NSW STATE EMERGENCY SERVICE

Lismore City

Local Flood Emergency Sub Plan

FloodSafe

LISMORE CITY FLOOD EMERGENCY SUB PLAN

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

Volume 1 of the Lismore City Flood Emergency Sub Plan

Endorsed by the Northern Rivers Local Emergency Management Committee

Endorsed date……22/08/2023

AUTHORISATION

The Lismore City Flood Emergency Sub Plan is a sub plan of the Lismore City 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	Lismore City Local Flood Plan	November 2006
2	Lismore City Local Flood Plan	August 2013
3	Lismore City Local Flood Plan	March 2018

AMENDMENT LIST

Suggestions for amendments to this plan should be forwarded to:

Manager Emergency Planning
NSW State Emergency Service
PO Box 6126, Wollongong NSW 2500
nswses.communityplanning@ses.nsw.gov.au

Amendments in the list below have been entered in this plan.

Amendment Number	Description	Updated by	Date

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 Lismore City 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 Lismore City LGA. The Lismore City 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 Lismore City level emergency management arrangements for prevention, preparation, response and initial recovery for flooding in the Lismore City 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 This plan outlines the local level arrangements for the management of downstream consequences of flooding due to dam failure, however it does not cover the management of flooding of an underground mine by inrush or other cause, which should be covered by the Mine Emergency Sub Plan for the respective mine.

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 Lismore City 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 Dam Failure Notification Flowchart.

c. 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 Lismore City LGA.

2.1.2 Declared dams in or upstream of the Lismore City Local Government Area.

Dam Name	Owner	Dam Hazard Rating
Rocky Creek Dam	Rous County Council	High C

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 maintains 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. Dam Owners will provide Dam Emergency Plans (where required) and consult with NSW SES on alert levels and messaging. Alert level definitions are listed in Dam Emergency Plans.

f. NSW SES maintains a dedicated dam failure hotline and procedures to ensure priority dissemination of dam failure warnings.

g. 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.

h. 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. On receipt of a dam safety alert; or

e. 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 facilities 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 – Detailed - issued for all capital cities and surrounding areas when individual severe thunderstorms are within range of the capital city radars.
- 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 system where relevant to provide warnings and information to NSW SES, key stakeholders and the community.

c. Dam Owners will utilise the Dam Emergency Plan to provide warnings and information to NSW SES and communities (where appropriate).

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

- Advice.
- Watch And Act.
- Emergency Warning.

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

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

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

h. 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.

i. 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.

j. 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. Lismore City 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 Lismore City 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 NSW SES local Flood Emergency Sub Plan. In addition, Local and Region EMPLAN's contain 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.
- Dam safety assessment and dam stability.
- 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 Lismore City 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 Lismore City Council(s) 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 SECON 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 Lismore City 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.
Lismore City	**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. • Maintain Dam Emergency Plans for the [Lismore City] dams and provide copies to NSW SES. • Provide information on the consequences of dam failure to NSW SES for incorporation into planning and flood intelligence. • 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.

AGENCY	RESPONSIBILITIES
	– 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. – 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 where appropriate. • 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)	• Prepare a flood emergency plan for the Caravan Park.

AGENCY	RESPONSIBILITIES
	• 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: – 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.

AGENCY	RESPONSIBILITIES
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: • 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	• If requested by the NSW SES Incident Controller, advise appropriate

AGENCY	RESPONSIBILITIES
Management Officer (LEMO)	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.
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.
Rous County Council	• Fulfil the roles and responsibilities as Owners of Declared Dams outlined in the State Flood Plan. • Undertake dam safety and dam stability assessments in consultation with Dam Safety Consultants. • Maintain responsibility for the operations of Rous County Council owned assets; including the Emigrant Creek Water Treatment Plant and water infrastructure. • Undertake Flood Mitigation activities related to Rous County Council owned assets.

AGENCY	RESPONSIBILITIES
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 NSW	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	• Transport for NSW coordinates information on road conditions for emergency services access. • Transport for NSW coordinates the management of the road network across all modes of transport. • Transport for NSW 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 (examples only)

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 LISMORE CITY

Volume 2 of the Lismore City Flood Emergency Sub Plan

Last Update: November 2023

FloodSafe

AUTHORISATION

The Hazard and Risk in Lismore City 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: 16/11/2023

Approved

Signature: _____

NSW SES North Eastern Zone Commander/ Deputy Zone Commander

Print Name Superintendent Joanna Jones (DZC)

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
Lismore City Flood Emergency Sub Plan Volume 2	2006

AMENDMENT LIST

Suggestions for amendments to this Volume should be forwarded to:

Manager, Emergency Risk Manager

NSW State Emergency Service

PO Box 6126, Wollongong NSW 2500

nswses.communityplanning@ses.nsw.gov.au

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

Amendment Number	Description	Updated by	Date

Document Issue: Version 3-02052016

1 THE FLOOD THREAT

1.1 OVERVIEW

a. The local government area (LGA) of Lismore is located within the Richmond River Basin, approximately 200km south of Brisbane and 700 kilometres (km) north of Sydney. The Richmond River Basin consists of two distinct river catchments: the Wilsons River Catchment on the north-east of the basin (north of Lismore), and the larger Richmond River catchment on the western and southern sections of the river basin (1).

b. The Lismore LGA includes the urban areas of Lismore as well as the rural villages of Bexhill, Clunes, Dunoon, Eltham, Modanville, Nimbin, The Channon and Wyrallah as well as many smaller settlements (1).

c. The landscape is made up of rural and residential land and includes significant areas of National Parks and nature reserves, including Nightcap National Park, Whian Whian State Conservation Area, Boatharbour, Tuckean, Bungabbee, Tucki Tucki, Muckleewee and Wilson Nature Reserves (2).

d. Much of the rural land use is dairy farming, macadamia nut, coffee, tea tree, tropical fruit and sugar growing and cattle and pig farming (2).

e. Over 60% of the population is based in the urban areas of the Lismore CBD, South Lismore, North Lismore and East Lismore, and the smaller villages of Bexhill, Clunes, Dunoon, Nimbin and Wyrallah.

f. Lismore has a subtropical climate, with hot, wet summers and mild drier winters. Most rainfall is experienced between December and May.

g. The population of Lismore, as recorded in the 2021 Census, is 44,334. See Table 6 for more detail regarding the specific areas of the Lismore area and the population numbers recorded in the 2021 census (3).

h. Lismore is one of the major emergency retrieval health facilities for the Northern Rivers region, with both Lismore regional airport and the Westpac Rescue Helicopter helipads at Lismore Base Hospital and Nimbin Soccer Fields being key community assets (2).

1.2 LANDFORMS AND RIVER SYSTEMS

Richmond River Catchment

a. **The Upper Richmond:** The Richmond River flows in a north-south direction from its source in the McPherson Range on the Queensland/New South Wales border. The first major tributary, Eden Creek, joins the river between Kyogle and Casino. The

river continues through Casino, and the village of Tatham, to its confluence with the Wilsons River at Coraki. The river upstream of Coraki is known as the Upper Richmond and drains an area of approximately 1,800 square kilometres.

b. **The Mid Richmond:** The river continues southwards downstream of Coraki until it meets Bungawalbin Creek. At this point the river winds in an easterly direction to Woodburn. Downstream of Woodburn the river turns to flow in a north-easterly direction passing Broadwater, Wardell and finally Ballina before reaching the ocean. There is a natural constriction in the river and floodplain at the township of Broadwater. The constriction acts to hold floodwaters in the extensive floodplain 'basin' between Broadwater, Woodburn and Coraki. This floodplain 'basin' is known as the Mid Richmond.

c. Whilst the majority of the Lismore LGA lies within the Wilsons River catchment, parts of its southern sector falls within the Richmond River catchment, and include Tregeagle, Marom Creek, Tuckurimba, Dungurabba, East Coraki, Kilgin, Buckendoon, North Woodburn and Green Forest.

Wilsons River Catchment

a. The Wilsons River is a major tributary of the Richmond River, which enters the Richmond on the coastal plain at Coraki.

b. Lismore is located at the southern end of the catchment at the confluence of Wilsons River and Leycester Creek. The total catchment area at Lismore is approximately 1,400 square kilometres (the Leycester Creek sub-catchment has an area of 900 square kilometres, and the Wilsons sub-catchment an area of 500 square kilometres (1).

c. These two tributaries themselves have several contributing arms, each of approximately the same stream length and catchment area. The Wilsons River and Coopers Creek drain the eastern section of the catchment. Leycester Creek, and its tributaries Terania Creek, Goolmangar Creek and Back Creek, drain the central and western sections. This catchment configuration, combined with the steep terrain of the catchment, results in a rapid concentration of rainfall run-off at Lismore; often with coincident peak flows from the upstream catchments.

d. The Leycester Creek floodplain is approximately 2 to 2.5 metres higher than the Wilsons River floodplain. This causes the Wilsons River to act as a natural retention basin. During the very early rising stages of a flood it is not uncommon for floodwaters from the Leycester Creek to backup into the Wilsons River.

e. Tidal extents of the Wilsons system are 113km and 115km upstream of the river entrance within the Wilsons River and Terania Creek respectively (4).

1.3 STORAGE DAMS

a. Dam locations are shown on Map 1; Richmond River Basin and Map 10, The Channon & Dunoon Town map.

Table 1: Prescribed Dams in Lismore City LGA; summary of information about each storage.

Rocky Creek Dam (5)	
Owner / Operator	Rous County Council
Description of Dam	Rocky Creek Dam is the principal source of water for Rous Regional Supply, which supplies water in bulk to Lismore, Byron, Ballina and Richmond Valley LGAs. It is a rock fill embankment with an impervious central clay core. It has an embankment height of 28m and embankment length of 220m. There is an un-gated overflow spillway. Reservoir capacity is 13,2 Giga litres and the contributing catchment area is 30km^2.
Location	Located approximately 20km north of urban Lismore on the confluence of Rocky and Gibbergunyah Creeks. It lies within the Lismore LGA and Richmond River Basin.
Communities Downstream	The area immediately downstream of Rocky Creek Dam is a picnic area maintained by Rous County Council. Further downstream, houses that may potentially be at risk are located in the following streets in The Channon, Keerrong and Goolmangar: Whian Whian Rd, The Channon Rd, Keerrong Rd, Terania St, Koonorigan Rd, Tuntable Creek Rd, Pinchin Rd, Terania Creek Rd, Keerrong Bridge Rd. In a larger flood event with dambreak (greater than 1%AEP), downstream effects may be observed in the vicinity of the Leycester and Terania Creek confluence and into South Lismore. 8 properties may be affected in a Sunny Day failure, and up to 357 in a Dam Break Flood with PMF (324 of which would have already been affected in a PMF, therefore incrementally 33).
Monitoring System	Water levels are monitored via SCADA telemetry, Routine visual inspections, rainfall gauge, piezometers, seepage, seismic monitoring.
Warning System	There is a SCADA system with pre-set alert levels to alert Rous staff. NSW SES State OCC to be notified by Rous County Council Emergency Coordinator if an alert is issued as per Dam Safety Emergency Plan.
Other	No known safety deficiencies. Remedial works carried out in 2009 to allow dam to pass PMF level.

1.4 WEATHER SYSTEMS AND FLOODING

a. Flooding at Lismore shows strong seasonality, with the majority of recorded floods occurring between January and July. This seasonality of flooding is the result of two

distinct weather patterns; tropical cyclones and intense depressions, or East Coast Lows, 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 300km away.

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

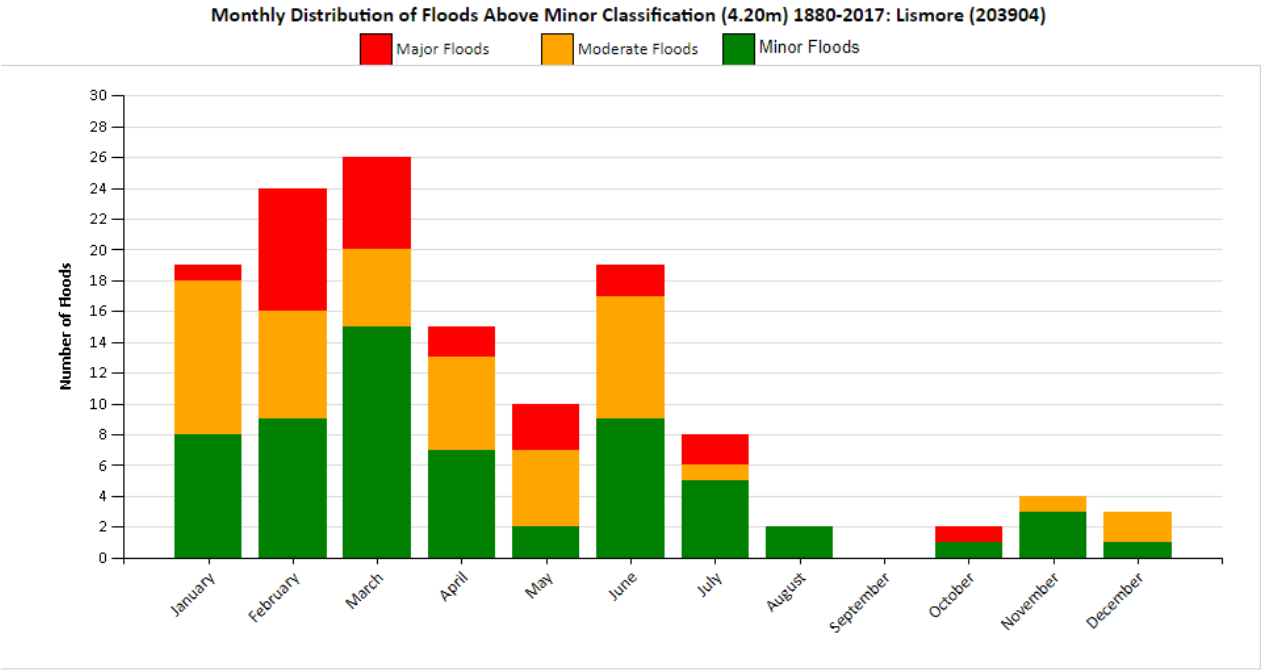
d. These depressions may develop at any time, but the flood rain events are most likely during that part of the year when sea surface temperatures are high and the air is humid. As tropical cyclones can also be expected at this time, most flood events in the Wilsons and Richmond River catchments occur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

e. Floods in the Wilsons River catchment can originate from either short intense rainfall bursts, or longer duration heavy rainfall in the upper part of the catchments above Lismore.

f. Floods in the mid-Richmond River basin, originate from one or more sources. Rainfall over the Richmond River, Wilsons River or Bungawalbin Creek catchments, and localised rainfall that is unable to drain because of relatively flat topography, high embankments and/or constrictions caused by flood drainage structures (1).

g. The pattern and distribution of rainfall across the Leycester Creek and Wilsons River sub-catchments has an important effect on flood behaviour across the Lismore LGA (6). Concentrated rainfall over any tributaries of these sub-catchments, such as Terania Creek into Leycester Creek, can have important effects on both flood levels and when warnings are received due to placement of gauges along the system (7).

Figure 1: Monthly distribution of floods above minor at the Lismore Rowing Club Gauge.



1.5 CHARACTERISTICS OF FLOODING

a. **Upper Wilsons River:** Upstream of the confluence of the Wilsons River and Leycester Creek, the catchment above Lismore is fan shaped and the valleys and streams are steep (6). Flooding in this area rises and falls quickly and is generally contained within the stream banks, although the villages of Goolmangar, Blakebrook, The Channon, Keerong and Koonorigan, small areas of low-lying farmland and a number of local roads can be inundated. Floodwaters concentrate at the junction of the Wilsons and Leycester Creek where flooding from the entire upstream catchment has to squeeze through a narrow section of floodplain at Lismore (1).

b. **Lismore:** The urban area of Lismore is located at the confluence of the Wilsons River and Leycester Creek and is subject to flooding from both of these streams. At the confluence, the Leycester Creek floodplain is approximately 2 to 2.5m higher than the Wilsons River floodplain. This causes the upper section of the Wilsons River to act as a natural detention basin (6). As a result, flood slope within Lismore can be considerable. This means that care needs to be taken when relating flood heights to the Lismore water level gauge (203904 - 58176) as water levels upstream of Lismore can be comparatively much higher than within the town itself.

c. Flood behaviour can also be influenced by localised features such as Hollingworth Creek which functions as a drain until the levee is overtopped, but then becomes a major floodway (6).

d. The effects of flooding in Lismore can vary depending on the location of heavy rain, that is whether the Wilson River or Leycester Creek flooding is more dominant and upon the magnitude and timing of flows in these streams. Depending on which area is in flood, it can substantially affect at what height the levees within urban Lismore are overtopped. The most severe flooding in Lismore has occurred when high flows in both streams have coincided (8).

e. Modelling has shown that flood levels throughout Lismore tend to be dominated by the magnitude of the Leycester Creek catchment inflows, and a reduction in the magnitude of flow from this branch has a larger reduction in predicted flood levels compared to the Wilsons River inflows (9).

f. In the instance a flood event is dominated by Leycester Creek flooding, flow direction in the Wilsons River branch can reverse as this wider floodplain storage is filled (9).

g. The Central and Southern parts of urban Lismore are protected to approximately a 10% Annual Exceedance Probability (AEP) by levees. Evacuations are required from Lismore when the predicted river heights are expected to exceed the design levels of these levees. North Lismore does not have any levees and therefore is usually the first part of Lismore to flood, requiring evacuation.

h. Warning lead times of flooding at Lismore can be short. The average rate of rise for recorded floods (1974, 1998) and design floods up to the 1% AEP flood indicates an average rate of rise of around 0.5 metres per hour. In rarer floods the rate of rise can be as high as 1 metre per hour and localised or short-term rates can be up to 1.5 metres per hour. A Probable Maximum Flood (PMF) could produce rates of rise of up to 3.0m per hour (6).

i. Modelling has shown that from the time 5m AHD is reached at the Lismore Rowing Club gauge that a minimum of 5 hours may be available before the Rowing Club gauge reaches 10m AHD. In the 1974 flood the time between reaching 5m AHD and 10m AHD on the Rowing Club gauge was approximately 9 hours (1). During the 2017 floods, this time was approximately 12 hours. In the February 2022 floods it was approximately 17 hours (10).

j. The time available to prepare for and carry out an evacuation will depend on rate of rise in the river, as shown below. These times assume the decision to evacuate is made when the river is at approximately 5m AHD. It should be noted these times are a guide only, and will vary between flood events. The exact time available for evacuation will also vary depending on the evacuation district.

Table 2: Expected time available for evacuation based on rate of river rise, based on gauge readings at Lismore Rowing Club Gauge (6)

Rate of Rise In the River	Time Between Flood Warning & Overtopping of Evacuation Routes
0.5 m/hr	6.5 – 10.0 hrs
1.0 m/hr	3.0 – 5.0 hrs
1.5 m/hr	2.0 – 3.5 hrs
3.0 m/hr	1.5 hrs

k. The characteristics of flooding in specific parts of the Lismore LGA are further described in Section 2 - Specific Risk Areas.

l. **Wilsons River- Downstream of Lismore:** The Wilsons River floodplain narrows just South of Lismore near Gundurimba. This constriction is approximately one kilometre along the length of the river. The floodplain then becomes progressively wider until it merges with the Richmond River above Coraki. In this area between the two rivers, the complex pattern of flooding once again varies with the relative flows in each river. It is made more complex by flows joining the river from Pelican Creek (1).

m. During lower levels of flooding, water movement east of the Wilsons River is restricted by flood control structures such as the Tuckurimba levee. However, once these are overtopped, floodwaters move eastward and fill up low-lying areas including the Tuckean Swamp (1).

n. **Mid-Richmond River- Downstream of Coraki:** It is possible to have a flood in one of the streams (Wilsons River, Richmond River, or Bungawalbin Creek) and not have a major flood in the Mid Richmond River. Conversely, flooding can occur as a result of heavy rain in any of the catchments. When significant rainfall occurs in all three catchment areas, flooding is usually extensive (1).

o. Floodwaters which have flowed out of the Lower Wilsons River and filled the Tuckean Swamp and surrounding areas, are joined by water from the Mid Richmond River. These combined floodwaters eventually flow back into the Richmond River at Broadwater (1)

p. At Woodburn, floodwaters from the Richmond River can flow through flood mitigation works on the Tuckombil Canal and into the Evans River, entering the Pacific Ocean at Evans Head. The Tuckombil Canal also takes floodwaters from the catchment of the relatively short Rocky Mouth Creek (1).

q. Table 3 below outlines indicative flow travel time between selected locations in the Lismore area. It is important to note that these times may vary between floods, and

Table 3: Indicative Flow Travel Time between select locations in the Richmond River Basin

Locations	Travel Time
Nashua to Lismore	18 to 21 hours
Nimbin to Lismore	8 to 21 hours
The Channon to Lismore	5 to 25 hours
Bentley to Lismore	4 to 23 hours
Lismore to Coraki	12 to 15 hours
Coraki to Bungawalbin Junction	3 to 6 hours
Coraki to Woodburn	10 to 13 hours
Coraki to Broadwater	10 to 20 hours

Flood design heights

r. The following table details the gauge height for a number of design flood events at selected gauges (9).

Table 4: Design flood events at select Lismore gauges (9)

Design event	Lismore (Rowing Club) Gauge (mAHD) 203904 - 58176	Woodlawn Gauge (mAHD) 203402 - 558012	Tuncester Gauge (mAHD) 203443 - 058201	East Gundurimba Gauge (mAHD) 203427 - 558047
10% AEP	10.97	11.39	12.65	9.66
5% AEP	11.45	11.98	13.22	10.03
1% AEP	12.47	12.93	13.88	10.88
0.2% AEP	13.02	13.49	14.14	11.49
PMF	16.55	17.06	17.30	14.72

1.6 FLOOD HISTORY

a. Records indicate that approximately 32 historical flood events at Lismore occurring up to 2022 could be classified as major flood events, with a flood height exceeding 9.7mAHD. Of these events, fourteen were of a large enough magnitude to overtop the current CBD levee (9).

b. February 1954. The flood of February 1954 was produced by extremely heavy rainfalls in the Wilsons River catchment, with a pronounced concentration in Terania Creek. Rainfall data for the storm event that caused this flood show maximum rainfalls in the upper Terania Creek area in the order of 760mm for the 48 hours to 0900hrs on 21 February 1954. Recorded rainfalls were significantly less than this to the west, east and south of the Terania Creek catchment, indicating that very heavy rain in this specific area, supplemented by moderately heavy falls in other parts of the Wilsons catchment, are enough to cause major flooding.

c. March 1974. The flood of March 1974 was caused by very heavy rainfall that had a relatively uniform distribution across the whole Wilsons River catchment, but again, with heaviest falls in the Terania Creek catchment.

d. April 1989. The flood of April 1989 resulted from heavy rainfall in the total Leycester Creek catchment and the headwaters of the Wilsons River catchment. The heaviest falls were again centred on the Terania Creek catchment. Current modelling has calibrated the magnitude of this event in the order of a 5% AEP at Leycester Creek at Tuncuster, and 10% AEP at the Wilsons River at Lismore (9).

e. February 2001. The flood of February 2001 occurred after a 12 year period in which Lismore did not experience a major flood. The river peaked at 10.4mAHD on the Lismore Rowing Club gauge. Most of North Lismore, the CBD and low-lying residential areas of central Lismore were inundated, with water up to 3 metres deep in the lowest parts of the CBD. As the Hollingworth Creek floodgates were closed, there was also a small area of back-up flooding inside the levee in South Lismore. All major roads out of Lismore were closed.

f. June 2005. The flood of June, 2005 peaked at 10.3 mAHD at the Lismore Rowing Club gauge, flooding North Lismore and surrounding rural areas. Central Lismore and South Lismore were protected from mainstream riverine flooding by their respective levees. However, some properties in Central Lismore were inundated due to localised flooding in the basin area. At the peak of the flood the river level was surveyed as being 0.3 metres below the Browns Creek Spillway.

g. March 2017. Rainfall began in the Northern Rivers region at 6pm on the 29th of March, and lasted approximately 30 hours. By 2.55pm on the 30th of March, the Lismore gauge exceeded the minor flood threshold and exceeded the moderate threshold by 7.40pm. By 12.45am on the 31st of March it exceeded the major flood threshold, and the CBD levee overtopped at the Browns Creek Spillway by 4am, at 10.85m at the Rowing Club Gauge. This event was the first in which the CBD levee was overtopped since its completion in 2005. The flood reached 11.6m on the Lismore Rowing Club gauge. Current modelling has calibrated the magnitude of this event in the order of a 1% AEP at Leycester Creek at Tuncester, and 5% AEP at the Wilsons River at Lismore and the Wilsons River at Woodlawn College (9).

h. In late February of 2022, a blocking high pressure system in the Tasman Sea in conjunction with a slow-moving trough produced heavy multi-day rainfall. The majority of the Lismore LGA saw above average rainfall totals above 800mm in February 2022, with much of this concentrated in intense bursts. 24 hour rainfall totals on the 28th of February included 633mm at Dawson St in Lismore, 550mm at The Channon, 504mm at Jiggi, 775mm at Dunoon and 538mm at Nimbin (11). Already wet soils and full rivers resulted in flooding in Lismore that exceeded the highest recorded peak, and the CBD levee overtopping (11).

i. In late March 2022, a low-pressure system off the NSW North Coast brought further rain over the region. Major flooding again occurred in Lismore, with the CBD levee being overtopped on the 30th of March (12).

Table 5: Flood History for the Lismore Rowing Club Gauge (203904 - 58176) – floods above Major (9.7m)

Year	Peak Height (m)
02/02/1893	11.14
04/06/1945	11.23
21/02/1954	12.27
18/02/1956	11.23
11/07/1962	11.3
08/05/1963	10.74
20/07/1965	10.39
19/03/1967	10.21
29/10/1972	10.03
11/03/1974	12.15
03/03/1975	10.51
29/02/1976	10.08
19/03/1978	10.06
10/04/1984	9.78
10/03/1987	10.36
11/05/1987	10.66
02/04/1989	11.22
02/02/2001	10.4
30/06/2005	10.2
22/05/2009	10.38
31/03/2017	11.59
28/02/2022*	14.36*
30/03/2022	11.4

**the Rowing Club gauge stopped functioning after reaching this recorded height for February 2022. The Dawson St gauge (558087) recorded a peak of 14.79m, and the Woodlawn College gauge (202402 - 558012) recorded 15.03mAHD, both on the 28/02/22.*

1.7 FLOOD MITIGATION SYSTEMS

a. There are three known levees within the Lismore LGA:

   i. South Lismore Levee located in the South Lismore sector and runs from the North Coast railway past Snow St, Three Chain Rd and the South Lismore industrial area down to the Bruxner Highway; and

   ii. Lismore CBD Levee located in located in the Lismore Central Sector and runs from Molesworth St past Spinks Park and Ballina St to John St.

   iii. The Tuckurimba Levee located along 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. Levee locations are shown on Town Maps 2, 6 and 7.

d. There are no prescribed detention basins within the Lismore LGA.

e. Lismore City Council maintains and operates a series of pumps throughout the floodplain to assist in the minimisation of inundation. These are located at Hollingworth Creek, Gasworks Creek, Browns Creek, the RSL, Bowling Club, Rowing Club, Glasgow Lane and Woodlark St.

f. There are floodgates located at Gasworks Creek and Hollingworth Creek.

g. Other hydraulic controls include the Bruxner Highway, which acts as a control of flow by way of bridge and culvert structures during floods not high enough to overtop the road. An unused railway embankment near Kyogle Rd at South Lismore forms a hydraulic control in minor flood events and restricts flow to South Lismore by increasing flow through Leycester Creek (9)

h. A voluntary house raising scheme was introduced in Lismore as a support to the Lismore Levee Scheme. 12 dwellings in north Lismore were raised as part of the Levee scheme, and property owners not protected by the levees whose properties were below a 10% AEP flood level were able to participate to raise their floor levels to 0.5m above the 1% AEP flood level (9).

i. The Resilient Homes program, led by the Northern Rivers Reconstruction Corporation may offer three potential measures to homeowners in Lismore based on property assessment, flood impact severity data and safety risks. These include home buybacks, home raising and home retrofit.

