INDEX OF REPORTS OF THE BLAYNEY SHIRE COUNCIL MEETING HELD ON MONDAY 19 DECEMBER 2016

INFRASTRUCTURE SERVICES REPORTS

PLANNING AND ENVIRONMENTAL SERVICES REPORTS

Floodplain Risk Management Study and Floodplain Risk Management Plan for Blayney

Blayney Shire Council

Final

December 2016

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Floodplain Risk Management Study and Floodplain Risk Management Plan for Blayney

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Cover photo: Henry Street during flood of 19 August 2010, photograph provided by Blayney Shire Council

Foreword

The primary objective of the New South Wales Government's Flood Prone Land Policy is to reduce the impact of flooding and flood liability on individual owners and occupiers of flood prone property, and to reduce private and public losses resulting from floods, utilising ecologically positive methods, wherever possible. Under the Policy, the management of flood prone land remains the responsibility of local government.

The policy provides for a floodplain management system comprising the following five sequential stages:

Data Collection	Involves compilation of existing data and collection of additional data
Flood Study	Determines the nature and extent of the flood problem
Floodplain Risk Management Study	Evaluates management options in consideration of social, ecological and economic factors relating to flood risk with respect to both existing and future development
Floodplain Risk Management Plan	Involves formal adoption by Council of a plan of management for the floodplain
Implementation of the Plan	Implementation of flood, response and property modification measures (including mitigation works, planning controls, flood warnings, flood preparedness, environmental rehabilitation, ongoing data collection and monitoring by Council)

Blayney Shire Council proposes to develop a floodplain risk management plan for Blayney to address the existing, future and continuing flood problems, in accordance with the NSW Floodplain Development Manual (2005).

A report entitled "Blayney Flood Study" was prepared by Jacobs Group Australia Pty Ltd (Sinclair Knight Merz merged with Jacobs in December 2013) in June 2015 for Blayney Shire Council to address outcomes from the first and second stages of the floodplain risk management process. This report represents the third stage of the management process and has been prepared for Council by Jacobs. The report identifies social and economic impacts of flooding in Blayney. The report identifies both structural and non-structural measures for floodplain risk management. A set of floodplain management measures is recommended for consideration by Council and other stakeholders.

Contents

Executive Summary

The Town of Blayney is located in the Central West region of New South Wales approximately 240km west of Sydney in the Blayney Shire Council area. Blayney Township (population 3,355 at the 2011 census) is the urban centre of Blayney Shire and provides the administrative, commercial, retail and industrial centre for the Shire. Blayney is strategically located on the junction of the Mid-Western Highway and the road between Orange and Goulburn. It is also located on the intersection of the Main Western Railway and the Blayney – Demondrille Railway, which provides a link between the Western and Southern lines, providing direct rail access into Melbourne.

The town of Blayney is located in the upper reaches of the Belubula River catchment, part of the larger Lachlan River basin, so flooding occurs with little or no warning, other than the contributory rain. Flooding from both mainstream and overland flooding is an issue for the town. Severe weather events in September and December 2010 and March 2012 resulted in the Belubula River and its tributaries all experiencing high flows which caused damage to the infrastructure including roads and bridges. Roads were closed in the town due to elevated water levels and SES attended houses in the area.

A Flood Study Report was prepared (Jacobs 2015) to define the flood behaviour for a range of flood events up to and including the probable maximum flood. Community consultations, review of the relevant planning and legislations, flood damage assessment and identification and assessment of flood mitigation measures have been undertaken as part of this study to formulate a Draft Floodplain Risk Management Plan (FRMP) for consideration by the Floodplain Management Committee and Blayney Shire Council.

Measures adopted in the Floodplain Risk Management Plan for Blayney are provided below.

Measures considered	Required Funding	Features of the Measure	Recommended Priority Rankings
1. Update the Local Flood Plan for Blayney.	SES costs	• SES to update the flood intelligence for the town of Blayney and monitor flood behaviour in Abattoir Creek and the Belubula River. • SES to update the Local Flood Plan for Blayney utilising information in this study and the Blayney Flood Study Report (Jacobs 2015).	**High Priority:** this measure has a high priority for inclusion in the FRMP. It does not require Local Government funding and it has a high priority in terms of managing flood risk to people.
2. Implement controls over future development/ re-development in flood prone areas in Blayney.	Council costs	• Floor levels of new developments1 are to be located at the adopted Flood Planning Level (1% AEP flood levels plus the adopted freeboard). • A detailed flood assessment should be undertaken prior to Council approval of any proposed works within the Floodways and Major Overland Flowpaths identified in the Blayney Floodplain Risk Management Study (Jacobs 2016). • All new development within the Flood Planning Area are to be constructed	**High Priority:** this measure has a high priority for inclusion in the FRMP. It does not require additional Local Government funding.

