controller, based on the scale of the flood rescue operations. • The Incident Controller may declare a flood rescue area of operations and establish a flood cell to assist with the management of flood rescues. • All Flood Rescue Operations will be undertaken as per the State Rescue Policy.
	In large flood events, Broadwater may only be accessible by boat or helicopter.
Resupply	In larger flood events, both Broadwater and Rileys Hill may be subject to isolation.
	There are approximately 68 properties in Rileys Hill which may be vulnerable to isolation due to the closure of Rileys Hill Rd.
	Table 21, in Volume 2 of this Flood Emergency Sub Plan provides information about isolated communities in the Richmond Valley area and potential periods of isolation.
Aircraft Management	***Helicopter Landing Points:*** The closest designated landing points are located at Woodburn and Evans Head. • *Woodburn: 29.07394°S 153.3382° E* - The Woodburn landing site may be in the flood extent for a 1%AEP, with depths of 0.1m-5m. • *Evans Head: 29.10130 S 153.42034 E* - Not modelled to be within the flood extent until a PMF.
	Airports: • There is no airport located in the Broadwater sector. The closest airports are located in Ballina or Lismore.
Other	Special considerations relating to evacuation: • Closure of schools - coordinated through the Department of Education and Training. • The evacuation of domestic animals, horses and livestock to the appropriate facility to be managed by Department of Primary Industries and Local Land Services. • Closure of licensed premises. All hotels and licensed clubs will be closed if required. • Security. Police patrols to be established to maintain law and order after evacuation has occurred. • The NSW SES will use flood boats, aircraft, community contacts and other agencies to monitor the safety of individuals, where feasible. • These arrangements will stay in place until the "Return with Caution" is provided by the NSW SES to residents to return to their premises.

5.2. BROADWATER SECTOR MAP



5.3. EVACUATION PLANNING



OBJECTID	Polygon Name	Gauge Name	Gauge Number	Gauge Height	Population Estimate	Dwelling Estimate	Vehicle Estimate	Comment
65731	Rileys Hill	Broadwater	203415	3.2	138	63	113	Low Flood Island
46438	Rileys Hill Trail	Broadwater	203415	3.2	5	2	3	Low Flood Island
65732	Broadwater A1	Broadwater	203415	3.3	481	298	436	Low Flood Island

RICHMOND VALLEY NSW SES
CARAVAN PARK ARRANGEMENTS

Chapter 4 of Volume 3 (NSW SES Response Arrangements for Richmond Valley) of the Richmond Valley Flood Emergency Sub Plan

Last Update: March 2024

CONTENTS

LIST OF TABLES

1 ARRANGEMENTS FOR THE EVACUATION OF CARAVAN PARKS AND THE RELOCATION OF MOVABLE DWELLINGS

1.1 GENERAL

1.1.1 The following caravan parks are flood liable:

a. Broadwater Sunrise Caravan Park

b. Broadwater Stop Over Tourist Park

c. Coraki Caravan Park

d. Casino Showground

e. Discovery Parks Casino

f. Big 4 Casino Resort

g. Browns Caravan Park

h. Riverside Village

1.1.2 For more information on individual caravan parks see Table 1 and **Error! Reference source not found.** at the end of this Chapter.

1.2 ADVISING PROCEDURES

1.2.1 Caravan Park proprietors will ensure that the owners and occupiers of movable dwellings are:

a. Made aware that the caravan park is flood liable by:

- Providing a written notice to occupiers taking up residence. The notice will indicate that the caravan park is liable to flooding and designate the location of flood liable land within the park (1).
- Displaying this notice and the emergency arrangements for the Caravan Park prominently in the park.

b. Made aware that if they are expecting to be absent for extended periods, they should:

- Provide the manager of the caravan park with a contact address and telephone number in case of an emergency.
- Leave any movable dwelling in a condition allowing it to be relocated in an emergency (i.e.: should ensure that the wheels, axles and draw bar of the caravans are not removed, and are maintained in proper working order).

c. Informed of Flood Warning Information. At this time, occupiers will be advised to:

- Ensure that they have spare batteries for their radios.
- Listen to a local radio station for updated flood information.
- Prepare for evacuation and movable dwelling relocation.