1.8 EXTREME FLOODING

a. In a PMF approximately 4506 people in residential properties would be impacted by above floor flooding in the Lismore urban area alone (9), with many more affected by inundation and/or isolation in rural areas. The majority of dwellings in the flood

liable areas of urban Lismore are elevated and it has been estimated that approximately 60 percent have floor levels above the height of the 1954 flood. Only six percent of these dwellings however, have floor levels above the PMF. Furthermore, the structural integrity of these elevated dwellings is endangered by rapid floodwater flows, and by debris (1)

2 EFFECTS ON THE COMMUNITY

2.1 COMMUNITY PROFILE

a. Lismore City 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. **Lismore Central Sector**- includes Lismore, East Lismore, Girards Hill, Lismore Heights, Chilcotts Grass, Howards Grass, Lagoon Grass, Lindendale and Goonellabah.
2. **Lismore North Sector**- includes North Lismore, Tullera, Woodlawn, Bexhill, Richmond Hill, Numulgi (part), Boat Harbour, McLeans Ridges, Pearces Creek, Booyong (part), Eltham, Clunes (part), Corndale, Rosebank and Repentance Creek.
3. **Lismore South Sector**- includes South Lismore, Loftville, Monaltrie, South Gundurimba, Caniaba, McKees Hill, Ruthven, Wyrallah, Tregeagle, Tucki Tucki, Tuckurimba, East Coraki, Buckendoon, North Woodburn, Green Forest, Kilgin, Dungarubba, Marom Creek, Tuncester.

b. **Nimbin & Rural North Sector** - includes Booerie Creek, Blakebrook, Bungabbee, Bentley, Tullera (part), Leycester, Fernside Tullera, Numulgi, Kerrong, Koonorigan, Dunoon, Terania Creek, Tuntable Creek, The Channon, Goolmangar, Jiggi, Rock Valley, Georgica, Larnook, Mountain Top, Stony Chute, Blue Knob, Whian Whian, Nightcap and Nimbin.

c. Table 6 shows the 2021 Census 'usual resident' counts for key statistics for the Lismore City Council LGA. Note these vary slightly from the sector areas due to census availability, and does not account for changes following the 2022 floods.

Table 6: Census of Population and Housing data, 2021 (3)

Census Description	LGA	Lismore Central Sector	Lismore North Sector-urban	Lismore North Sector-Rural	Lismore South sector-urban	Lismore South sector - Rural	Nimbin & Rural North sector
Total Persons	**44,334**	**26049**	**754**	**4869**	**1775**	**3949**	**7325**
Aged 0-4 yrs	2106	1377	30	204	83	165	285
Aged 5-14 yrs	5479	3116	102	646	254	550	888
Aged 65 + yrs	9238	5523	143	1004	251	788	1547
Of Indigenous Origin	2600	1839	57	117	127	162	275
Who do not speak English well	144	35	3	0	4	4	30
Have a need for assistance (profound/severe disability)	3133	2165	44	183	138	235	414
Living alone (Total)	5210	669	91	256	214	349	810
Living alone (Aged 65+)	2379	1694	41	98	79	167	364
Residing in caravans, cabins or houseboats or improvised dwellings	298	40	7	3	0	185	33
Occupied Private Dwellings (Households)	**17,154**	**10420**	**301**	**1713**	**681**	**1418**	**2752**
No Motor Vehicle	914	721	16	9	45	44	60
Caravan, cabin, houseboat or improvised dwellings	244	25	3	3	0	163	27
Rented via State or Housing Authority	429	415	0	0	0	0	0
Rented via Housing Co-Op or Community Church Group	239	227	0	0	0	0	5
Unoccupied Private Dwellings	**1321**	**745**	**14**	**139**	**43**	**106**	**307**
Average persons per occup dwelling	**2.4**	**2.5**	**2.4**	**2.7**	**2.4**	**2.7**	**2.5**
Average vehicles per occup dwelling	**1.9**	**2**	**1.9**	**2.5**	**1.9**	**2.4**	**2.2**

SPECIFIC RISK AREAS - FLOOD

Richmond River Valley

2.2 LISMORE CENTRAL

2.2.1 Community Overview

a. The Lismore central sector comprises the central business district of Lismore and a large residential area, and includes the suburbs of Lismore, East Lismore, Girards Hill, Lismore Heights, Chilcotts Grass, Howards Grass, Lagoon Grass, Lindendale and Goonellabah. Lismore Central encompasses the Central Basin Area, within the Lismore CBD, which is predominantly public recreation space (Oakes Oval, Mortimer Oval and Lismore Park) with some commercial, educational and residential uses adjacent (6).

b. **Lismore** has a population of approximately 3656, and the suburb of Lismore encompasses the Central Business District (CBD) of the Lismore Area. 19% of the population is over 65, with a 6.6% Indigenous population. 1.1% of the population live in caravans, cabins or improvised dwellings, and it is noted this number may be larger than recorded here post the 2022 flood event.

c. **East Lismore** has a population of approximately 4980. 20% of the population is over 65, with a 7.2% Indigenous population.

d. **Girards Hill** has a population of approximately 1318. 20.7% of the population is over 65, with a 6.8% Indigenous population.

e. **Goonellabah** has a population of approximately 13,351. 22.4% of the population is over 65, with a 7.5% Indigenous population.

f. **Lismore Heights** has a population of approximately 2117. 20.2% of the population is over 65, with a 6.5% Indigenous population.

g. **Howards Grass and Lagoon Grass** have a combined population of 127 and make up the northern aspect of the Lismore Central sector. 11% of the population is over 65, with a 4.7% Indigenous population.

h. **Chilcotts Grass** has a population of approximately 237. 22.8% of the population is over 65, with a 1.3% Indigenous population.

i. **Lindendale** has a population of approximately 263. 25% of the population is over 65, with a 1.9% Indigenous population.

2.2.2 Characteristics of flooding

a. Central Lismore is subject to riverine flooding from the Wilsons River and Leycester Creek, either separately or concurrently (9).

b. Areas of the Lismore CBD are referred to as the Basin, or Central Basin Area. This is a mix of public recreation space with some adjacent commercial, educational and residential use, including Lismore Square, and acts as a flood storage area. It is also affected by flash flooding and flooding due to localised rainfall over the area, independent of riverine flooding (6).

c. The majority of Central Lismore urban area is protected by a levee. The levee was originally constructed to offer protection up to events of approximately the magnitude of a 10% AEP, however overtopping has previously occurred at heights lower than the current 10% AEP peak height of 10.97mAHD.

2.2.3 Flood Behaviour

a. Riverine flooding within the Central Lismore area can be due to flows from the Wilsons River and/or Leycester Creek. The Leycester Creek floodplain is located at a higher elevation than the Wilsons by 2-2.5m, and the Wilsons River branch is low-lying with wider floodplains. In the instance of a Leycester Creek dominated flood, flow direction in the Wilsons River may reverse, and the wider Wilsons Floodplain is filled (9).

b. The majority of Central Lismore CBD is protected by the CBD levee to just below the 10% AEP flood peak height. In modelled events, overtopping is first observed at the Browns Creek spillway with a height corresponding to 10.6-10.7mAHD, or in some rarer instances as low as 10.3-10.4mAHD, at the Rowing Club Gauge, with flows overtopping at Gasworks Creek to follow. The sequence of events based on river level heights at the Lismore (or Lismore Rowing Club) gauge (203904 – 58176) are outlined below.

c. **4mAHD:** The Gasworks Creek Floodgate will be closed.

d. **Below 5mAHD:** At the beginning of an event, most of the Lismore CBD drains freely via Browns creek, through culverts connected to the Wilsons at the Browns Creek Pump Station.

e. **Approximately 5mAHD:** A small section of Central Lismore CBD is located outside the levee. This part includes properties in lower northern section of Molesworth St near Simes Bridge, Coleman St and Brunswick St. Initial flooding in this area begins at approximately 5 metres AHD on the Rowing Club gauge (1) (6).

f. **5.2mAHD:** The Browns Creek Floodgates are closed, and Pump 1 starts operating, to drain local flood flows from the Central Lismore area (9).

g. **5.4mAHD**: Pump 2 of the Browns Creek Pumping Station begins operating.

h. **6.4mAHD:** Gasworks Creek Pump 1 begins operating.

i. **7 mAHD**: Gasworks Creek Pump 2 begins operating.

j. **10.3-10.7mAHD:** Levee overtopping begins at the Browns Creek Spillway.

k. The Browns Creek floodgates will be opened at the time of the first overtopping of the levee.

l. In a 10% AEP event, an average rate of rise in the Lismore CDB area post levee overtopping is modelled to be 1m per 3.5 hours to the peak, with depths of 3.5m. In a 1% AEP event, the modelled rate of rise increases to 1m per 1.9 hours, with depths of 6m. In this event, the majority of the Lismore CDB acts as flood storage (13).

m. See table 7 for more detail on flood behaviour after levee overtopping.

n. Central Lismore is also susceptible to flooding in the Lismore Basin area as a result of stormwater flooding occurring independent of riverine flooding, and may occur due to heavy local rainfall.

Table 7: Design Flood event behaviour in Central Lismore (9)

Flood Event	Flood Behaviour
10% AEP	Peak flood levels are approximately 10.3m AHD. Isolated overtopping of the levee is observed around the north-eastern edge and at Browns Creek spillway.
5% AEP	Peak flood levels are approximately 11.5m AHD. Overtopping of the CBD levee along its full length is observed.
1% AEP	Peak flood levels are approximately 12.1 – 12.5m AHD. Overtopping of the CBD levee along its full length is observed.
0.2% AEP	Peak flood levels are approximately 12.8- 13m AHD. Overtopping of the CBD levee along its full length is observed.
PMF	Peak flood levels are approximately 16.3- 16.7 m AHD. Overtopping of the CBD levee along its full length is observed.

2.2.4 Classification of Floodplain

a. The majority of the Lismore Central sector has Rising Road Access (13).

b. For emergency management purposes, Lismore Central can be further broken down into subsectors for floodplain classification, these classifications are as follows;

Table 8: Floodplain Classifications for subsectors in Central Lismore

GEMS ID	Subsector Name	Classification	Population Estimate	Dwelling Estimate	Vehicle Estimate
41582	Lismore A	Low Flood Island	103	57	103
41583	Lismore B	Low Flood Island	-	-	-
41584	Lismore C	Low Flood Island	191	77	139
41585	Lismore D	Rising Road Access	582	319	574

41587	Lismore E	Rising Road Access	483	195	351
41588	Lismore F	Rising Road Access	562	281	506
41598	Lismore G	Rising Road Access	627	311	249
45611	Lismore H	Low Flood Island	130	61	110
41620	Lismore J	Low Flood Island	26	15	27
41677	Lismore K	Rising Road Access	211	117	211
41678	Lismore L	High Trapped Perimeter	488	202	364
41984	Albert Park	Low Flood Island	-	-	-
41599	Girards Hill A	Low Flood Island	583	297	535
41597	Girards Hill B	Rising Road Access	1020	460	828
41985	Girards Hill C	Overland Escape Route	82	39	70
41619	Lismore Heights A	Indirectly Affected Area	904	483	869
41618	Lismore Heights B	Low Flood Island	150	88	158
41658	Chilcotts Grass A	High Flood Island	1488	594	1069
41660	Lagoon Grass A	Overland Escape Route	13	5	9
41661	Lagoon Grass B	Rising Road Access	3	1	2
42383	Lagoon Grass C	Overland Escape Route	66	26	47
41986	Campus Precinct	High Flood Island	9	4	7
41987	East Lismore A	Rising Road Access	818	385	693
41998	East Lismore B	High Flood Island	180	55	99
41989	East Lismore C	Overland Escape Route	434	217	391
41995	East Lismore E	Overland Escape Route	78	48	86

2.2.5 Inundation

a. The primary gauge utilised for Lismore is the Wilsons River at Lismore (or Lismore Rowing Club) Gauge (203904 - 58176). Gauges at Woodlawn on the Wilsons River (203402 – 558012) and Tuncester at Leycester Creek (203443 – 058201) are secondary gauges (9).

b. The Dawson St Gauge (558087) is located within the Lismore CBD, and can be utilised for localised flooding within the CDB Basin.

c. Low lying parts of Central Lismore CBD, near Lismore Shopping Square are often flooded by heavy local rainfall. The Browns Creek pumps cannot cope with rainfall more than 5mm/hr under certain conditions, particularly when the catchment is already wet and river levels are elevated (14), and flooding may begin inside the levee at the Dawson/Uralba St intersection. Dawson St may be cut off near the Caravan Park at approximately 6m at the Dawson St gauge.

d. Riverine Flooding in Central Lismore begins once the Browns Creek spillway within the Central Lismore Levee begins to overtop. However, a small section of Lismore CBD area is located outside the levee. This part includes properties in lower northern

section of Molesworth St near Simes Bridge, Coleman St and Brunswick St. Initial flooding in this area may begin from 5mAHD at the Lismore Rowing Club gauge.

e. The gauge height at which the Browns Creek spillway overtops varies depending upon the flood gradient between the Browns Creek spillway and the Rowing Club gauge. Typically overtopping will commence at approximately 10.6 to 10.7 mAHD on the Rowing Club gauge. However, this may be as low as 10.3-10.4m AHD on the Rowing Club gauge if Leycester Creek and Wilsons River peaks occur concurrently and are accompanied by fast rates of rise.

f. Initial inundation is restricted to the Browns Creek Floodway, but then begins to inundate Molesworth and Woodlark Streets into the central basin area, and water velocity may become increasingly fast and deep. Keens St to Leycester Street will be inundated soon after, cutting off access to the north.

g. As the river levels continue to rise floodwaters will overtop the levee at the Gasworks Creek Spillway and Spinks Park Spillway. When Gasworks Creek is overtopped, there is additional inundation of the southern part of the CBD area, with Ballina St becoming cut off. In a very large flood, the entire levee system may be overtopped as occurred during the 2017 and 2022 flood events.

h. Known low points exist at the Browns Creek flood channel, where the existing open channel narrows as it crosses Brewster St, causing a restriction in flow which breaks the channel and spills across parks and roads at Brewster St and Uralba St, which are both important for evacuation purposes (7).

i. Timing of inundation depends on the magnitude of the event, with the time between overtopping at Browns Creek and Gasworks Creek, then Spinks Park Spillways varying.

j. There are approximately 1215 residential buildings and 2800 people in Lismore CBD and 257 residential buildings and 590 people in East Lismore that live within areas that may need to be evacuated during flooding (13).

k. Parts of the Lismore Central sector lie outside the PMF extent, these include the majority of Goonellabah and Lismore Heights, Chilcotts Grass, Lindendale and parts of East Lismore.

l. Table 9 below outlines the potential properties at risk of over floor flooding based on floor height data and gauge height for a range of design events . Please note this is not an exact representation of the number of inundated properties in a given event, as many factors influence the depth of inundation.

Table 9: Properties at risk in Lismore CBD, East Lismore and Girards Hill based on floor height data

Lismore Rowing Club Gauge Height mAHD (Design Event)	No. Properties at risk
11.45mAHD (5% AEP)	598
12.47mAHD (1% AEP)	1046
13.02mAHD (0.2% AEP)	1301
16.5mAHD (PMF)	1533

2.2.6 Isolation

a. Once the Lismore CBD Levee spillways begin to overtop key evacuation routes from Central Lismore begin to be cut. Refer to section 2.6, Road Closures, for more detail.

b. Once the Browns Creek Spillway begins to overtop water from the Browns Creek floodway will initially flow through the Clyde Campbell Car park, then begin to flow down Molesworth and Woodlark Streets into the CBD basin area. Access routes to the north via Keen St to Leycester St will be cut off initially in the vicinity of Browns Creek.

c. Once floodwaters overtop the Gasworks Creek Spillway, additional flooding of the Southern portion of the CBD will cut off the main access route to the South via Ballina St.

d. All CBD evacuation routes are progressively lost after the levee overtops.

e. Parts of Lismore Central sector lie outside of the PMF extent, including Goonellabah, parts of East Lismore and Lismore Heights. However, these areas may become isolated in major flood events.

2.2.7 Flood Mitigation Systems

Table 10: Levees in Lismore Central; summary of information

Lismore CBD Levee	
Location	Located on the south-eastern side of the Wilsons River adjacent to the Lismore CBD
Type of Levee (ring etc.)	Partial Levee
Owner	Lismore City Council
Design Height and freeboard	The Central Lismore Levee was constructed to protect Central Lismore against floods just below the height of the 10% AEP. Crest Height varies along levee length, with lowest points at spillway locations.

Overtopping Height	Can vary depending on the flood gradient. This can vary, and may occur from approximately 10.3mAHD on the Wilsons River at Lismore/Rowing Club Gauge (203904 – 58176).
No. of properties protected	Approximately 1080 businesses and 1020 homes.
Known low points	Overtopping first occurs at the Browns Creek Spillway in Molesworth Street. As the river levels continue to rise floodwaters will overtop the levee at the Gasworks Creek Spillway and Spinks Park Spillway.
Location and sequence of inundation	The Central Lismore Levee is designed to overtop in a controlled manner. The Browns Creek floodgates will be opened at the time of the first overtopping of the levee and the carpark at Browns Creek will be an important flowpath. When the levee wall overtops, fast flowing floodwaters from the river enter the Central Lismore Basin via the Clyde Campbell car park. A second flow path initially conveys floodwater from the south, across Ballina Road and Dawson Street into the Central basin. Floodwaters in the basin exit through Browns Creek and Gasworks Creek once the river begins to recede. Modeling has indicated as little as 5 hours may be available from the time the Rowing Club Gauge reaches 5mAHD until initial overtopping (15).
Consequences of levee overtopping or failure	The entire Lismore Central business district can be flooded once the Central Lismore levee overtops as occurred during the 2017 and 2022 flood events. This has consequences particularly for ground floor businesses within Lismore. Up to 1000 homes are also at risk of flooding, however many properties are elevated so depending on the size of the flood event may not necessarily be flooded over habitable floor level.
Deficiencies	Nil known

a. The Gasworks Creek culvert floodgates enable CBD drainage prior to flood rises in the Wilsons River. The gates are closed once the river rises to minimise backwater from the river through the CBD (9).

b. The pump systems at Gasworks and Browns Creeks, are utilised to drain local flooding during a flood event where the CBD floodgates are closed. When heights reach 5.2m, the Browns Creek gate is closed and the first pump kicks in, with the second pump starting when heights reach 5.4m. They will both operate until heights drop below 5.4, with pump 1 continuing until 4.8m. The pumps have a capacity of 3000 litres per second each.

c. The Gasworks Creek gate closes at 4mAHD, pump 1 starts at 6.4m and pump 2 at 7m. Both will stop at 5.5m, with each pump having a capacity of 2000L/second.

d. There are five deflector walls located within the Browns Creek Floodway, which are designed to provide some protection to buildings from fast flowing water once the levee overtops along this floodway (16).

2.2.8 Dams

a. Rocky Creek Dam is located upstream of Central Lismore, and parts of the Central Lismore sector lie within the inundation extent of a PMF with Dambreak. It is important to note the majority of this area would have already been flooded in a PMF situation without dambreak, and no additional properties at risk have been identified (5).

b. Refer to section 1.3.

2.2.9 At Risk Facilities

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

2.2.10 Other Considerations

a. Approximately 1,720 residences in the Lismore LGA as a whole were impacted in the 2022 floods, so resident counts from the 2021 census may not accurately reflect the true number of residents occupying the area. Similarly, 656 commercial and industrial properties were flood affected, with 78% of these suffering severe impacts or complete destruction (17).

b. The number of people and visitors within the Lismore Central area may be temporarily increased during special events such as the Lantern Parade in June, the Lismore Cup in September, the North Coast National in October and the biennial Masters Games held in September.

2.3 LISMORE SOUTH

2.3.1 Community Overview

a. The Lismore South sector is comprised of the urban residential areas of South Lismore, as well as the broader urban fringe and rural areas of the southern part of Lismore LGA.

b. **South Lismore:** The suburb of South Lismore, which makes up the majority of the urban area of the sector, has a population of approximately 1775. 14% of the population is over 65, with a 7.2% Indigenous population. 2.5% of the population have identified they have no motor vehicle at their place of residence. There are approximately 681 occupied private residential dwellings, and 43 unoccupied private dwellings in South Lismore which all lie within the extent of the PMF. It is important to note these figures are from the 2021 census and may have changed since the 2022 floods.

c. **South Lismore Rural Area and Urban Fringe:** this includes the suburbs of Loftville, Monaltrie, South Gundurimba, Caniaba, McKees Hill, Ruthven, Wyrallah, Tregeagle, Tucki Tucki, Tuckurimba, East Coraki, Buckendoon, North Woodburn, Green Forest, Kilgin, Dungarubba, Marom Creek, Tuncester. It includes parts of the suburbs of Spring Grove and Broadwater. There are 3949 people living across these areas, with 20% being over 65%, and a 4.1% Indigenous population. There were 1418 occupied dwellings recorded at the 2021 census across the urban fringe and rural parts of the South Lismore Sector.

2.3.2 Characteristics of Flooding

a. South Lismore urban area experiences riverine flooding from either the Wilsons River and/or Leycester Creek.

b. The rural areas of the South Lismore sector primarily lie within the Wilsons River catchment.

c. Rural areas in the south-eastern part of the sector can also be affected by Richmond River flooding.

d. South Lismore urban area is classified as H3 and H4 hazard classification, meaning it is considered unsafe for people and vehicles in a 1%AEP event (13).

e. See section 1.5 for further information.

2.3.3 Flood Behaviour

a. South Lismore urban area is initially protected by the South Lismore levee. Prior to levee overtopping, breakout flow from Leycester Creek is directed down the airport floodway. Floodgates on upper and lower Hollingworth Creek prevent backflow from the Wilsons River, and are closed at 4mAHD on the Rowing Club gauge (16). This

then causes floodwater to back up inside the levee. Flooding of low-lying areas north of Casino St can be observed early in the event. The statements below outline the approximate sequence of events based on river level heights at the Wilsons River at Lismore (or Lismore Rowing Club) gauge (203904 – 58176).

b. **4mAHD**: Floodgates on Lower and upper Hollingworth Creek are closed, the pump on lower Hollingworth Creek begins operating, and is designed to keep water out of South Lismore urban area.

c. **7.6-8.6mAHD:** Overtopping of the South Lismore levee may be observed if flooding is significant in Leycester Creek only. The lower readings during Leycester creek flooding occur because part of the Leycester Creek flow is diverted up the Wilsons River and fills the floodplains north-east of the Lismore CBD. The portion of flood discharge is reduced and the gauge reading is low when the South Lismore levee overtops.

d. **10.0-10.2mAHD:** levee overtopping occurs if flooding is occurring in both the Wilsons River and Leycester Creek (9).

e. The first overtopping of the levee is typically observed in the north-west corner in the vicinity of the Bowling Club, with overtopping at Caniaba St observed if floodwaters continue to rise.

f. In a 1% AEP event, flood depths in the South Lismore urban area are modelled to reach 1.6m in 10 hours. In this event, much of urban South Lismore is classified as flood storage, with areas in the vicinity of Hollingsworth Creek being floodway (13).

Table 11: Design Flood event behaviour in South Lismore urban area (9)

Flood Event	Flood Behaviour
10% AEP*	Peak flood levels range from approximately 9 to 11.5m AHD. South Lismore Levee is not overtopped. Backwater up Hollingworth Creek observed due to overtopping at Riverview Park. Some overtopping at the eastern end of South Lismore Levee.
5% AEP	Peak flood levels are approximately 11 to 12m AHD. South Lismore Levee overtopped north of Railway.
1% AEP	Peak flood levels are approximately 11.6 to 12.8mAHD. South Lismore levee overtopped along length.
0.2% AEP	Peak flood levels are approximately 12 to 13.3m AHD. South Lismore levee overtopped along length.
PMF	Peak flood levels are approximately 15.5 to 16.8m AHD. South Lismore Levee overtopped along length.

**It is important to note the gauge height at which overtopping of the South Lismore levee occurs may vary depending on whether flooding is significant in Leycester Creek only, or in the Wilsons River and Leycester Creek.*

g. **Rural South Lismore:** The Wilsons River floodplain narrows just south of urban Lismore near Gundurimba. This constriction is approximately one kilometre along the length of the river. The floodplain then becomes progressively wider until it merges with the Richmond River above Coraki. In this area between the two rivers, the complex pattern of flooding once again varies with the relative flows in each river. It is made more complex by flows joining the river from Pelican Creek.

h. During lower levels of flooding, water movement east of the Wilsons River is restricted by flood control structures such as the Tuckurimba levee. However, once these are overtopped, floodwaters move eastward and fill up low-lying areas including the Tuckean Swamp.

i. Floodwaters which have flowed out of the Lower Wilsons River and filled the Tuckean Swamp and surrounding areas, are joined by water from the Mid Richmond River. These combined floodwaters eventually flow back into the Richmond River at Broadwater (1)

2.3.4 Classification of Floodplain

a. For emergency management purposes, Lismore South can be further broken down into subsectors for floodplain classification, these classifications are as follows;

Table 12: Floodplain Classifications for subsectors in Lismore South

GEMS ID	Subsector Name	Classification	Population Estimate	Dwelling Estimate	Vehicle Estimate
41634	Broadwater Alleys Hill	High Flood Island	69	27	49
41666	Caniaba A	High Flood Island	177	77	139
41633	Coraki (East) B	Low Flood Island	254	104	187
42412	Coraki North A	Overland Escape Route	43	19	34
42793	Dungarubba A	Low Flood Island	155	63	113
41648	Loftville A	Low Flood Island	10	7	13
41664	Loftville C	Overland Escape Route	58	64	115
41663	Monaltrie A	Overland Escape Route	42	16	76
41665	South Gundurimba A	Overland Escape Route	155	70	126
41646	South Lismore A1	Low Flood Island	1013	455	819
45632	South Lismore A2	Low Flood Island	468	200	360
45633	South Lismore A3	Low Flood Island	-	-	-
41983	South Lismore C	Low Flood Island	291	124	223
41667	South Lismore D	Overland Escape Route	41	17	31
45197	Tatham (North) A	Overland Escape Route	150	72	130
45606	Tucki Tucki	Rising Road Access	340	134	241
45209	Tuckurimba- Marom Creek	Overland Escape Route	139	58	104
41668	Tuncester A	Overland Escape Route	19	8	14
41669	Tuncester B	Overland Escape Route	2	1	2

41670	Tuncester C	Overland Escape Route	16	7	13
42410	Tuncester D	Overland Escape Route	16	7	13
42411	Tuncester E	High Flood Island	2	1	2
41645	Woodburn North A	Low Flood Island	162	69	124
43186	Woodburn North B	Low Flood Island	43	17	31

2.3.5 Inundation

a. **Urban Lismore South:** The primary warning and forecasting gauge for the South Lismore urban area is the Wilsons River at Lismore/Lismore Rowing Club Gauge (203904 – 58176) (18). Other river level gauges in the sector are located at on the Wilsons River at East Gundurimba (203427 - 558047) and Tuckurimba (558076).

b. Inundation in the South Lismore urban area may be extensive if the South Lismore Levee is overtopped. Many properties in South Lismore have a floor level above approximately 5% AEP, however evacuation routes out of the area begin to close once the levee overtops. Modelling has indicated this may happen between 7.2-10.3mAHD at the Rowing Club gauge. Historically, overtopping has occurred at heights greater than 9.37mAHD.

c. Inundation begins in low lying areas north of Casino St and east of Ostrom St, and in the vicinity of Hollingworth Creek.

d. If the South Lismore levee is overtopped by flows from Leycester Creek in the vicinity of the South Lismore Bowling Club, water will flow into the northern portion of South Lismore. As floodwaters rise, levee overtopping will occur at Caniaba St, and inundation will occur south of Hollingworth Creek on the western side and through the majority of South Lismore.

e. If the levee is overtopped by a Wilsons River dominated flood, South Lismore could also flood from the eastern side near the river bend west of Union St, due to a backwater effect at the confluence of Leycester Creek and the Wilsons River.

f. There are approximately 766 residential buildings and 1840 people in urban South Lismore that live within areas that may need to be evacuated during flooding (13).

g. Table 13 below outlines the potential properties at risk of over floor flooding based on floor height data and gauge height for a range of design events . Please note this is not an exact representation of the number of inundated properties in a given event, as many factors influence the depth of inundation.

Table 13: Properties at risk in Urban South Lismore based on floor height data

Lismore Rowing Club Gauge Height mAHD (Design Event)	No. Properties at risk
11.45mAHD (5% AEP)	188

12.47mAHD (1% AEP)	507
13.02mAHD (0.2% AEP)	680
16.5mAHD (PMF)	952

h. **Rural Lismore South:** Some rural areas within the Lismore South sector fall within the Flood Warning Reference Areas for the Coraki (203403 – 58175) and Woodburn (203412 – 58061) gauges for Bureau of Meteorology flood forecasting and warning purposes.

i. Areas which utilise the Coraki Gauge include Ruthven, Tucki Tucki, Tuckurimba, East Coraki and part of Green Forest.

j. Areas which utilise the Woodburn Gauge include Dungarubba, Kilgin, Buckendoon and North Woodburn.

k. Additionally, the Broadwater gauge (203415) may utilised for flood intelligence purposes in the Dungarubba and Green Forest areas, although it is not a Bureau of Meteorology forecasting or warning gauge.

l. Much of Rural Lismore South is classified as floodway, and will experience inundation. More detailed information on the number of inundated properties is not available at this time.

m. East Coraki may begin to experience significant inundation from approximately 6.55m at the Coraki gauge (203403 - 58175)

n. In North Woodburn, inundation of lower levels of houses in Kilgin Rd and Banks Street may begin from approximately 3.95m at the Woodburn gauge (203412 - 58061).

o. In the Dungarubba, Kilgin and Green Forest areas, inundation of access routes can begin to occur from 2.74m at the Broadwater gauge (203415), with complete inundation of the area historically occurring by 4m.

