NSW STATE EMERGENCY SERVICE

Central Darling Shire

Local Flood Emergency Sub Plan

FloodSafe

CENTRAL DARLING SHIRE FLOOD EMERGENCY SUB PLAN

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

Volume 1 of the Central Darling Shire Flood Emergency Sub Plan

Endorsed by the Central Darling Local Emergency Management Committee

29 November 2023
Version 2.0

AUTHORISATION

The Central Darling Shire Flood Emergency Sub Plan is a sub plan of the Central Darling Shire 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

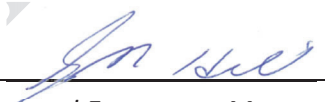
Signature: 

NSW SES Local Commander

Print Name: Jack Davies

Date: 4/12/2023

Endorsed

Signature: 

Chair, Local Emergency Management Committee

Print Name: Gregory Hill

Date: 29/11/2023

VERSION HISTORY

Version Number	Description	Date
1.0	Central Darling Shire Local Flood Plan	January 2013

AMENDMENT LIST

Suggestions for amendments to this plan should be forwarded to:

Manager Emergency Planning
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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 Central Darling Shire 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 Central Darling Shire Local Emergency Management Plan (EMPLAN) and is endorsed by the 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 Central Darling Shire 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 Central Darling Shire LGA. The Central Darling Shire LGA and its principal towns, villages, rivers and creeks are shown in Appendix A.

1.4.2 The council area is within the NSW SES Western Zone and for emergency management purposes, is part of the Far West Emergency Management Region.

1.4.3 The plan sets out the Central Darling Shire level emergency management arrangements for prevention, preparation, response and initial recovery for flooding in the Central Darling Shire 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 the Central Darling Shire LGA are detailed within this plan (Appendix B and Appendix C).

1.7.3 Any agency with agreed responsibilities in this plan which are temporarily unable or are 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 and / or the NSW SES Western Zone Office (for regional level responsibilities outside of response operations).

1.8 PLAN MAINTENANCE AND REVIEW

1.8.1 The 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 The NSW SES maintains information on the nature of flooding and the effects of flooding on communities in the Central Darling Shire LGA.

2.1.2 Declared dams in or upstream of the Central Darling Shire LGA:

Dam Name	Owner	High Risk Dam
Menindee Lakes Storage System	Water NSW	No

3 PREVENTION/ MITIGATION

3.1 INTRODUCTION

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

b. The NSW SES will provide responses to land use planning proposal referrals that have created 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. The 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.

b. The NSW SES will provide advice, support, technical resources and training for NSW SES representatives to contribute effectively on local Floodplain Risk 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**: The 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 (CMGs) 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 the NSW SES.

4.3 FLOOD INTELLIGENCE SYSTEMS

4.3.1 **Strategy**: The 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. The 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. The 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 the NSW SES on alert levels and messaging. Alert level definitions are listed in Dam Emergency Plans.

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

g. The 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 the NSW SES.

4.5 BRIEFING, TRAINING AND EXERCISING

4.5.1 **Strategy**: Ensure the 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. The NSW SES will consult stakeholders throughout the development of plans.

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

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

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

e. The 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**: The 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**: The 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. The NSW SES will 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 failure 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. The 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. The NSW SES will operate Incident Control Centre(s) as required.

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

- Control resources from the NSW SES and coordinate resources of supporting emergency services and functional areas.
- Manage incident 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 the NSW SES and supporting agencies or functional areas in accordance with the 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. The 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. The 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 the 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 post a flood.

Actions:

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

b. All supporting emergency services and 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. The 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 the NSW SES. This may occur post impact and continue into the recovery phase.

e. The NSW SES may request Engineering Services Functional Area 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: The 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. Dam owners will utilise the Dam Emergency Plan to provide warnings and information to the NSW SES and communities (where appropriate).

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

- Advice
- Watch and Act
- Emergency Warning

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

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

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

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

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

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

i. The Disaster Welfare Assistance Line will be established by the Disaster Welfare Services Functional Area 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: The 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. Central Darling Shire Council will coordinate the closure and reopening of council managed roads once inspections have been carried out by the relevant authority.

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

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

d. The 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 that the Emergency Operations Controller provide suitable personnel to assist with traffic coordination.

5.7 PROTECTION OF ESSENTIAL SERVICES

5.7.1 Local and region EMPLANs 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. The Transport Services Functional Area is to coordinate the provision of information about the assessment and restoration of transport network infrastructure.

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

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

d. The 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. The Functional Areas and council will keep the NSW SES informed of the status of utilities and infrastructure.

5.8 EVACUATION

5.8.1 Evacuation is the NSW SES' 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. The 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. The 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. The 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. The Health Services Functional Area will coordinate the evacuation of hospitals, health centres and aged care facilities (including nursing homes) in consultation with the NSW SES and Welfare Services Functional Area.

f. School administration offices (government and private) will coordinate the evacuation of schools in consultation with the NSW SES and the Welfare Services Functional Area, 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 the 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. The NSW SES will provide initial welfare for evacuees where required but will hand the responsibility over to the Welfare Services Functional Area as soon as possible. The NSW SES will brief the Welfare Services Functional Area at the earliest opportunity regarding the level of assistance required.

b. The Welfare Services Functional Area will manage evacuation centres for affected residents and travellers in accordance with the 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 the NSW SES in the temporary closure of schools and will coordinate with the NSW SES, the Transport Services and Welfare Services Functional Areas in the management of school evacuees.

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

e. The 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 State Emergency Operations Controller (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 the NSW SES and the SEOCON in consultation with members of the State Emergency Management Committee (SEMC).

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 the Health Services Functional Area.

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

Actions:

a. The 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. The Agriculture and Animal Services Functional Area role will coordinate the evacuation, emergency care and assessment of animals and he supply of emergency fodder and water (with areial support where necessary).

5.10 FLOOD RESCUE

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

Actions:

a. The 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. The NSW SES may request other supporting emergency services to undertake flood rescues on behalf of the NSW SES. Agencies must be authorised/accredited to undertake flood rescue operations in accordance with State Rescue Board requirements, as prescribed by the 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 the 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. The 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, the NSW SES will establish loading points where retailers can instruct suppliers to deliver goods.

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

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

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

b. The 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 the 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. The 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 an '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. The 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, the Welfare Services Functional Area and Central Darling Shire Council representatives.

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

c. The 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 State Emergency Recovery Controller (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 the NSW SES as the lead agency to transition to the 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. The 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: The NSW SES works with relevant stakeholders and Central Darling Shire Council on post flood data collection analysis including review of flood intelligence where necessary.

6 RECOVERY OPERATIONS

6.1 INTRODUCTION

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

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

6.2 NSW SES RECOVERY ROLE

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

6.2.2 **Actions**:

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

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

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

f. The NSW SES may coordinate immediate relief in collaboration with State Emergency Operations Controller (SEOCON) and the State Emergency Recovery Controller (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 Central Darling Shire Council Area

10 Appendix B – Roles and Responsibilities

AGENCY	RESPONSIBILITIES
NSW State Emergency Service	The 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 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.
Caravan Park Proprietor(s)	• Prepare a flood emergency plan for the caravan park. • 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.

AGENCY	RESPONSIBILITIES
	• Secure any movable dwellings that are not able to be relocated to prevent floatation. • Inform the 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.
Central Darling Shire Council	**Preparedness** • Establish and maintain floodplain and coastal risk management committees and ensure that key agencies are represented. • Develop and implement floodplain risk management plans in accordance with the NSW Government's Flood Prone Land Policy and the Floodplain Development Manual. • Provide levee studies, flood studies and floodplain management studies to the NSW SES. • Maintain council-owned flood warning networks and flood mitigation works. • Participate in the 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 the NSW SES with flood operations including: – Traffic management on council managed roads. – Provision of assistance to the 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 the 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.

AGENCY	RESPONSIBILITIES
	• 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 the 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 the NSW SES and the 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.
Childcare Centres and Preschools	• When notified of possible flooding or isolation, childcare centres and preschools should: – Liaise with the NSW SES and arrange for the early release of children whose travel arrangements are likely to be disrupted by flooding and/or road closures. – Assist with coordinating the evacuation of preschools and childcare centres.
Dams Safety NSW	The roles and responsibilities for Dams Safety NSW (formerly NSW Dam Safety Committee) are outlined in the NSW State Flood Plan.
Department of Defence	Arrangements for Defence Assistance to the Civil Community are detailed within the State EMPLAN (section 448).
Energy and Utilities Services Functional Area	The roles and responsibilities for Energy and Utilities Services Functional Area are outlined in the Energy and Utility Services Supporting Plan (EUSPLAN). Roles and responsibilities in addition to the supporting plan are: • Assist the 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:

AGENCY	RESPONSIBILITIES
	– Provide advice to the NSW SES of any need to disconnect power/gas/water/wastewater supplies or of any timetable for reconnection. – Advise the 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 the NSW SES to identify infrastructure at risk of flooding for incorporation into planning and intelligence.
Engineering Services Functional Area	The roles and responsibilities for the Engineering Services Functional Area are outlined in the Engineering Services Supporting Plan and NSW State Flood Plan.
Environmental Services Functional Area	The roles and responsibilities for the Environmental Services Functional Area 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 the Forestry Corporation of NSW are outlined in the NSW State Flood Plan.
Health Services Functional Area	The roles and responsibilities for the Health Services Functional Area are outlined in the Health Services (HEALTHPLAN) Supporting Plan and NSW State Flood Plan.
Local Emergency Operations Controller (LEOCON)	• Monitor flood operations. • If requested, coordinate support for the NSW SES Incident Controller.
Local Emergency Management Officer (LEMO)	• If requested by the NSW SES Incident Controller, advise appropriate agencies and officers of the start of response operations.
Manly Hydraulics Laboratory (MHL)	The roles and responsibilities for Manly Hydraulic Laboratory are outlined in the NSW State Flood Plan.
Marine Rescue NSW	The roles and responsibilities for Marine Rescue NSW are outlined in the NSW State Flood Plan.
NSW Ambulance	The roles and responsibilities for NSW Ambulance are outlined in the Health Services (HEALTHPLAN) Supporting Plan and NSW State Flood Plan.

AGENCY	RESPONSIBILITIES
NSW Department of Education, Association of Independent Schools of NSW, and National Catholic Education Commission	The roles and responsibilities for the 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 the 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 the NSW Department of Planning and Environment (Water) are outlined in the NSW State Flood Plan.
NSW Food Authority	The roles and responsibilities for the 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 the the NSW Police Force are outlined in the NSW State Flood Plan.
NSW Reconstruction Authority	The roles and responsibilities for the NSW Reconstruction Authority are outlined in the NSW State Flood Plan.
NSW Rural Fire Service	The roles and responsibilities for the NSW Rural Fire Service are outlined in the NSW State Flood Plan.
Owners of Declared Dams within or upstream of the LGA	The roles and responsibilities for owners of declared dams are outlined in the NSW State Flood Plan.
Public Information Services Functional Area	The roles and responsibilities for the Public Information Services Functional Area are outlined in the Public Information Services Supporting Plan and NSW State Flood Plan**.**
State Emergency Operations Controller (SEOCON)	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 the Telecommunications Services Functional Area 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.

AGENCY	RESPONSIBILITIES
	• Transport for NSW in conjunction will assist the NSW SES with the evacuation of at-risk communities by maintaining access and egress routes. • Assist the 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 the NSW SES with identification of road infrastructure at risk of flooding.
Transport Services Functional Area	The roles and responsibilities for Transport Services Functional Area 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 the Welfare Services Functional Area are outlined in the Welfare Services Functional Area Supporting Plan and NSW State Flood Plan.

11 Appendix C – Community Specific Roles and Responsibilities

Community Members	**Preparedness** • Understand the potential risk and impact of flooding. • Prepare homes and property to reduce the impact of flooding. • Understand warnings and other triggers for action and the safest actions to take in a flood. • Households, institutions and businesses develop plans to manage flood risks, sharing and practicing this with family, friends, employees and neighbours. • Have an emergency kit. • Be involved in local emergency planning processes. **Recovery** • Assist with community clean-up if required and able to do so. • Participate in After Action Reviews if required.
Service and Sporting Clubs	**Wilcannia Golf Club/RSL** Assist with; • Evacuation **Wilcannia Rugby Club, Menindee Rugby Club** Assist with; • Sandbagging • Transport • Door nocking • Deliveries • Relocation
Aboriginal Organisations or Groups	**Wilcannia Aboriginal Land Council, Menindee Aboriginal Land Council:** • Act as the point of contact between the NSW SES and the Wilcannia and Menindee communities. • Inform the NSW SES Incident Controller about flood conditions and response needs. • Disseminate flood information, including flood and evacuation warnings, to the Wilcannia and Menindee community.

NSW STATE EMERGENCY SERVICE

HAZARD AND RISK IN CENTRAL DARLING SHIRE

Volume 2 of the Central Darling Shire Local Flood Plan

Last Update: November 2016

FloodSafe

AUTHORISATION

The Hazard and Risk in Central Darling Shire 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

Manager Emergency Risk Management

Date: 16/11/16

Approved

NSW SES Far West Region Controller

Date: 16/11/16

Tabled at LEMC

Date: 13·2·17

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LIST OF TABLES

VERSION LIST

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

Description	Date
Menindee Local Flood Plan Annex A	Feb 1996
Wilcannia Local Flood Plan Annex A	Feb 1996

AMENDMENT LIST

Suggestions for amendments to this Volume should be forwarded to:

The Central Darling Shire Local Controller

NSW State Emergency Service

Opal Street, White Cliffs, NSW 2836

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 Central Darling Shire covers areas of the Paroo River, Darling River and Lachlan River Basins, all of which lie within the extensive Murray Darling Basin (See Maps 1-3).