1.2.2 The NSW SES Local and/or Unit Commander will ensure that the managers of caravan parks are advised of Flood Information (described in Volume 1 of the Richmond Valley Local Flood Plan).

1.3 EVACUATION OF OCCUPANTS AND RELOCATION OF MOVEABLE DWELLINGS

1.3.1 When an evacuation order is given caravan park occupants should follow the flood evacuation procedures for the park under the direction of the caravan park management. This should include advice to:

a. Isolate power to moveable dwellings.

b. Collect personal papers, medicines, a change of clothing, toiletries and bedclothes.

c. Lift the other contents in any remaining dwellings as high as possible.

d. Move to friends, relatives or a designated evacuation centre if they have their own transport, or move to the caravan office to await transport.

e. If undertaking self-managed evacuation, register their movements with the caravan park management upon leaving the park.

1.3.2 Where possible, movable dwellings that can be moved will be relocated by their owners. Park managers will arrange for the relocation of movable dwellings as required. Council and NSW SES personnel may assist if required. Vans are to be moved to the locations outlined in Tables 1 and 2 at the end of this Chapter.

1.3.3 Caravan park managers will:

a. Secure any movable dwellings that are not able to be relocated to prevent floatation.

b. Ensure that their caravan park is capable of being evacuated in a timely and safe manner.

c. Advise the NSW SES Local and/or Unit Commander of:

- The number of people requiring transport.
- Details of any medical evacuations required.
- Whether additional assistance is required to effect the evacuation.

d. Check that all residents and visitors are accounted for.

e. Inform the NSW SES Local and/or Unit Commander when the evacuation of the caravan park has been completed.

f. Provide the NSW SES Local and/or Unit Commander with a register of people that have been evacuated.

1.4 RETURN OF OCCUPANTS AND MOVEABLE DWELLINGS

1.4.1 The NSW SES Local and/or Unit Commander, using council resources as necessary, will advise when it is safe for the caravan parks to be re-occupied.

1.4.2 Moveable dwellings will be returned back to the caravan park(s) by owners or by vehicles and drivers arranged by the park managers.

1.4.3 Council and NSW SES personnel may assist by request where resources are available.

Table 1: Caravan Parks at risk of Inundation and/or Isolation from Flooding.

Name	Address/Location description	Town/Sector	Number of sites	Risk	Evacuation route	Evacuation route closure	Moveable dwelling relocation location	Evacuation centre	Notes
Broadwater Sunrise Caravan Park	8 Broadwater-Evans Head Rd	Broadwater	Powered and unpowered sites	May experience inundation, with surrounding road closures from 3.3m at the Broadwater gauge.	Broadwater-Evans Head Rd to Evans Head.	3.3m at the Broadwater Gauge – Broadwater-Evans Head Rd near the Park entrance.	High ground in Evans Head	Nominated Evacuation Centres in Evans Head	3.3m at Broadwater gauge, flooding affects roads around caravan park
Broadwater Stop Over Tourist Park	1-5 Pacific Highway	Broadwater	Cabins and Powered sites.	May experience inundation.	Broadwater-Evans Head Rd to Evans Head.	Paringa Drive at approx. 3.2m at the Broadwater Gauge, Broadwater-Evans Head Rd at approx. 3.3m at the Broadwater Gauge.	High ground in Evans Head	Nominated Evacuation Centres in Evans Head	
Coraki Caravan Park	81 Richmond Terrace	Coraki	Approx 30 campsites.	Inundation begins from 3.8m, completely inundated by 5m at the Coraki gauge.	Richmond Terrace towards Adams St	Richmond Terrace becomes inundated from approx. 6m.	High ground in Richmond Terrace, or high ground in the vicinity of Belmore and Donaldson St's in events	Coraki Public School	