2.3.6 Isolation

a. **Urban Lismore South:** South Lismore becomes isolated when the evacuation routes out of the area are cut. These begin to close once the South Lismore levee overtops. The overtopping height can vary as discussed above.

b. Hollingsworth Creek bridge is one low point which is cut along the evacuation route when flood waters reach 8.8m AHD isolating the area of South Lismore to the South of Hollingworth Creek, however alternate access may be available via the Wilson St Bridge.

c. Evacuation routes can close earlier due to localised flooding.

d. **Rural Lismore South:** By 10-10.2m at the Lismore Rowing Club gauge, the majority of Rural Lismore will be isolated from the Lismore urban area. However, local road closures may occur prior to this, causing isolation.

e. In a 5% AEP flood event, there may be multiple closures occuring along Wyrallah Rd, with over road depths in the vicinity of Stibbards Creek exceeding 1m (19). In this event, Swan Bay Road and large stretches of Coraki Rd between Coraki and the Bruxner Highway would also be inundated to depths of >1m. It is important to note the 5% AEP event is related to the Coraki Gauge, and these closures may be expected to occur from approximately 6-6.5m at the Coraki Gauge (20).

f. Prolonged periods of isolation may occur in the Green Forest and Dungarubba areas after the Tuckurimba, (or East Coraki) levee overtops. This is estimated to occur between 6.24-6.58m at the Tuckurimba gauge (203429 – 558076).

2.3.7 Flood Mitigation Systems

Table 14: Levees in Lismore City LGA; summary of information

South Lismore Levee	
Location	The South Lismore Levee protects South Lismore urban area. It is composed of two main sections, one on its south western side and the other to the east along the banks of the Wilson River.
Type of Levee (ring etc)	Partial Levee
Owner	Lismore City Council
Design Height and freeboard	Provides protection up to approximately the 10% AEP flood, however overtopping height may vary as discussed below.
Overtopping Height	The over-topping height of the South Lismore levee is dependent upon flows in Leycester Creek. • If only Leycester Creek is in flood and the Wilsons River has low flow the level on the Rowing Club gauge when the South Lismore levee overtops could be between 7.6 and 8.6 m AHD. • When the Wilsons River is also in flood the South Lismore levee will over top at a greater height between 10.0 and 10.2m AHD on the Rowing Club gauge (1).
No. of properties protected	There are approximately 400 businesses and 800 residences at risk of flooding (1).
Known low points	When the Leycester Creek is the predominant 'flood carrier', the levee is typically overtopped just upstream from the Robert White Bridge, adjacent to the South Lismore Bowling Club (21). When the Wilsons River is the dominant flood source the levee can potentially flood from the eastern side near the river bend west of Union Street.

Location and sequence of inundation	Overtopping first occurs at the north-west corner adjacent to the Bowling club. This is followed by overtopping near Caniaba Street and rapid inundation of all of South Lismore.
Consequences of levee overtopping or failure	Overtopping of the levee has the potential to flood all 1200 properties that are protected by the levee including residential businesses and industrial premises. There is no high ground located behind the levee with the population required to evacuate prior to the levee overtopping and roads becoming cut.
Deficiencies	Nil known

a. An unused railway embankment near Kyogle Rd forms a hydraulic control in minor flooding. It restricts flow to South Lismore and increases flow through Leycester Creek.

b. The Hollingworth Creek Floodgates enable drainage from South Lismore prior to flood rise in the Wilsons River. As the river rises, the gates are closed to minimise backwater through South Lismore (9).

c. In Rural South Lismore, the Tuckurimba Levee protects properties to the eastern side of the Wilsons River. The Tuckurimba Levee Runs along the bank of the Wilsons River between Baxters Lane and Coraki. Properties to the east of the Levee are protected from floodwaters breaking out of the Wilsons River during more frequent events. Once the levee is overtopped, the lower East Coraki and then Buckendoon and Green Forest floodplains fill.

2.3.8 Dams

a. Rocky Creek Dam is located upstream of the Lismore South sector, and parts of the sector lie within the inundation extent of a flood with dambreak event. It is important to note no properties have been identified as being at risk in a Sunny Day event, and the majority of this area would have already been flooded in a both a 1% AEP and PMF situation without dambreak. Only a small number of properties (2 incrementally in a 1%AEP and 3 incrementally in a PMF) have been identified at incremental risk from dambreak (5).

b. Refer to section 1.3.

2.3.9 At Risk Facilities

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

2.3.10 Other Considerations

a. Approximately 1,720 residences in the Lismore LGA were impacted in the 2022 floods, with 675 of these in South Lismore urban area alone, so resident counts from the 2021 census may not accurately reflect the true number of residents or occupied dwellings in the area. Similarly, 656 commercial and industrial properties were flood affected, with 78% of these suffering severe impacts or complete destruction (17).

2.4 LISMORE NORTH

2.4.1 Community Overview

a. The Lismore North sector comprises the North Lismore urban area and extends up into more rural settlements. The suburbs within the sector include North Lismore, Tullera, Woodlawn, Bexhill, Richmond Hill, Numulgi (part), Boat Harbour, McLeans Ridges, Pearces Creek, Booyong (part), Eltham, Clunes (part), Corndale, Rosebank and Repentance Creek.

b. **Urban North Lismore** comprises a residential area and a small number of commercial and industrial businesses. It has a population of approximately 754. 19% of the population is over 65, with a 7.5% Indigenous population. 2.1% of the population have identified they have no motor vehicle at their place of residence. There are approximately 301 occupied private residential dwellings, and 14 unoccupied private dwellings in North Lismore urban area which all lie within the extent of the PMF. It is important to note these figures are from the 2021 census and may have changed since the 2022 floods.

c. **Bexhill** has a population of approximately 528. 17.6% of the population is over 65, and 18.8% under 14, with a 2.8% Indigenous population.

d. **Eltham** has a population of approximately 332. 19.9% of the population is over 65, and 16.3% under 14.

e. **Clunes** has a population of approximately 907. 16.2% of the population is over 65, and 19.4% under 14, with a 2.4% Indigenous population.

f. **Richmond Hill** has a population of approximately 850. 29.6% of the population is over 65, and 15.3% under 14, with a 2.3% Indigenous population.

g. **McLeans Ridges** has a population of approximately 808. 19.6% of the population is over 65, and 16.8% under 14, with a 2.1% Indigenous population.

h. **Corndale** has a population of approximately 358. 19% of the population is over 65, and 16.8% under 14, with a 1.7% Indigenous population.

i. **Rosebank** has a population of approximately 423. 20.3% of the population is over 65, and 14.9% under 14, with a 3.5% Indigenous population.

j. **Repentance Creek** has a population of approximately 118. 16.1% of the population is over 65, and 20.3% under 14, with a 4.2% Indigenous population.

k. **Woodlawn** has a population of approximately 45.

l. **Boatharbour** has a population of approximately 19.

m. **Tullera** has a population of approximately 271. 23.6% of the population is over 65, and 18.5% under 14, with a 2.2% Indigenous population.

n. **Pearces Creek** has a population of approximately 210. 16.2% of the population is over 65, and 18% under 14.

2.4.2 Characteristics of Flooding

a. Lismore North is affected by riverine flooding from the Wilsons River, Leycester Creek flooding also affects the urban areas of North Lismore.

b. Almost all of urban North Lismore is located in a High Flood Risk and Flood Isolated precinct. It is considered a flood hazard classification H5-H6, which is unsafe for vehicles, people, and all buildings vulnerable to failure in a 1% AEP event (13).

c. North Lismore is not protected by the Lismore Levee Scheme.

d. See section 1.5 for further information.

2.4.3 Flood Behaviour

a. **Urban North Lismore:** During a flood event, urban areas in North Lismore can initially be impacted by Wilsons River floodwater backing up Slater Creek, which can cause inundation of low-lying areas from the Showground past Mackenzie Park to the Wilsons River. This occurs when water levels at the Rowing Club gauge exceed 4.75mAHD, with Bridge St on the western side of McKenzie Park historically the first road to be impacted.

b. Once the Wilsons River has overtopped its banks, floodwaters from the Wilsons River will first impact North Lismore at Bridge St and Bray St, however as described above, parts of North Lismore experience inundation earlier than this.

c. Leycester Creek floodwaters will first impact Tweed St and Bouyan St.

d. In a modelled 10% AEP flood event, flood depths within the urban area reach 0.5m in just under 8 hours.

e. In a 1% AEP modelled event, depths throughout North Lismore reach 1.9m in just under 12 hours. In this event, much of urban North Lismore is floodway (13).

f. Once levels at the gauge reach 9.3mAHD most roads in urban North Lismore are cut.

Table 15: Design Flood event behaviour in Urban North Lismore (9)

Flood Event	Flood Behaviour
10% AEP	Peak flood levels at approximately 11.3 – 11.6mAHD. properties in Macaulay St remain flood free.
5% AEP	Peak flood levels are approximately 12m AHD
1% AEP	Peak flood levels are approximately 12.8m AHD
0.2% AEP	Peak flood levels are approximately 13m AHD
PMF	Peak flood levels are approximately 16.9m AHD

g. **Rural Lismore North:** There is limited published information available on flood behaviour in rural parts of the Lismore North sector. However fast and dangerous water rises can be observed in areas such as the Eltham Valley, and flooding from local creeks can occur in many areas throughout the sector.

2.4.4 Classification of Floodplain

a. Lismore North can be further broken down into subsectors for floodplain classification, these classifications are as follows;

Table 16: Floodplain Classifications for subsectors in Lismore North

GEMS ID	Subsector Name	Classification	Population Estimate	Dwelling Estimate	Vehicle Estimate
6173	North Lismore A	Low Flood Island	19	10	18
41201	North Lismore B1	Low Flood Island	89	44	79
45634	North Lismore B2	Low Flood Island	253	116	209
41600	North Lismore C	Overland Escape Route	212	86	155
41623	North Lismore D	Overland Escape Route	36	15	27
41651	North Lismore E	Rising Road Access	312	132	238
41679	North Lismore F	Overland Escape Route	19	8	14
41621	Lismore Heights C	Low Flood Island	2	1	2
41656	Bexhill A	Overland Escape Route	199	83	149
41655	Bexhill B	High Flood Island	157	65	117
41680	Bexhill C	Overland Escape Route	29	12	22
41681	Bexhill D	Overland Escape Route	5	2	4
45603	Bexhill E	Overland Escape Route	66	27	49
41662	Bexhill F	Overland Escape Route	13	5	9
45604	Corndale A	Overland Escape Route	28	12	22
45203	Numulgi A	Rising Road Access	19	8	13
41652	Woodlawn A	Rising Road Access	88	39	70
41653	Woodlawn B	Overland Escape Route	20	8	14
41654	Woodlawn C	Overland Escape Route	10	6	11

2.4.5 Inundation

a. The primary warning and forecasting gauge for the North Lismore urban area is the Wilsons River at Lismore (or Lismore Rowing Club) gauge (203904 – 58176) (18). Other river level gauges in the sector are located at Woodlawn on the Wilsons River (203402 – 558012), Coopers Creek at Repentance (203002 - 558000), Corndale (203024 – 058206) and the Wilsons River at Eltham (203014 - 058200).

b. **Urban North Lismore:** Flooding begins in North Lismore when the Wilsons River backs up at Slaters Creek and inundates the low-lying areas which extend from the Showground past McKenzie Park to the Wilsons River. These initial effects may begin to occur as low as 4.75 mAHD on the Rowing Club gauge.

c. Inundation continues to increase in these areas as river levels rise, until the Wilsons River and Leycester Creek begin to over-top their banks and threaten nearby properties particularly in Winterton Parade. Most roads are cut by approximately 9.3 metres AHD on the Rowing Club gauge, with the remaining roads being cut by 10.2-10.4mAHD (1).

d. Floodwaters from the Wilsons River then begin to inundate the floodplain to the east of North Lismore and move westward into developed areas following low-lying land between Bridge St and Bray St. Floodwaters from Leycester Creek first flow northwards between Tweed St and Bouyon St, quickly cutting Bouyon St and Terania St West.

e. Rising water soon closes all evacuation routes into Central Lismore and inundates the entire area (1). Bridge St, between its intersection with Union St and Terania St, is generally the last route to be inundated at approximately 10.4mAHD at the Rowing Club gauge.

f. There are approximately 227 residential buildings and 540 people in urban North Lismore that live within areas that may need to be evacuated during flooding (13).

g. Table 17 below outlines the potential properties at risk of over floor flooding based on floor height data and gauge height for a range of design events . Please note this is not an exact representation of the number of inundated properties in a given event, as many factors influence the depth of inundation.

Table 17: Properties at risk in Urban North Lismore based on floor height data

Lismore Rowing Club Gauge Height mAHD (Design Event)	No. Properties at risk
11.45mAHD (5% AEP)	106
12.47mAHD (1% AEP)	165
13.02mAHD (0.2% AEP)	240
16.5mAHD (PMF)	313

h. **Rural North Lismore:**

i. The Eltham Valley can experience fast and dangerous water level rises after heavy and sustained rainfall in the Wilsons catchment.

j. Inundation may also occur in rural areas due to local creek flooding.

k. Inundation may occur in events as frequent as 10%AEP, however information on number of inundated properties is not available at this time. Many areas of rural North Lismore experienced extensive inundation in the flood events of 2022.

2.4.6 Isolation

a. **Urban North Lismore:** As the flood rises, Slaters Creek closes Bridge Street near McKenzie Park at approximately 4.75mAHD and floodwaters from Leycester Creek flow northwards, over a low saddle in the vicinity of Tweed Street, just west of the railway line. This isolates North Lismore from South Lismore, and progressively inundates the entire residential area of North Lismore by approximately 10.2mAHD.

b. Parts of Urban North Lismore can become isolated at low flood levels (around 7-7.5m) and the decision to evacuate around 10 properties in Winterton Parade, North Lismore must be made early to ensure persons are not trapped.

c. The majority of urban North Lismore becomes isolated between 9.15m and 9.4m AHD, with the closures of Terania St and Bridge St respectively (21). However, access routes may be affected earlier than this depending on levee overtopping in South and Central Lismore (1).

d. **Rural North Lismore:** Rural North Lismore is highly susceptible to isolation. Closure of main access routes along Bangalow Road can cause isolation for Bexhill, Clunes, Boatharbour and Eltham.

e. Isolation due to main access road closures may begin from approximately 7mAHD on the Rowing Club gauge, when inundation of Bangalow Rd between Lismore and Boatharbour may cause access to be cut off. By 10-10.2mAHD at the Lismore gauge Bexhill, Clunes, Eltham and surrounding areas will be isolated from the Lismore City area, however local road closures may mean this isolation occurs earlier.

2.4.7 Flood Mitigation Systems

a. No known flood mitigation systems.

2.4.8 Dams

a. Rocky Creek Dam is located upstream of the Lismore North sector, and parts of the sector lie within the inundation extent of a flood with dambreak event. It is important to note no properties have been identified as being at risk in a Sunny Day event, and the majority of this area would have already been flooded in a both a 1% AEP and PMF situation without dambreak. No additional properties within the sector have been identified at incremental risk from dambreak (5).

b. Refer to section 1.3 for more detail.

2.4.9 At Risk Facilities

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

2.4.10 Other Considerations

a. Approximately 1,720 residences in the Lismore LGA were impacted in the 2022 floods, with 222 of these in North Lismore, so resident counts from the 2021 census may not accurately reflect the true number of residents or occupied dwellings in the area. Similarly, 656 commercial and industrial properties were flood affected, with 78% of these suffering severe impacts or complete destruction (17).

b. Visitors and people within the Lismore North Sector may be temporarily increased during events held at the Showgrounds such as the Lismore Cup in September, North Coast National Lismore Show in October and the Tropical Fruits New Years Festival in December/January.

2.5 NIMBIN & RURAL NORTH

2.5.1 Community Overview

a. The Nimbin & Rural North sector includes the larger townships of Goolmangar, The Channon, Dunoon and Nimbin, as well as extensive areas of rural land.

b. A large portion of the northern aspect of the sector comprises of Nightcap National Park and Whian Whian Conservation Area.

c. The Rural North sector is large in geographical size, but with sparse population, with the main settlements being Nimbin, Dunoon, The Channon and Modanville.

d. Suburbs within the sector include Booerie Creek, Blakebrook, Bungabbee, Bentley, Tullera (part), Leycester, Fernside Tullera, Numulgi, Kerrong, Koonorigan, Dunoon, Terania Creek, Tuntable Creek, The Channon, Goolmangar, Jiggi, Rock Valley, Georgica, Larnook, Mountain Top, Stony Chute, Blue Knob, Whian Whian, Nightcap and Nimbin.

e. **Nimbin** has a population of approximately 1607. 22.7% of the population is over 65, and 15.2% under 14, with a 5.6% Indigenous population.

f. **Goolmangar** has a population of approximately 183. 16.4% of the population is over 65, and 15.8% under 14, with a 2.2% Indigenous population.

g. **The Channon** has a population of approximately 325. 18.8% of the population is over 65, and 16.3% under 14, with a 2.2% Indigenous population

h. **Dunoon** has a population of approximately 840. 17.2% of the population is over 65, and 22.9% under 14, with a 1.8% Indigenous population

i. **Modanville** has a population of approximately 614. 23.5% of the population is over 65, and 14.8% under 14, with a 4% Indigenous population

2.5.2 Characteristics of Flooding

a. The catchment above Lismore is fan shaped and the valleys and streams are steep, providing a relatively quick transfer of rainfall to runoff.

b. The areas in the Rural North Sector can be affected by local catchment and riverine flooding, as well as flash flooding.

c. Many areas and roads in rural Lismore can be affected by flash flooding following heavy rainfall when creeks, culverts and causeways rise and fall quickly (14).

d. See section 1.5 for further information.

2.5.3 Flood Behaviour

a. Flood behaviour in the sector is influenced by a number of local creeks and smaller catchments.

b. Leycester Creek, Goolmangar Creek and Terania Creek are the larger creeks within the Rural North sector, which all combine at Leycester Creek west of Lismore. Rainfall within these catchments can cause localised flooding.

c. **Nimbin:** Goolmangar Creek flows through the western side of Nimbin, and goes on to join Leycester Creek to the West of Lismore. There are a number of smaller creeks which may have an influence on flood behaviour in Nimbin, including Mulgum Creek and Calico Creek. Nimbin can be affected by local catchment flooding from the creeks which flow through, as well as by overland flow (22).

d. **The Channon:** The Channon is situated on the convergence of three creeks, and can be affected by local catchment flooding due to localised rainfall.

e. **Dunoon:** Flood effects in Dunoon are primarily isolation.

f. **Goolmangar** is located along Goolmangar Creek, and is vulnerable to flooding from this source.

g. Although flooding and/or isolation of rural towns and villages within the Nimbin and Rural North sector is common, there is very little recorded quantitative flood intelligence available for the purposes of emergency planning of the Sector.

2.5.4 Classification of Floodplain

a. The Nimbin and Rural North sector can be further broken down into subsectors for floodplain classification, these classifications are as follows;

Table 18: Floodplain Classifications for subsectors in Nimbin & Rural North

GEMS ID	Subsector Name	Classification	Population Estimate	Dwelling Estimate	Vehicle Estimate
41601	Booerie Creek A	Overland Escape Route	68	29	52
42429	Booerie Creek B	Overland Escape Route	7	3	5
41602	Blakebrook A	Indirectly Affected Area	16	7	13
41650	Blakebrook B	Overland Escape Route	24	10	18

2.5.5 Inundation

a. Gauges exist at Nimbin on Goolmangar Creek (203901 - 058180), and in Goolmangar at Goolmangar Creek (558075) however these are not Bureau of Meteorology forecasting locations.

b. **Goolmangar:** in previous events, properties along Nimbin Rd have experienced inundation, with over floor depths of over 150cm. Goolmangar is located in a zone of high to medium hazard. Properties along Jiggi Rd have also experience inundation.

c. **The Channon:** Along Terania Creek, Branch Creek bridge has historically been the first access point to be inundated, followed by Mulley's Crossing and O'Briens Crossing. Many smaller roads along the creek will also experience inundation.

d. **Nimbin:** Lower lying areas of Sibley Street can be vulnerable to inundation.

2.5.6 Isolation

a. Areas in the Nimbin and Rural North sector not directly affected by inundation can be isolated due to main access roads being washed away, damaged, or blocked by landslips. Some common spots for road closures include Nimbin Rd, Rock Valley Rd, Jiggi Rd, Tuntable falls Rd, Terania Creek Rd, Gungas Rd, Blue Knob Rd and Stony Chute Rd (17).

b. The residents located in and around the rural villages of Nimbin, the Channon, Dunoon and Modanville as well as many smaller communities and properties within the sector may be subject to isolation in excess of 96 hours in major floods in the Lismore LGA.

c. The low-lying rural road network is flood liable and includes low level bridges and causeways which may be affected by rising rivers and creeks. The main arterial roads leading into Lismore are all vulnerable to flooding, and generally cause isolation to rural villages in moderate to major flood events.

d. Isolation from the City of Lismore for all rural areas begins from the moderate flood level of 7.2m at the Lismore Rowing Club Gauge. Road closures may initially occur immediately to the north of Lismore near Woodlawn and Lagoons Grass, and to the west of Lismore along Kyogle Rd.

e. By 7.75m, Nimbin Rd closes at Boorie Creek to the northwest of Lismore, isolating Keerong, Georgica, Blakebrook, Larnook and Nimbin.

f. At 9.2m Terania St will close in North Lismore isolating Tullera, Pigottos Ridge, Modanville and Dunoon.

g. By 10.2m, Lismore is no longer accessible from any direction and Dunoon, Goolmangar, Nimbin, The Channon and all other settlements in the north-west sector will be isolated from the Lismore City area.

h. It is important to note road closures may occur prior to these heights due to rainfall and localised flooding.

2.5.7 Flood Mitigation Systems

a. No known flood mitigation systems.

2.5.8 Dams

a. Rocky Creek Dam is situated in the Nimbin and Rural North sector.

b. Downstream communities within the sector may experience inundation in a Sunny Day or Flood Dam Failure scenario. Areas which may be at risk include Dunoon, The Channon, Goolmangar and Keerrong. Travel time to the first properties at risk in a Sunny Day Failure at the Whian Whian road crossing is approximately 0.56 hours (or 33 minutes), with travel time in a 1%AEP with dambreak approximately 0.27 hours (or 16 minutes).

c. Refer to section 1.3 for more detail.

2.5.9 At Risk Facilities

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

2.5.10 Other Considerations

a. Nimbin and surrounding areas may experience an increase in visitors to the area during events such as the Nimbin Show in September, Nimbin Roots festival in October, Mardi Grass in May and during peak holiday periods over summer.

b. There may be a number of residents living in “off grid” dwellings within the sector which may not be reflected in the census or community data given above. These may be multiple occupancy dwellings and exist in areas including Nimbin, The Channon, Jiggi and Mountain Top.

ROAD CLOSURES AND ISOLATED COMMUNITIES

2.6 ROAD CLOSURES

a. Table 19 lists roads liable to flooding in the Lismore LGA, [these locations are shown on Maps 2-9 – Lismore LGA Town Maps].

b. Many roads within Lismore are vulnerable to flooding, table 19 below outlines road closures which affect major evacuation or access routes.

c. *It is important to note Central Lismore CBD area is highly susceptible to flash flooding, and road closures may occur due to localised rainfall independent of the gauge heights stated below.

Table 19: Roads liable to flooding in Lismore LGA.

Road	Closure location	Consequence of closure	Alternate Route	Indicative gauge height (Rowing Club Gauge)
North Lismore				
Simes Bridge	Central Lismore	Access into central Lismore affected	N/A	Orion St approach at 4.8 - 5.1mAHD
Bridge St	Near Mackenzie Park	Access into Central Lismore may be lost.	Local roads to lower Bridge St.	4.75mAHD-5.7mAHD
Woodlawn Rd	Near Turf Club entrance	Woodlawn College is isolated	N/A	6.2mAHD
Winterton Pde	Near Lismore Racecourse	Access in/out of North Lismore	N/A	6.16mAHD
Alexandra Pde	Showground 'dip'	Direct access in/out via Dunoon Rd for Lower North Lismore cut	Showground Detour.	6.5mAHD
Alexandra Pde	Near The Rivers Secondary College	Affects access to the north via Dunoon Rd.	N/A	6.8m – 9mAHD
Bangalow Rd	Near Lions Park	Access to rural North Lismore is cut.	N/A	From 7mAHD
Alexandra Pde	Showground entrance	Access to Showground to Dunoon Rd may be lost	Access to showground possible via railway line opposite Slater St	7.75mAHD
Terania St	Railway underpass	Cuts access to South Lismore via Robert White Bridge.	N/A	Inundation starts at 8.8mAHD, closes approximately 9.2mAHD

Tweed St	Near Terania St	Cuts off access to the north via Dunoon Rd	N/A	9-9.2 – 10mAHD
Dunoon Rd	North Lismore	Access out of urban north Lismore	N/A	10.1mAHD
Fawcett Bridge	North Lismore	Access between north and Central Lismore may be lost	N/A	Deck level 12.24mAHD. Southern approach trafficable until CBD levee overtopping. Northern approach lost early in event.
South Lismore				
Caniaba Rd	Loftville Culvert	May affect access to the Bruxner Highway from west of the crossing.	N/A	7mAHD
Casino St	Multiple locations, South Lismore	Affects access towards East Lismore	N/A	After levee overtopping, typically >10.1mAHD (may be lower if levee overtops prior to this)
Kyogle Rd	West of the South Lismore Levee	Access in and out of South Lismore to the west is lost	N/A	After levee overtopping, typically >10.1mAHD (may be lower if levee overtops prior to this)
Hollingworth Creek Bridge	Wilson St	May affect access for areas south of Hollingworth Creek.	Wilson St to Casino St	Deck height 8.8mAHD. Access may be lost by 8-8.84m, will be lost before a 10% AEP event. (<10.9mAHD).
Wilson St causeway	Wilson St, South Lismore	May affect access out for areas South of Hollingsworth Creek.	N/A	Deck height approx. 9mAHD. Access will be lost before a 10% AEP event. (<10.9mAHD)
Union St	Railway Viaduct	May affect access out of South Lismore.	N/A	9.5m
Bruxner Highway	South Lismore	May cut off access between urban South Lismore and rural areas to the South	N/A	10-10.7m
Union St Bridge	South Lismore	May cut off access between North and south Lismore	Not a preferred evacuation route	Deck level 12.92mAHD. Access from Union St cut before a 10%AEP (10.97mAHD).
Robert White Bridge	South Lismore	May cut off access for South Lismore	Ballina St bridge	Deck level 15.7mAHD. Both northern and southern approaches inundated in events larger than 5%AEP (approx. 11.45mAHD)

Ballina St Bridge	South Lismore	May cut off access for South Lismore	N/A	Deck Level 14.65mAHD. Eastern approach trafficable until levee overtopping. Western approach may cut at a 5%AEP (11.45mAHD)
Central Lismore*				
Simes Bridge	Orion St approach	Access between North and central Lismore may be lost	Fawcett bridge	4.8 – 5.1mAHD
Dawson St	Near Caravan Park	Due to localised basin flooding.	N/A	6m at the Dawson St gauge (558087)
Ballina Rd	Between Keen St & Wyrallah Rd	Affects access into East Lismore.	Conway St	From 8.7mAHD
Keen St, then Leycester or High St		Last road out of Central Lismore (North)	All routes out of central Lismore cut off after Levee overtopping	10.6-10.9mAHD
Bruxner Highway	Both east and westbound	Access out of Lismore urban area affected	N/A	11.05mAHD
Wyrallah Rd	Near Sewage Treatment Plant	Affects access into East Lismore from the south	N/A	10.1mAHD
Wyrallah Rd	Browns Creek Crossing	Access towards Dalley St may be affected.	N/A	12-12.5mAHD
Nimbin & Rural North				
Nimbin Rd	Booerie Creek	Access between urban Lismore and Rural North is cut	N/A	7.75mAHD
Dunoon Rd	North Lismore	Access out of urban north Lismore	N/A	10.1mAHD

2.7 SUMMARY OF ISOLATED COMMUNITIES AND PROPERTIES

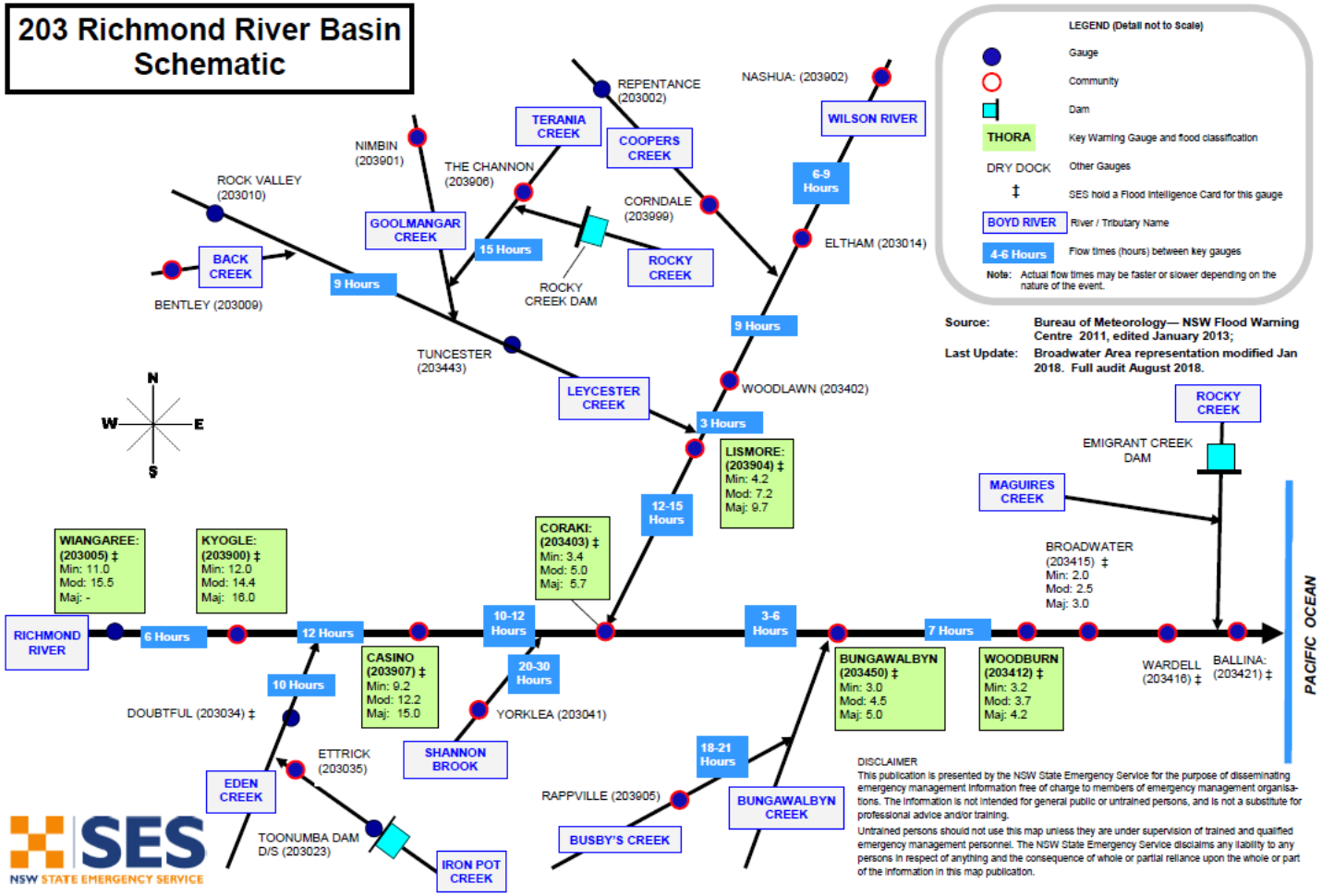
a. Table 20 lists communities liable to isolation and potential periods of isolation. Information presented here is based on a combination of historical and design events and does not reflect the duration of isolation expected in larger and extreme events.