1.2 LANDFORMS AND RIVER SYSTEMS

Murray-Darling Basin

a. The Murray–Darling Basin is an area of over 1 million km^2 in south-eastern Australia. It is made up of 23 river catchments which encompass areas of Victoria, New South Wales, South Australia, Queensland and the ACT. The watercourses mostly start as fast flowing streams in the Great Dividing Range. As the rivers flow inland the river channels widen and meander through wide riverine plains with very low gradient, slowing down the pace of water flow through the system (1).

b. The water in the Murray-Darling River system comes from a very small percentage of the Basin area; mainly along the southern and eastern rim. Almost 86% of the vast 'catchment' area contributes very little or no regular run-off to rivers (2).

c. The Basin has a big variety of climatic conditions and its highly diverse landscapes range from sub-tropical conditions in the far north, cool humid eastern uplands, high alpine country of the Snowy Mountains, the temperate south-east, to the hot and dry semi-arid and arid western plains (2).

d. The three longest rivers in Australia all run through the Murray-Darling Basin:
   i. Darling River (2740 km)
   ii. Murray River (2520 km)
   iii. Murrumbidgee River (1575 km) (2).

e. The river basins of the Darling River system include Border, Moonie, Gwydir, Namoi, Castlereagh, Macquarie, Condamine – Culgoa, Warrego, Paroo and Darling River Basins.

f. The Central Darling Shire LGA covers areas of Paroo and Darling River Basins, but flooding in other river basins of the Darling River system may also impact the shire. Details of the Paroo and Darling River systems within the Central Darling Shire are provided in section 1.5.

Lachlan River Basin

g. The southeast corner of the Central Darling Shire lies in the Lachlan River Basin, but there are only minor flooding effects in this area, so it is not discussed further within this plan.

1.3 STORAGE DAMS

a. The only prescribed dam in the Central Darling Shire is the Menindee Lakes Storage System, described below. Several tailing dams located in Cobar are not large enough to have any effect on the Central Darling Shire. Prescribed dam locations are shown on Map 2, Darling River Basin.

b. The Menindee Lake Storage System is a series of natural and manmade lakes located 10km north of the township of Menindee and 280kms north of the Darling River Junction with the Murray River (see Maps 2 and 7). The lakes are used to supply water to NSW, Victoria and South Australia under the Murray-Darling Basin Agreement. The works have increased the capacity of the original natural lakes, and allow the regulation of the majority of most flows (except for large major floods). The 'Main Weir' on the Darling River raises the water to 12 metres above river bed level and forms Lake Wetherell, the other smaller lakes of Malta, Balaka, Bijijie and Tandure surrounding Lake Wetherell are filled dependant on Darling River levels. Water can then flow under gravity, even during low flow conditions, from Lake Wetherell into the other major lakes of Pamamaroo, Menindee and Cawndilla (2).

c. River gauging stations upstream are used for predicting inflows to the Menindee Lakes. Two key gauging stations for this purpose are located at Bourke, approximately 15 days flow travel time upstream (Bourke, 425003) and Wilcannia over 300km upstream of Lake Wetherell (Wilcannia, 425002). 'Losses' on the floodplain of the Darling River and its tributaries can be highly variable and accurately predicting inflows can be difficult (2).

d. Releases are made from Lake Menindee and Lake Wetherell into the Darling River. A gauge downstream of Menindee at 'Weir 32' is used to measure the total release into the lower Darling River. Releases can also be made from Lake Cawndilla for supplying environmental flows along the Great Darling Anabranch (2).

Table 1: Prescribed Dams in Central Darling Shire LGA.

Menindee Lakes Storage System (3) (2)	
Owner / Operator	WaterNSW To assist in balancing water security priorities, the Menindee Lakes are operated under a joint arrangement between the Murray Darling Basin Authority (MDBA) and the NSW government. Under the Agreement, the MDBA directs operations once the storage volume exceeds 640 GL. At times of decreasing storage, NSW takes operational control once the storage volume falls below 480 GL. NSW solely directs operation during all flood events regardless of the system's capacity. This arrangement enables NSW to manage for water supply and safety requirements that are important for the local Menindee and lower Darling River community.
Description of Dam	Lake System capacity is 1,794 GL, potential capacity of 2,050 GL during flood surges. Outlet Capacity is 7,096ML/Day Water release and gating of the Menindee Lakes Storage Scheme comprises several weirs, 2 inlet regulators, 4 outlet regulators, levees and channels. The Main Weir located on Lake Wetherell contains a spillway of six large vertical lift gates. Main Weir Dam Wall Height is 12.5metres. Average Water depth is 8 metres. Crest Length 85.34 metres.
Location	Far Western NSW, Menindee. The Lake system is part of the Murray Darling Basin and located on the Darling River 10 kms north of the township of Menindee. Storage System Location: Lat 32.392947° S Long 142.372846° E
Communities Downstream	Menindee (immediately downstream) and Pooncarie (120km downstream).
Monitoring System	Weirs and water levels are monitored daily. Monitoring consists of open standpipe piezometers installed in the vicinity of the Outlet Regulators, the Main Weir and at various points along Levees. Piezometers have also been established where seepage has been observed in the past (3). All weirs structures transmit telemetry to the NSW Office of Water, however Menindee based employees of the Office of Water complete visual inspections of all weirs on a regular and planned basis.
Other	The furthest upstream dambreak structure is the Fuse Plug Spillway, located on the Main or East Levee on Lake Wetherell. The Three Mile Creek Branch represents the drainage area downstream of the Fuse Plug Spillway. The fuse plug can be activated to relieve pressure on the main weir protecting Menindee from potential dam failure.

1.4 WEATHER SYSTEMS AND FLOODING

a. Flooding can occur at any time of the year and from weather events in upstream catchments some distance away from Central Darling Shire. Different types of weather schemes produce floods at different times of year and this difference is

associated with the contributions of the various tributaries. The major flood-producing regimes are as follows:

i. Summer: Very heavy daily rainfalls result from the penetration of 'monsoonal' low-pressure schemes from northern Australia. In effect there is an incursion of the northern 'wet' into the Darling River catchment for a period usually of some days. Such intrusions are not annual events, however, and summer flooding is sporadic. It usually emanates from tributaries entering the Barwon-Darling River Scheme from the north and the north-east (2).

ii. Winter: High monthly rainfalls result from a series of well-developed troughs associated with southern depressions which cross the catchment from west to east. These troughs rarely produce high daily rainfall but can bring substantial falls over longer periods. It is the sequence of events rather than individual ones that cause floods to occur, and they generally arise from tributaries entering the Barwon-Darling River from the south (2).

b. The Macquarie and Bogan Schemes have weak tendencies towards a concentration of flood occurrences during the winter months. Several floods have been recorded outside these months, however (2).

c. The Castlereagh, Namoi, Gwydir, Border and Moonie Schemes, located further to the north, are less influenced by the southerly depressions that occur in winter and tend more frequently to experience floods during the summer months. Rainfall is highest between November and February, the averages for these months being roughly twice those of the winter months in many locations (2).

d. Occasionally, very heavy summer rains may occur over large areas for up to three days and create off-river flooding which may last for some days or weeks in low-lying areas. Rainfall intensities of more than 250mm in 24 hours can occur and may lead to such flooding as occurred in early 2000 to the north of Menindee (2).

e. Periodically, high-intensity short-duration convective thunderstorms cause flooding over limited areas. These are summer events concentrated in the months between November and March. They do not cause noticeable rises in levels in the major rivers, but may lead to flash flooding on small creeks and in poorly drained low-lying areas (2).

1.5 CHARACTERISTICS OF FLOODING

1.5.1 Flood Behaviour in the Wilcannia Area

a. Flooding within the Wilcannia area originates mainly from the Paroo River, Darling River and Talyawalka Creek. It has two main characteristics:

i. Floods originate some distance away. As a result, there is usually adequate warning time to prepare communities and to check the adequacy of both structural and non-structural mitigation measures in advance (2).

ii. Flood waters usually flow through at low velocities, often taking over a month to pass a particular location. Although this causes little structural damage, it means that protective levees are required around towns and many rural properties. It also results in these properties being isolated for weeks or months at a time (2).

Paroo River

b. The Paroo River originates in South Western Queensland flowing through Wanaaring (Bourke Shire), before entering the Central Darling Shire 18 kms south of Wanaaring. The Paroo floods on a regular basis, however flows will normally only reach Peery Lake 85kms to the north west of Wilcannia. During large flooding it has the potential to overflow from Peery Lake and enter a series of channels and creeks but only in exceptionally wet years will the Paroo join the Darling River between Louth and Wilcannia. This has occurred only 4 times between 1900 and 2010 (4) (5).

c. Just upstream of Louth in Bourke Shire, the Darling River is joined by the Warrego River, which drains a large catchment in south western Queensland. Some floodwaters from this system can move west through the Cuttaburra Creek and join the Paroo River system. Here, floodwaters spread over an extensive area where they are mostly absorbed by the network of channels, billabongs, creeks, anabranches, lakes and clay pans; this has been known to isolate rural properties in the surrounding area (2).

The Darling River

d. Flooding in the area around Wilcannia is mainly caused by over-bank flows from the Darling River. High levels in the Darling River can cause the river to back up resulting in the inundation of large portions of the shire (2).

e. As floodwaters move downstream of Tilpa they initially break out into a series of creeks and billabongs, the major being Talyawalka Creek. When this occurs wide spread inundation will occur isolating many rural properties for weeks or even months on end (2).

Talyawalka Creek

f. The Darling River is characterised by considerable anabranch development in the Central Darling Shire. The most noteworthy anabranch is the Talyawalka Creek, a 350-kilometre long creek which leaves the river near 'Wilga', 45 kilometres upstream of Wilcannia and continuing a parallel journey with the Darling River before entering

the Darling downstream of Menindee. The creek gradient is approximately 25.4m over its entire length (2).

g. This creek runs only during major floods when the Darling River reaches 8.42m at the Wilcannia gauge but as the flood height rises it takes an increasing proportion of the total river flow. In the bigger events the Talyawalka carries more water than the river itself (in 1998, 70,000 ML per day compared with 50,000 ML in the Darling, this occurred again during 2010, and 2012 due to flows from the Paroo River overflow). It will travel slowing filling numerous lakes and billabongs in its path before flowing into the Darling River between 40 to 55 days later (2).

1.5.2 Flood behaviour in the Menindee Area

a. Flood behaviour in the Menindee area depends on levels in the Darling River and Talyawalka Creek, and the state and operation of the Menindee Lake Storages to the north of the community. Menindee rarely experiences major flooding, as the Menindee Lake Storages are able to manage most flood flows, providing the ability to re-direct flood flows around Menindee and to re-enter the Darling River downstream of the township. The majority of Menindee flooding is generated by the release of water from the Menindee Lake System to allow air space in the lakes to receive potential flood water from upstream tributaries (4).

b. In general, flood intensities on the Darling River decline in a downstream direction as a result of natural storage in lakes and on the floodplain but this characteristic can be altered if a flood originating on the Darling upstream of Bourke is accompanied by very heavy and long-lasting rain in the Menindee area. The occurrence of a number of flood peaks in a period of only a few weeks or months in the vicinity of Bourke can also counter the tendency for flooding to be attenuated in a downstream direction (2).

c. In the larger floods, very large areas upstream and downstream of Menindee are inundated. The Darling River and the Talyawalka Creek share a common floodplain and all land between them is flooded except for the higher sand hills (2). A map of the estimated inundation extent during the 1971 flood shows around half the land flooded between Darling River and Talyawalka Creek from Wilcannia to Menindee (6).

d. Effluent flow from the Talyawalka near 'Teryawynia' fills up to 20 shallow storage lakes between Menindee and Ivanhoe. The remaining flow re-enters the river below Menindee at 'Wanda'. Further downstream, the Great Anabranch leaves the Darling River on the western side (2).

e. The gradient on the Darling River in the vicinity of Menindee is very low (about 4cm per kilometre) and it is lower still on the very sinuous Talyawalka Creek. As a result flood flows are slow and durations of inundation long especially on the Talyawalka

where the floodplain is also wider than along the Darling River. Indicative flow times for various reaches are as shown below, but it should be noted that they can be much shorter especially in the more extreme events and those associated with localised heavy rainfall (2). Travel times are also heavily dependent on what flooding is occurring within each of the tributaries.

Table 2: Indicative Flow Travel Time for the Darling River, Talyawalka Creek, Paroo River (2), (4).