		using flood compatible materials to withstand hydrostatic pressures and debris load • Council to provide information on flooding in Section 149 certificate • A cumulative flood impact assessment is to be undertaken for all development applications involving significant earthworks within the Blayney Flood Planning Area. • Evaluation of development proposals to use data presented in the Blayney Flood Study Report (Jacobs 2015) and in this FRMS, 2016 • Council to develop a stormwater management strategy to implement principles of water sensitive urban design for the town of Blayney. 1 While it is recommended that this floor level requirement be applied to residential buildings, the DCP may detail alternative requirements or exceptions for commercial and industrial buildings as determined by Council.	
3. Provide flood signage and flood depth indicators at major road crossings to enhance flood education and preparedness.	$15,000	• Provide flood signage and flood depth indicators at major road crossings and public areas within the study area (approximately 30 signs)	**High Priority:** this measure would improve flood education and flood preparedness for residents and has a high priority in terms of managing flood risk to people.
4. Protect existing development from overland flooding.	$0.20 Million	• Initial investigations and assessments required in the preparation of concept design and cost estimates for the required works involving flood retarding basins.	**High Priority:** this measure would ensure that concept design and cost estimates are prepared to improve flood affection to existing developments from overland flooding.
5. Voluntary house purchase/ voluntary house raising	$0.65 Million	• Initial investigation to identify willingness of owners for voluntary house purchase/raising of two residential properties and voluntary house raising of one residential property impacted by mainstream flooding.	**Medium Priority:** this measure would ensure that no residential buildings are damaged in the 1% AEP event by mainstream flooding. A high priority is to be given to the initial investigation so that the preference of property owners are known and the cost of

		• Capital costs of voluntary purchase and demolition and landscaping of two properties and voluntary house raising of one residential property.	managing flood risk to properties can be finalised.

Important note about this report

The sole purpose of this report and the associated services performed by Jacobs is to prepare a Floodplain Risk Management Study report for the township of Blayney in accordance with the scope of services set out in the contract between Jacobs and Blayney Shire Council (hereafter Council). That scope of services, as described in this report, was developed with the Council.

In preparing this report, Jacobs has relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by the Council and/or from other sources. Except as otherwise stated in the report, Jacobs has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

Jacobs derived the data in this report from information sourced from the Council (if any) and/or available in the public domain at the time or times outlined in this report. The passage of time, manifestation of latent conditions or impacts of future events may require further examination of the project and subsequent data analysis, and re-evaluation of the data, findings, observations and conclusions expressed in this report. Jacobs has prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

This report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by Jacobs for use of any part of this report in any other context.

All topographic data used in this study were sourced from a LiDAR survey and a ground survey which were undertaken by third parties engaged by the Council. Undertaking independent checks on the accuracy of the topographic data was outside Jacobs' scope of work for this study.

This report has been prepared on behalf of, and for the exclusive use of, Jacobs's Client, and is subject to, and issued in accordance with, the provisions of the contract between Jacobs and the Client. Jacobs accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this report by any third party.

1. Introduction

1.1 Background

The Town of Blayney is located in the Central West region of New South Wales approximately 240km west of Sydney in the Blayney Shire Council area. Blayney Township (population 3,355 at the 2011 census) is the urban centre of Blayney Shire Council (hereafter Council) and provides the administrative, commercial, retail and industrial centre for the Shire. Blayney is strategically located on the junction of the Mid-Western Highway and the road between Orange and Goulburn. It is also located on the intersection of the Main Western Railway and the Blayney – Demondrille Railway, which provides a link between the Western and Southern lines and direct rail access to Melbourne.

The town is located in the upper reaches of the catchment, so flooding occurs with little or no warning, other than the contributory rain. Severe weather events in September and December 2010 and March 2012 resulted in the Belubula River and its tributaries all experiencing high flows which caused damage to infrastructure including roads and bridges. Roads were closed in the town due to elevated water levels and SES attended houses in the area.