Table 20: Potential Periods of Isolation for communities in the Lismore 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	
Nimbin	1607 pp, 834 properties, 1 hospital	Indirectly affected area	Up to 48 hours									If resupplied required, usually occurs by helicopter from Casino. Distribution point at the Bowling Club.
The Channon & Dunoon	1165 pp 403 properties	Indirectly Affected Area	36- 48 hours									If resupplied required, usually occurs by helicopter from Casino. Distribution point at the Channon or Dunoon school.
Goolmangar	183 pp , 54 properties	Overland Escape	36-48 hours									If resupplied required, usually occurs by helicopter from Casino. Distribution point at the Memorial Hall.
Wyrallah	493pp, 185 properties	Low Flood Island	24 hours									If resupplied required, usually occurs by helicopter from Casino, or boat from Coraki or Lismore. Distribution point at the Wyrallah Public School.
Gundurimba	335pp, 156 properties	Overland Escape	2 -3 days									If resupplied required, usually occurs by helicopter from Casino or boat from Lismore. Distribution point at the Gundurimba Hall.
Caniaba	804pp, 279 properties	High Flood Island	48 hours									If resupplied required, usually occurs by helicopter from Casino. Distribution point at the Caniaba Public School.
Bexhill & Clunes	1435pp, 608 properties	Bexhill- Rising Road Access Clunes- Indirectly affected	3 days									If resupplied required, usually occurs by boat from Lismore. Distribution point at Bexhill Public School.

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 River Valley

**Some facilities within this list have been relocated due to damage sustained in the 2022 flood events. Current known locations have been noted and will be updated as information becomes available.*

Facility Name	Street	Suburb	Comment
Schools			
Richmond River High School	Alexandra Pde/ Lake St	North Lismore	Approx. 832 students, 74 staff. Access becomes difficult at 5.5m at the Rowing Club gauge.
St John College Woodlawn	Woodlawn Rd	North Lismore	Approx. 771 students, 115 staff. Is isolated when Woodlawn Rd is cut off at approx. 6.2m on the Rowing Club gauge
The Rivers Secondary College – Lismore Campus	Dalley St	Lismore	Approx. 355 students, 47 staff. Has rising road access into Goonellabah. May become isolated in larger events.
Trinity Catholic College*	1 Dawson St* *The Dawson St campus sustained significant damage in the 2022 floods and students are now located at Southern Cross University	Lismore	Approx. 1142 students, 92 staff. Affected overfloor by floods above 7.0mAHD on the Rowing Club gauge.
Nimbin Central School	Thorburn St	Nimbin	Approx. 203 students, 34 staff. The Nimbin area may experience isolation.
Albert Park Public School	344 Keen St	Lismore	Approx. 57 students, 7 staff. May experience inundation.
Goolmangar Public School	Nimbin Rd	Goolmangar	Approx. 15 students, 2 staff. May experience inundation in Goolmangar Creek Flooding, or isolation.
The Channon Public School	21 Standing St	The Channon	Approx. 45 students, 3 staff. May experience isolation.
Modanville Public School	Dunoon Rd	Modanville	Approx. 83 students, 3 staff. May experience isolation.

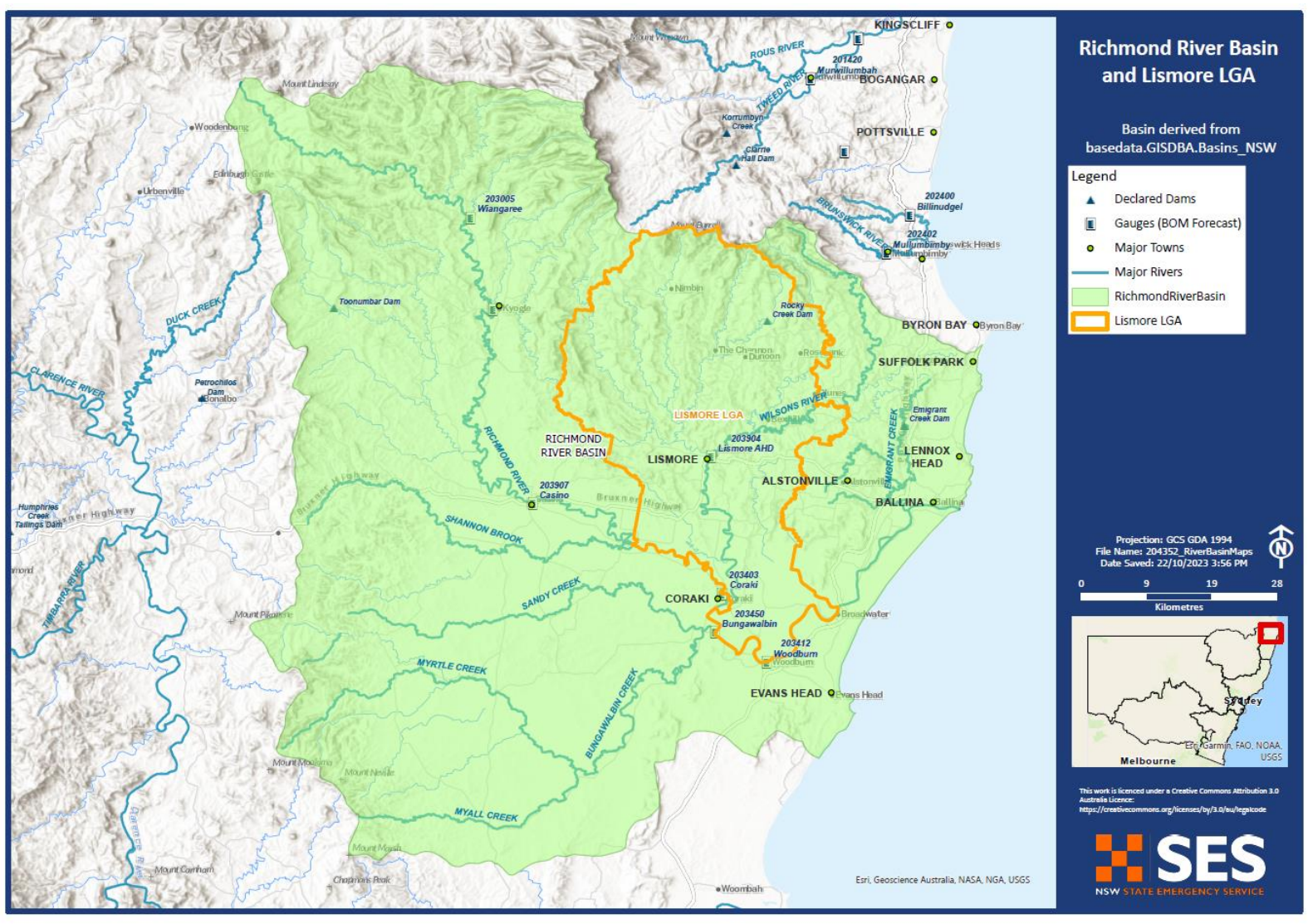
Tregeagle Public School	808 Tregeagle Rd	Tregeagle	Approx. 103 students, 7 staff. May experience isolation in larger events.
Lismore Public School & OOSC Care	10 Pound St	Lismore	Approx.326 students, 32 staff. May experience inundation.
Corndale Public School & OOSC care	647 Corndale Rd	Corndale	Approx. 19 students, 2 staff/ May experience inundation or isolation.
South Lismore Primary School & OOSC Care	Phyllis/Wilson St	South Lismore	Approx. 255 students, 17 staff. May experience inundation.
Lismore Heights Public School & OOSH Care	195 High St		Approx. 231 students, 19 staff. May experience isolation in larger events. Above the PMF.
Wyrallah Rd Public School & OOSH Care	152 Nielson St	East Lismore	Approx. 510 students, 32 staff. May experience inundation, has rising road access.
Blakebrook Public School	417 Rosehill Rd	Blakebrook	May experience isolation or inundation.
Clunes Public School & OOSH Care	Walker St	Clunes	Approx. 87 students, 6 staff. May experience isolation.
Bexhill Public School & OOSH Care	12 Withers St	Bexhill	Approx . 103 students, 7 staff. May experience inundation.
Dunoon Public School & OOSH Care	75 James St	Dunoon	Approx. 80 students, 6 staff. May experience isolation.
Jiggi Public School	1093 Jiggi Rd	Jiggi	May experience isolation.
St Carthages Public School & OOSH Care	2 Dawson St	Lismore	Approx. 599 students, 48 staff. May experience inundation.
Our Lady Help of Christians Public School & OOSH Care	24 Rhodes St	Lismore	Approx . 234 Students, 23 staff. May experience inundation, Becomes isolated if Hollingsworth Creek Bridge is cut off from 8.8m due to flood pump failure. Water on site if levee overtops.
Child Care Centres			
Me and My House Child Care Center	39 Diadem St	Lismore	Approx . 39 children, 9 staff. May experience inundation.
First Steps Early Learning Centre	3 Carson St	Goonellabah	Approx .90 children, 25 staff. May experience isolation.

Blinky's Corner Child Care Centre	94 Military Rd	East Lismore	Approx .71 children, 16 staff. May experience isolation in larger events. Above the level of PMF.
Possums Early Education Centre*	45 Wilson St *	Lismore	Approx .68 children, 15 staff
Gingerbread House Occasional care Centre	35 Uralba St	Lismore	Approx . 28 children, 6 staff. May experience inundation.
Friends of St Vincent's Long Daycare Centre	20 Dalley St	East Lismore	Approx .39 children. 10 staff. May experience some inundation in a PMF.
Lismore PCYC Kidzcare	Cnr Orion & Dawson Streets	Lismore	Approx .30 children, 3 staff. May experience inundation.
East Lismore community Preschool*	24 Colleen Place* *The East Lismore Preschool is currently housed at Wyrallah Rd Public School, 152 Nielson St, East Lismore, due to damage sustained in the 2022 floods.	East Lismore	Approx . 50 children, 5 staff. May experience inundation.
Lismore Pre-School Kindergarten Inc*	62 Brewster St* * Currently operating from Lismore Public School, 10A Pound St, Lismore.	Lismore	Approx .50 children, 15 staff. May experience inundation.
Clunes Community Preschool	34 Smith St	Clunes	Approx . 25 children, 5 staff. May experience isolation.
The Channon Children's Centre	18 Mill st	The Channon	Approx . 20 children, 3 staff. May experience inundation or isolation.
Nimbin Preschool	37 Cecil St	Nimbin	Approx . 20 children, 6 staff. May experience isolation in larger events.
Rosebank Community Preschool	311 Rosebank rd	Rosebank	Approx . 20 Children, 3 staff
Dunoon Preschool	84 James St	Dunoon	May experience isolation.
Anglican Parish Centre Preschool	24 Keen St	Lismore	Approx . 29 children, 6 staff. May experience inundation.
Richmond Hill Community Preschool	149 Richmond Hill Rd	Richmond Hill	Approx . 20 children, 4 staff. Above the PMF, may experience isolation.

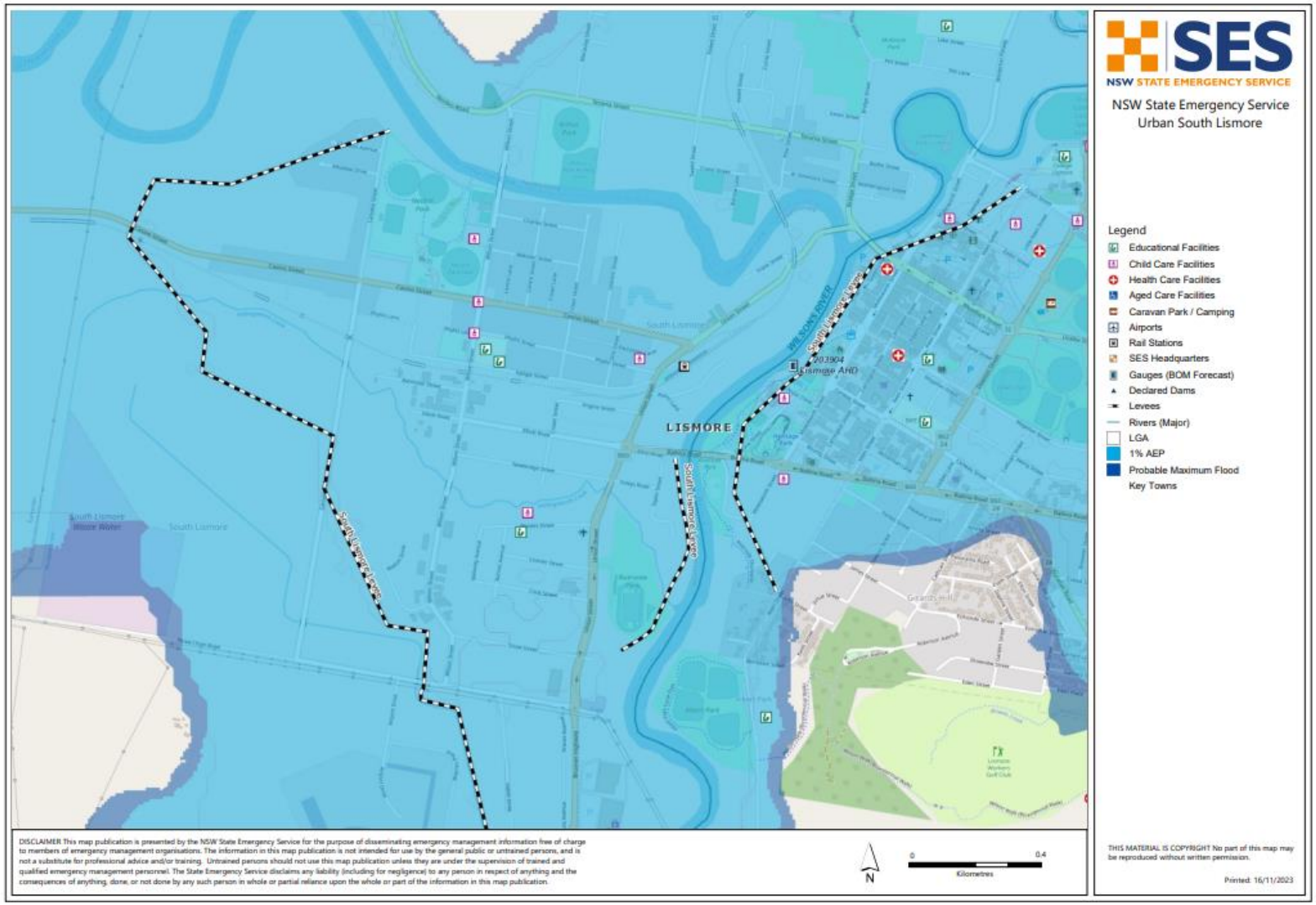
Tower Preschool	1034 Jiggi Rd	Jiggi	Approx . 22 children, 3 staff. May experience inundation or isolation.
Nimbin Early Learning Centre	81 Cullen St	Nimbin	Approx . 15 children, 3 staff. May experience isolation.
Facilities for the aged and/or infirm			
Lismore Base Hospital	60 Uralba St	Lismore	260 bed facility. May experience isolation or some inundation in a PMF.
St Vincents Hospital	20 Dalley st	East Lismore	Between 50-99 beds. May experience isolation. May experience some inundation in a PMF.
Nimbin Multi Purpose Service	35 Cullen St	Nimbin	3 Emergency beds, 4 acute beds, 11 aged care beds. May experience isolation.
Fromelles Manor – RSL LifeCare	445 McKenzie St	Lismore	63 residents, 35-38 staff. May experience inundation.
Ozanam Villas – Catholic healthcare	131 Dibbs st	East Lismore	May experience isolation. Has rising road access to Southern Cross University.
St Josephs Nursing Home	20 Dalley St	East Lismore	130 bed facility. May experience isolation. Has rising road access to Southern Cross University.
Maranoa Lismore Hostel	26-28 Dibbs St	Lismore	20 beds. May experience isolation. Has rising road access to Southern Cross University.
Utilities and infrastructure			
Essential Energy Lismore Depot	244 Union St	Lismore	May experience inundation.
Electricity Zone Substation	176 Three Chain Rd	South Lismore	May experience inundation.
Lismore switching station	148 Military Rd	Lismore	May experience inundation.
Sewerage Treatment Works	171 Canabia St	South Lismore	May experience inundation. Innundation of lower levels in 2022 floods.
Sewerage Treatment works	135, 135A & 135B Three Chain Road	South Lismore	May experience inundation. Damaged in 2022 floodings, operations restored, remediation works ongoing.
Sewerage Treatment Works	313 Wyrallah Rd	Monaltrie	May experience inundation, suffered major damage in 2022 floods, remediation works ongoing.
Sewerage Treatment Works	4 West Rd	Nimbin	May experience inundation

Nimbin Water Treatment Plant*		Nimbin	*Container treatment plant currently installed, pending new Treatment Plant.
Telstra Lismore Exchange	176 Molesworth St	Lismore	May experience inundation
Lismore Regional Airport	Canabia Rd & Bruxner Highway	South Lismore	May experience inundation, occurring from approximately 9mAHD at the Lismore Rowing Club gauge. Inundated with 2m of water through terminals and across runways in 2022 floods, remediation works ongoing.
Lismore Recycling and Recovery Centre	313 Wyrallah Rd	East Lismore	May experience inundation.
Camping Ground / Caravan Parks			
Lismore Lake Caravan Park	156 Bruxner Highway	South Lismore	Currently Closed. May experience inundation
Lismore Centra Tourist Caravan Park	60 Dawson St	Lismore	Floor level 6.5m. May experience inundation in early stages of flooding. Dependent on operation of Brown's Creek floodgate and pumping station, entrance may be cut from approximately 5.8mAHD.
Road Runner Caravan park	74/61 Caniaba Rd	Loftville	May experience inundation.
Lucky Country Leisure Parks Lismore (formerly Lismore Palms Caravan Park)	42-58 Brunswick St	North Lismore	Floor level 9.7m AHD. Access point may be closed from 7.2mAHD
Nimbin Tourist Caravan Park	29 Sibley St	Nimbin	May experience isolation
Teretre Cabins	5 High St	Nimbin	May experience isolation