River / Creek	Locations	Travel Time (days)
Darling	Bourke to Louth	4-7
Darling	Louth to Tilpa	3-6
Darling	Tilpa to Wilcannia	4-10
Darling	Wilcannia to Menindee	4-14
Darling	Menindee to Pooncarrie	3-13
Darling	Pooncarrie to Wentworth	3-13
Talyawalka	Wilcannia to Menindee	48 when wet 54 when dry
Paroo	Hungerford to Wanaaring	5-7
Paroo	Wanaaring to Peery Lake	7-10 can vary
Paroo	Peery Lake to Darling River	10-20 can vary

1.6 FLOOD HISTORY

Flood history across the shire is fairly consistent; Tilpa, Wilcannia and Menindee all have the flood of record in 1976, and the next most significant flood across the shire being 1956. More recently the 2012 floods were above major level at Tilpa and Wilcannia, and moderate at Menindee.

a. Table 3 lists recent significant floods at Tilpa, with heights referenced to the Tilpa Gauge 425900. The highest recorded flood was in Mar 1976.

Table 3: Flood History at Tilpa Gauge 425900 (7)

Date	Gauge Height (m)	Description
02/09/1950	12.83	
10/08/1956 31/03/1956	13.03 13.08	Level maintained for 4 days.
06/02/1974	13.27	500ml at Bourke.
07/03/1976	13.35	350ml at Bourke. In this event, 254ml of rain fell in the district overnight causing every local creek to run. Tilpa was completely isolated for 10 weeks.
30/06/1983 04/08/1983	12.75 12.5	Isolation for 4 to 6 weeks
03/06/1988	12.49	
25/06/1989 20/07/1989	11 11.36	
22/05/1990 27/09/1990	12.65 11.96	
04/03/1996 10/03/1996	11.52 12.23	Tilpa-Wilcannia road north of river closed at numerous locations including: Marra, Mt Murchinson and Rosedale.
06/09/1998 11/09/1998 09/10/1998	12.56 12.7 12.87	Isolation for 4 to 6 weeks. An SES Flood Boat pre-deployed for resupply operations and transportation surrounding Tilpa. In this event, there was a total of 6 people isolated in Tilpa and 16 people on properties in the immediate vicinity: "Rosedale" Flood Hut, "Glenroy", "Wygilla", "Kallara", "Nangra Bend" and "Tarra". It was possible to drive from "Curranulpya" to Cobar via 4WD over 'red country'.
28/01/2011 05/03/2011	12.3 12.43	
30/01/2012 18/03/2012	12.33 12.9	Tilpa was isolated during this peak for up to 6 weeks. SES air resources completed re-supply and transport operations for the community and surrounding area. The Levee was raised to 13.4m and compacted in other areas.

b. Table 4 below lists recent significant floods at Wilcannia, with heights referenced to the Wilcannia Town Gauge 425002. The highest recorded flood was in Apr 1976.

Table 4: Flood History from Wilcannia Gauge (425002) – Floods above Major (10.4m) (8), (9)

Date	Peak Height (m)	Description
11/10/1886	10.54	
23/05/1890	11.23	
17/09/1891	10.49	
21/08/1893	10.62	
07/03/1910	11.04	
30/07/1921	10.67	
15/09/1950 15/12/1950	10.92 10.49	
24/04/1956 01/05/1956	10.97 11.00	
23/05/1956 28/08/1956	11.02 11.13	
31/03/1971	10.67	
23/02/1974 28/02/1974	11.08 11.03	
05/04/1976	11.57	Most local roads in Central Darling Shire were closed for many weeks and many properties were isolated for 6-8 months. No water got into town but the levee system around St Theresa's Mission had to be strengthened. There were 100 evacuations from the aboriginal reserve to Wilcannia.
28/07/1983 16/08/1983	10.59 10.63	
23/06/1990	11.00	
01/10/1998 20/10/1998	10.54 10.93	During this event, there were three separate peaks above 10 metres resulting in rural properties in the Shire being isolated for a period of 10.5 weeks. At this height 80% of all river frontage properties from Tilpa to Menindee will be affected by local flooding and road closures.
21/02/2011	10.49	
15/04/2012	10.63	No issues were experienced within Wilcannia. Temporary levee repairs were carried out on the Waralli Estate and St Theresa Mission School. Major wash outs occurred to most roads along the length of the Darling River within the Shire Councils Boundaries. The Talyawalka Creek flowed under all bridges spreading out to 2.5kms. The Creek peaked at 4.95 metres.

c. Table 5 below lists recent significant floods at Menindee, with heights referenced to the Menindee Town Gauge 425001. The highest recorded flood was in Jan-Apr 1976, then Sep 1956. The descriptions highlight the impact of flooding in river basins outside the Central Darling Shire.

d. Flooding at Menindee is dependent on the operation of the Menindee Lakes storage system. The lakes were originally a series of shallow natural depressions that filled during floods and then drained back into the Darling River. During drought, the lakes would dry up. In the 1950s and 1960s the NSW Government built a series of weirs, levees and canals to capture and retain floodwaters, and regulate the release of water downstream. Work began in 1949, major works were completed in 1960, with final completion in 1968 (10).

e. Since then the only change to the Menindee Lake system operation is the use of telemetry. Lakes, gates and weirs are unchanged. The fuse plug was relocated as of July 2015 (see section 2.4.8) (11).

Table 5: Recent Flood History at Menindee Town Gauge 425001. Floods below major (9.7m) in italics (4), (12)

Date	Gauge height (m)	Description
1950 Sep 27	9.86	
(1955)		Serious floods on the Bogan, Macquarie, Castlereagh, Namoi and Gwydir rivers produced no flooding at Menindee, which indicates the tendency for flood intensity to decline downstream of Bourke.
1956 May 17 1956 May 30 1956 Sep 05	9.91 9.96 10.19	Appears to have emanated largely from the Macquarie River and the Barwon-Darling below Walgett: Bourke had three high flood peaks in the preceding 6 months which accounted for the very long duration of flooding that year at Menindee. 20 families were evacuated.
1971 Apr 13	9.75	Largely from the Namoi but several other NSW and Queensland tributaries also experienced repeated flooding during this time in the mid 1970's
1974 Mar 11	9.92	
1976 Jan 02 1976 Apr 20	10.47 10.47	
1983 Sep	*9.53*	
1990 Jul 24	9.90	Caused by very heavy autumn rains primarily over the Warrego, Paroo, Bogan and Macquarie catchments. During this flood, about 20-25 people were evacuated from houses in Irrigation Road, Cemetery and Wentworth Road. All roads except for the Broken Hill road and Wilcannia Road (west side) were closed.
1998 Oct 18 1998 Oct 26	9.90 9.96	Largely from winter flooding over the Gwydir and Namoi catchments. Flooding from these catchments at this time of year is relatively uncommon. 18/10/1998 - Readings remained steady at 9.90m for 5 days. 22/10/98, Ivanhoe road gave way at Talyawalka Creek. This completely isolated rural residents on the eastern side of Talyawalka Creek, 800 km to Mildura, Broken Hill or Hay. Residents were resupplied by boat travelling 25 km up the Talyawalka Creek. About 20-25 houses along Irrigation and Wentworth Road were inundated and a total of 27 people were registered evacuees. Flood waters threatened the Menindee Bridge Caravan Park but the construction of a temporary levee kept water out. 12 caravans remained on site. The flood remained above major flood

Date	Gauge height (m)	Description
		level from 7 Oct 98 until the first week in November 1998.
1999 Oct	9.89	Wilcannia Road (west side) closed at "Culpaulim" about 25 km south west of Wilcannia. Council 'broke' the Ivanhoe road to ease pressure off the culverts.
2000 Dec	*8.74*	As the natural flood peak approached, the Dept of Land and Water Conservation (DLWC) made room for flood intake to the Menindee Storages by releasing water to the Darling River. This resulted in the peak occurring earlier and with a lower peak height than if the floodwaters had been uncontrolled.
2010 Jul - 2011 Nov	*9.63*	
2011 Dec - 2012 May	*9.57*	The 2011-2012 peak was again artificial and caused by the release of water from the lake system to allow for increased flows that were a result of flooding to the north and in southern Queensland. Unusual heavy rainfall to the west of Wilcannia prolonged this flooding event, for approximately 3 months reaching a moderate level, and isolating 16 properties from the Main Weir to the south of Menindee

1.7 FLOOD MITIGATION SYSTEMS

a. The Menindee Lake Storage System is used to store water for the Broken Hill district and to control downstream flows for environmental use. It has also previously been used as a flood mitigation system by releasing water downstream to create storage capacity. Over the past decade the Murray Darling Basin Authority has controlled most flows (11). Details are given in section 1.3 above.

b. There are three levees within the Central Darling Shire LGA (4) described further in Section 2. Levees are shown on Wilcannia and Tilpa town maps 4 and 5.
   i. Tilpa Levee located along the Darling River and around the junction of West Tilpa Rd and Tilpa-Tonga Rd.
   ii. Wilcannia has a levee around the St Theresa Mission School.
   iii. Wilcannia has a levee located at Waralli Estate.

c. There are a number of private rural levees in Central Darling Shire LGA.

1.8 EXTREME FLOODING

a. No extreme flood modelling has been undertaken for the Central Darling Shire.

2 EFFECTS ON THE COMMUNITY

2.1 COMMUNITY PROFILE

Table 6: Census of Housing and Population data (2011)

Census Description	Central Darling LGA	Ivanhoe	Menindee	White Cliffs	Wilcannia
Total Persons	**1,991**	**608**	**449**	**319**	**603**
Aged 0-4 yrs	128	27	27	24	59
Aged 5-14 yrs	283	82	52	35	106
Aged 65 + yrs	266	95	71	51	50
Of Indigenous Origin	758	105	180	8	465
Who do not speak English well	7	4	0	0	3
Have a need for assistance (profound/severe disability)	68	18	24	9	13
Living alone (Total)	265	85	67	54	57
Living alone (Aged 65+)	79	31	22	21	12
Residing in caravans, cabins or houseboats or improvised dwellings	35	8	6	16	8
Occupied Private Dwellings (Households)	**736**	**228**	**187**	**131**	**188**
No Motor Vehicle	104	17	30	8	51
Caravan, cabin, houseboat or improvised dwell	18	8	3	6	3
Rented via State or Housing Authority	94	16	24	4	56
Rented via Housing Co-Op or Community Church Group	34	0	13	0	21
No Internet Connection	284	75	68	31	112
Unoccupied Private Dwellings	**326**	**195**	**39**	**85**	**10**
Average persons per occup dwelling	**2.4**	**2.2**	**2.1**	**2.0**	**3.1**
Average vehicles per occup dwelling	**1.6**	**1.9**	**1.3**	**2.1**	**1.1**

SPECIFIC RISK AREAS - FLOOD

Darling River Basin

2.2 TILPA

2.2.1 Community Overview

a. Tilpa is a small community located on about 150km upstream of Wilcannia on the Darling River. Its population numbers up to 12 (2).

b. Tilpa was first settled during 1876 and still contains some original buildings. The area surrounding Tilpa is home to Baakandji Indigenous tribe (4).

c. Tilpa is a flat, mainly agricultural area, with sheep grazing the primary activity and some pockets of irrigated land along the river. Tourism, including farmstay programs on local stations, is the other major local industry. Fishing and camping are popular along the river (2).

2.2.2 Characteristics of flooding

a. Low lying flood plains exist on both sides of the river which can be affected by riverine flooding (4).

2.2.3 Flood Behaviour

a. Flood water from the Darling River approaches the community to its north east. A partial ring levee protects community infrastructure. It redirects flood water to the west of the village through numerous causeways before re-entering the Darling River to the south of the village (4).

b. The airstrip just to the west of town is situated on high ground. The road to the airstrip has been raised such that the community is no longer isolated from it during flood events (11).

2.2.4 Classification of Floodplain

a. Tilpa is classified as having Rising Road Access. Road access is available to the west via White Cliffs. This may change to a High Flood Island depending on the level of flooding in the Paroo Overflow (2).

2.2.5 Inundation

a. Since the construction of the levee during 1980, Tilpa has not experienced any form of inundation (4).

2.2.6 Isolation

a. At 9.4m referenced to the Tilpa Gauge 425900, access roads to Tilpa begin to close. In previous floods the last access road, Tonga Rd, was closed 3km north of Tilpa, and Tilpa was isolated by road, often experiencing long term isolation of 6-10 weeks and up to 3 months (4).

b. As at June 2015 this section of road was raised to 12.5m, using box culverts (13). This will now mean that Tilpa will be able to access the airport and possible outer roads to access Wilcannia. However this will depend on flooding along the Darling River to Wilcannia and north to Louth and whether the Paroo overflow is in flood (11).

c. In the event of severe flooding caused by heavy localised rainfall or the severe flooding of the Darling River and Paroo River the following effects will occur if flood peaks are experienced above 12.5 metres at Tilpa (4):

   i. A large area of inundation will occur to the east and west of the river causing isolation of approximately 20 rural properties.

   ii. Prolonged isolation exceeding 4 to 6 weeks or longer, is possible.

2.2.7 Flood Mitigation Systems

a. Tilpa is surrounded by a ring levee protecting the village with a crest height of 13.4m. Details are given in the table below.