Council proposes to develop a Floodplain Risk Management Plan for the Town of Blayney to address the existing, future and continuing flood risk. Council wishes to develop formal floodplain risk management strategies to provide an appropriate level of protection for the community. Further, Council wishes to develop formal emergency management strategies to effectively manage the continuing flood risk for Blayney. Hence, Council proposes to develop a Floodplain Risk Management Plan in phases, in accordance with the NSW Government's (2005) Floodplain Development Manual. Initial investigations (including data collection and review of all relevant data) and a Flood Study, are components of the first phase (Phase 1). A Floodplain Risk Management Study (the Study) and Plan (the Plan) will be developed in the second phase (Phase 2), with the Plan being implemented in the third phase (Phase 3).

Sinclair Knight Merz (operating as Jacobs since December 2013) was engaged by Council in May 2013 to develop a Floodplain Risk Management Plan for the Town of Blayney encompassing all activities in Phases 1 and 2. This report details outcomes from Phase 2 (Floodplain Risk Management Study and Draft Floodplain Risk Management Plan) of the project.

1.2 Study Area

The town of Blayney sits in the Belubula River valley, part of the larger Lachlan River basin, and is surrounded by rolling hills that range from 890m to 930m above sea level and falling to the river corridor at approximately 850m to 860m. The town generally drains from west to east, with the major watercourse being the Belubula River running north to south along the eastern edge of the urban area (catchment size approximately 120km^2 upstream of the town). Remaining watercourses are either drainage channels or intermittent watercourses that generally run from the higher elevations to the north and west towards the Belubula River in the east. The only other named watercourse is Abattoir Creek (sometimes referred to as Farm Creek and with an approximate catchment area of 20km^2), which rises in the rural lands and undulating hills to the north west and drains along the northern edge of town, north of the Main Western Railway, before joining the Belubula River. As a result of this pattern of watercourses and the catchment topography there are potential drainage/flooding issues present in Blayney.

The study area for Blayney is presented in **Figure 1-1** which shows that the urban area is generally a typical grid pattern running in a north-south and east-west direction. Blayney is the key centre in the Blayney Shire with a variety of land uses including business, industrial, community and residential land uses and open space and recreation.

Legend

Railway

Road

Study Area

SCALE	1:11,625 A3
SHEET	1 of 1
	GDA 1994 MGA Zone 55
TITLE	Study Area
PROJECT	Blayney FRMS
CLIENT	Blaney Shire Council
DRAWN MR	PROJECT # EN04201
MAP #	FIGURE 1-1
REV	1
VER	1
CHECK AH	DATE 22/09/2016

1.3 Overall Objectives

Council needs to develop a Floodplain Risk Management Plan (FRMP) for Blayney, to address the existing, future and continuing flood problems, in accordance with the NSW Floodplain Development Manual (2005). To meet the requirements of the Manual, Council needs a FRMP in order to:

- Reduce the flood hazard and risk to people and property in the existing community;
- Provide valuable flood intelligence to assist State Emergency Service (SES) in updating Local Flood Plans for the township;
- Protect, maintain and, where possible, enhance the river and floodplain environment, and
- Ensure flood management decisions integrate the social, economic and environmental considerations.

The study was undertaken in three phases. Major activities undertaken in each phase are provided in the following sections.

1.3.1 Phase 1

Initial Investigations (Stage 1)

- Undertake a comprehensive site inspection;
- Review of all relevant documents, data and reports;
- Undertake a comprehensive consultation with the local community, Council and relevant agencies;
- Collate and assess all data and information required to satisfy this brief including the current status of the material;
- Identify any "gaps" in the available data including surveys required to complete the study and update all information as required, with the approval of the Council.

Flood Study (Stage 2)

- Establish appropriate hydrologic model/s of both the Belubula River and the sub-catchments for overland flooding assessment to be used in the estimation of design floods for riverine and overland flooding and /or modelling of flood storages;
- Establish appropriate hydraulic model/s for the Belubula River, Abattoir Creek and overland flowpaths within the study area, to be used in the estimation of design flood levels and modelling of any preferred/ recommended flood mitigation measures;
- Identification of flood velocities and flood levels for 0.5%, 1%, 5% and 20% annual exceedance probability (AEP) events and the probable maximum flood (PMF);
- Mapping of flood extents and peak velocities for all investigated design events