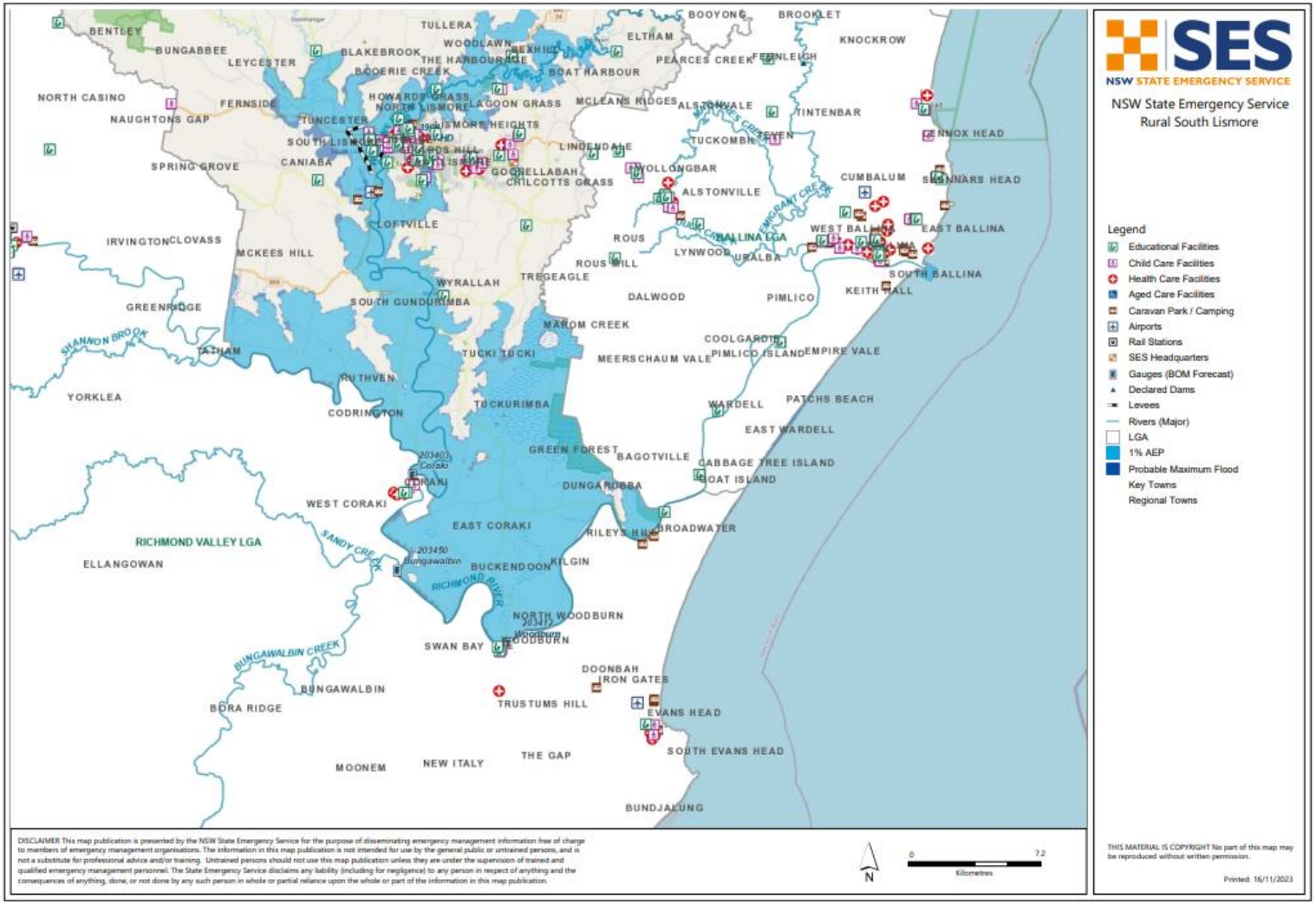
MAP 1: RICHMOND RIVER BASIN



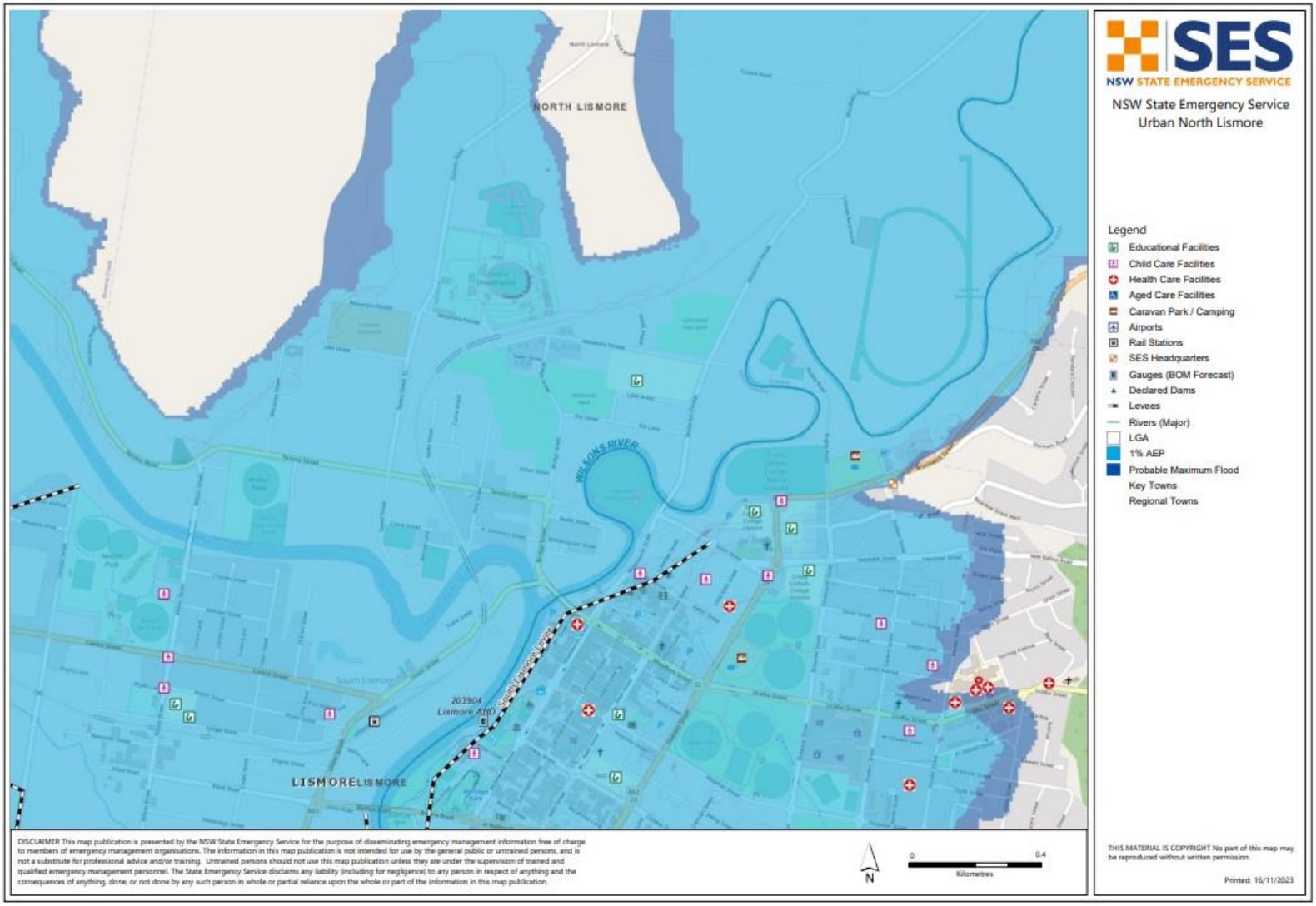
MAP 2: URBAN SOUTH LISMORE TOWN MAP



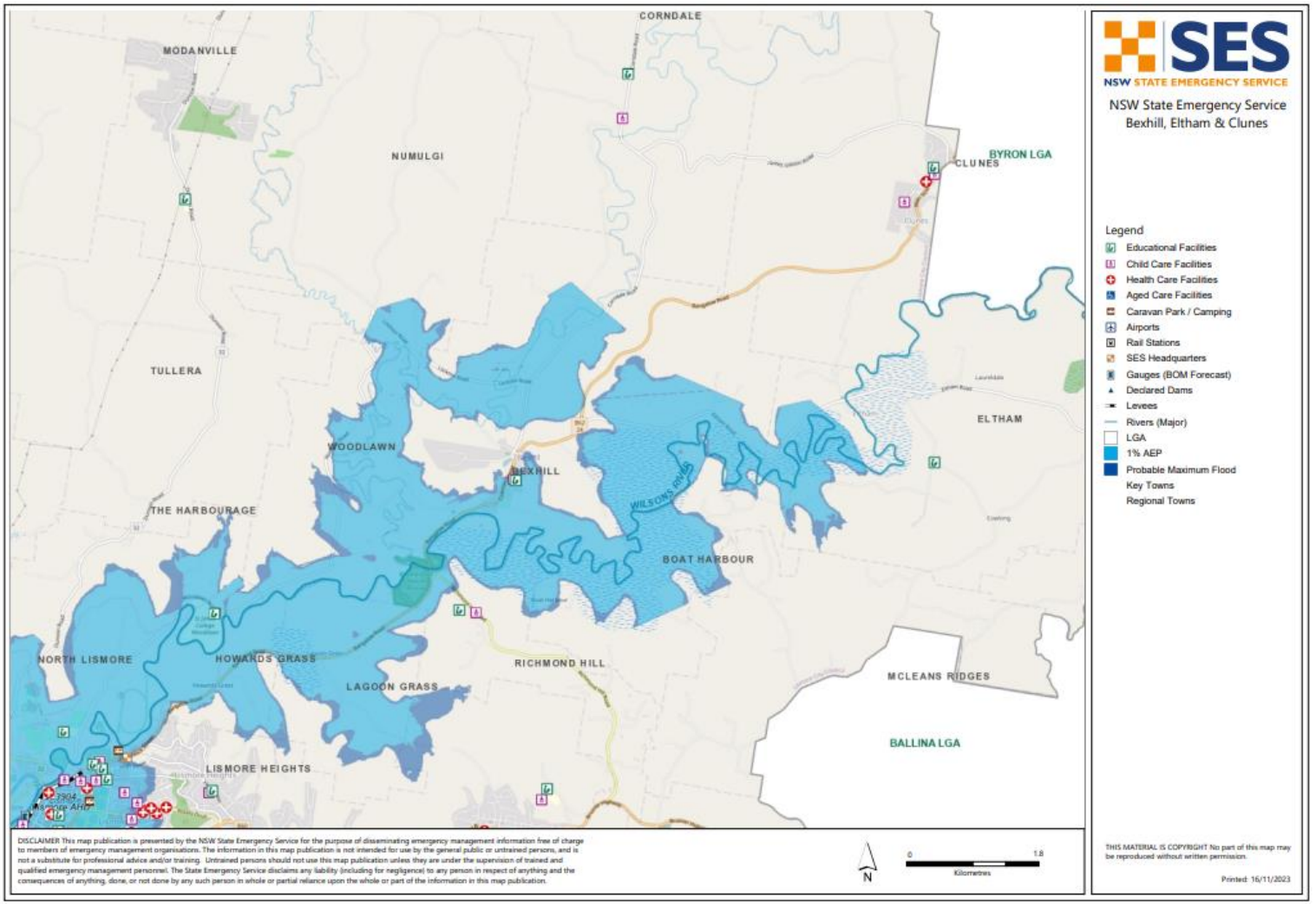
MAP 3: RURAL SOUTH LISMORE TOWN MAP



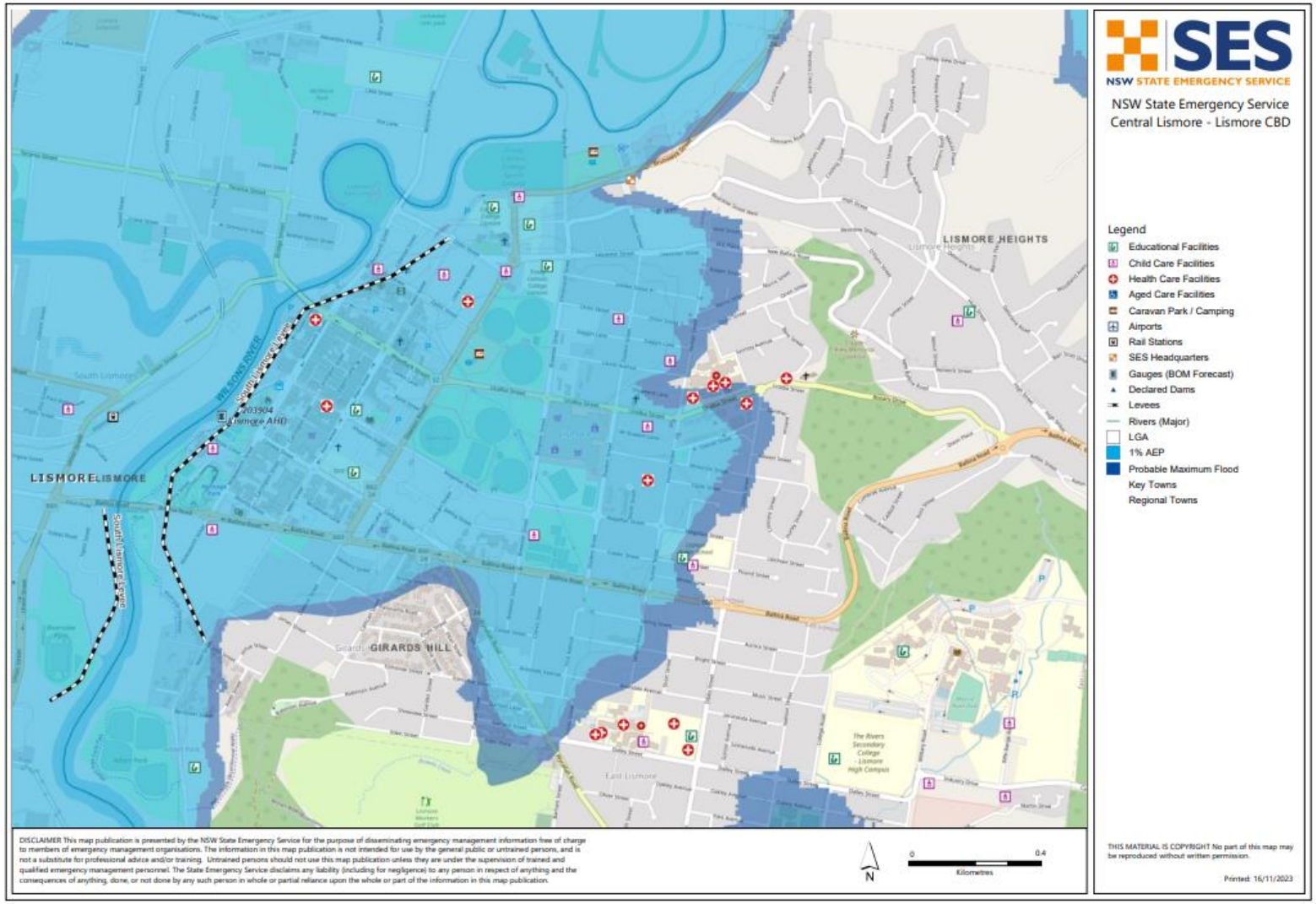
MAP 4: URBAN NORTH LISMORE TOWN MAP



MAP 5: BEXHILL, ELTHAM & CLUNES TOWN MAP

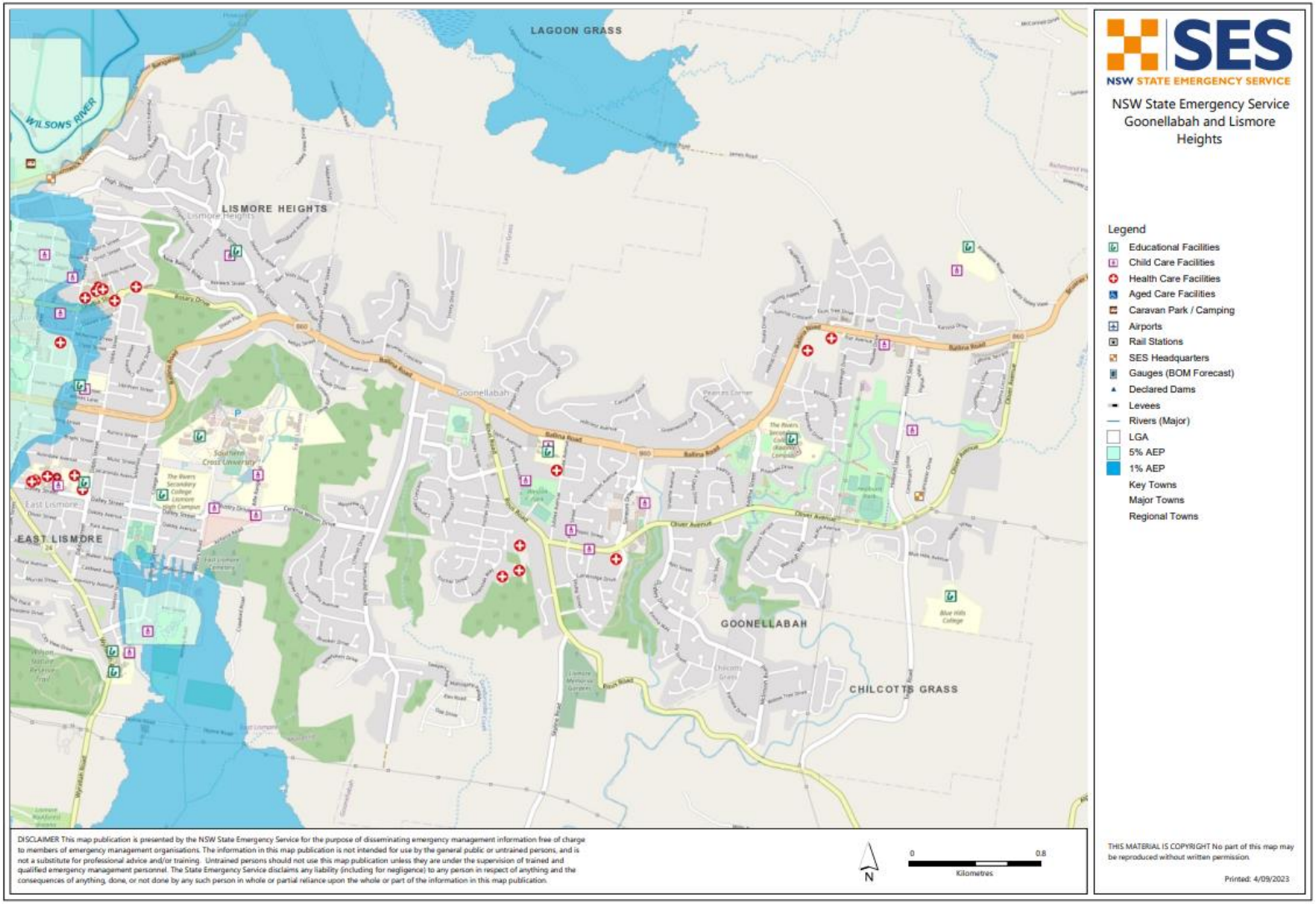


MAP 6: LISMORE CBD TOWN MAP

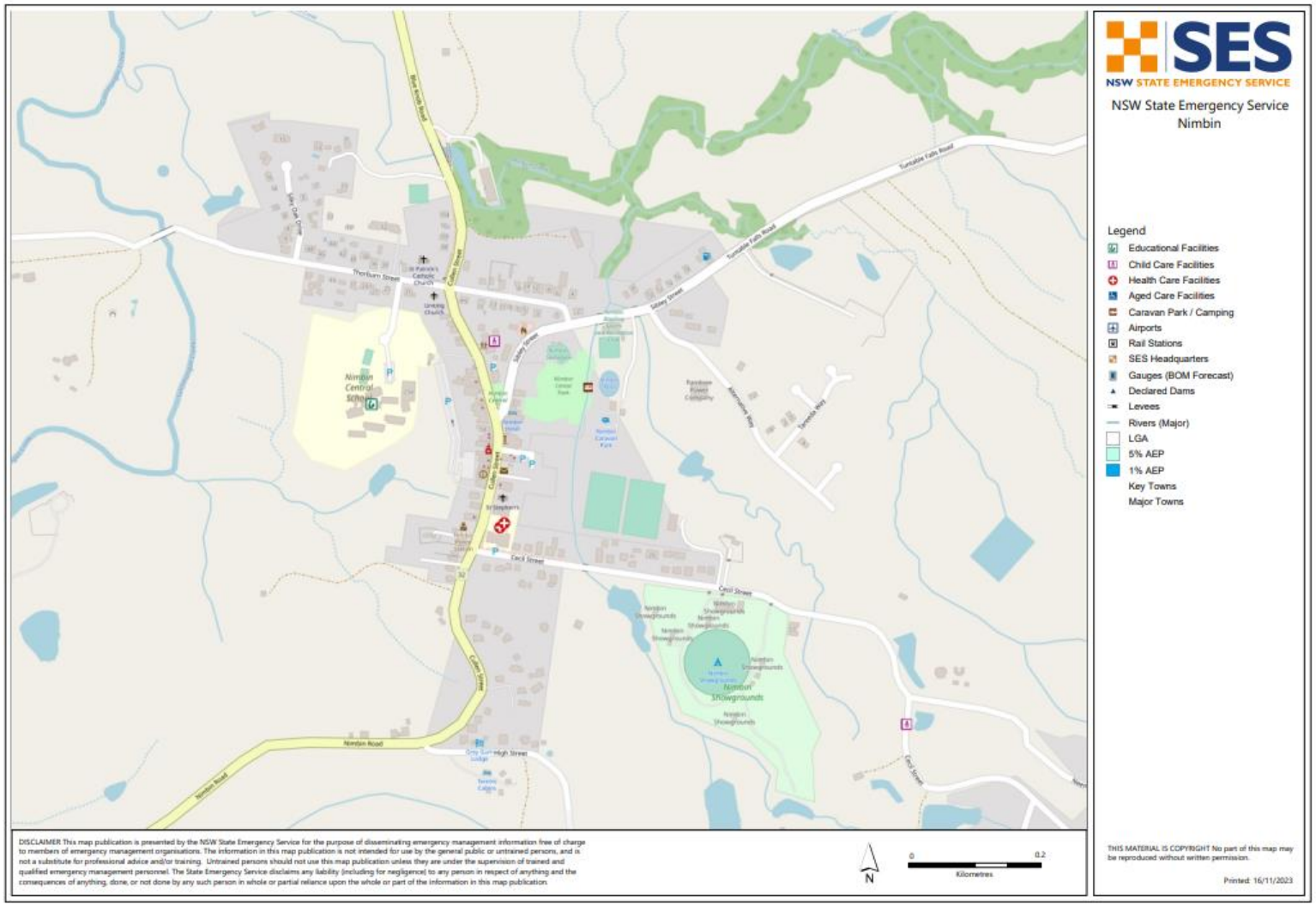


MAP 7: EAST LISMORE & GIRARDS HILL TOWN MAP

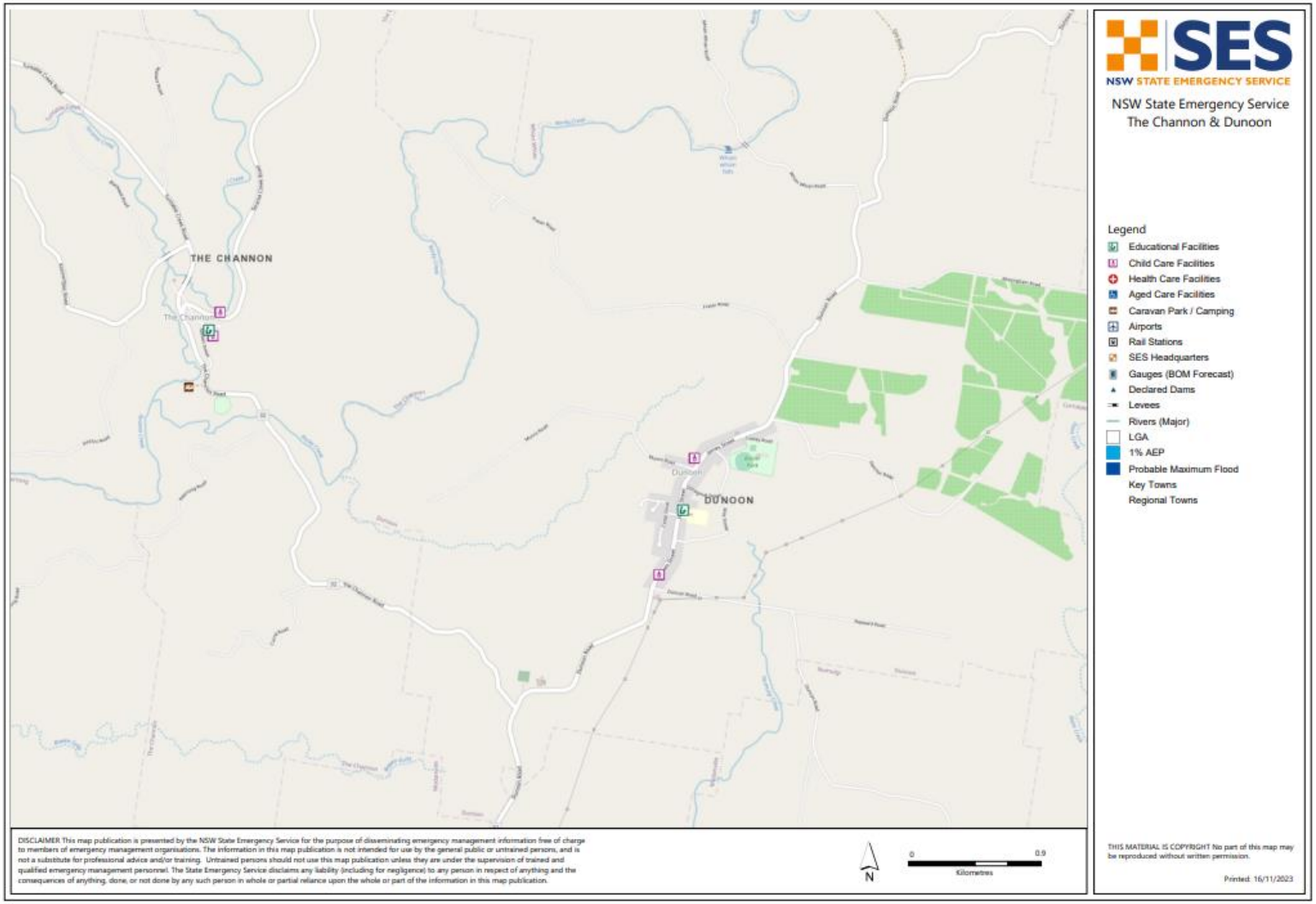
MAP 8: GOONELLABAH AND LISMORE HEIGHTS TOWN MAP



MAP 9: NIMBIN TOWN MAP



MAP 10: THE CHANNON & DUNOON TOWN MAP



LIST OF REFERENCES

1. **NSW State Emergency Service.** *Lismore City Local Flood Plan.* 2006.

2. **NSW Government.** *Northern Rivers Local Emergency Management Plan.* 2017.

3. **Australian Bureau of Statistics.** *Lismore Community Profiles.* 2021.

4. **BMT WBM.** *Richmond River Flood Mapping Study - Final Report.* 2010.

5. **Rous County Council.** *Rocky Creek Dam Safety Emergency Plan.* 2023.

6. **Lismore City Council.** *Lismore Floodplain Risk Management Plan.* 2014.

7. **CSIRO.** *Rapid Project Prioritisation for Flood Resilience in the Northern Rivers Region.* 2022.

8. **Patterson Britton and Partners Pty Ltd.** *Lismore Floodplain Management Study.* s.l. : Lismore City Council, June 2001. Issue No. 2.

9. **Engeny Water Management.** *Lismore Floodplain Risk Management Study.* 2021.

10. **Bureau of Meteorology.** *Lismore Wilsons River 058176 - River Level Data Feb Mar 2022.* 2022.

11. **Manly Hydraulics Laboratory.** *North Coast Flood Summary February/March 2022.* 2022.

12. **Manly Hydraulics Laboratory**. *Brunswick, Wilsons and Richmond Rivers Flood Summary March/April 2022.* 2022.

13. **Engeny Water Management.** *Lismore Floodplain Risk Management Plan .* 2023.

14. **NSW State Emergency Service.** *Lismore Rowing Club gauge (203904) Flood Intelligence Card.* s.l. : NSW SES - SES-In-Confidence, Last Updated 7 August 2017.

15. **Patterson, Britton & Partners.** *Lismore Levee Scheme Gradient Sensitivity Analysis.* 2003.

16. **Lismore City Council.** *Flood Response Report.* 2022.

17. **Sea & Star Advisory.** *Lismore Flooding Impacts & Recovery Statement.* 2022.

18. **Bureau of Meteorology.** *Service Level Specification for Flood Forecasting and Warning Services for New South Wales and the Australian Capital Territory.* 2013.

19. **BMT WBM.** *Richmond Valley Flood Study - Draft.* 2023.

20. **NSW State Emergency Service.** *Coraki Flood Intelligence Card.* 2001.

21. **NSW State Emergency Service.** *Flood Action Card - NSW SES Lismore City Unit.* 8 August 2016.

22. **Nimbin Disaster Resilience Group.** *Nimbin Community Disaster Plan.* s.l. : Lismore City Council, 2023.

23. **Australian Bureau of Statistics.** 2016 Census of Population and Housing. 2017.

LISMORE FLOOD WARNING SYSTEMS AND ARRANGEMENTS

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

Last Update: March 2024

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LIST OF TABLES

1. GAUGES MONITORED BY THE NSW SES LISMORE UNIT HEADQUARTERS

Table 1: Gauges monitored by the NSW SES Lismore Local Headquarters

Gauge Name	Type	AWRC No.	Bureau Gauge No.	Stream	Flood level classification in metres			Special Reading Arrangements	Owner
					MIN	MOD	MAJ		
Wilsons River at Lismore*†‡	Automatic	203904	058176	Wilsons River	4.2	7.2	9.7		Lismore City Council
Coraki*†‡	Automatic	203403	058175	Richmond River	3.4	5.0	5.7		DPIE
Bungawalbin*†‡	Automatic	203450	058184	Richmond River/ Bungawalbin Creek	3.0	4.5	5.0		DPIE
Woodburn*†‡	Automatic	203412	058016	Richmond River	3.2	3.7	4.2		DPIE
Bentley	Automatic	203009	058202	Back Creek	-	-	-		Lismore City Council
Corndale	Automatic	203024	058206	Coopers Creek	-	-	-		Lismore City Council
East Gundurimba	Automatic	203427	558047	Wilsons River	-	-	-		DPIE
Eltham	Automatic	203014	058200	Wilsons River	-	-	-		Lismore City Council/ Water NSW
Goolmangar	Automatic	-	558075	Goolmangar Creek	-	-	-		Lismore City Council
Lismore (Dawson St)	Automatic	-	558087	Browns Creek	-	-	-		Lismore City Council
Nashua	Automatic	203902	058162	Wilsons River	-	-	-		Lismore City Council
Nimbin	Automatic	203901	058180	Goolmangar Creek	-	-	-		Lismore City Council

Repentance	Automatic	203002	558000	Coopers Creek	-	-	-		Lismore City Council/Water NSW
The Channon	Automatic	203906	058147	Terania Creek	-	-	-		Lismore City Council/Water NSW
Tuncester	Automatic	203443	058201	Leycester Creek	-	-	-		Lismore City Council / DPE
Tuckurimba‡	Automatic	-	558076	Wilsons River	-	-	-		Lismore City Council
Woodlawn	Automatic	203402	558012	Wilsons River	-	-	-		Lismore City Council/ DPE
Rock Valley	Automatic	203010	058199	Leycester Creek	-	-	-		Water NSW

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 (‡)

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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 (@NSW SES Northern Rivers)
        - Facebook (@NSW SES Lismore City 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	
	Lismore	900 AM	
2ZZZ	Lismore	101 FM	2ZZZ
North Coast Radio	Lismore	92.9 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
- Lismore City Council
- Rous County Council
- NSW Health
- Media Outlets
- Others where appropriate

LISMORE CITY NSW SES LOCALITY RESPONSE ARRANGEMENTS

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

Last Update: March 2024

AUTHORISATION

NSW SES Locality Response Arrangements in Lismore City 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

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SECTOR OVERVIEW

Table 1: Overview of Sectors in the Lismore City LGA.

Sector Name	Community	Sector Basis	Total properties	Properties potentially at risk
Lismore Central	Lismore, East Lismore, Girards Hill, Lismore Heights, Chilcotts Grass, Howards Grass, Lagoon Grass, Lindendale and Goonellabah.	Rising Road Access	12,557	In a PMF, properties within the Lismore CBD area and parts of East Lismore would be at risk of either isolation and/or inundation (approx. 1215 properties in Central Lismore and 951 in East) Over floor inundation data not available for the remainder of the sector.
Lismore South	South Lismore, Loftville, Monaltrie, South Gundurimba, Caniaba, McKees Hill, Ruthven, Wyrallah, Tregeagle, Tucki Tucki, Tuckurimba, East Coraki, Buckendoon, North Woodburn, Green Forest, Kilgin, Dungarubba, Marom Creek, Tuncester	Urban South Lismore has Rising Road Access Much of rural Lismore South is a Low Flood Island	2406	In a PMF, properties within the urban and surrounding South Lismore area (approx. 1137 properties) would be at risk of either isolation and/or inundation. Over floor inundation data not available for the remainder of the sector.
Lismore North	North Lismore, Tullera, Woodlawn, Bexhill, Richmond Hill, Numulgi (part), Boat Harbour, McLeans Ridges, Pearces Creek, Booyong (part), Eltham, Clunes (part), Corndale, Rosebank and Repentance Creek.	Urban North Lismore has rising road access. Areas around Bexhill have Overland Escape Routes	2146	In a PMF, properties within the urban North Lismore area (approx. 176 properties) would be at risk of either isolation and/or inundation. Whilst not in the currently modelled flood extent, it is

				likely an additional 310 properties may be at risk of isolation and/or inundation in the Outer North Lismore Subsector.
Nimbin & Rural North	Booerie Creek, Blakebrook, Bungabbee, Bentley, Tullera (part), Leycester, Fernside Tullera, Numulgi, Kerrong, Koonorigan, Dunoon, Terania Creek, Tuntable Creek, The Channon, Goolmangar, Jiggi, Rock Valley, Georgica, Larnook, Mountain Top, Stony Chute, Blue Knob, Whian Whian, Nightcap and Nimbin.	Rural areas north of Boorie Creek are not covered by modelled flood extents and so are not classified.	2963	All properties may be at risk of isolation to services in a major flood. Over floor inundation data currently not available in this sector.