Table 7: Levee in Tilpa (14), (15)

Tilpa Levee	
Location	At the junction of Tilpa-Tonga Rd and West Tilpa Rd, along Darling River. Paroo / Darling River Basins.
Type of Levee	Ring levee, earth mound, 1400m, no spillway
Owner	Central Darling Shire Council
Design Height and freeboard	No formal design for levee
Overtopping Height	Constructed during 1980 with a crest height of 13.7m (relative to Tilpa gauge). During the 2012 flood event, an engineering inspection reported that areas of the levee had deteriorated to average crest levels of 13.3 metres (14). Major temporary works were completed, increasing the crest level to 13.4 metres (4). These were upgraded to permanent repairs by Central Darling Shire Council (13).
No. of properties protected	Estimated 12 persons protected; properties protected - Tilpa Pub, several dwellings
Known low points	NA
Location and sequence of inundation	NA
Consequences of levee overtopping or failure	All evacuation requirements would need to be completed by air resources (4). There is high ground behind the levee which would be free from flooding (15; 16).
Deficiencies	Before the upgrade, the levee was in good condition and regularly reviewed by the Shire Council for upkeep and general maintenance (4). A crest level survey was completed post-2012 floods, with a verbal report given. Some points on the levee were found to be 0.2m below nominal due to erosion from driving vehicles over the levee, but these could be repaired if floods were predicted (11).

2.2.8 Dams

a. There are no prescribed dams on the Darling River upstream of Tilpa.

2.2.9 At Risk Facilities

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

b. No such facilities have been identified within Tilpa.

2.2.10 Other Considerations

a. None.

2.3 WILCANNIA

2.3.1 Community Overview

a. Situated on the Darling River, Wilcannia is a community with a strong historical background and indigenous culture. The population is around 600, with over 75% being people of Indigenous origin. There are about 190 occupied dwellings in Wilcannina (2011 census). Wilcannia is located on the Barrier Highway 200kms northeast of Broken Hill. Two caravan parks, a Mission School and Waralli Aboriginal Estate are located to the east of Wilcannia near the river (4).

2.3.2 Characteristics of Flooding

a. Flooding in the area around Wilcannia is mainly caused by riverine flooding from the Darling River and the Talyawalka Creek system. This results in flooding mainly to the east of Wilcannia and further upstream and downstream of town.

b. Localised heavy rainfall can exacerbate riverine flooding.

2.3.3 Flood Behaviour

a. Flooding within the Wilcannia area originates mainly from the Paroo River, Darling River and Talyawalka Creek. It has two main characteristics (2):

   i. Floods originate some distance away.

   ii. Flood waters usually flow through at low velocities, often taking over a month to pass a particular location.

b. The Talyawalka Creek system breaks its banks at around 8.75m and the Darling River first breaks its banks both upstream and downstream of Wilcannia at around 9m on the Wilcannia gauge 425002 (17).

c. Closer to town, the Darling River also breaks its eastern banks at around 9.5m at Wilcannia gauge 425002 and begins to flood the low floodplain to the east of the Wilcannia Township.

d. Overbank flooding from the Darling River and the Talyawalka creek system join together at around 10.5m - 11m on the Wilcannia gauge creating a large expanse of water that can be around 10km wide (17).

2.3.4 Classification of Floodplain

a. Wilcannia township is located on high ground to the west of the Darling River. It is situated about 15m above river level and has not been affected by previous floods (11). The Barrier Highway was re-constructed during the early 1990's to ensure it was no longer isolated during major flood events and is also well above river level (4).

b. To the east of the town is low level flood plain that eventually joins the Talyawalka Creek flood plain 5kms to the east of Wilcannia. In this flood plain lies the Warrali Estate and the St Theresa Mission School. Both areas are protected by ring levees to 12 metres referenced to the Wilcannia gauge 425002. Both areas are accessible via road as the road is constructed to the same height (12m) out to the Barrier Hwy (4), (11).

c. St Theresa Mission School and Waralli Estate are Low Flood Islands that become surrounded by floodwaters at around 11.6m on the Wilcannia gauge . Once the levee is overtopped they will be completely flooded. Evacuation is to the west via a walkway into Wilcannia (2). High ground exists between the estate/school area and Wilcannia Township. If evacuation from both sources were required residents and children can be relocated into Wilcannia Evacuation Centres (4).

2.3.5 Inundation

a. The following are key inundation consequences for flooding in Wilcannia, referenced to heights on the Wilcannia gauge 425002 (9), (4):

   i. 9.0m - Rural properties to the north and south start to be affected. Road closures start.

   ii. 9.5m - Inundation commences at Wilcannia floodplain, affecting the Victory Caravan Park.

   iii. 10.05 – Floodwaters cover Victory Caravan Park.

   iv. 10.93 – 80% of all riverfront properties from Tilpa to Menindee will be affected by flooding and road closures.

b. The NSW SES holds information regarding the gauge heights at which a small number of homesteads are isolated or their private levees are overtopped (9).

2.3.6 Isolation

a. In the event that flood peaks are experienced above 10.0 metres on the Darling River Wilcannia gauge (4):

   i. A large area of inundation will occur along the Darling River to the east and west of the river causing isolation of approximately 30 rural properties.

   ii. A large area of inundation will occur along the Paroo River to the east and west of the river causing isolation of approximately 16 rural properties.

   iii. A potential of prolonged isolation is possible leading to periods exceeding 4 to 6 weeks, possibly longer.

   iv. Possible inundation of several residential properties to the south of Wilcannia.

b. The Mission School and Waralli Estate should not become isolated as the evacuation route out is at the same height as the levee (12m at the Wilcannia gauge). Beyond this height the levee would be overtopped and the area inundated.

2.3.7 Flood Mitigation Systems

a. Numerous rural property levees exist along the length of the Darling River from Tilpa to below Wilcannia, all are maintained by, and the responsibility of the property owners (4).

b. The township of Wilcannia is positioned well above previous historical flood levels, however two small communities to the west of the township are surrounded by a levee to a river gauge height of 12.0 metres - St Theresa Mission School and the Warilla Estate (4).

c. Although both are of reasonable condition, they are located on Aboriginal Land, therefore negotiations with the Shire Council and Aboriginal Lands Council is required for funding and maintenance works to be completed (4).

Table 8: Levees in Wilcannia (16)

Waralli Aboriginal Estate and St Theresa Mission School Levees	
Location	1km southeast of Wilcannia township
Type of Levee	System – Waralli Estate Levee (785m) and Mission school Levee (580m) are separate ring levees. Both earth mounds, date of construction unknown.
Owner	Central Darling Shire Council
Design Height and freeboard	12.0m on Wilcannia gauge for Mission School and Waralli Estate, 1% AEP design flood
Overtopping Height	12.2m on Wilcannia gauge
No. of properties protected	Waralli Estate – 10 houses & approx. 70 people (9) St Therese Mission School - 6 people on a permanent basis, and an additional 20-25 students Mon-Fri (Principal, Jul 2016). Sewage Pumping Station No.2
Known low points	See deficiencies
Location and sequence of inundation	NA
Consequences of levee overtopping or failure	Once the Mission School levee is overtopped or fails the school will be completely flooded. Evacuation is to the west via a walkway into Wilcannia (4)
Deficiencies	Levee strengthening works in 2012 (no extension or raising) At terminus of Warralli Ave narrow gap in levee was reinstated with temporary repairs. No major works have been carried out as this is Aboriginal Land Council property (11). No major structural issues.

2.3.8 Dams

a. There are no prescribed dams on the Darling River upstream of Wilcannia that could cause flood effects in this LGA.

2.3.9 At Risk Facilities

a. The key at risk facilities in Wilcannia include the St Theresa Mission School and Child Care Centre as well as two caravan parks located on the floodplain.

b. These facilities are further described in Annex 2.

2.3.10 Other Considerations

a. None.

2.4 MENINDEE

2.4.1 Community Overview

a. Menindee is situated 110kms south west of Broken Hill on the bank of the Darling River. It is considered to be among the first western NSW settled communities and rich in history. Menindee has a population of around 450 with about 40% being people of indigenous origin. There are about 190 occupied dwellings in Menindee (2011 Census).

b. Menindee has an agricultural industry which attracts CALD workers from various European and Asian communities. Although they are self-sufficient it should be noted that these groups are often located in Menindee during the storm season, October to March (4).

2.4.2 Characteristics of Flooding

a. The majority of flooding in Menindee is controlled by the release of water from the Menindee lakes system. Riverine flooding in Menindee is largely dependent on whether or not water is released from Lake Wetherell or Lake Pamamaroo. Flooding within Menindee can also be exacerbated by heavy rainfall within the local area.

2.4.3 Flood Behaviour

a. 10kms north of Menindee is the Menindee lake Storage System. The Storage System has the ability to redirect large flows of water through a series of interconnecting lakes, bypassing the township of Menindee. Flooding will affect the township only when heavy rainfall is experienced in the local area or water is released from the Main Weir situated to the north of Menindee. If this is the case State Water will attempt to maintain flows below the moderate flood level (NSW SES, Dec 2012). If the storages are already full, State Water may need to release larger flows from Weir 32 into the river system. Details of the Menindee Lake Storage System are in section 1.3 above.

2.4.4 Classification of Floodplain

a. Menindee is classified as having Rising Road Access meaning that the town itself does not become isolated and people can move out of the area by road as floodwaters advance. However numerous rural properties outside of town can themselves be isolated. Flooding affects the western side of the river heading north up to the Main Weir, and both the western and eastern side of the river heading south of Menindee to Weir 32. However the road between Menindee and Broken Hill remains open (2).

2.4.5 Inundation

a. The centre of Menindee is situated on high ground and has not been affected by previous flood events. During the highest record peak in 1956 (10.19m) flood water reached the rear steps of the Maiden's Hotel. Several residential properties to the north and south of town are affected by isolation and then inundation (4).

b. Table 9 below lists inundation and isolation effects, referenced to the Menindee Town gauge 425001.

Table 9: Inundation effects at Menindee, relative to Menindee Town gauge 425001 (4), (9)

Gauge Height (m)	Date	Description
7.8		Isolation commences for residential and rural properties to the north and south (4).
8.0		River roads start to close (4).
8.38		Tandou Creek runs and progressively fills back to GR 326414 causing homes on the west side of the road to progressively become isolated (12)
8.4		16 residential properties between the Main Weir at Lake Wetherell and the south of Menindee at Weir 32 are isolated, and up to 30 are potentially isolated if flows from the Main Weir are released. Some are protected by small private levees. Some are not permanently occupied (4).
>8.5	2012	Some of the 16 isolated properties to north and south of Menindee start to face inundation (4).
8.83		The area from the main bridge through to McGuiness Road is inundated by flood waters. About 8 houses on the eastern side of the river are inundated with water over the floor (12)
9.2		6 of the 16 isolated properties will experience inundation (4)
9.4		Water closes Irrigation Road about 3 km west-south-west of Menindee. Once this road closes the evacuation route for about 20 people is lost (12).
9.5	Jan to May 2012	Up to 25 properties along the Darling River from Texas Downs to Weir 32 were isolated or inundated. Rural roads to the South east of Menindee were affected or closed. 6 Rural properties were isolated
9.57	2012 peak	All 16 properties to the north and south of town were affected by isolation or inundation, many for over 5 months, which was the duration of controlled releases from Menindee Lakes Storage System (4).
9.9	24/07/1990	20-25 people were evacuated from houses in Irrigation Road, Cemetery and Wentworth Road. All roads except for the Broken Hill road and Wilcannia Road (west side) were closed (12)
9.96	26/10/1998	20-25 houses along Irrigation and Wentworth Rd inundated. Flood waters threatened the Menindee Bridge Caravan Park but were kept out by the construction of a temporary levee. 12 caravans remained on site (12)
>10m		For severe floods, over 10m gauge height, the following consequences are expected: • Up to 30 residential properties will be affected (mainly isolation) • Up 4 commercial properties will be affected (mainly isolation) • Up to 20 properties would experience above floor level flooding • A large area of inundation will occur to the east of the river causing isolation of several rural properties. • A potential of prolonged isolation is possible leading to periods exceeding 4 to 6 weeks (4).

2.4.6 Isolation

a. Numerous properties within the area become isolated as flood levels increase. See Inundation section above and Table 9.

2.4.7 Flood Mitigation Systems

a. The Menindee Lakes Storage System has been used as a flood mitigation system in the past, as described in section 1.3.

2.4.8 Dams

a. The Menindee Lakes Storage System is the only dam affecting Menindee; refer to section 1.3 for details. The Dam Safety Emergency Plan (DSEP) (18) (3) investigates sunny day dambreak at Menindee Main levee, Pamamaroo Lake Main levee, West Levee / Main Weir on Lake Wetherell, as well as failure of the fuse plug section of the Main or East Levee on Lake Wetherell. A general town level of 58.9mAHD is assumed.

b. Inundation maps have not been produced due to the limited extent of survey information, but discharges, inundation depths, velocities, and flood wave travel times at certain points have been tabulated.

c. The sunny day dambreak for Pamamaroo Block dam will not flood the Menindee township (18).

d. Failure of the Main Weir would flood approximately 50 to 60 properties on the Northern and Southern sides of the Menindee township by 0.3m with a flood wave travel time of nearly 7 hours (18)

e. Failure of the Menindee Block Dam would flood approximately 21 low lying properties downstream of the Menindee town by 0.6m with a flood wave travel time of only 30 minutes (18).

f. Failure of the fuse plug at existing crest level, breach width of 600m, would flood Menindee by about 4m (18). The fuse plug was activated in 1974 and found to cause various problems including erosion, scouring the land and difficulty with stemming the flow once activated. So the fuse plug was relocated by 2015, to a position downstream of Three Mile Creek with the intention of alleviating these issues and the potential flood impacts to Menindee (19), (20). It is still operated manually by blasting the bank if the Main Weir is under stress. If used, localised flooding will occur but there is no threat to residential property (11).