1.3.2 Phase 2 Floodplain Risk Management Study and Plan (Stages 3 & 4)

- Flood mapping including preparing hydraulic and true hazard categorisation mapping for the 1% AEP event and preparing a provisional Flood Planning Area map (based on the 1% AEP flood levels with a freeboard).
- An assessment of potential flood management and mitigation measures in order to achieve improvements necessary to meet the required service levels. Such measures may include flood modification (eg. levees, bypass floodways, retarding basins, channel modifications etc.), property modifications (eg. development control, rezoning, voluntary purchase of high hazard properties, house floor raising, flood proofing etc) and response modification (eg. flood education, flood preparedness, flood warning, local flood plans etc.);
- Estimates of the flood damages in the design floods and annual average damages and their net present worth;

- An economic assessment of the floodplain management measures based on life cycle costs and benefits;
- Completed application for financial assistance for all recommended mitigation and/or management objectives.

1.3.3 Phase 3 Floodplain Risk Management Plan Implementation

Council is responsible for implementation of the Floodplain Risk Management Plan.

1.4 Report Structure

The outcome of the Floodplain Risk Management Study and draft Plan (Phase 2) as described in **Section1.3.2** of this report and the outcome from the Phase 1 was produced in the SKM 2013 report.

The report has been divided into the following sections:

- Executive Summary
- Section 1: introduces the study
- Section 2: provides background information on catchment characteristics and land use for the study area
- Section 3: details community consultation process and outcomes from the consultation
- Section 4: provides a review on the relevant legislation and planning
- Section 5: details flood behaviour
- Section 6: assesses flood damages
- Section 7: provides an overview on floodplain risk management measures
- Section 8: provides details on the identified floodplain risk management measures for Blayney
- Section 9: provide details on the Draft Floodplain Risk Management Plan for endorsement by Council
- Section 10: acknowledges input provided by others in completing the study
- Section 11: provides details on references citied in this report
- Section 12: provides the glossary of terms
- Appendix A: contains the Newsletter and Questionnaire sent to residents
- Appendix B: includes flood results including flood extents, velocity maps and flood profiles

2. Background

2.1 Catchment Characteristics

The major watercourse adjacent to the town of Blayney is the Belubula River which runs along the eastern edge of the urban area. The remainder of the watercourses are either drainage channels or intermittent watercourses that generally run from the higher elevations to the north and west towards the Belubula River in the east. The only other named watercourse is Abattoir Creek located north of the Main Western Railway. As a result of this pattern of watercourses and the catchment topography there are potential drainage/flooding issues present in Blayney.

Belubula River is a perennial river which is part of the Lachlan River catchment. Belubula River rises south of Vittoria, mid-way between Bathurst and Orange and generally flows south and west. It is joined by eight minor tributaries before flowing east of the township of Blayney and then through Lake Carcoar where its flow is regulated, before reaching its mouth at the Lachlan River east of Gooloogong. Carcoar Dam, constructed in 1970, is a 52m high concrete arch dam with a capacity of 35800 ML (www.statewater.com.au). Water stored in Carcoar Dam is used for irrigation, stock and domestic usage. The full supply level of the dam is at RL 847.2 mAHD which is located approximately 10m below the bed level of the Belubula River in Blayney. This means that the flood levels in Blayney are unlikely to be impacted by backwater flooding due to Carcoar Dam.

2.2 Land Use

The majority of the catchment area of the Belubula River upstream of Blayney was cleared for agriculture, primarily grazing. A part of Vittoria State Forest is located along the upper northern catchment of the river. Abattoir Creek is a major tributary which joins the river near Blayney. The bed level of the Belubula River drops approximately 670m over its 165km course (grade of approximately 0.4%).

2.3 Effects of Flooding on the Community

During the severe weather events of September and December 2010, and March 2012 the Belubula River and its tributaries all experienced high flows causing damage to infrastructure including roads and bridges. Roads closed in the Town of Blayney due to elevated water levels included Hobbys Yards Road (MR390), Farm Lane, Henry Street and Newbridge Road. State Emergency Services (SES) attended houses in the Farm Lane and Henry Street area.

The Abattoir Creek catchment rises to the north-west of Blayney, through the undulating hills of rural lands, before entering the more built up area alongside the Main Western Railway in the vicinity of the old abattoir located at the western end of Hills Street. At the western end of the Intermodal Terminal at Blayney Railway station it joins with an unnamed water course from the urban area to the south of the Newcrest dewatering facility, prior to travelling east toward St Joseph's Central School, located north of the railway line at the intersection of Adelaide and Hill Streets. The school has been affected by overland flows along Abattoir Creek, in recent years, and most notably on 1 June 1990.