1. LISMORE CENTRAL SECTOR

1.1. LISMORE CENTRAL RESPONSE ARRANGEMENTS

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

Sector Description	This sector covers the suburbs of Lismore, East Lismore, Girards Hill, Lismore Heights, Chilcotts Grass, Howards Grass, Lagoon Grass, Lindendale and Goonellabah.		
Hazard	Riverine Flooding from Wilsons River and Leycester Creek Flash Flooding and/or stormwater flooding due to localised heavy rainfall		
Flood Affect Classification	The CBD and parts of East Lismore have Rising Road Access into flood free areas of East Lismore and Goonellabah		
At risk properties	Approx 1213 properties within the Central Lismore area and an additional 951 in East Lismore are within the flood extent for a PMF.	**Total number of properties within Sector/Community**	12557
Sector Control	The 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)**
	Wilsons River at Lismore Dawson St	203904 558087* *(BoM Number)	4.2 -	7.2 -	9.7 -

General Strategy	• Evacuation of at-risk population. • Self-evacuation to friends/family outside of the impact area. • Establishment of an Assembly Area at Southern Cross University, where evacuees are able to gather while flood situation is monitored. • Where a major levee overtopping and/or failure occurs, evacuees will either remain at Southern Cross University or be transported to an appropriate alternate evacuation centre if capacity is exceeded.
Key Risks / Consequences	• Inundation of access routes due to localised flooding in the CBD area prior to levee overtopping. • Overtopping and/or failure of the Lismore CBD levee resulting in inundation behind the levee. • Potential loss of life from rapid and potentially high velocity inundation in levee overtopping/failure scenario. • Inundation of a large number of dwellings and businesses. • Potential isolation of thousands of people estimated to be for a number of days.
	▪ Flood Watch (BoM)

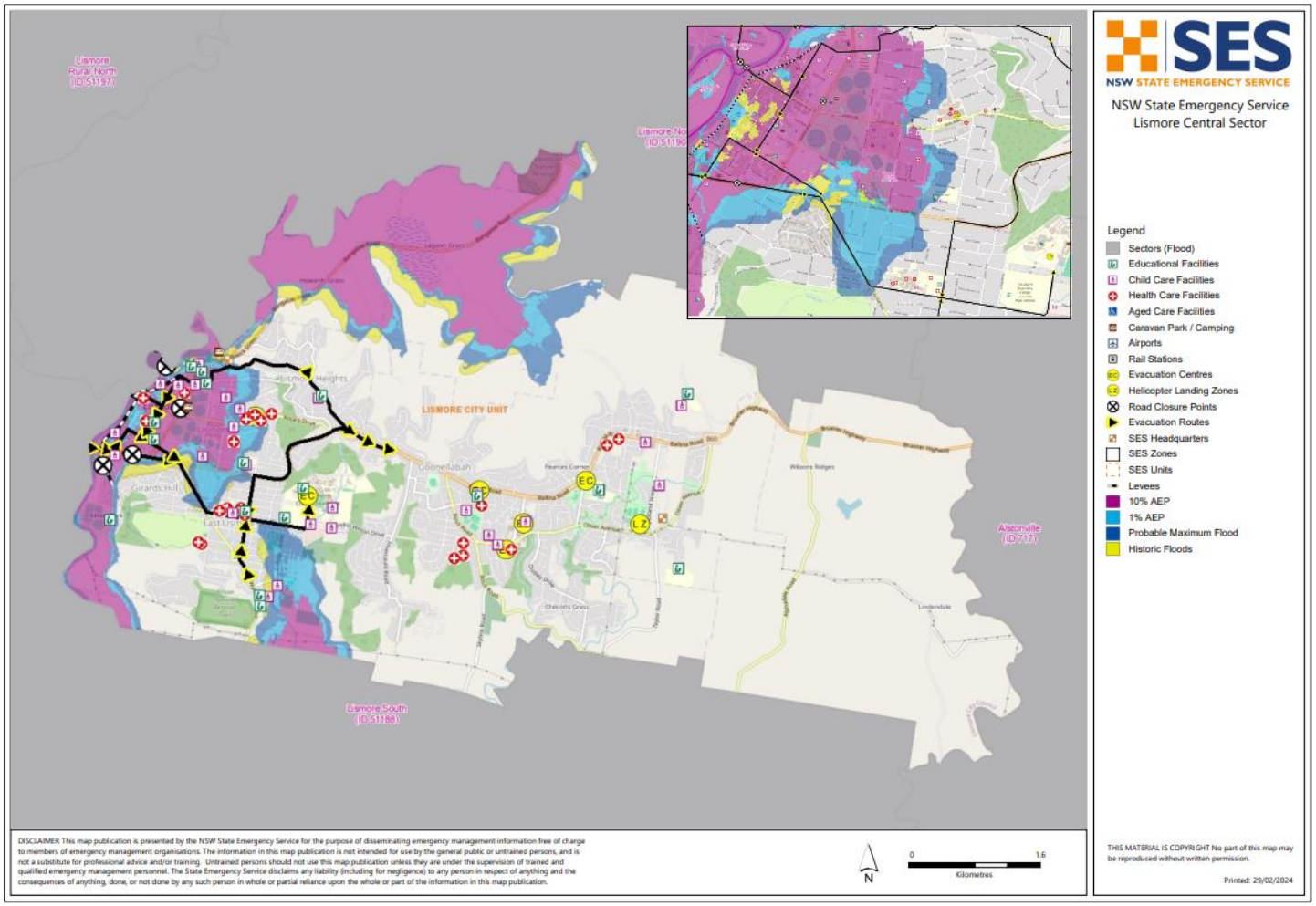
Information and Warnings	▪ Flood Warnings (BoM) ▪ AWS Advice ▪ AWS Watch and Act ▪ AWS Emergency Warning ▪ Sequenced door knocking of evacuation sector ▪ Media announcements (including social media) ▪ Emergency Alerts (SMS, landlines) ▪ Standard Emergency Warning Signal
	• At risk businesses/residents will be door knocked by NSW SES and / or by other emergency personnel and advised on the evacuation details. • Sirens may be used to alert residents of this sector.
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. • Monitoring integrity of dwellings surrounded by flood waters. • Monitoring integrity of existing levee system. • Control of surface water inside levee
	Assistance with property protection: • Refer to Chapter 4: Caravan Park arrangements
	Protection of essential infrastructure: **Essential infrastructure may be affected during periods of major flooding, however no protective actions have currently been identified.** • Water supply is from bulk supply to reservoirs, which is then distributed to premises. Lismore City Council owns the infrastructure from reservoirs to premises and Rous County Council is responsible for getting water to reservoirs. • Major Essential Energy Substation for Lismore is located at McKees Hill and is outside the PMF extent. • Main telecommunications exchange in this sector is located on Molesworth St.
	Lismore City Council is responsible for closure of flood gates and pump operation. Gates in the Central Lismore area are expected to close at the following heights at the Lismore gauge; • Gasworks Creek Floodgates close at 4mAHD • Browns Creek Floodgates close at 5.2mAHD and open upon levee overtopping • Pump operation will be dependent on river height, with Browns Creek Pumps activating at 5.2mAHD and 5.4mAHD, and Gasworks Creek pumps expected to activate at 6.4mAHD and 7mAHD.

Evacuation and/or Isolation Triggers	Evacuation may be considered due to flood heights expected to cause; • Inundation of property • Closure of main evacuation routes • Overtopping of CBD levee
Evacuation Triggers	Evacuation triggers based on Bureau of Meteorology flood height predictions at the **Wilsons River at Lismore Gauge (203904):** **1. Prediction to reach and exceed 5.2m with further sustained rainfall >5mm/hr, and Dawson St gauge exceeding 6m.** At this height the Browns Creek Floodgates are expected to close. Rainfall amount is a guide only, and the Dawson St gauge must be monitored and reconnaissance of areas around Dawson and Uralba St's. With heavy sustained rainfall, once floodgates are closed, flooding within the CBD basin area may occur based on effectiveness of pumps. Flash flooding of the CBD Basin area may also occur with locally heavy rainfall events independent of riverine rises. **2. Prediction to reach and exceed 7m** Some flooding of areas outside the levee may occur in the vicinity of Molesworth, Coleman and Brunswick Streets from approx. 5m, Water may impact the site around Trinity Catholic College from around 7m. 3. **Prediction to reach or exceed 9.7m** As the river rises above this height, low lying properties in the vicinity of Wade Park, East Lismore may begin to be impacted, with inundation increasing following levee overtopping. Depending on local conditions and rainfall, inundation in East Lismore areas may be influenced by flooding from local drains and needs to be monitored from early in an event by reconnaissance. 4. **Prediction to reach or exceed 10.2-10.7** CBD Levee overtopping is expected to occur between 10.6-10.7m at the Lismore Gauge, however some modelling has shown it may happen as early as 10.2m. Warnings need to be confirmed based on reconnaissance and monitoring of flood levels and levee condition. Initial area of inundation is expected to be in the Lismore CBD Browns Creek subsector post overtopping at the Browns Creek Spillway.
Sequencing of evacuation	**For Prediction 1:** Emergency Warning for CBD Basin based on assessment of local conditions (GEMS ID 6172). **For Prediction 2:** Early warning for subsector CBD Outside Levee (GEMS ID 66957) based on local conditions. **For Prediction 3**: Based on monitoring of local conditions, messaging may be considered for low lying properties in East Lismore A (GEMS ID 62273), Albert Park (GEMS ID 65630). **For Prediction 4:** Emergency Warning for all subsectors inside the levee, (beginning with Lismore CBD Browns Creek (GEMS ID 60215), then Lismore Inside Levee (GEMS ID 65625), East Lismore Inside Levee (GEMS ID 65627) and Central Lismore E (ID 62278) and F (GEMS ID 62279) subsectors as well as East Lismore A (GEMS ID 62273) and Albert Park (GEMS ID 65630) based on levee monitoring and assessment. Consider messaging for Girards Hill area (GEMS ID 65640) due to loss of access routes and Central Lismore Indirectly Affected Subsector (GEMS ID 65765) to not enter Lismore depending on predicted heights.

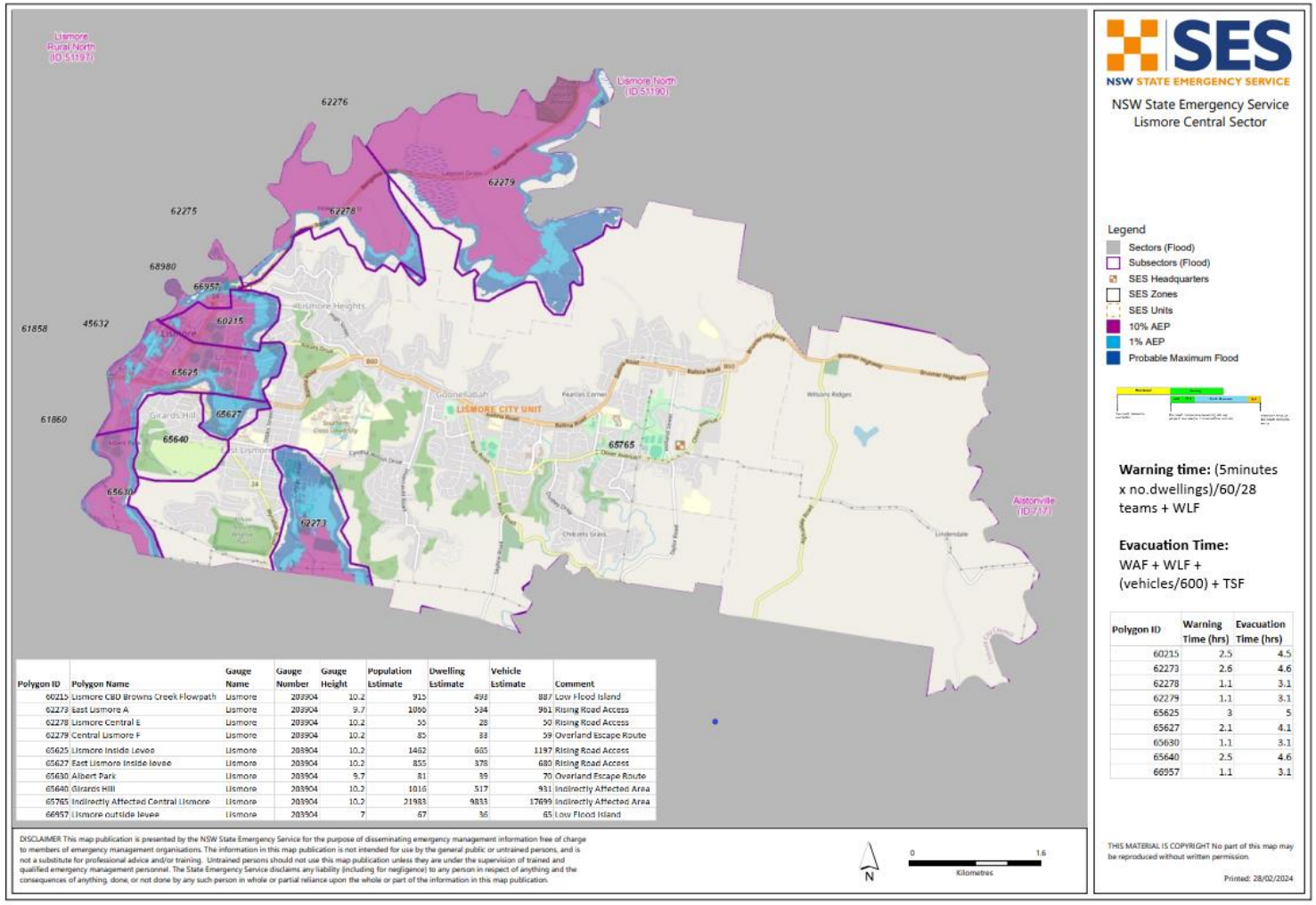
Evacuation Routes	• **Route A**: Local roads to Conway St or Ballina Rd*, then onto Wyrallah Rd and Dalley Street to Southern Cross University. • **Route B**: Local roads to Leycester St, New Ballina Rd, Rotary Drive, Ballina Rd, Dibbs St, Dalley St, Military Rd to Southern Cross University • **For East Lismore**: Wyrallah Rd to Dibbs St, then Dalley St towards Southern Cross University.
Evacuation Route Closure	• Local road closures may occur due to rainfall and flash flooding within the Central Basin area prior to levee overtopping, and need to be monitored. • *Ballina Rd between Molesworth and Conway St can be affected by flash flooding and is a common spot for flood rescues to occur. Based on assessment of local conditions, this portion of the route can be bypassed via Molesworth St and Conway St, joining back on to Wyrallah Rd. • All access routes will be lost progressively post levee overtopping, with expected last roads out along listed evacuation routes.
Method of Evacuation	• Primarily self-evacuation by private transport to higher ground in East Lismore, Lismore Heights or Goonellabah. • Primarily self-evacuation by private transport to evacuation centres at Southern Cross University. • Bus services may circulate to take people to evacuation centres at Southern Cross University
Evacuation Centre/Assembly Point	**The Primary evacuation centre is:** Southern Cross University, Military Rd, Lismore. Other evacuation centres may be opened at Goonellabah or other nominated locations as the need arises and may include; • Goonellabah Sports and Aquatic Centre: 50 Oliver Ave Goonellabah • Goonellabah Community Centre: 27 Oliver Ave Goonellabah • Goonellabah Primary School: Cnr Bruxner Highway and Jubilee Ave • Kadina High School: Kadina St, Goonellabah
Large scale evacuations	When large-scale evacuations are likely, the NSW SES Incident Commander will liaise with the LEOCON and request support of the EOC as required.
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 will be provided by the NSW SES through the 132500 call out system. • Resupply in this Sector is less likely than the other Sectors of Lismore.

	Table 20, in Volume 2 provides information about isolated communities in the Lismore City area and potential periods of isolation.
Aircraft Management	***Helicopter Landing Points:*** Suitable landing points are located at: • **Hepburn Park** - Hepburn Avenue, Goonellabah 2480. 28.82189° S, 153.34430°E This landing zone is outside the PMF extent and is expected to remain flood free. • **Lismore Base Hospital Helipad**– 60 Uralba St, Lismore 28.80904° S, 153.29204° E This landing zone is outside the PMF extent and is expected to remain flood free.
	Airports: The closest airport is located in the Lismore South 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.

1.2. LISMORE CENTRAL SECTOR MAP



1.3. EVACUATION PLANNING



Polygon ID	Polygon Name	Gauge Name	Gauge Number	Gauge Height	Population Estimate	Dwelling Estimate	Vehicle Estimate	Comment
60215	Lismore CBD Browns Creek Flowpath	Lismore	203904	10.2	915	493	887	Low Flood Island
62273	East Lismore A	Lismore	203904	9.7	1066	534	961	Rising Road Access
62278	Lismore Central E	Lismore	203904	10.2	55	28	50	Rising Road Access
62279	Central Lismore F	Lismore	203904	10.2	85	33	59	Overland Escape Route
65625	Lismore Inside Levee	Lismore	203904	10.2	1462	665	1197	Rising Road Access
65627	East Lismore Inside levee	Lismore	203904	10.2	855	378	680	Rising Road Access
65630	Albert Park	Lismore	203904	9.7	81	39	70	Overland Escape Route
65640	Girards Hill	Lismore	203904	10.2	1016	517	931	Indirectly Affected Area
65765	Indirectly Affected Central Lismore	Lismore	203904	10.2	21983	9833	17699	Indirectly Affected Area
66957	Lismore outside levee	Lismore	203904	7	67	36	65	Low Flood Island

Polygon ID	Warning Time (hrs)	Evacuation Time (hrs)
60215	2.5	4.5
62273	2.6	4.6
62278	1.1	3.1
62279	1.1	3.1
65625	3	5
65627	2.1	4.1
65630	1.1	3.1
65640	2.5	4.6
66957	1.1	3.1

2. LISMORE SOUTH

2.1. LISMORE SOUTH RESPONSE ARRANGEMENTS

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

Sector Description	The Lismore South sector includes the urban area of South Lismore, as well as the suburbs of Loftville, Monaltrie, South Gundurimba, Caniaba, McKees Hill, Ruthven, Wyrallah, Tregeagle, Tucki Tucki, Tuckurimba, East Coraki, Buckendoon, North Woodburn, Green Forest, Kilgin, Dungarubba, Marom Creek and Tuncester.		
Hazard	Riverine flooding from the Wilsons River, Leycester Creek and the Richmond River.		
Flood Affect Classification	Urban South Lismore has Rising Road Access Much of Rural South Lismore is a Low Flood Island		
At risk properties	There are approximately 1137 properties that may be within the PMF flood extent in urban and surrounding South Lismore. All properties at risk of isolation. Over floor inundation data not available for the remainder of the sector.	**Total number of properties within Sector/Community**	2406

Sector Control	The 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 Gauges Name

Name	AWRC No.	Min (m)	Mod (m)	Maj (m)
Wilsons River at Lismore	203904	4.2	7.2	9.7
Coraki	203403	3.4	5.0	5.7
Woodburn	203412	3.2	3.7	4.2
Broadwater	203415	2.0	2.5	3.0
Tuncester*	203443	-	-	-
**This gauge may provide indication of upstream levels in Leycester Creek.*				

General Strategy

Urban South Lismore

- Evacuation of at-risk population.
- Self-evacuation to friends/family outside of the impact area.
- Establishment of an Assembly Area at Southern Cross University, where evacuees are able to gather while flood situation is monitored.
- Where a major levee overtopping and/or failure occurs, evacuees will either remain at Southern Cross University or be transported to an appropriate alternate evacuation centre.

Rural South Lismore

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

Key Risks / Consequences	• Inundation of main access routes • Overtopping and/or failure of the South Lismore levee resulting in inundation behind the levees. • Potential loss of life from rapid and potentially high velocity inundation in levee overtopping/failure scenario. • Potential loss of life from rapid and potentially high velocity inundation of rural areas. • Inundation of a large number of dwellings and businesses. • Potential isolation of thousands of people estimated to be for a number of days. • Potential longer-term isolation for properties in rural areas of Lismore South
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 in conjunction with messaging via 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 furniture and valuable goods. • Relocation or lifting shop/business fittings and stock. • Relocation of livestock. • Relocation of farm machinery and valuable goods • Control of surface water through sandbagging measures. • Monitoring integrity of dwellings surrounded by flood waters. • Monitoring integrity of existing levee system. • Control of surface water inside levee.
	Assistance with property protection: • Refer to Chapter 4: Caravan Park Arrangements
	Protection of essential infrastructure: Identified essential infrastructure in this sector includes; • Lismore Regional Airport may be impacted from approximately 9-9.5mAHD at the Lismore Gauge. The southern end of the Airport is inundated first, by levels approx. 9.9mAHD. Remediation works ongoing since 2022 flooding. • Sewerage Treatment Works: 313 Wyrallah Rd Monaltrie, 171 Canabia St, South Lismore and Three Chain Rd South Lismore. All undergoing remediation works following 2022 floods.

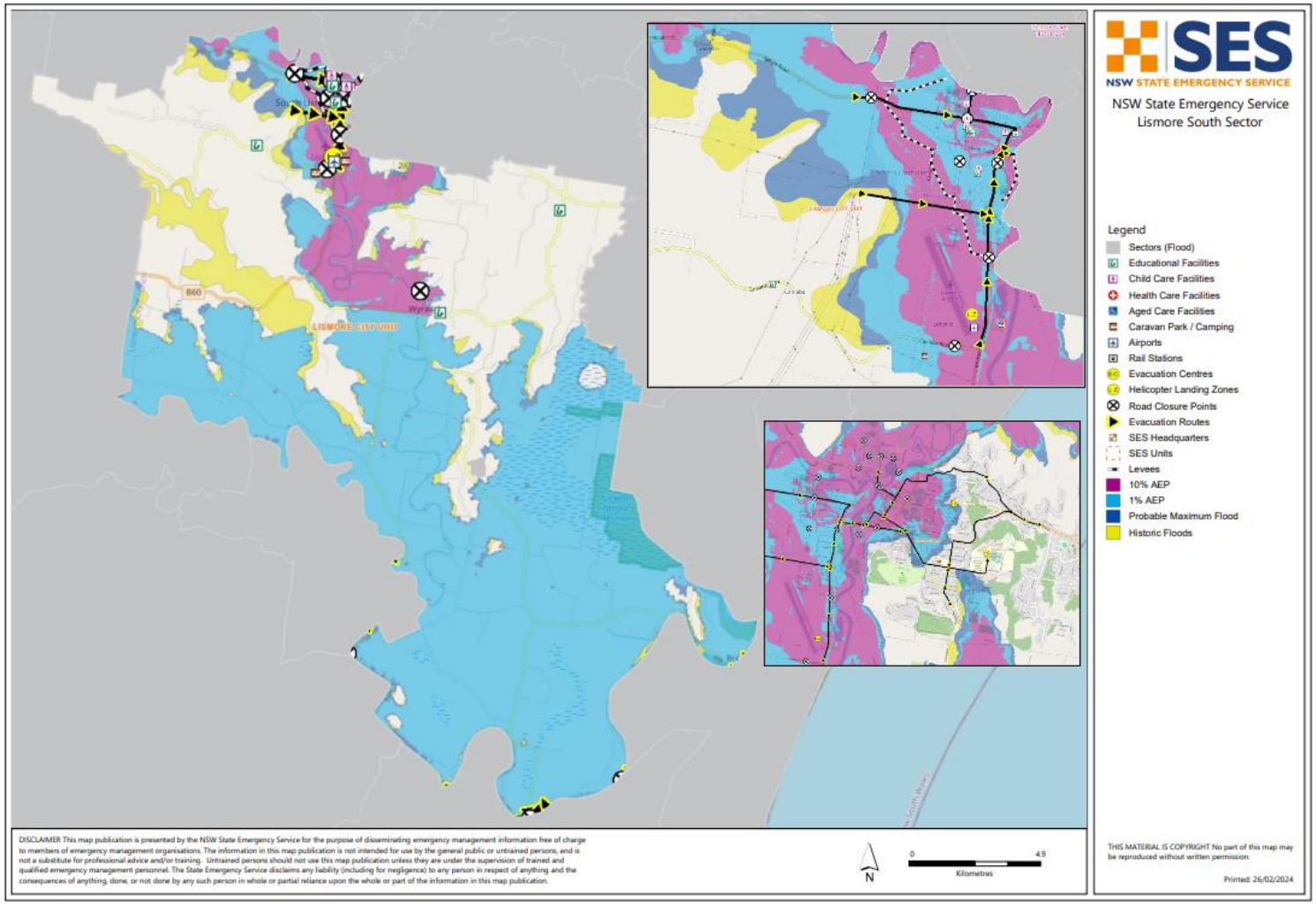
	• Water supply comes from Bulk supply from Rocky Creek Dam , Nightcap Water Treatment plant and Lismore Source Pump Station and is distributed from reservoirs. • Major electricity substation is located at McKees hill, with supply networks feeding from this and is flood free below the PMF. • There are significant sub stations located at 176 Three Chain Rd that provide power to flood pump stations.
	Flood gate and pump operation are the responsibility of Lismore City Council. This includes; • Hollingworth Creek Floodgates which close approx. 4m. • Pumps at Hollingworth Creek
Evacuation and/or Isolation Triggers	• Inundation of property • Closure of key evacuation routes prior to isolation and inundation • Overtopping of South Lismore levee • Failure of essential services
Evacuation and Warning Triggers	Evacuation or warning triggers based on Bureau of Meteorology flood height predictions at the **Wilsons River at Lismore Gauge (203904):** 1.) **Prediction to reach and exceed 7-7.4m at the Lismore gauge:** Areas to the South of Lismore may be cut off from this level due to closures at Wyrallah Rd near Ingram Rd. Kyogle Rd may close west of South Lismore by 7.4m, limiting access towards Lismore for subsector South-West Lismore. **2.) Prediction to reach and exceed 7.6-10.2m at the Lismore gauge** This will represent the range for South Lismore levee overtopping and needs to be supported by reconnaissance and reports on levee. If Leycester Creek is dominant carrier overtopping may occur from 7.6-9m, if Wilsons River or both are in flood, the range may be closer to 9-9.5m or higher. Upstream Gauges to be monitored. For a later overtopping, subsector South Lismore A1 will require earlier messaging at 9m. Evacuation or warning triggers based on Bureau of Meteorology flood height predictions at the **Coraki Gauge (203403):** **3.) Prediction to reach and exceed 6.3-6.55m at the Coraki gauge:** This may result in access towards Coraki over the East Coraki Bridge being compromised. Evacuation or warning triggers based on Bureau of Meteorology flood height predictions at the **Woodburn Gauge (203412):** **4.) Prediction to reach and exceed 3.95m at the Woodburn gauge** Water begins to flow under houses in Kilgin Rd and Banks St, North Woodburn in subsector Woodburn North. Rural isolation triggers 5.) **2.74m at the Broadwater gauge (203415)**: Isolation may occur in rural areas including Dungarubba, Kilgin and Green Forrest from this height due to closure of key access routes. 6.) **4m at the Broadwater gauge (203415)**: Complete inundation of areas around Dungarrubba, Kilgin & Green Forrest may occur by this height.