2.4.9 At Risk Facilities

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

2.4.10 Other Considerations

a. None

2.5 OTHER COMMUNITIES

2.5.1 White Cliffs

a. White Cliffs is a township in the northwest corner of the Central Darling Shire. The nearest significant watercourse is the Paroo River about 50km to the east. Very infrequently rural properties to the east are isolated by flooding from the Paroo Overflow, but this has occurred only about 4 times in recorded history. The township itself is not affected during flooding (11).

2.5.2 Ivanhoe

a. Ivanhoe is a township in the southwest corner of Central Darling Shire. The nearest significant watercourse is Willandra Creek, about 40km to the southeast. Rural properties which rely on Ivanhoe's infrastructure (medical etc.) are isolated every 4-5 years by flooding from the Talywalka Overflow (11).

ROAD CLOSURES AND ISOLATED COMMUNITIES

2.6 ROAD CLOSURES

a. Table 10 lists roads liable to flooding in the Central Darling Shire LGA, schematics of these roads are shown in Annexes 3A, 3B and 3C.

b. During flooding events in Wilcannia, all roads alongside the river are closed and can remain so for periods exceeding three months, this is dependent on infrastructure damage (4).

c. Direct access from Menindee to Broken Hill and from Wilcannia to Broken Hill will not be affected (4).

Table 10: Roads liable to flooding in Central Darling Shire LGA relative to the Tilpa, Wilcannia and Menindee Town gauges (2), (4).

Road	Closure location	Consequence of closure	Alternate Route	Indicative gauge height (m)
Menindee/Wilcannia		Isolation to rural Properties. Increased travel times	Menindee /Broken Hill /Wilcannia	
Menindee/Pooncarie		Isolation to rural Properties. Increased travel times	Menindee /Broken Hill /Wentworth /Pooncarie	
Menindee/Ivanhoe (MR433)		Isolation to rural Properties. Increased travel times	Menindee /Broken Hill /Wilcannia /Ivanhoe	MT 10.0
Tilpa/Wilcannia (MR68A)	Numerous locations	Rural Property Isolation	SR9 Via SR3	T 9.20
Tilpa/Wilcannia (SR1)	Numerous locations	Rural Property Isolation	MR68A	T 8.76
Tilpa to Louth (SR2)	Numerous locations	Rural Property Isolation	SR3/MR68A	T 9.98
Tilpa to Louth (SR1)	Numerous locations	Rural Property Isolation	MR68A	T 10.92
Tilpa to Barrier Hwy (SR22)	2.5kms south of Tilpa	Rural Property Isolation	MR68A	T 11.35
Tilpa to Tongo (SR3)	2 kms west of Tilpa	Tilpa Totally Isolated	Nil	T 12.20
Norma Downs to Wilcannia SR9	Porters Crossing	Rural Property Isolation	Nil	Temporary gauge
Wilcannia/Menindee (SR10)	Numerous locations	Rural Property Isolation	Barrier Highway via Broken Hill	W 8.85
Wilcannia/Menindee (MR68B)	Numerous locations	Rural Property Isolation	Barrier Highway via Broken Hill	W 10.00
Menindee/Pooncarie	Numerous locations	Rural Property Isolation	Nil	MT 8.35
Menindee/Kinchega Via Nora Street	2.5kms west of Menindee	Property Isolation	Via MR66	MT 8.25
Menindee/Main Weir (West) Racecourse Road	2kms north of Menindee	Property Isolation	Nil	MT 8.00
Kinchega National Park (NPWS)	River Road	Cannot access NP via this route	Can still access NP through main access Menindee MR66 which remains open	MT 10.0

T – Tilpa 425900, W – Wilcannia gauge 425002, MT – Menindee Town gauge 425001

2.7 SUMMARY OF ISOLATED COMMUNITIES AND PROPERTIES

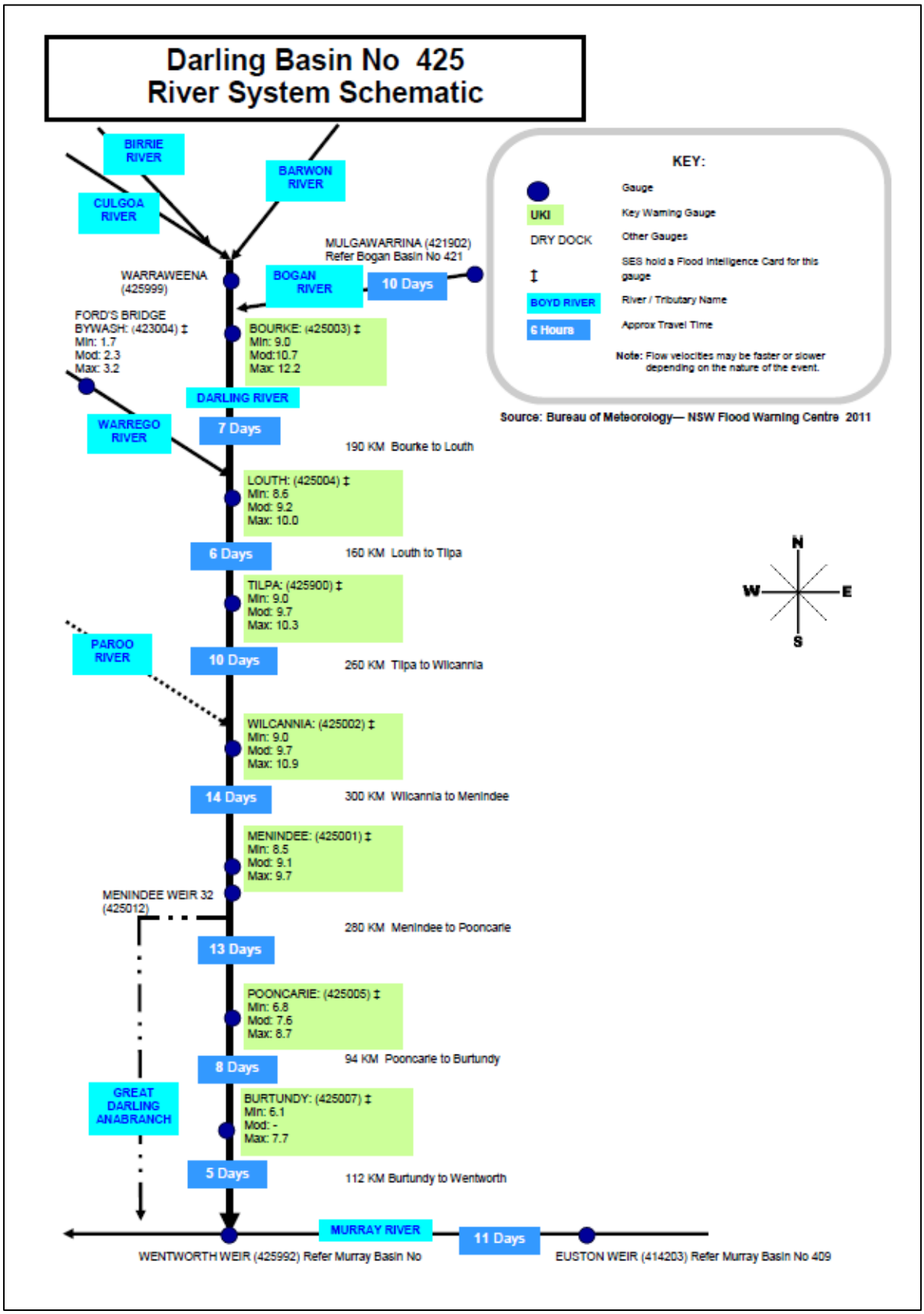
a. Table 11 lists communities liable to isolation and potential periods of isolation. Information presented here is based on historical events and does not reflect the duration of isolation expected in larger and extreme events.

Table 11: Potential Periods of Isolation for communities in the Central Darling Shire LGA during a flood (2).

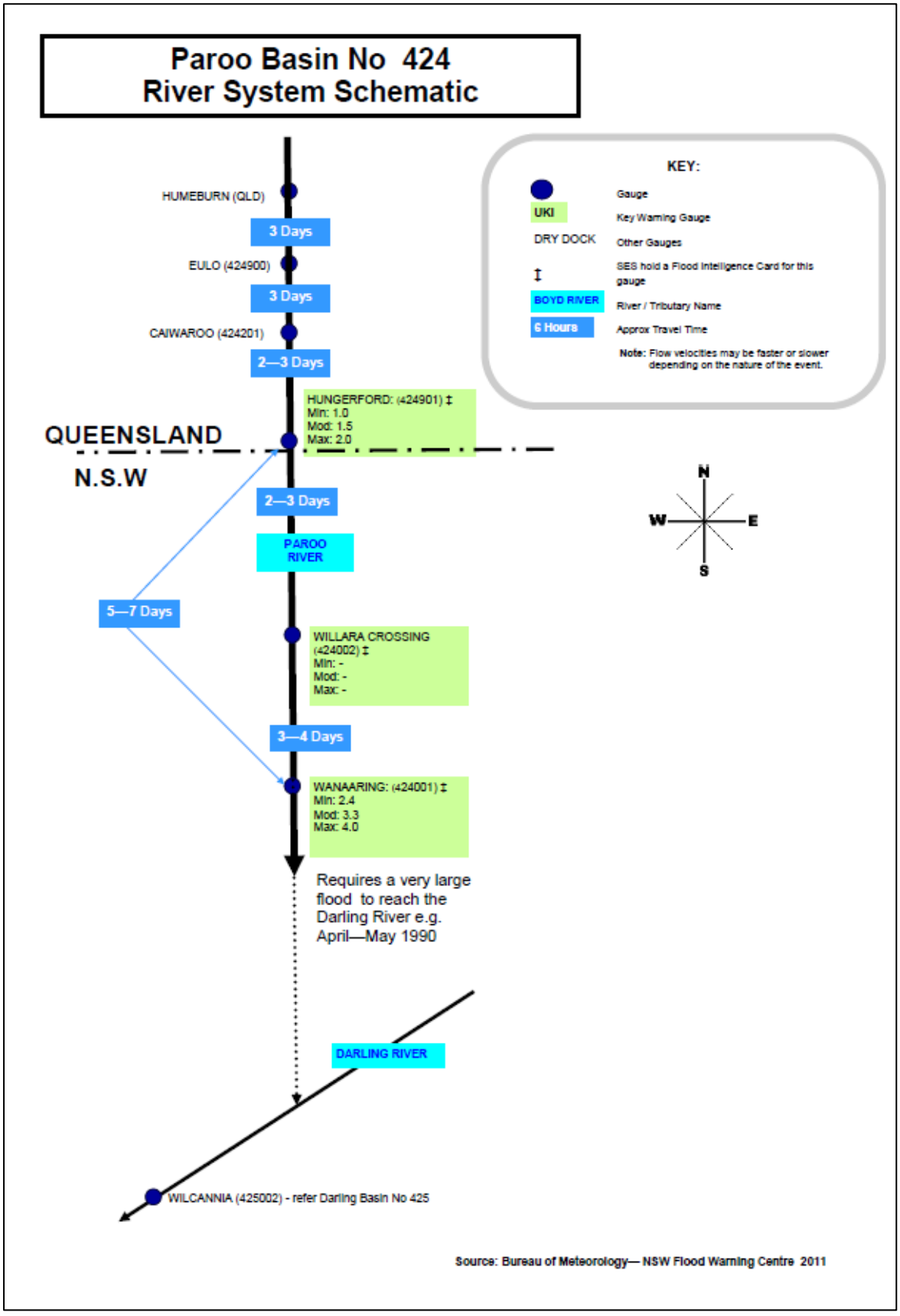
Town / Area (River Basin)	Population/ Dwellings	Flood Affect Classification	Approximate period isolation	Weeks								NOTES
				1	2	3	4	5	6	7	8	
Tilpa	10 pp, 12 dwellings	Normally rising road access high flood island	Nil or 3-6 weeks									Isolation is dependent on if the Paroo is flooding
Menindee	333 pp, 96 dwellings	Rural properties isolated	1-4 weeks dependant on Lake system releases									Menindee itself is not isolated by flooding, however surrounding rural properties can be.
Rural Properties Shire Area	56 properties	Isolation	1-6 weeks									Resupply likely to be required after 5 days