An unnamed water course that meets Abattoir Creek rises to the west of the Blayney-Demondrille Railway through rural lands before entering the piped stormwater system, before day lighting at the intersection of Burton and Smith Streets and passing under the Main Western Railway at the western end of the Intermodal Terminal. Residents have previously complained about ongoing development in the catchment, generating larger overland flows between Burton and Doust Streets exceeding the capacity of the drainage path.

The area to the south-west of Blayney on the western side of the Blayney- Demondrille Railway is generally directed to a single culvert under the railway, despite three culverts existing, and toward the piped system in the vicinity of the intersection Plumb Street and Piggot Place. On 21 December 2007, residents were affected by overland flows causing over floor flooding to dwellings at the lower end of Piggott Place.

To the south of Blayney, there are two drainage paths that carry flows into the urbanised environment. A catchment drains alongside the Mid-Western Highway through open flow paths, before crossing the highway in the vicinity of the Blayney Ambulance Station and passing along a concrete lined open channel to Stillingfleet Street into the piped network. The recently developed Highlands Estate to the south of Polona Street delivers stormwater to a natural watercourse running behind properties to the west of Mount Errol Street before crossing

Hobbys Yards Road. Residents complained to Council about surcharging of the stormwater pit at Polona Street.

2.4 Availability of Data

Details on the availability of data for this study are described in the Blayney Flood Study Report (Jacobs 2015). A preliminary assessment was undertaken utilising the LiDAR data to identify properties which would be subject to above floor flooding in the 1% AEP event. As part of this study floor levels of 185 buildings were connected to AHD by Geolyse Pty Ltd in March 2016. The surveyed floor levels are more reliable than that estimated using the LiDAR data.

3. Community Consultation

The local community have a key role to play in the development and ongoing implementation of a Floodplain Risk Management Plan. Engaging the community early in the project provides people with the opportunity to actively contribute to the flood risk management process. This is important for Blayney as residents experienced severe flooding in 2007 and 2010, 2012 and have local knowledge of the area, which can be useful when understanding the flood behaviour.

3.1 Consultation Process

The Community consultation process involved the following steps:

- At the start of the study, an Inception Meeting was held with the floodplain risk management committee (FRMC), government agencies and Jacobs. This meeting was used to establish the project, agree to the study program and obtain relevant data for the project;
- Consultation letters were sent to key stakeholders;
- A community questionnaire was distributed to residents to gauge their experience of flooding and their opinions on flood-related issues. A copy of the questionnaire is included in **Appendix A**.
- A draft version of this report was placed on public exhibition for a period of 28 days. Two submissions were received from the public. A summary of each submission and responses to these submissions are provided in **Appendix C**.

3.2 Community Questionnaire

A community consultation process was initiated to obtain flood information for past events. This involved sending a newsletter and a questionnaire (included in **Appendix A**) to residents and landowners within the study area in Blayney. The newsletter introduced the floodplain management process to the residents of the area, described the purpose of the questionnaire and provided the residents with contacts for their responses. The questionnaire was prepared in consultation with Council to help identify flooding issues for the study area and to provide reliable flood information to assist in the validation of the hydrologic and hydraulic computer models.

The flood information that was requested included:

- General information, such as:
  - Residents from the Study Area
  - Ownership of the residence
  - How long residents lived at the property
- Specific flood information, such as:
  - Experience on flooding in residence and/or at work
  - Location and depth of flood water in the worst flood experienced
  - Duration of flooding
  - Flood damages to residence and business
  - Disruption to vehicular access to residence during flooding
  - Assistance required by residents from SES during flooding
  - Flooding to residence made worse by works on other properties or by construction of roads or other structures

- Identify information (eg. flood photographs, newspaper clippings, flood marks etc) that can be provided to the Consultant
- Residents intention for further development on their lands
- Ranking of development types for protection against flooding
- Ranking of potential flood mitigation measures

Any comments on any other issues associated with this study

3.2.1 Summary of Responses to Flood Questionnaire

In total 220 questionnaires were sent to residents of Blayney with reply paid envelopes and sixteen (16) responses were received from the community to the questionnaire and all respondents were residents of the study area. One response was received from Blayney Hospital. A summary of responses is provided in the following paragraphs.