Sequencing of evacuation	**Wilsons River at Lismore Gauge (203904):** 1.) **For prediction 1:** Based on assessment of predicted heights and local conditions, and if levee overtopping is considered likely, Emergency Warning messaging for South Lismore C2 (GEMS ID 62263) and South-West Lismore (GEMS ID 62264) subsectors may be considered prior to road closures. **2.) For prediction 2:** Emergency Warning messaging for South Lismore A1 (GEMS ID 45632) ,South Lismore A2 (GEMS ID 61858) and South Lismore A3 (GEMS ID 61860) , South Lismore B1 (GEMS ID 61861) and South Lismore C1 (GEMS ID 61863)**.** As noted above, if overtopping is considered to be likely at the higher end of the range, South Lismore A1 will require Emergency Warning messaging for 9m. **Coraki Gauge** 1.) **Prediction 3**: Consider evacuation or isolation messaging for Lismore-East Coraki (GEMS ID 61867) and Lismore Coraki (GEMS ID 61868) subsectors based on assessment of predicted heights and local conditions. **Woodburn Gauge** **1. Prediction 4:** Emergency warning for evacuation of the Woodburn North subsector (GEMS ID 61871). **Broadwater Gauge** **1. Predictions 5 and 6:** Consider messaging for isolation or inundation for subsector Lismore Woodburn (GEMS ID 61869) and Marom Creek (GEMS ID 61872) based on predicted levels and local conditions.
Evacuation Routes	For Areas North of Hollingworth Creek (Subsectors South-West Lismore and South Lismore A2) • **Route A:** Local streets Casino St, Union St, Ballina Rd, Wyrallah Rd, Dalley St and Military Rd to Southern Cross University • **Route B (if Ballina Rd is cut between Keen St and Wyrallah Rd):** Local streets to Casino St, Union St, Ballina Rd, Molesworth St, Conway St, Wyrallah Rd, Dalley St and Military Rd to Southern Cross University For areas South of Hollingworth Creek (subsectors South Lismore A3, B1 and C1) • **Route A:** Local Streets to Bruxner Highway or Three Chain Rd**,** Union Street, Ballina Rd, Wyrallah Rd, Dalley St and Military Rd to Southern Cross University • **Route A1:** Access may also be possible north along Wilson St over the Wilson St Crossing, to Casino St, then Union St to Ballina Rd. This route may be trafficable until the Casino St/Union St intersection is affected. • **Route B (if Ballina Rd is cut between Keen St and Wyrallah Rd):** Local Streets to Bruxner Highway or Three Chain Rd, Union Street, Ballina Rd to Molesworth St, Conway St, Wyrallah Rd, Dalley St and Military Rd to Southern Cross University F**or rural areas, evacuation routes will be selected based on local conditions. These may include;** • East Coraki Bridge towards Coraki

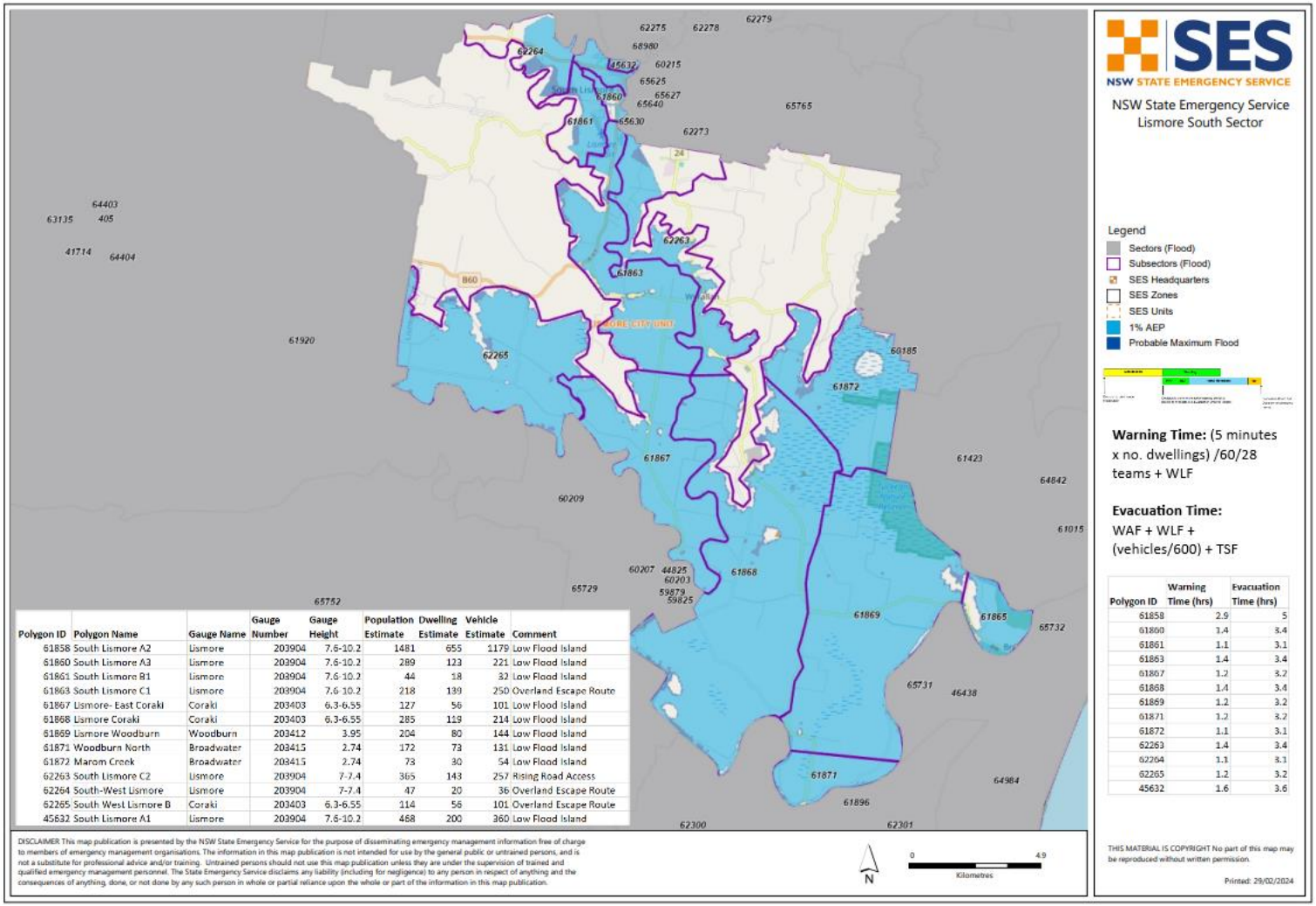
	• Court St towards Woodburn then to Woodburn evacuation routes to Evans Head
Evacuation Route Closure	All evacuation routes are progressively lost once the South Lismore levee overtops. • **North of Hollingworth Creek:** Casino and Wilson St intersection may close in the vicinity of a 10% AEP event (approx. 10.97m at the Lismore gauge) onwards. • **South of Hollingworth Creek**: Hollingworth Creek Bridge: May close from 8m if pump malfunctioning, otherwise around 8.8m . Alternate access may be available across Hollingworth Creek via Wilson St, however this will also be inundated by a 10%AEP event (approx. 10.97m at the Lismore gauge). The Bruxner Highway heading towards South Lismore may close from approx. 10-10.7m.
Method of Evacuation	• Primarily self-evacuation by private transport to higher ground within East Lismore, Lismore Heights or Goonellabah. • Primarily self-evacuation by private transport to nominated evacuation centres/assembly area at Southern Cross University. • In rural subsectors, primarily self-evacuation by private transport to higher ground or to nominated evacuation centres in Coraki, Woodburn or Evans Head.
Evacuation Centre/Assembly Point	**The Primary evacuation centre is:** Southern Cross University, Military Rd, Lismore. Other evacuation centres may be opened at Goonellabah or other nominated locations as the need arises and may include; • Goonellabah Sports and Aquatic Centre: 50 Oliver Ave Goonellabah • Goonellabah Community Centre: 27 Oliver Ave Goonellabah • Goonellabah Primary School: Cnr Bruxner Highway and Jubilee Ave • Kadina High School: Kadina St, Goonellabah In rural subsectors, evacuation centres in neighbouring LGAs may be the most suitable options and may include nominated locations in Coraki, Woodburn or Evans Head. Refer to Richmond Valley Flood Emergency Sub Plan for further details.
Large scale evacuations	When large-scale evacuations are likely, the NSW SES Incident Commander will liaise with the LEOCON and request support of the EOC as required.
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 may be necessary for areas in rural South Lismore.
	• Buckendoon (approx. 18 dwellings), Dungarubba (approx. 22 dwellings) and Kilgin (approx. 24 dwellings) may become isolated from approx. 2.74m at the Broadwater gauge, requiring resupply.

	• Wyrallah (approx. 185 dwellings) may become isolated via Wyrallah Rd, Tregeagle Rd and Coraki Rd requiring resupply. Resupply may be via boat or helicopter with distribution point at Wyrallah Public School. • Gundurimba (approx. 156 dwellings) may become isolated via Bruxner Highway and Coraki Rd requiring resupply Resupply may be via boat or helicopter with distribution point at Gundurimba Hall. • Caniaba (approx. 131 dwellings, plus additional 148 in surrounding area) may become isolated via Caniaba Rd requiring resupply. Resupply may be via helicopter with distribution point at Caniaba Public School.
	Table 20 in Volume 2 provides information about isolated communities in the Lismore City area and potential periods of isolation.
Aircraft Management	***Helicopter Landing Points:*** Designated landing points are located at: 7.) Westpac Helicopter Base: 77 Krauss Ave, South Lismore 28.83484° S, 153.26236° E 8.) Woodburn (in Richmond Valley LGA) 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. Other sites which may be used include; *9.)* Wyrallah: adjacent to Wyrallah PS 10.) Gundurimba: Gundurimba Hall 11.) Caniaba: Caniaba Public School
	Airports: Lismore Regional Airport has one runway. The runway is subject to flood impacts as outlined above.
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. LISMORE SOUTH SECTOR MAP



2.3. EVACUATION PLANNING



Polygon ID	Polygon Name	Gauge Name	Gauge Number	Gauge Height	Population Estimate	Dwelling Estimate	Vehicle Estimate	Comment
61858	South Lismore A2	Lismore	203904	7.6-10.2	1481	655	1179	Low Flood Island
61860	South Lismore A3	Lismore	203904	7.6-10.2	289	123	221	Low Flood Island
61861	South Lismore B1	Lismore	203904	7.6-10.2	44	18	32	Low Flood Island
61863	South Lismore C1	Lismore	203904	7.6-10.2	218	139	250	Overland Escape Route
61867	Lismore- East Coraki	Coraki	203403	6.3-6.55	127	56	101	Low Flood Island
61868	Lismore Coraki	Coraki	203403	6.3-6.55	285	119	214	Low Flood Island
61869	Lismore Woodburn	Woodburn	203412	3.95	204	80	144	Low Flood Island
61871	Woodburn North	Broadwater	203415	2.74	172	73	131	Low Flood Island
61872	Marom Creek	Broadwater	203415	2.74	73	30	54	Low Flood Island
62263	South Lismore C2	Lismore	203904	7-7.4	365	143	257	Rising Road Access
62264	South-West Lismore	Lismore	203904	7-7.4	47	20	36	Overland Escape Route
62265	South West Lismore B	Coraki	203403	6.3-6.55	114	56	101	Overland Escape Route
45632	South Lismore A1	Lismore	203904	7.6-10.2	468	200	360	Low Flood Island

Polygon ID	Warning Time (hrs)	Evacuation Time (hrs)
61858	2.9	5
61860	1.4	3.4
61861	1.1	3.1
61863	1.4	3.4
61867	1.2	3.2
61868	1.4	3.4
61869	1.2	3.2
61871	1.2	3.2
61872	1.1	3.1
62263	1.4	3.4
62264	1.1	3.1
62265	1.2	3.2
45632	1.6	3.6

3. LISMORE NORTH SECTOR

3.1. LISMORE NORTH RESPONSE ARRANGEMENTS

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

Sector Description	The suburbs within the sector include North Lismore, Tullera, Woodlawn, Bexhill, Richmond Hill, Numulgi (part), Boat Harbour, McLeans Ridges, Pearces Creek, Booyong (part), Eltham, Clunes (part), Corndale, Rosebank and Repentance Creek.		
Hazard	Riverine flooding Wilsons River and Leycester Creek as well as local catchment flooding from upper catchment creeks.		
Flood Affect Classification	Urban North Lismore has Rising Road Access		
At risk properties	There are approximately 176 properties within the PMF flood extent at risk of isolation and/or over floor inundation in Urban north Lismore. Over floor inundation data not available for the remainder of the sector.	**Total number of properties within Sector/Community**	2146
Sector Control	The 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)**
	Wilsons River at Lismore	203904	4.2	7.2	9.7

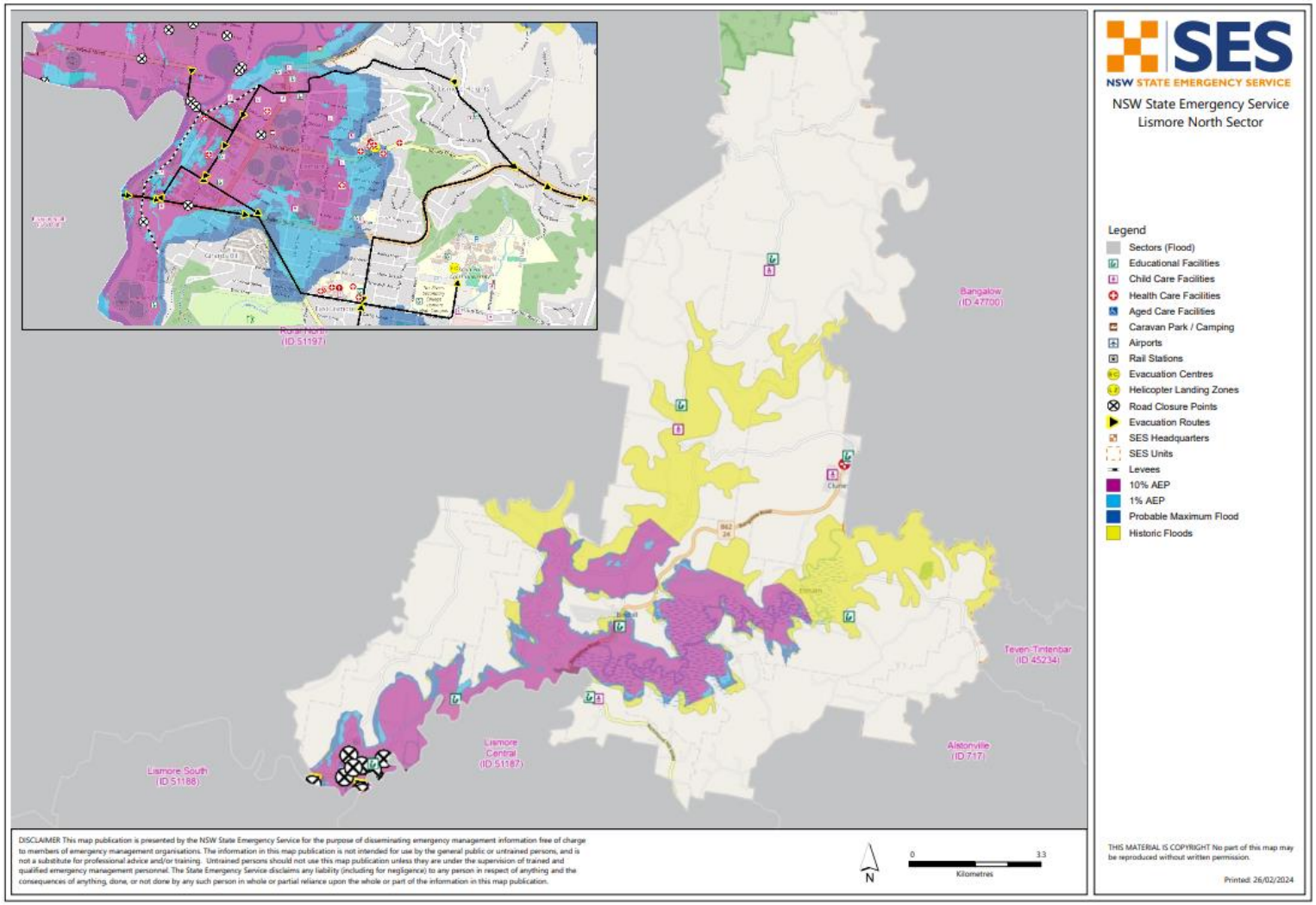
General Strategy	• Evacuation of at-risk population. • Self-evacuation to friends/family outside of the impact area. • Establishment of an Assembly Area at Southern Cross University, where evacuees are able to gather while flood situation is monitored. • If required, evacuees will either remain at Southern Cross University or be transported to an appropriate alternate evacuation centre.
Key Risks / Consequences	• Potential loss of life from rapid and potentially high velocity flooding inundation. • Inundation of a large number of dwellings. • Potential isolation of thousands of people estimated to be for a number of days.
Information and Warnings	▪ Flood Watch (BoM) ▪ Flood Warnings (BoM) ▪ AWS Advice ▪ AWS Watch and Act ▪ AWS Emergency Warning

	▪ Sequenced door knocking of evacuation sectors ▪ 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 in conjunction with messaging via 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:*** • Monitoring rising flood waters. • Relocation of livestock. • Relocation of farm machinery and valuable goods • Relocation of furniture and valuable goods. • Relocation or lifting shop/business fittings and stock. • Control of surface water through sandbagging measures. • Monitoring integrity of dwellings surrounded by flood waters.
	Assistance with property protection: • Refer to Chapter 4: Caravan Park Arrangements
	Protection of essential infrastructure: There is no identified essential infrastructure requiring protection in this sector. Refer to other sectors for infrastructure within the Lismore LGA.
Evacuation and/or Isolation Triggers	• Closure of evacuation routes prior to isolation • Inundation of property • Failure of essential services
Evacuation Triggers	Evacuation or warning triggers based on Bureau of Meteorology flood height predictions at the **Wilsons River at Lismore Gauge (203904):** **1.) Prediction to reach and/or exceed 7m:** Parts of urban North Lismore can become isolated from this level, with inundation to occur with further river rises. The first area to become isolated is in the vicinity of Pine St and Pitt St, with Winterton Parade, Wotherspoon St to follow. **2.) Prediction to reach and/or exceed 9m:** Last roads out become impacted for urban North Lismore, and all parts of this area quickly become inundated. Outside of the sequenced evacuation subsectors, isolation and/or inundation may occur, with the following key triggers based on Bureau of Meteorology flood height predictions at the **Wilsons River at Lismore Gauge (203904):** **3.) Prediction to reach and/or exceed 6.2 at the Lismore gauge:** Woodlawn College may become isolated when Woodlawn Rd near the Turf Club entrance is cut. **4.) Prediction to reach or exceed 7-7.2m at Lismore gauge:** Road closures occur north of Lismore near Woodlawn, including Bangalow Rd near Lions Park .

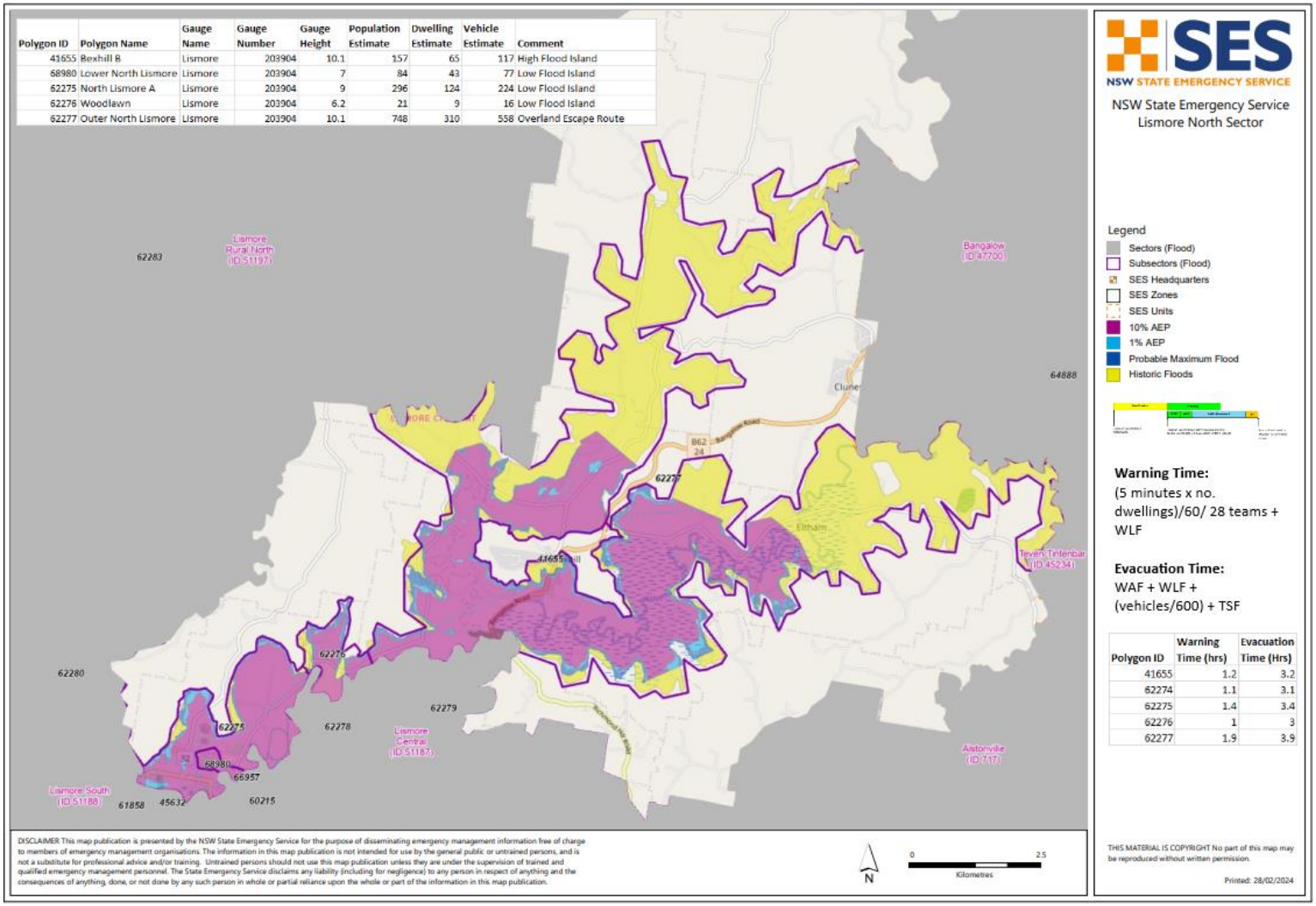
	This may isolate areas around Bexhill and the Outer North Lismore subsector **if access to Richmond Hill Rd is also lost at Boat Harbour Bridge.** **5.) Prediction to reach or exceed 9.2m at the Lismore gauge:** Terania St closes in North Lismore, roads in North Lismore are all predicted to close from approximately this height. **6.) Prediction to reach or exceed 10.2m at the Lismore gauge:** Lismore is no longer accessible from any direction.
Sequencing of evacuation	1.) **For prediction 1:** Watch and Act prepare to evacuate or prepare to isolate for targeted properties in the Lower North Lismore subsector (GEMS ID 68980) or Emergency Warning depending on predicted heights and monitoring of local conditions. Unit to doorknock affected properties. 2.) **For prediction 2**: Emergency warning for North Lismore A (GEMS ID 62275) and remainder of Lower North Lismore subsector (GEMS ID 68980). Outside of the sequenced evacuation subsectors, evacuation or isolation messaging may need to be considered based on predicted heights and local conditions, as well as isolation triggers outlined in predictions 3-6. These may include; 3.) **For prediction 3:** Woodlawn subsector (GEMS ID 62276). 4.) **For prediction 4:** Outer North Lismore subsector (GEMS ID 62277).
Evacuation Routes	**North Lismore Route 1:** Bridge St to Keen St, then Orion St to Leycester or High St towards East Lismore or Goonellabah. **North Lismore Route 2:** Bridge St to Keen St, then Conway St to Wyrallah Rd to Dalley St and Military Rd to Southern Cross University.
Evacuation Route Closure	The majority of roads out of North Lismore are generally closed by 9.2-9.4m at the Lismore gauge. Tweed St leading to Robert White Bridge and the southern portion of Bridge St may remain open until approx. 10.2-10.4m. Road closures may also occur within the CBD area affecting evacuation and are outlined in the Lismore Central Sector. Closures within the sector which may affect local evacuation include; • Bridge St near McKenzie Park from 4.75m. • Simes Bridge from 5.1m. • Bridge St at Slater Creek from approx. 5.7m. • Closures of local streets in Lower North Lismore subsector occur from approx. 7m and include Pine St and Pitt Lane. • Terania St approx. 9.2-9.4m near railway viaduct
Method of Evacuation	• Primarily self-evacuation by private transport to higher ground within East Lismore, Lismore Heights or Goonellabah. • Primarily self-evacuation by private transport to nominated evacuation centres/assembly area at Southern Cross University or other nominated evacuation centre.
Evacuation Centre/Assembly Point	**The Primary evacuation centre is:** Southern Cross University, Military Rd, Lismore.

	Other evacuation centres may be opened at Goonellabah or other nominated locations as the need arises and may include; • Goonellabah Sports and Aquatic Centre: 50 Oliver Ave Goonellabah • Goonellabah Community Centre: 27 Oliver Ave Goonellabah • Goonellabah Primary School: Cnr Bruxner Highway and Jubilee Ave • Kadina High School: Kadina St, Goonellabah If needed, the Showground may act as an emergency refuge in the pavilion area until suitable evacuation can be arranged from this point.
Large scale evacuations	When large-scale evacuations are likely, the NSW SES Incident Commander will liaise with the LEOCON and request support of the EOC as required.
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.
	Road access to this sector may close early in an event.
Resupply	Resupply may be required for communities within this sector.
	Areas around Bexhill and Clunes (approx. 608 properties) may require resupply in some flood events. This is likely to take place via boat or helicopter, with a possible distribution point at Bexhill Public School.
	Table 20 in Volume 2 provides information about isolated communities in the Lismore City Council area and potential periods of isolation.
Aircraft Management	***Helicopter Landing Points:*** Suitable landing points are located at: • Bexhill Public School
	Airports: There 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. LISMORE NORTH SECTOR MAP



3.3. EVACUATION PLANNING



4. NIMBIN & RURAL NORTH SECTOR

4.1. NIMBIN & RURAL NORTH RESPONSE ARRANGEMENTS

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

Sector Description	This sector includes the suburbs of Booerie Creek, Blakebrook, Bungabbee, Bentley, Tullera (part), Leycester, Fernside Tullera, Numulgi, Kerrong, Koonorigan, Dunoon, Terania Creek, Tuntable Creek, The Channon, Goolmangar, Jiggi, Rock Valley, Georgica, Larnook, Mountain Top, Stony Chute, Blue Knob, Whian Whian, Nightcap and Nimbin.		
Hazard	Riverine and local catchment flooding, flash flooding and isolation.		
Flood Affect Classification	Parts of the Nimbin and Rural North Sector are Indirectly Affected Areas. Some inundation may be expected, however due to lack of flood extent mapping in this sector, classifications of individual areas cannot be determined.		
At risk properties (isolation)	2936* Property inundation data not available. Isolation only	**Total number of properties within Sector/Community**	2936

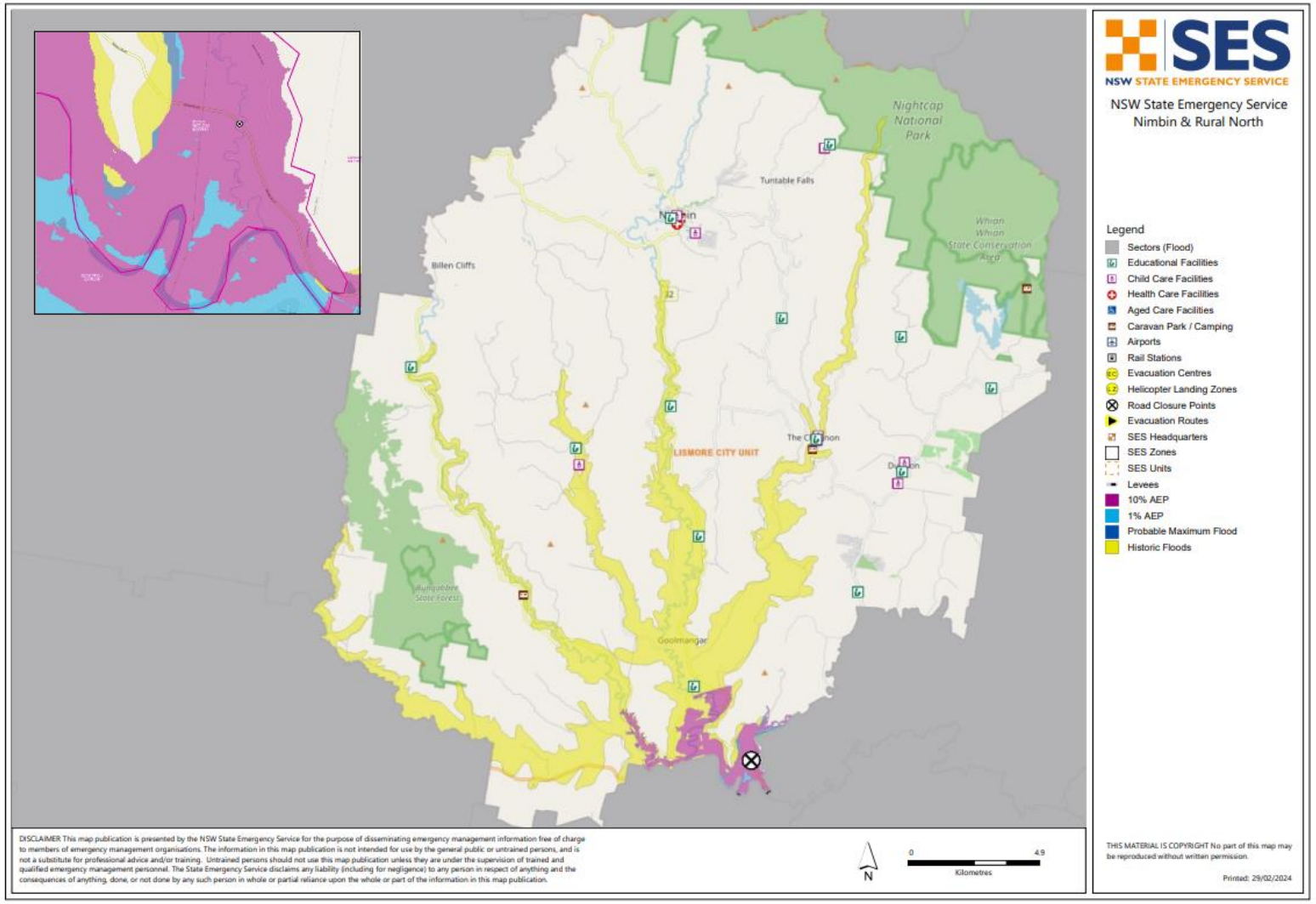
Sector Control	The Incident Controller will nominate a Sector Commander to control evacuations in this Sector. The NSW SES will conduct evacuations in this sector with assistance from NSW Police, Fire and Rescue NSW, and NSW Rural Fire Service (RFS) volunteers.				
Key Warning Gauge Name	**Name**	**AWRC No.**	**Min (m)**	**Mod (m)**	**Maj (m)**
	Wilsons River at Lismore	203904	4.2	7.2	9.7
General Strategy	• Evacuation of at-risk population. • Self-evacuation to friends/family outside of the impact area. • Establishment of an Assembly Area nominated as the need arises, where evacuees are able to gather while flood situation is monitored. • Resupply in floods that peak above a level whereby road access towards Lismore may be cut off.				
Key Risks / Consequences	• Closure of main access roads leading to isolation. • Landslips of local roads. • Inundation of property • Failure of essential services • Potential loss of life from rapid and potentially high velocity 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				

Property Protection	***Specific property protection measures:*** • Monitoring rising flood waters. • Relocation of livestock. • Relocation of farm machinery and valuable goods where resources are available • Relocation of furniture and valuable goods where resources are available. • Relocation or lifting shop/business fittings and stock where resources are available. • Control of surface water through sandbagging measures. • Monitoring integrity of dwellings surrounded by flood waters.
	Assistance with property protection: ▪ Refer to Chapter 4: Caravan Park Arrangements
	Protection of essential infrastructure: No protective measures of essential infrastructure have been identified. However essential infrastructure in this sector includes; • Nimbin water supply is owned and managed by Lismore City Council. The water supply main and other infrastructure was damaged in the 2022 flood events and remediation is underway for a permanent solution, with temporary measures in place. • There is one Sewerage treatment plant in Nimbin, with two (2) sewerage pump stations. Each pump has a short rising main connected to a common manhole in Thorburn Street.
Evacuation and/or Isolation Triggers	• Closure of evacuation routes prior to isolation • Inundation of property • Failure of essential services
Evacuation/Isolation Triggers	There is no Bureau of Meteorology warning or forecasting gauge in this sector. However main access road closures in the vicinity of the Wilsons River at Lismore gauge may give an indication of expected isolation to services in Lismore. **7.) Prediction to reach or exceed 7.0m at Lismore gauge:** Road closures occur north of Lismore and includes Bangalow Rd near Lions Park. **8.) Prediction to reach or exceed 7.75m at the Lismore gauge:** Towards the northwest of Lismore, Nimbin Rd closes at Booerie Creek which may isolate the areas around Keerong, Georgica, Blakebrook, Larnook and Nimbin. **9.) Prediction to reach or exceed 9.2m at the Lismore gauge:** Most of the remaining access roads in and out of North Lismore close from this height. **10.) Prediction to reach or exceed 10.2m at the Lismore gauge:** Lismore is no longer accessible from any direction.
Sequencing of evacuation	A number of residences and properties may need to be evacuated during periods of significant flooding. In most floods, the evacuation tasks will only involve a small number of people. These properties would be dealt with on a case-by-case situation in conjunction with Department of Communities and Justice.
Evacuation Routes	The local evacuation routes will be chosen in consideration of current road conditions. These routes will direct residents to the local Assembly Area/Evacuation Centre.