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

ANNEX 1A: DARLING RIVER BASIN SCHEMATIC



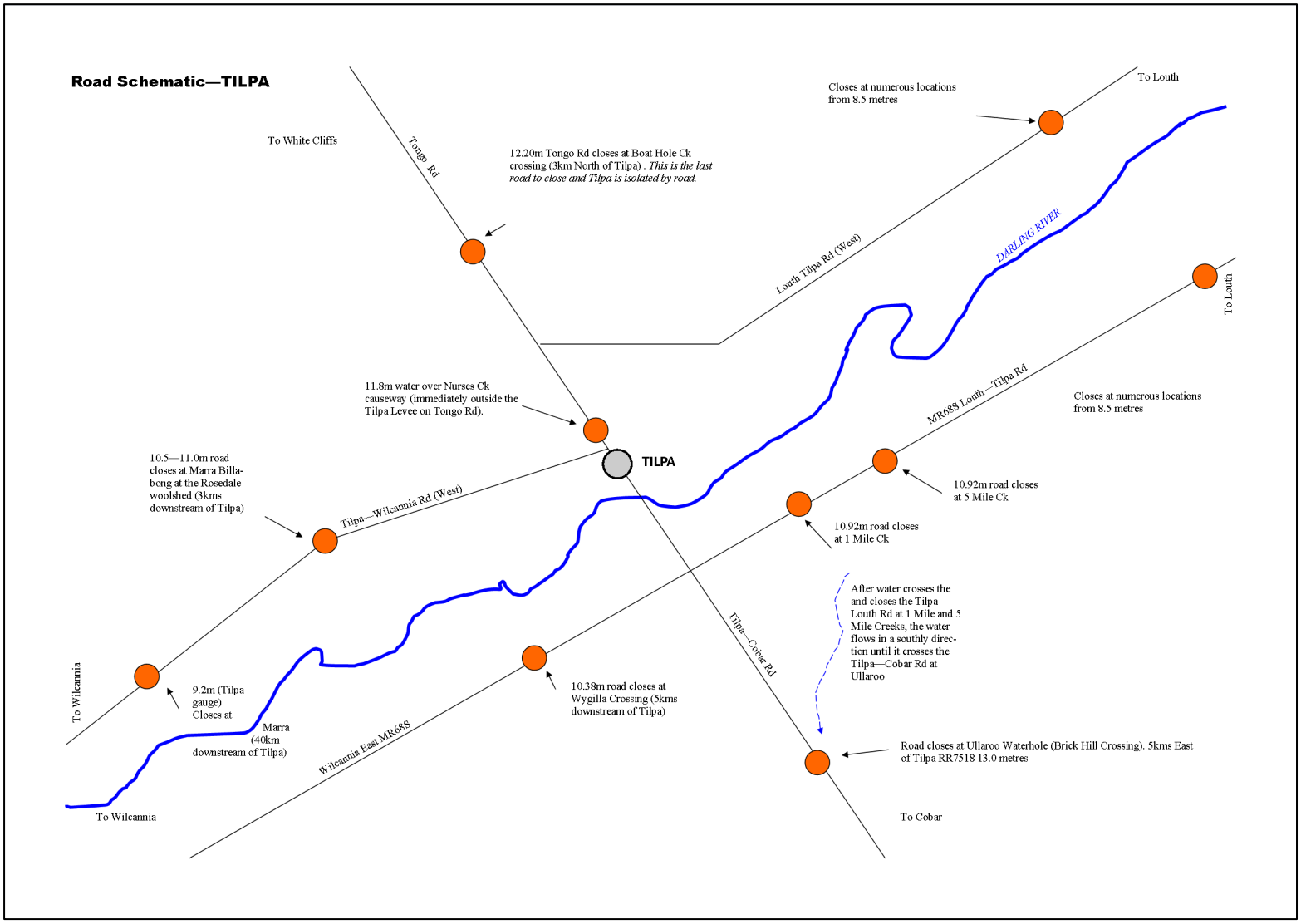
ANNEX 1B: PAROO RIVER BASIN SCHEMATIC



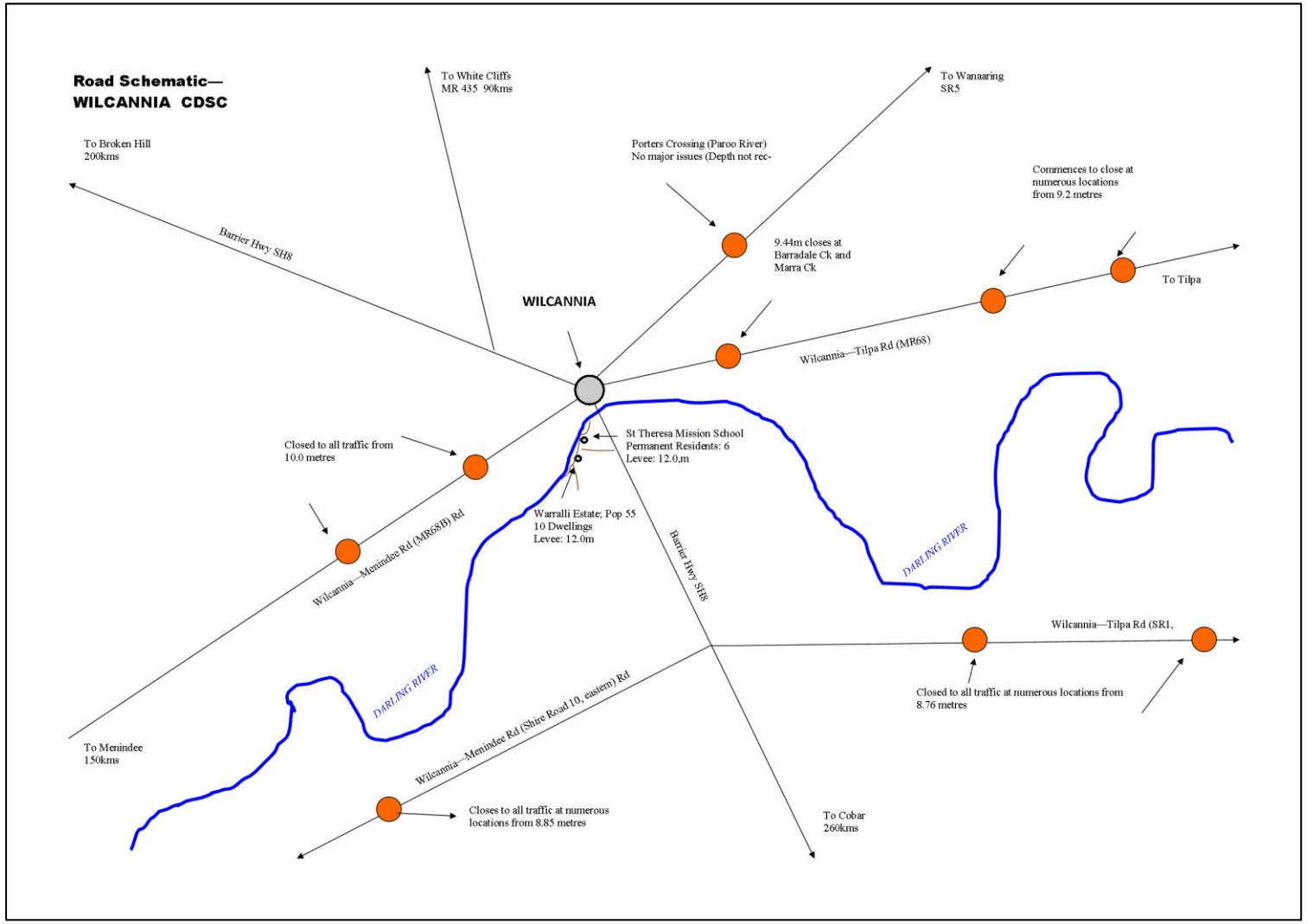
ANNEX 2: FACILITIES AT RISK OF FLOODING AND/OR ISOLATION

Facility Name	Street	Suburb	Comment
Schools			
St Theresa Mission School	Barrier Hwy (East), Warrali Ave	Wilcannia	Low flood island (2) protected by levee with design height of 12.0m referenced to Wilcannia gauge.
Child Care Centres			
St Theresa Childcare Centre attached to Mission School	Barrier Hwy (East), Warrali Ave	Wilcannia	Low flood island (2) protected by levee with design height of 12.0m referenced to Wilcannia gauge.
Facilities for the aged / infirm			None identified
Hospitals			None identified
Utilities and infrastructure			None identified
Camping Ground / Caravan Parks			
Wilcannia Victory Caravan Park	Barrier Hwy, 200m southeast of river.	Wilcannia	9.5m on Wilcannia gauge – floodwater starts affecting park. 10.05m – floodwaters cover park.
Warrawong Caravan Park	Barrier Hwy, 3km southeast of township	Wilcannia	Park Above PMF at Wilcannia however road access affected at 11.37m (13).
Menindee Bridge Caravan Park	Pooncarie Rd	Menindee	Protected by levee to 10.0m. Only 10-12 sites.
Copi Hollow Caravan Park	Steve Hutton Drive (Copi Hollow Lake)	Menindee	Can have 300-400 people on weekends.

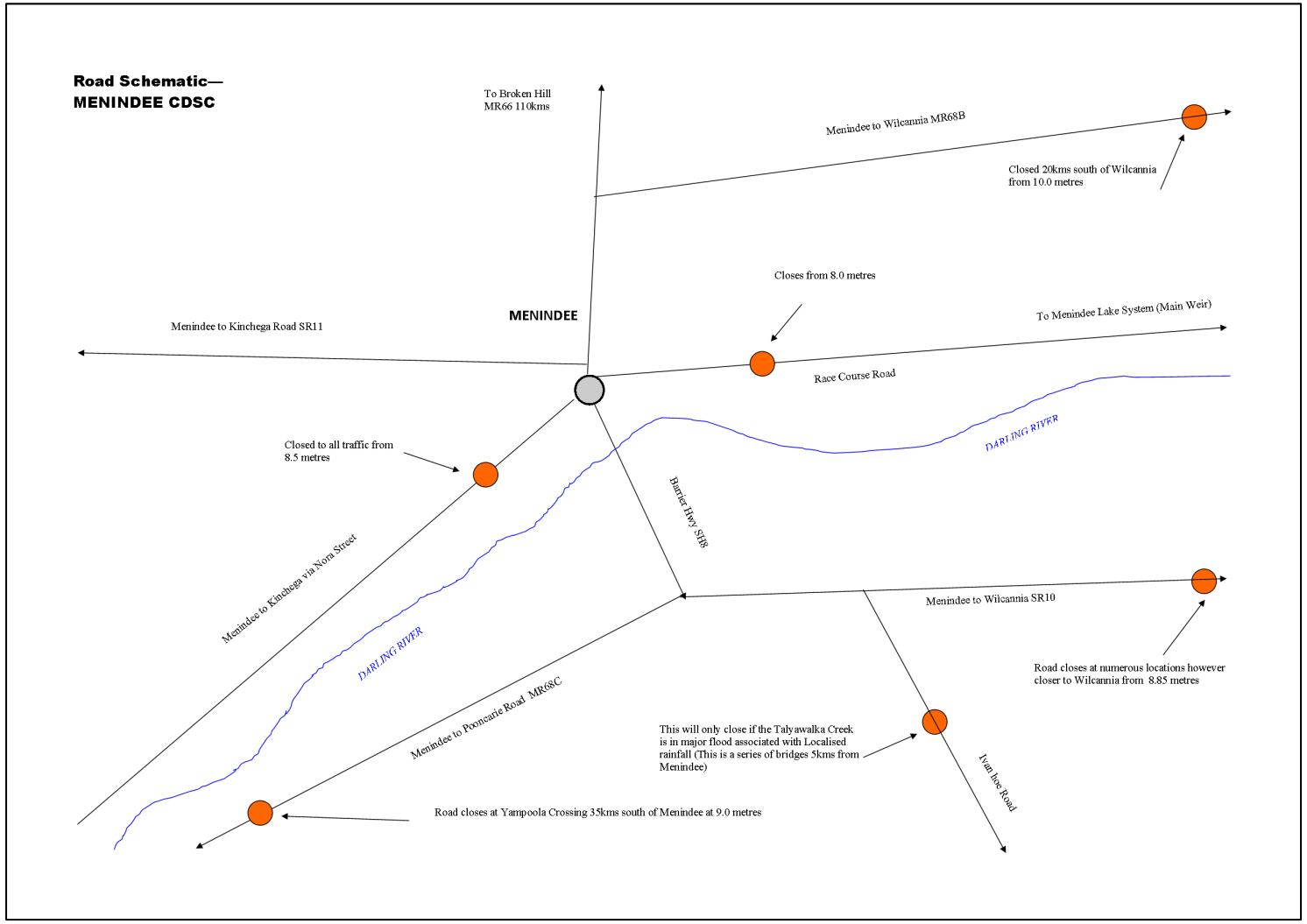
ANNEX 3A: ROAD CLOSURE SCHEMATIC FOR THE TILPA AREA RELATED TO THE TILPA GAUGE (425900)