Residency status (Question 1)

All respondents were residents of Blayney.

Length of Residency in Blayney and Business Activity (Questions 2-4)

Respondents lived in Blayney between 3 months to 45 years with an average residency of 17 years. Two (2) respondents managed a business located within the study area.

Experiences of Flooding (Questions 5-12)

Five (5) respondents experienced flooding during the flood events of 1973, 2007, 2011, 2012 and 2013. Three (3) respondents experienced flooding in their houses, two (2) respondents experienced flooding at their workplace and one (1) respondent experienced flooding elsewhere and the depth of flooding varied between 0.3m to 1.2m. Two respondents reported that the duration of flooding was less than 2 hours and one respondent identified the duration of flooding being less than six hours and another respondent identified the duration of flooding more than one day.

Three respondents identified minor flood damage to garden, lawn and backyard whilst one respondent identified minor damage to external wall of the house. One respondent identified minor damage to property fence.

Two (2) respondents identified that vehicular access to their properties were cut off and one business identified loss of income due to road closure by flood waters.

Flood Affection to properties due to works (Questions 13 - 14)

Three (3) respondents identified that flood impact on their properties was aggravated due road works and new developments along Newbridge Road, south of Polona Street and Smith Street.

Intention of Respondents for further development (Question 15)

Nine (9) respondents were not expecting to undertake any further developments on their lands and three (3) respondents were expecting to undertake minor extensions to their properties.

Priority for protecting different types of developments from flooding (Question 16)

Respondents were asked to rank different types of development for protection against flooding. Nine (9) respondents gave the emergency facilities (Hospital, Police Station, etc.) the greatest priority for protection against flooding, whilst five (5) respondents assigned the highest priority for protection of residential properties against flooding.

Priority for flood mitigation measures (Question 17)

Eight (8) respondents identified flood protection of house/business as the greatest priority. Three (3) respondents identified flood warning as their greatest priority and three (3) respondents assigned their highest priorities to providing an emergency flood free access to properties.

Willingness to provide additional information (Question 18)

Willows in the Belubula River were a major concern to a respondent.

Contact details for respondents (Question 19)

Fourteen (14) respondents provided their contact details.

4. Legislation and Planning

4.1 Background

This section provides an overview on the NSW flood risk management framework and existing policies and planning controls applicable to Blayney and recommends the way forward to develop a Floodplain Risk Management Plan.

4.2 NSW Flood Risk Management Framework

4.2.1 Objectives and Approach

The primary objective of NSW Flood Risk Management (FRM), as expressed within the NSW Flood Prone Lands Policy (Floodplain Development Manual 2005, page 1) is as follows:

"*To reduce the impact of flooding and flood liability on individual owners and occupiers of flood prone property, and to reduce private and public losses resulting from floods, utilising ecologically positive methods wherever possible*."

Within the scope of this report, the relevance of the above objective is primarily to ensure that the Floodplain Risk Management Plan (FRMP) for Blayney does not lead to increased flood risk to property and persons and that the planning controls and emergency management planning provisions proposed to achieve this outcome form part of a consistent and coordinated strategy to reduce flood risks.

4.2.2 NSW FRM Policy and Guidelines

The NSW Flood Prone Land Policy is produced within Section 1.1 of the Floodplain Development Manual (FDM 2005). This policy is consistent with that first introduced in 1984, which places the primary responsibility for implementation on local councils. This provides the opportunity for FRM to be integrated within council's normal planning processes. The NSW Government provides financial and technical assistance, and indemnity is provided in Section 733 of the Local Government Act 1993, subject to acting in "good faith" - being performance in accordance with the principles and guidelines of the FDM unless proven otherwise.

The FDM requires a merit approach to be adopted for the purposes of formulating a FRMP that provides a basis for decision making in the floodplain. This is in recognition that flood prone land is a valuable resource which should not be unnecessarily sterilised by the rigid application of prescriptive criteria, and to equally avoid the approval of inappropriate proposals. The merit approach is defined as follows:

"The merit approach weighs socio-economic, ecological and cultural impacts of land use options for different flood prone land areas together with flood damage, hazard and behaviour implications, and environmental protection and wellbeing of the State's rivers and floodplains."

The NSW Flood Prone Land Policy and the FDM provide a platform for the management of floodplains in a manner that follows a risk management approach. Consistent with this approach the FDM defines the floodplain for the purposes of establishing the broadest area potentially at risk from flooding for the preparation of studies and ultimately the FRMP, as follows:

"Floodplain means: Area of land which is subject to inundation by floods up to and including the probable maximum flood event, that is, flood prone land."