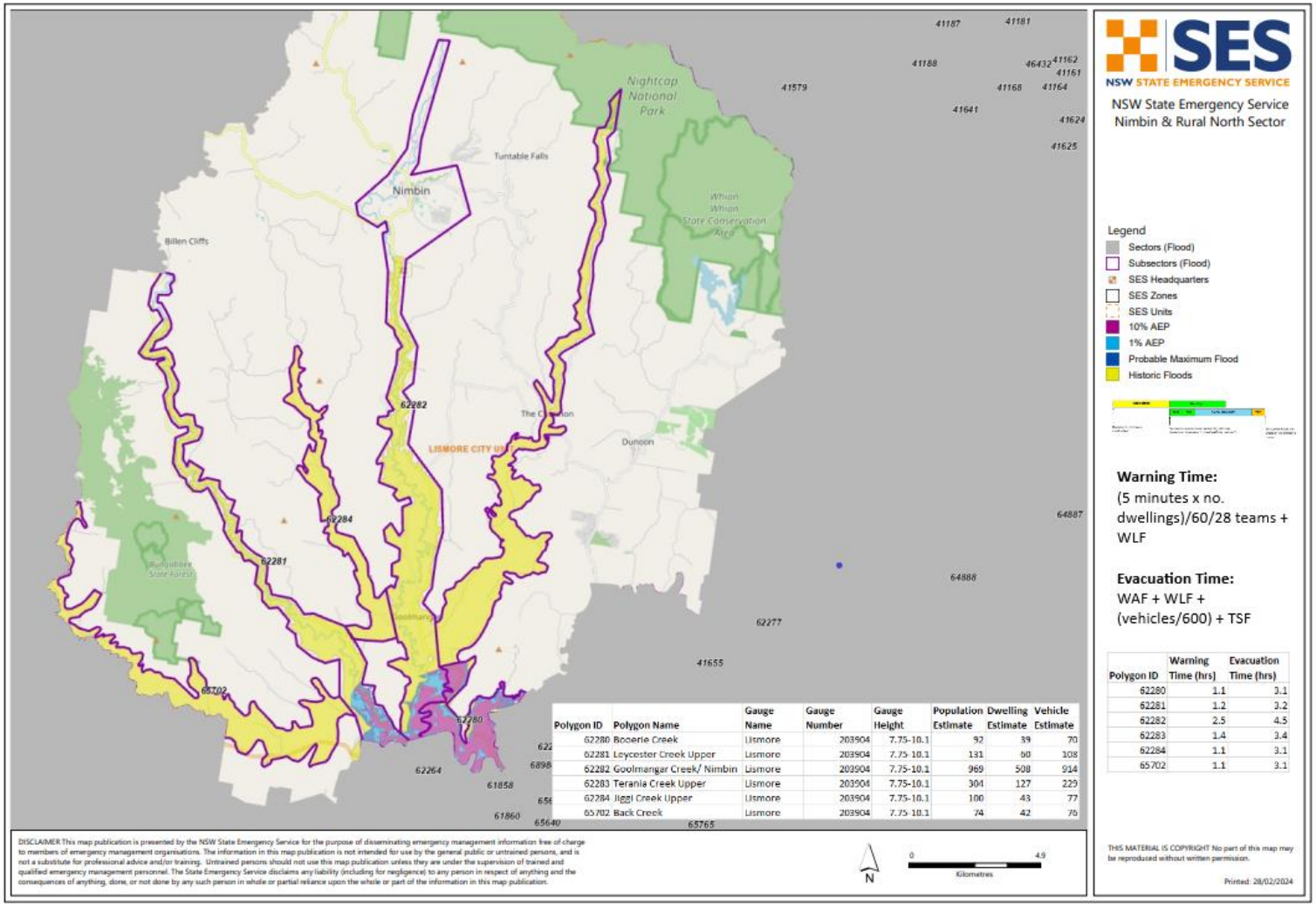
Evacuation Route Closure	There are many causeways and bridges in this sector which may become inundated due to rapid rises in creeks.
Method of Evacuation	Primarily self-evacuation by private transport to friends or family on higher ground within the sector. Primarily self-evacuation by private transport to nominated evacuation centres/assembly areas.
Evacuation Centre/Assembly Point	There are no designated evacuation centres for this sector in the Northern Rivers EMPLAN. Appropriate spaces may be opened as the need arises.
Large scale evacuations	When large-scale evacuations are likely, the NSW SES Incident Commander will liaise with the LEOCON and request support of the EOC as required.
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. ▪ Common areas for rescue include the Nimbin and Jiggi Rd intersection, Blue Knob and Milgate Rd, Nimbin.
	Parts of this sector may not be accessible by road or by Lismore City SES Unit in larger flood events. Helicopter or alternate means may be necessary.
Resupply	Resupply will be provided by the NSW SES through the 132500 call out system. Resupply in this Sector more likely than the other Sectors of Lismore.
	Areas which are likely to require resupply in this sector include; • Nimbin (approx. 282 dwellings, with a further 552 in surrounding areas) may be isolated by the closures of Nimbin Rd and Murwillumbah Rd. Resupply may be via helicopter to distribution point at Bowling Club. Multi-purpose service (medical service) may require resupply. • The Channon (approx. 136 dwellings) and Dunoon (approx. 200 dwellings, with an additional 143 in outlying areas) may be isolated by the closure of Dunoon Rd. Resupply may be via helicopter to distribution point at The Channon or Dunoon Schools. • Goolmangar (approx. 67 dwellings) and Jiggi (approx. 160 dwellings) may be isolated by the closure of Nimbin Rd. Resupply may be via helicopter.
	Table 20, in Volume 2 provides information about isolated communities in the Lismore City area and potential periods of isolation.
Aircraft Management	***Helicopter Landing Points:*** Suitable landing points are located at: • Nimbin- playing fields adjacent to Bowling Club

	28.59461 °S, 153.22508 °E • Nimbin: Playing fields at Nimbin Central School *28.59510°S 153.22053°E* • The Channon: The Channon Public School • Dunoon: Dunoon Public School
	Airports: See Lismore South Sector for Airport details
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. Considerations relating to warnings; • A significant number of 'off the grid' dwellings may exist in this sector, and methods of warning for these areas may need to be considered. • There are also a large number of multiple occupancy properties, some with over 100 people per property. • A significant number of properties in this sector may not have mobile phone reception, and reliance on landline and other forms of warning and communication needs to be taken into consideration.

4.2. NIMBIN & RURAL NORTH SECTOR MAP



4.3. EVACUATION PLANNING



LISMORE VALLEY NSW SES
DAM FAILURE ARRANGEMENTS

Chapter 3 of Volume 3 (NSW SES Response Arrangements for Lismore of the Lismore City Flood Emergency Sub Plan)

Last Update: March 2024

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1 DETAILS OF THE DAM FAILURE WARNING SYSTEM FOR ROCKY CREEK DAM

This Section describes the downstream consequences and specific notification and warning arrangements for the failure of Rocky Creek Dam and should be read in conjunction with the response arrangements detailed in the Lismore Flood Emergency Sub Plan, Volume 1.

1.1 INTRODUCTION

1.1.1 Rocky Creek Dam is used to supply drinking water in bulk to the local government areas in Lismore, Byron, Ballina and Richmond Valley. It is a rock fill embankment with an impervious central clay core. It has a height above the riverbed of 28m and a crest length of 220m. There is an un-gated overflow spillway with a crest level of RL 187.17m AHD. Storage capacity of reservoir is 13,2 Giga Litres and the contributing catchment area is 30km^2.

It is located approximately 20km north of Lismore on the confluence of Rocky and Gibbergunyah Creeks. It lies within the Lismore LGA and Richmond River Basin.

1.1.2 The two most likely causes of dam failure are:

a. Failure due to flood levels overtopping the embankment.

b. Failure due to rapidly deteriorating structural deficiency such as may be induced by an extreme earthquake, internal erosion, piping, landslide or sabotage. (This is the so-called “Sunny Day” failure, ie not induced by an inflow flood).

1.1.3 Although the dam is currently in good condition, an unsafe or emergency condition could occur at any time due to extreme natural events. Failure from a cause not related to extreme natural events is always a possibility although the probability of occurrence is extremely low.

1.1.4 There are no known safety deficiencies other than the dam having no outlet / scour infrastructure. Remedial work was carried out in 2009 to address issues related to failure of the embankment by piping and to enable the dam to safely pass probable maximum flood (PMF). This included improving the upper section of the embankment and raising the finished level of the dam to prevent failure due to piping or overtopping. A real-time seepage monitoring system was also installed at the toe of the embankment to allow a timely response to any piping along the original diversion conduit.

1.1.5 The Rocky Creek Dam is estimated to be able to withstand a flood volume up to the probable maximum flood passing through the storage.

1.2 CONSEQUENCES OF FAILURE

1.2.1 Dam failure could result in the following:

a. Inundation of property in downstream areas including The Channon, Keerrong, Goolmangar, Blakebrook, to as far downstream as South Lismore.

1.2.2 Up to 357 dwellings could be inundated by failure of Rocky Creek Dam in a PMF with Dambreak.

Table 1: Number of houses at risk of inundation

Modelled Event	Number of Dwellings
Sunny Day Failure	8
Flood- 1%AEP without Dam Break	33
Flood- 1%AEP with Dam Break	90
Flood- PMF without Dam Break	324
Flood- PMF with Dam Break	357

1.2.3 The number of dwellings at risk of inundation in modelled scenarios is shown in the table above. The study area of the model extends from the dam downstream to South Lismore.

1.2.4 The DSEP identifies properties at risk. In the event of an Alert being issued to SES for Rocky Creek Dam, some or all of these properties may require evacuation.

1.3 FLOW TRAVEL TIMES

1.3.1 Dam break flood wave travel time to various locations is identified in the table below;

Table 2: Dam Break Flood Wave Travel Time

Location	Travel time in a 1% AEP (hrs)	Travel time in a 0.2 %AEP (hrs)	Travel time in a PMF (hrs)	Travel time in a Sunny Day Failure (hrs)
Rocky Creek- Whian Whian Rd Crossing	0.27	0.28	0.32	0.56
Rocky Creek- Fraser Rd Crossing	0.58	0.61	0.69	0.82
Rocky Creek- The Channon Rd Crossing	0.89	0.92	0.94	1.16
Rocky Creek- Terania Creek confluence	1.21	1.07	0.98	1.46
Terania Creek – Keerrong Bridge Rd Crossing	2.08	1.81	1.54	3.57
Terania Creek – Nimbin Rd Crossing	4.12	3.63	2.69	9.78
Terania Creek – Goolmangar Creek confluence	4.13	3.65	2.71	9.97

Goolmangar Creek – Rosehill Rd Crossing	4.14	3.65	2.73	10.41
Goolmangar Creek – Jiggi Rd Crossing	4.56	3.75	2.76	
Leycester Creek – Terania Creek confluence	4.77	4.29	3.16	12.22

1.3.2 It should be noted that the travel times listed relate to only one component of the lead-up time before downstream flooding commences, and should be considered indicative only.

1.4 INUNDATION AREA

1.4.1 Downstream flood inundation could occur as the result of a dam failure due to a 'Flood' or a 'Sunny Day' failure.

Flood Failure

1.4.2 Degree of flooding at the Rocky Creek Dam is defined as the height of water flowing through the spillway structure. This parameter is measured by electronic equipment, with receiving points at the Nightcap Water Treatment Plant and at Rous County Council offices. The spillway flow conditions are monitored on a 24-hour basis.

1.4.3 The theoretical failure level is 3.29m above the spillway, which corresponds to the crest level of the main embankment (190.46m AHD). Structural failure of the earthen embankment is considered to be imminent as soon as it has been overtopped.

Sunny Day Failure

1.4.4 In the unlikely event of the dam failing under normal inflow conditions, downstream flood inundation would result from water held in the storage.

1.4.5 Potential failure may occur due to a rapidly deteriorating structural deficiency such as may be induced by an extreme earthquake or internal erosion.

1.4.6 The non-flood failure is considered to have the most potential for loss of life as it is likely to occur when there are no flood warnings and hence emergency services are not on standby and the public is unprepared.

1.5 INUNDATION MAPPING

1.5.1 Dam break flood inundation mapping has been prepared for Rocky Creek Dam and is contained in the Rocky Creek Dam Safety Emergency Plan.

1.6 MONITORING

1.6.1 The dam owner/operator is responsible for monitoring and managing any potential emergency at the dam site.

1.6.2 Water levels are monitored via SCADA telemetry, Routine visual inspections, rainfall gauge, piezometers, seepage, seismic monitoring.

1.7 NOTIFICATION PROCEDURES

1.7.1 The primary contact for dam failure warning notification by the dam owner to the NSW SES is the NSW SES 24hr Operations Centre. The NSW SES Operations Centre will subsequently notify the NSW SES North-Eastern Zone Incident Controller or After-Hours Duty Officer. An alternate NSW State Emergency Operations Centre (SEOC) contact is available if this notification procedure was to fail.

1.8 WARNING

1.8.1 Dam failure alerts are issued to NSW SES and are used to trigger appropriate response actions. Alerts from the DSEP for flood failure have been reproduced in Table against NSW SES responses. Responses escalate as the alert migrates from white to red. The conditions that define each of the alerts (as identified in the DSEP) are listed in Table 2. The meaning of each alert is as follows:

a. **White:** Preliminary alert to assist the NSW SES in its preparation. This is not a public alert. It indicates a potential issue/condition has been observed at the dam and is being investigated.

b. **Amber:** Alert necessitating the warning of the population at risk to prepare for evacuation.

c. **Red:** Alert requiring the immediate evacuation of the downstream population at risk.

1.8.2 Actions indicated as occurring at particular alerts may be brought forward if the development of a flood warrants.

Table 3: Rocky Creek Dam Flood Failure Alerts

Alert	Defining Conditions	Time to potential failure (approx)
White Alert	Spillway Water Level 187.77 m AHD Depth over spillway is 0.6m	8hrs 45 min
Amber Alert	Spillway Water Level 188.17 m AHD Depth over spillway is 1m	5hrs 15 min
Red Alert	Spillway Water Level 188.97 m AHD Depth over spillway is 1.8m Abrupt increase in seepage flow	2 hrs 15 mins

1.8.3 The NSW SES will disseminate dam failure warnings.

1.8.4 Rous County Council Staff will keep the NSW SES informed of the depth over spillway. The dam alerts will be activated in sequence as the storage level rises during the course of a major flood event and will be sent to the NSW SES as they occur.

1.8.5 The following tables outline the notification, warning and evacuation arrangements for a potential failure of Rocky Creek Dam.

Table 4: Notification, Warning and Evacuation Arrangements for a potential failure of Rocky Creek Dam

WHITE ALERT	
Defining Conditions:	Structural defect detected (eg crack, piping), heavy rainfall event, or an unusual operational event. Spillway Water Level 187.77mAHD, Depth over spillway 0.6m
Stakeholder	**Arrangements and Actions**
Dam Owner	▪ Advise NSW SES Operations Centre of White Alert Level being reached and provide regular updates on the situation at the dam.
NSW SES SOC	▪ Receive notification from dam operator. ▪ Advise NSW SES Zone Incident Controller or After Hours Duty Officer. ▪ Advise SEOC.
NSW SES Zone Incident Control Centre or After Hours Duty Officer	▪ Receive notification from NSW SES SHQ. ▪ Advise NSW SES Local Commander and/or Unit Commander or Duty Officer, NSW SES Units and NSW SES Local Headquarters. ▪ Advise the Regional Emergency Management Officer (REMO). ▪ Consider need for out of area assistance for warning and evacuation operations. ▪ Refer to Lismore City Flood Emergency Sub Plan for agencies to notify that the White Alert Level has been reached. (See Volume 1)
NSW SES Local Commander and/or Lismore City Unit Commander or After Hours Duty Officer	▪ Confirm NSW SES Zone HQ has been notified ▪ Activate Flood Emergency Sub Plan. ▪ Refer to Flood Emergency Sub Plan for agencies to notify that the White Alert Level has been reached. (See Volume 1).
LEOCON/Other Agencies	▪ When requested by NSW SES Incident Controller, coordinate support. ▪ Activation of Lismore City Flood Emergency Sub Plan includes notification to the LEOCON and activation of supporting arrangements within the local EMPLAN
People at Risk	▪ No action required. ▪ Some evacuations may be necessary due to mainstream riverine flooding.

AMBER ALERT	
Defining Conditions:	Failure possible if storage continues rising or structural defect not fixed. RL 188.17, Depth over spillway 1.0m. Potential to fail
Stakeholder	**Arrangements and Actions**
Dam Owner	▪ Advise NSW SES Operations Centre of Amber Alert Level being reached and provide regular updates on the situation at the dam. ▪ Closely monitor the condition of Rocky Creek Dam and implement preventative measures to return it to a safe condition as soon as possible.
NSW SES SOC	▪ Receive notification from dam operator. ▪ Advise NSW SES Zone Incident Control Centre or After Hours Duty Officer. ▪ Advise SEOC.
NSW SES Zone Incident Control Centre or After Hours Duty Officer	▪ Notify NSW SES Local Commander and/or Unit Commander or Duty Officer, NSW SES units and NSW SES LHQ. ▪ Provide NSW SES AWS warnings to the media organisations listed in Volume 3: Chapter 1, of this Lismore City Flood Emergency Sub Plan. ▪ Coordinate provision of out of area assistance for warning and evacuation operations. ▪ Coordinate the notification of other agencies as listed in Lismore City Flood Emergency Sub Plan.
NSW SES Local Commander and/or Lismore City Unit Commander or After Hours Duty Officer	▪ Confirm NSW SES Zone HQ has been notified ▪ Coordinate the delivery of Evacuation Warnings (Watch and Act) to at-risk residents. ▪ Coordinate the notification of other agencies as listed in Lismore City Flood Emergency Sub Plan.
LEOCON/Other Agencies	▪ When requested by the NSW SES Incident Controller, coordinate support. ▪ Activation of the Lismore City Flood Emergency Sub Plan includes notification to the LEOCON and activation of supporting arrangements within the local EMPLAN
People at Risk	▪ Prepare homes for inundation, pack valuables, mementos and pets and prepare to evacuate. ▪ Notify NSW SES doorknockers if transport to evacuation centres will be required. ▪ Some evacuations may be necessary due to mainstream riverine flooding.

RED ALERT	
Defining Conditions:	Failure imminent or occurred. RL 188.97, Depth over spillway 1.8m.
Stakeholder	**Arrangements and Actions**
Dam Owner	▪ Advise NSW SES Operations Centre of Red Alert Level being reached and provide regular updates on the situation at the dam.
SES SOC	▪ Receive notification from dam operator. ▪ Advise NSW SES Zone Incident Control Centre or After Hours Duty Officer. ▪ Advise SEOC.
NSW SES Zone Incident Control Centre or After Hours Duty Officer	▪ Notify NSW SES Local Commander and Unit Commander or Duty Officer, NSW SES Units and NSW SES LHQ. ▪ Advise the REMO. ▪ Confirm that residents immediately downstream of the dam have been notified of Red Alert Level being reached. ▪ Activate the Standard Emergency Warning Signal (SEWS) and ensure that Emergency Warning Evacuation Messaging is broadcast over the radio stations listed in Volume 3: Chapter 1 of this Lismore City Flood Emergency Sub Plan. ▪ Coordinate provision of out of area assistance for evacuation operations.
NSW SES Local Commander and/or Lismore City Unit Commander or After Hours Duty Officer	▪ Confirm NSW SES Zone HQ has been notified. ▪ Evacuate at-risk residents. ▪ Coordinate the notification of other agencies as per the Lismore City Flood Emergency Sub Plan. ▪ Ensure that evacuation centres are ready to receive evacuees. ▪ Conduct Evacuation of downstream residents by doorknock and public address systems from emergency service vehicles. ▪ Coordinate transport of evacuees without their own vehicles
LEOCON/Other Agencies	▪ When requested by the NSW SES Incident Controller, coordinate support. ▪ Activation of the Lismore City Flood Emergency Sub Plan includes notification to the LEOCON and activation of supporting arrangements within the local EMPLAN
People at Risk	▪ Evacuate to nearest evacuation centre or assembly area.

DAM FAILURE ALERT CANCELLATION	
Defining Conditions:	Dam owner assesses threat and advises whether the risk to the dam structure has passed.
Stakeholder	**Arrangements and Actions**
Dam Owner	▪ Advise NSW SES OCC of the outcome of the risk assessment
SES SOC	▪ Receive notification from dam operator. ▪ Advise NSW SES Zone Commander or After Hours Duty Officer. ▪ Advise SEOC.
NSW SES Zone Commander or Incident Controller or After Hours Duty Officer	▪ Following risk assessment of the dam, decide in consultation with NSW SES Incident Controller and State Duty Commander whether to issue an 'Reduced Threat – Return with Caution'. ▪ Issue 'Reduced Threat – Return with Caution'' message to NSW SES Unit Commander or Duty Officer, NSW SES units, NSW SES Local HQ and NSW SES State HQ. ▪ Advise the REMO/LEMO that 'Reduced Threat – Return with Caution'' has been issued. ▪ Issue 'Reduced Threat – Return with Caution'' message over radio stations listed in Volume 3: Chapter 1, of this Lismore City Flood Emergency Sub Plan.
NSW SES Local Commander and/or Lismore City Unit Commander or After Hours Duty Officer	▪ Coordinate issue of 'Reduced Threat – Return with Caution'' message at evacuation centres or by phone/doorknock. ▪ Deliver 'Reduced Threat – Return with Caution'' message to other agencies as necessary.
LEOCON/Other Agencies	▪ When requested by the NSW SES Incident Controller, coordinate support.
People at Risk	▪ Stay home, return home or await further advice.

1.9 EVACUATION PLANNING

1.9.1 **Sunny Day Failure:** One property at risk at Whian Whian Crossing (Wave travel time 33mins), 7 others in the vicinity of The Channon (Wave Travel Time 1 hour 9 minutes – 1hr 27 minutes). No properties further downstream of the Keerong Bridge crossing have been identified in the DSEP as being at risk due to a Sunny Day dam break.

1.9.2 Due to the short wave travel time to Whian Whian Crossing, evacuation outside the dambreak extent would be via Whian Whian Rd to adjacent high ground

and to high ground along The Channon Rd or most suitable road based on local conditions for properties near The Channon.

1.9.3 **1% AEP flood with Dam Break:** There are 57 additional properties identified as being at risk with a 1% AEP flood with dam break that may not have been affected in a 1% AEP without dam break. Therefore, it cannot be assumed all affected properties would have been evacuated due to the flood event without dam break. Mapping of affected properties is held within the Rocky Creek Dam Safety Emergency Plan.

1.9.4 **PMF Flood with Dam Break**: There are 33 additional properties identified as being at risk with a PMF due to dam break that may not have been affected in a PMF without dam break. Therefore, it cannot be assumed all affected properties would have been evacuated due to the flood event without dam break. Mapping of affected properties is held within the Rocky Creek Dam Safety Emergency Plan.

Table 5: Approximate Evacuation and warning timelines for number of inundated dwellings in modelled scenarios

Modelled Event	Number of Dwellings	Warning Time (hrs)	Evacuation Time (hrs)
Sunny Day Failure	8	1.0	3
Flood- 1%AEP without Dam Break	33	1.1	3.1
Flood- 1%AEP with Dam Break	90	1.3	3.3
Flood- PMF without Dam Break	324	2.0	4.0
Flood- PMF with Dam Break	357	2.1	4.1

LISMORE NSW SES
CARAVAN PARK ARRANGEMENTS

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

Last Update: March 2024

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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. Lismore Lake Caravan Park

b. Lismore Central Tourist Caravan Park

c. Road Runner Caravan Park

d. Lucky Country Leisure Parks Lismore (formerly Lismore Palms Caravan Park)

e. Caravans in the Home Program (Camplify)

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 Lismore City Unit Commander will ensure that the managers of caravan parks are advised of Flood Information (described in Volume 1 of the Lismore City Flood Emergency Sub 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 Lismore City 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 Lismore City Unit Commander when the evacuation of the caravan park has been completed.

f. Provide the NSW SES Lismore City 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 Lismore City 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
*Lismore Lake Caravan Park **CURRENTLY CLOSED**	156 Bruxner Highway	Lismore	89 vans, 30 cabins	***Currently closed** Potential for isolation after 7.6mAHD, inundation at approx. 9.5mAHD	Via Bruxner Highway	The Bruxner Highway closes from approx. 10.7m. Caniaba Rd towards Casino closes approx. 7m near the Loftville culvert.	High ground near McKees Hill south of park site	Southern Cross University or High Ground near McKees Hill	***Currently closed**
Lismore Central Tourist Caravan Park	60 Dawson Street	Lismore	74 powered sites	Floor level 6.5m. May experience inundation in early stages of flooding. Dependent on operation of Brown's Creek floodgate and pumping station.	Lismore CBD Evacuation route	Dawson St may experience inundation from approx. 5.8-6m dependant on local rainfall and flows in browns Creek. All roads in the Lismore CBD will close progressively when the Levee overtops.	High Ground towards East Lismore or Goonellabah.	Southern Cross University	
Road Runner Caravan Park	61 Caniaba Rd	South Lismore	121 van sites.	Floor Height 12.95mAHD. May be isolated from Lismore from 10-10.2mAHD and isolated from Casino	Via Caniaba Rd and then Bruxner Highway	Evacuation routes south of the Airport close between 9-10.2mAHD at Lismore gauge	High ground near McKees Hill	Southern Cross University or high ground near McKees Hill	

				via Caniaba Rd at approximately 11.1mAHD at the Lismore gauge.					
Lucky Country Leisure Parks Lismore (formerly Lismore Palms Caravan Park)	42-58 Brunswick St	Lismore	50 sites (including cabins and sites)	Floor Height 9.7m AHD. Primary access at Brunswick St impacted from 7.2-7.5m at the Lismore Gauge.	Lismore Heights Via Donnans Rd	Brunswick St becomes affected from approx. 7.2-7.5m	Lismore Heights Bowling Club area via Donnans Rd	Southern Cross University	
Caravans at Home	Blue Knob (3) Booerie Creek (1) East Lismore (5) Girards Hill (3) Goonellabah (1) Howards Grass (1) Modanville (1) North Lismore (8) South Gundurimba (2)	Lismore	25 vans	May be at risk of inundation and/or isolation depending on location.	Various- see relevant sector plan	Various- see relevant sector plan	Nearest area of high ground dependant on van location.	Southern Cross University or other nominated centre	Vans are distributed throughout the LGA as part of the Caravans at Home program. Register of all resources are held with Camplify.

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. **Rous County Council.** *Rocky Creek Dam: Dam Safety Emergency Plan. Flooding, Earthquake and other Emergency Situations.* 2023.

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

4. **Engeny Water Management.** *Lismore Floodplain Risk Management Study.* 2021.

5. **Engeny Water Management.** *Lismore Floodplain Risk Management Plan .* 2023.

6. **NSW State Emergency Service.** *Lismore Rowing Club gauge (203904) Flood Intelligence Card.* s.l. : NSW SES-In-Confidence, Last Updated December 2023.

7. **Patterson, Britton & Partners.** *Lismore Levee Scheme Gradient Sensitivity Analysis.* 2003.

8. **Lismore City Council.** *Flood Response Report.* 2022

9. **Sea & Star Advisory.** *Lismore Flooding Impacts & Recovery Statement.* 2022

10. **Bureau of Meteorology.** *Service Level Specification for Flood Forecasting and Warning Services for New South Wales and the Australian Capital Territory.* 2013.

11. **BMT WBM.** *Richmond Valley Flood Study.* 2023.

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

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

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