							expected to exceed 6m at the Coraki Gauge.		
Casino Showground	Summerland Way	Casino	Short term capacity for up to 12 vans.	May experience some inundation from southern and south eastern aspects from a 1%AEP, parts of Showground are modelled to remain flood free up to a PMF.	Summerland Way towards Centre St	-	High ground within Showground.	Nominated evacuation Centre in Casino (In an extreme flood event, Casino High School is the most suitable)	
Discovery Parks Casino	115 Johnston St	Casino	4 permanent caravans, 27 unpowered sites, 17 powered sites, 42 cabins	May experience some inundation from approx. 2%AEP.	Johnston St towards Casino High School or other nominated centre in Casino.	Johnston St	Parking lot or high ground in the vicinity of Casino Golf Club	Nominated evacuation Centre in Casino (In an extreme flood event, Casino High School is the most suitable)	
Big 4 Casino Resort	69 Light St	Casino	128 powered sites, 9 unpowered sites + cabins	May experience some inundation in a PMF.	Local roads towards Casino High School or other nominated	-	High ground along Light St	Nominated evacuation Centre in Casino (In an extreme flood event, Casino High	

					centre in Casino.			School is the most suitable)	
Browns Caravan Park	58-60 Hare St	Casino	31 powered sites	Has rising road access, may experience inundation in a PMF.	Local roads towards Casino High School or other nominated centre in Casino.	-	High Ground/parking areas near Crawford Square (Centre St, Casino)	Nominated evacuation Centre in Casino (In an extreme flood event, Casino High School is the most suitable)	
Camp Koinonia	29-41 Terrance St	Evans Head	50 cabins, plus powered and non-powered sites.	May have some inundation in a PMF	Local roads towards Beech St	-	Modelling indicates it is unlikely to affected until a PMF.	Nominated Evacuation Centres in Evans Head.	
Freedom Camping (New Italy Museum Carp Park)	Pacific Highway	New Italy	Rear carpark utilised for short term use of vehicles and caravans.	May become isolated by road.	Access is Via Pacific Motorway.	Swan Bay New Italy Rd and Pacific Motorway	Rest area is likely to remain flood free up to the PMF.	-	

LIST OF REFERENCES

1. **NSW Government.** *Local Government (Manufactured Home Estates, Caravan Parks, Camping Grounds and Moveable Dwellings) Regulation 2005 Part 3 Division 3 Subdivision 7 Clause 123.* 2005.

2. **NSW Government.** *Northern Rivers Local Emergency Management Plan.* 2021

3. **WBM, BMT.** *Richmond River Flood Mapping Study Final Report.* 2010.

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5. Oceanics, WBM. *Casino Floodplain Risk Management Plan.* 2002.

6. **Bureau of Meteorology.** *Service Level Specification for Flood Forecasting and Warning Services for NSW and the ACT - Version 3.13.*

7. **Bewsher Consulting.** *Intelligence Collection for the Richmond and Tweed Rivers.* NSW SES-In-Confidence*.* 2008.

8. **NSW State Emergency Service.** *Coraki Flood Intelligence Card. NSW* SES-In-Confidence, Last Updated December 2023.

9. **NSW State Emergency Service.** *Woodburn Flood Intelligence Card.* NSW SES-In-Confidence, Last Updated December 2023.

11. **NSW State Emergency Service.** *Casino Flood Intelligence Card.* NSW SES-In-Confidence, Last Updated December 2023.

12. **NSW State Emergency Service.** *Bungawalbin Flood Intelligence Card.* NSW SES-In-Confidence, Last Updated December 2023.

10. **NSW State Emergency Service.** *Broadwater Flood Intelligence Card.* NSW SES-In-Confidence, Last Updated September 2021.