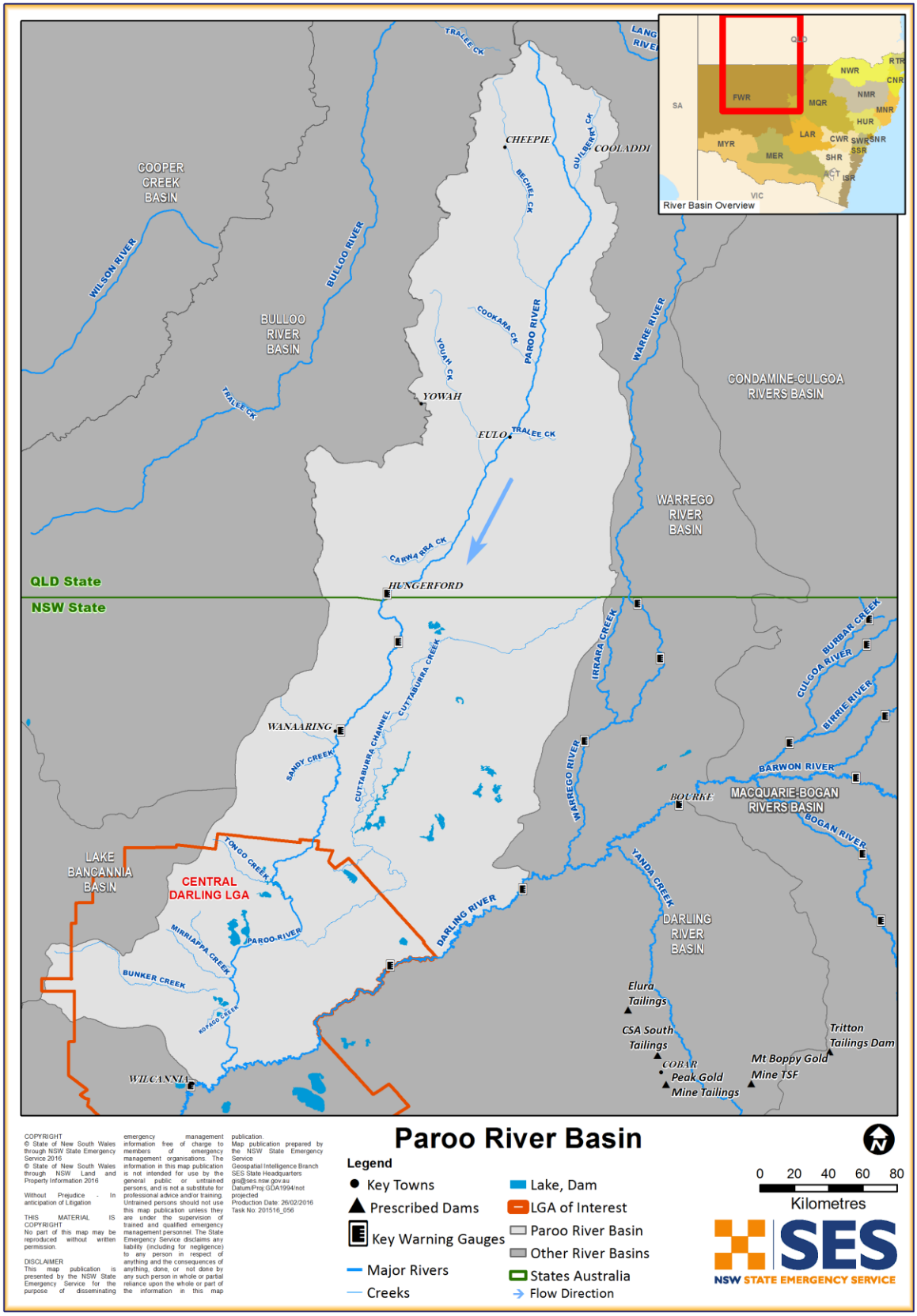
ANNEX 3B: ROAD CLOSURE SCHEMATIC FOR THE WILCANNIA AREA RELATED TO THE WILCANNIA GAUGE (425002)



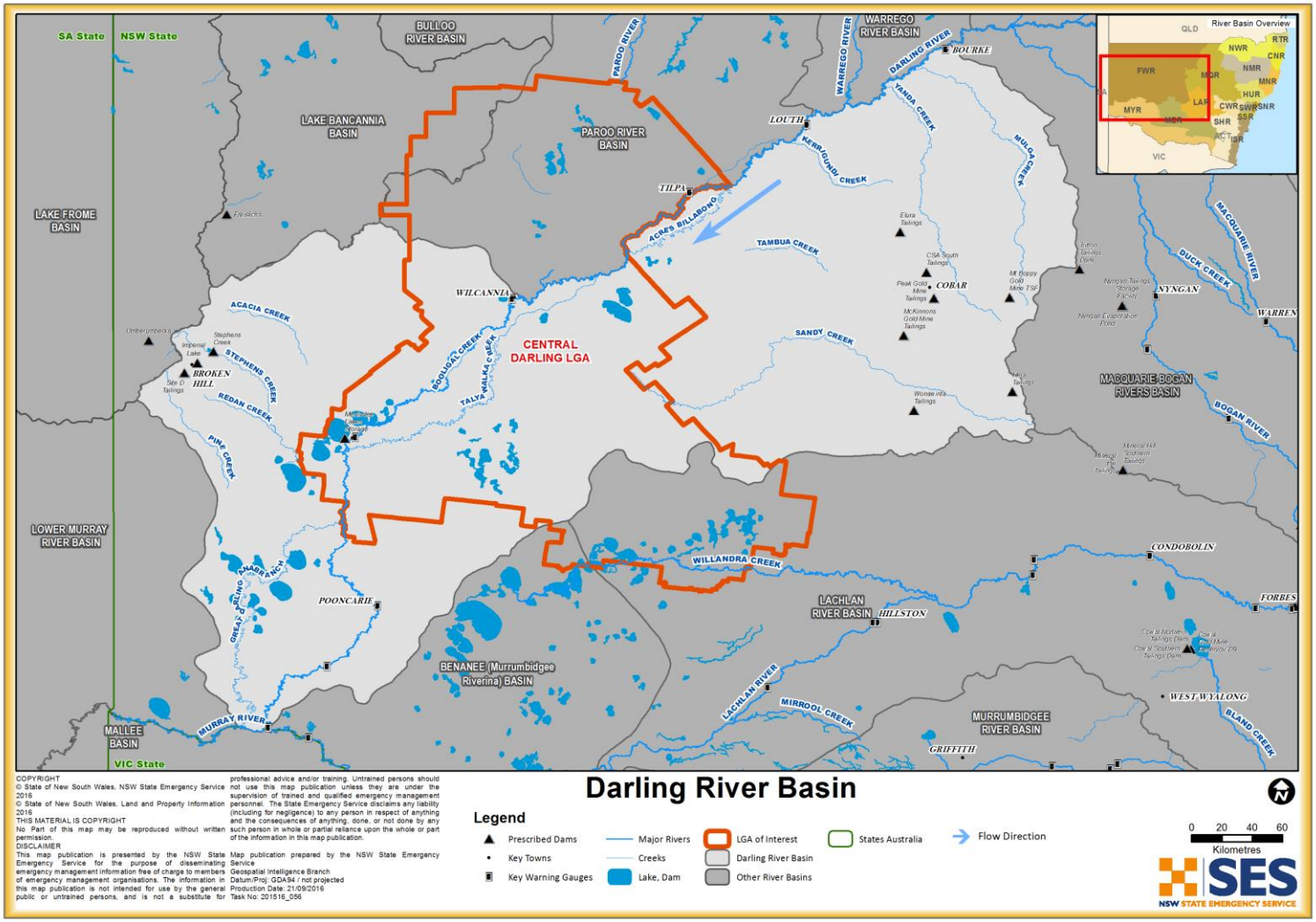
ANNEX 3C: ROAD CLOSURE SCHEMATIC FOR THE MENINDEE AREA RELATED TO THE MENINDEE TOWN GAUGE (425001)



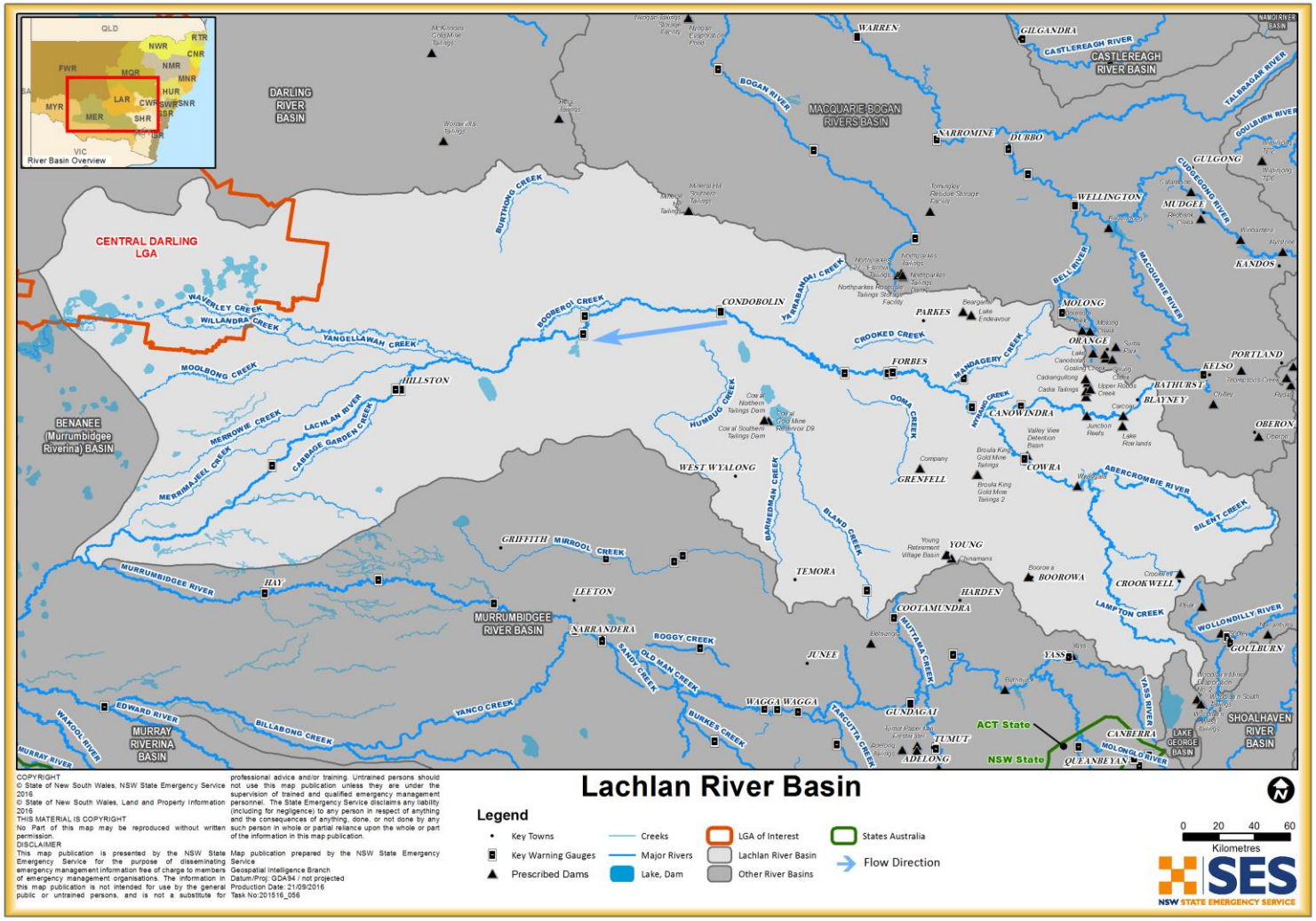
MAP 1: PAROO RIVER BASIN



MAP 2: DARLING RIVER BASIN



MAP 3: LACHLAN RIVER BASIN



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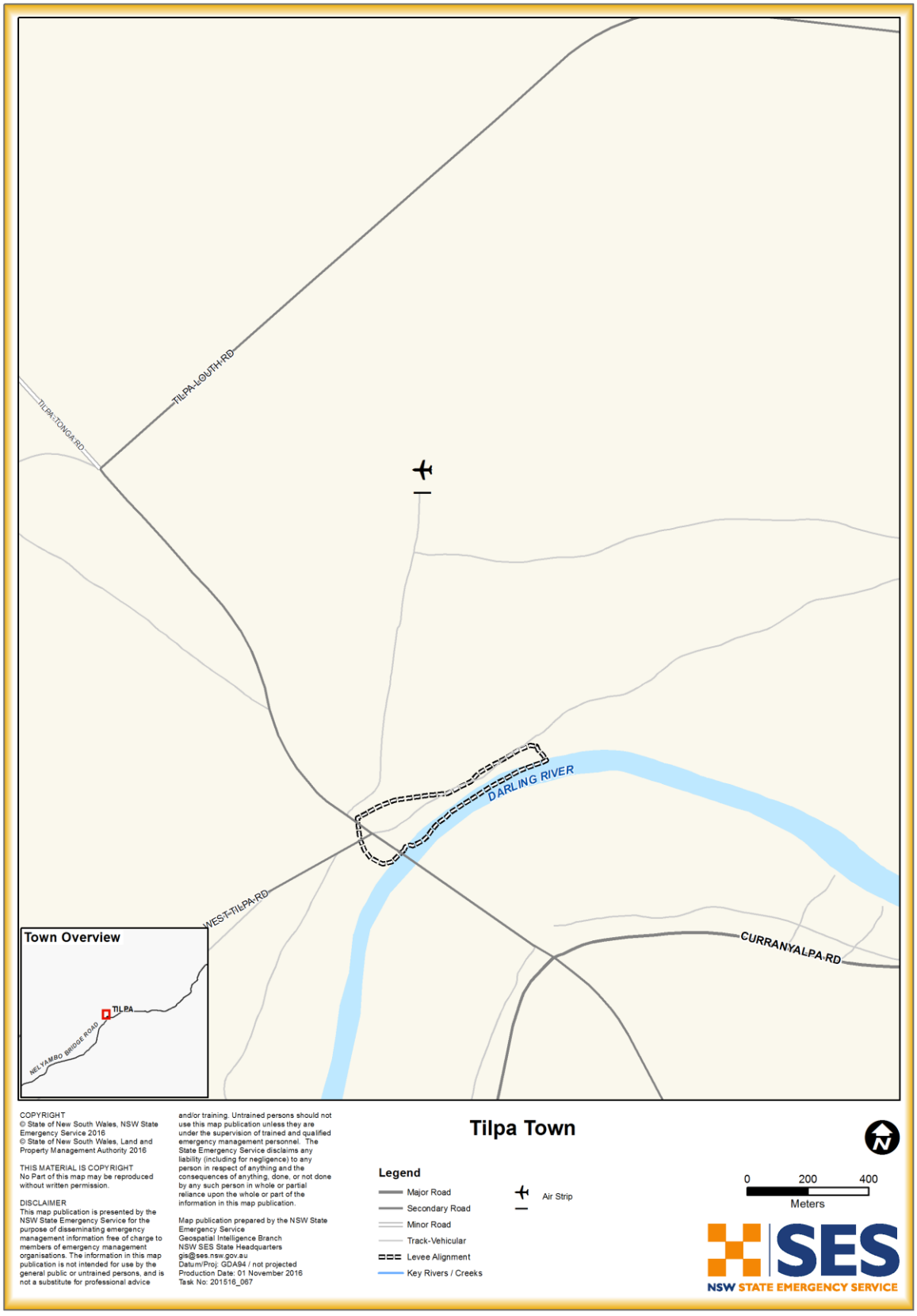
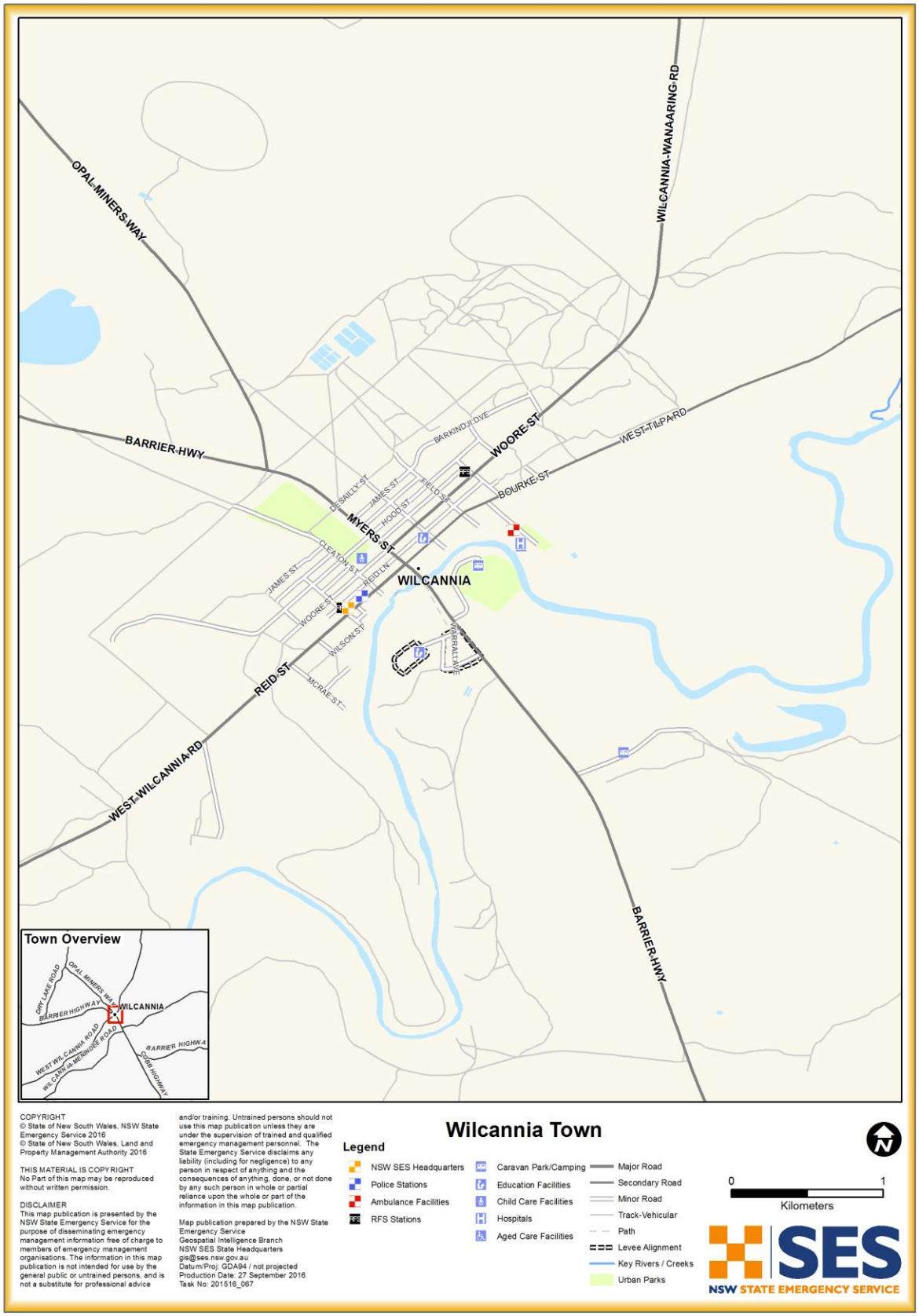
Geospatial Intelligence Branch
Datum/Proj: GDA94 / not projected
Production Date: 21/09/2016
Task No:201516_056

MAP 4: TILPA TOWN MAP



MAP 5: WILCANNIA TOWN MAP



Map publication prepared by the NSW State Emergency Service
Geospatial Intelligence Branch
NSW SES State Headquarters
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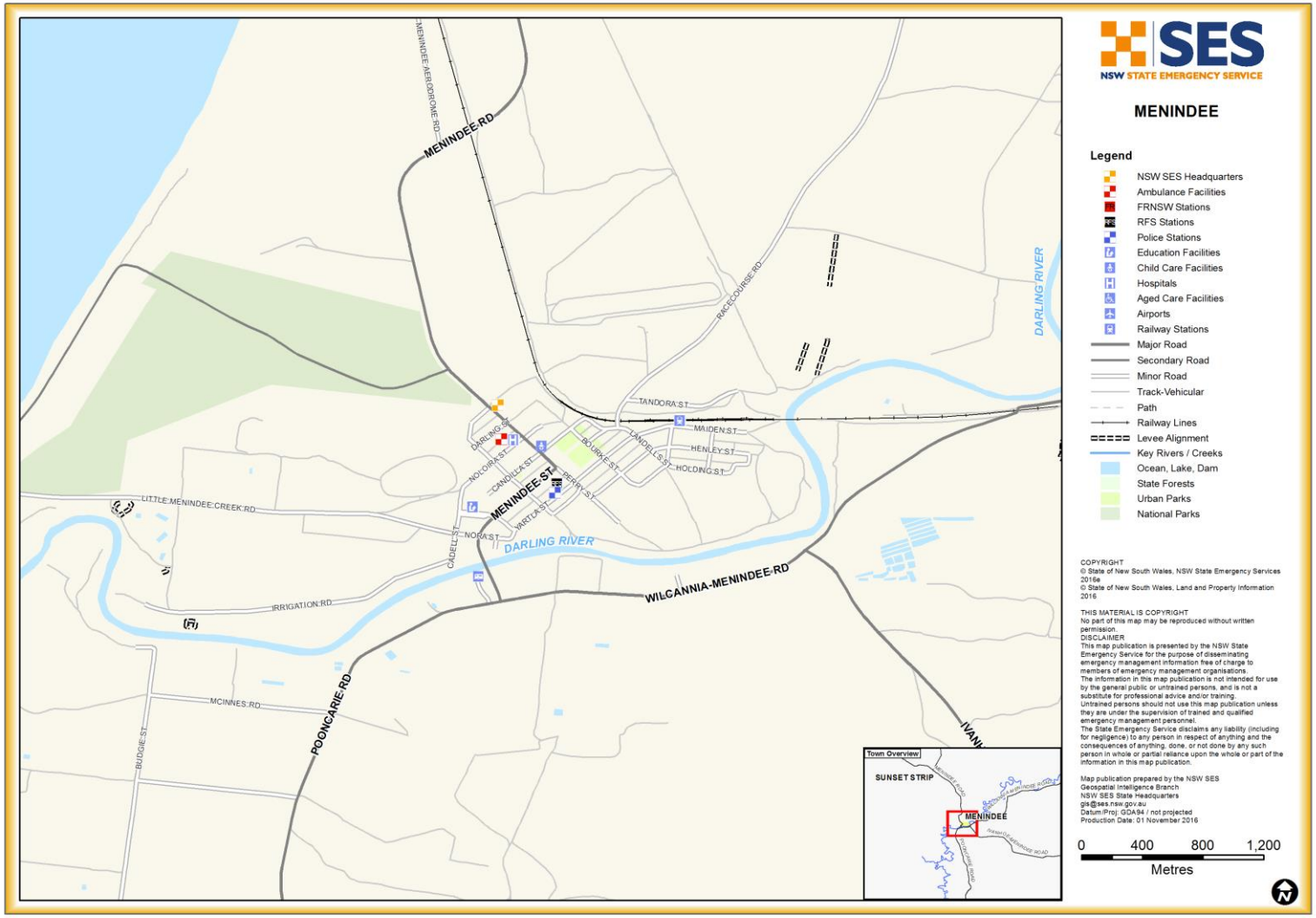
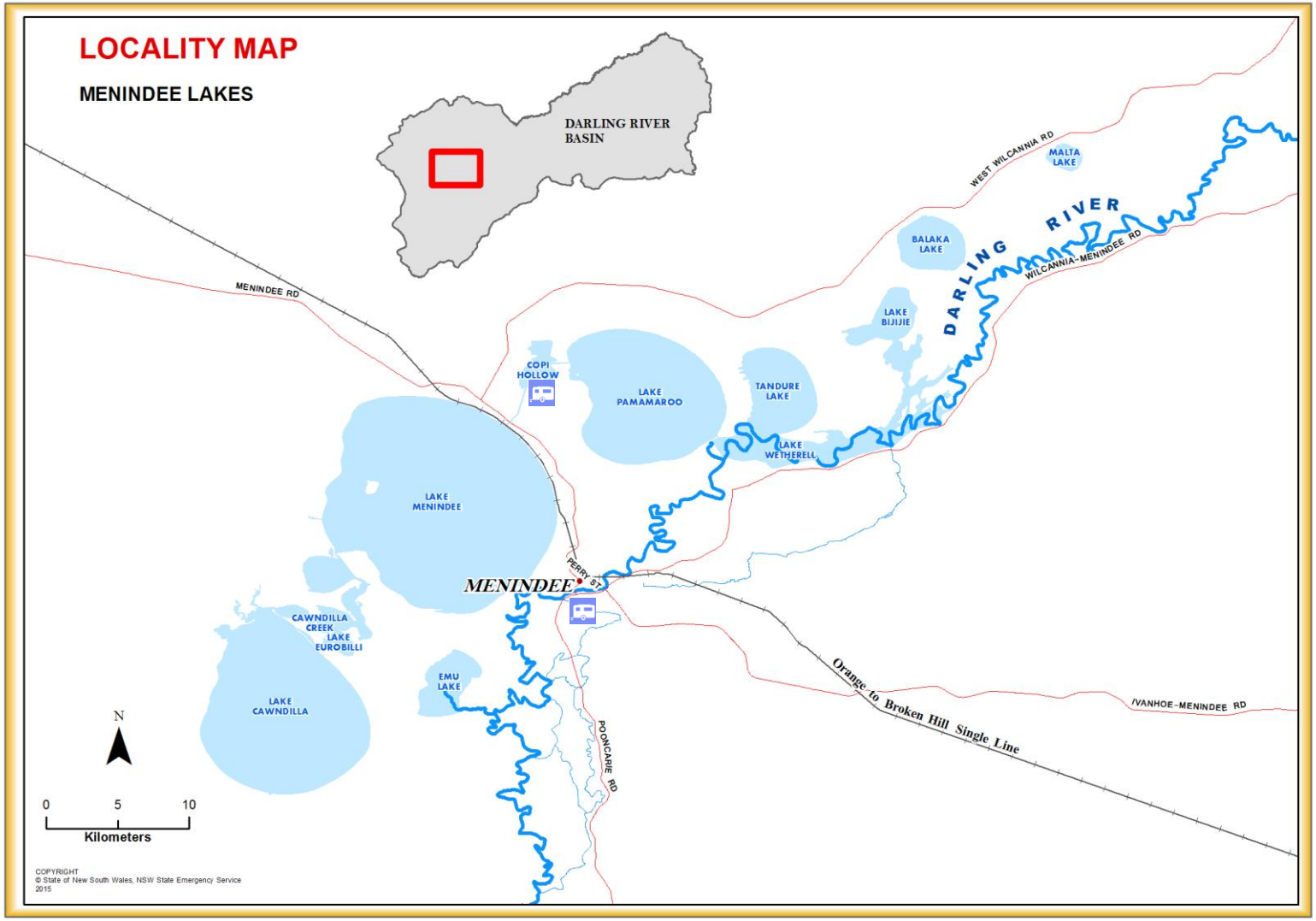
Datum/Proj: GDA94 / not projected
Production Date: 27 September 2016
Task No: 201516_067

MAP 6: MENINDEE TOWN MAP



MAP 7: MENINDEE LAKES STORAGE SYSTEM



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