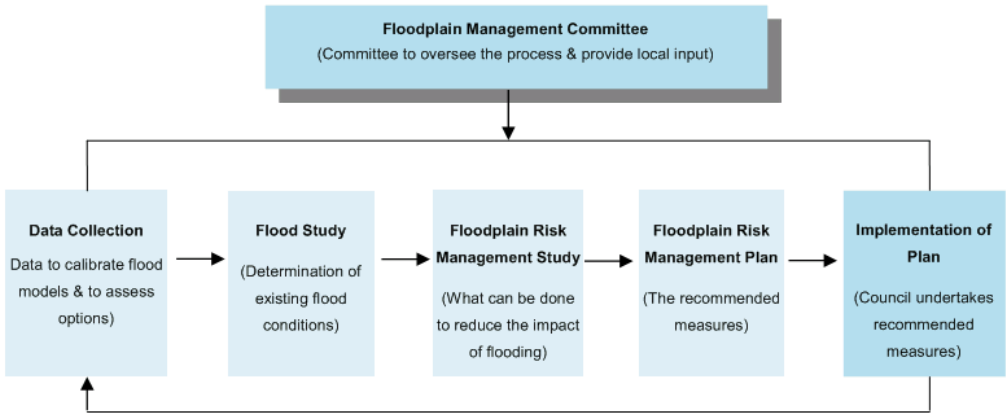
"Flood prone land means: Land susceptible to flooding by the PMF event. Flood prone land is synonymous with flood liable land."

"Probable maximum flood means: The PMF is the largest flood that could conceivably occur at a particular location; usually estimated from probable maximum precipitation, where applicable, snow melt, coupled with the worst flood producing catchment conditions. Generally, it is not physically or economically possible to provide

complete protection against this event. The PMF defines the extent of flood prone land that is the floodplain. The extent, nature and potential consequences of flooding associated with a range of events rarer than the flood used for designing mitigation works and controlling development, up to and including the PMF event should be addressed in a floodplain risk management study."

The FDM is a manual which provides guidance with regard to how to implement the NSW Flood Prone Land Policy. The FDM requires the level of flood risk acceptable to the community is to be determined through a process overseen by a committee comprised of local elected representatives, community members and state and local Government officials (including the SES). This process is shown in **Figure 4-1**.

The ultimate outcome is the preparation of a Floodplain Risk Management Plan (FRMP), which is a plan formally adopted by a local council in accordance with the NSW Flood Prone Land Policy. FRMPs should have an integrated mix of management measures that address existing, future and continuing risk.



- **Figure 4-1 NSW FRM Process (Adapted from FDM 2005)**

4.2.3 2007 Flood Planning Guideline

On January 31, 2007 the NSW Planning Minister announced a new guideline for development control on floodplains (the "Flood Planning Guideline"). An overview of the new Guideline and associated changes to the Environmental Planning and Assessment Act, 1979 (EPA Act) and Environmental Planning and Assessment Regulation 2000 (Regulation) was issued by the Department of Planning in a Circular dated January 31, 2007 (Reference PS 07-003). The Flood Planning Guideline issued by the Minister in effect relates to a package of directions and changes to the EPA Act, Regulation and FDM.

This Flood Planning Guideline provides an amendment to the Manual. The Guideline confirms that unless there are "exceptional circumstances", Councils are to adopt the 100 year flood (i.e. 1% AEP flood) as the flood planning level (FPL) for residential development, with the exception of some sensitive forms of residential development such as seniors living housing. The Guideline does provide that controls on residential development above the 100 year flood may be imposed subject to an "exceptional circumstance" justification being agreed to by the Department of Natural Resources (now the Office of Environment and Heritage -OEH) and the Department of Planning (now the Department of Planning and Environment - DPE) prior to the exhibition of a Draft LEP or Draft DCP.

The Flood Planning Guideline provides various potentially ambiguous statements in regard to what is the Residential FPL for the purposes of applying the directions in the Guideline. The DPE has advised that the reference to the FPL is a reference to both the 100 year flood plus freeboard (typically 0.5 metres). The Guideline only applies to the introduction of "new" controls and does not rescind pre-existing controls.

4.2.4 Relationship with EPA Legislation

The plan-making processes under the EPA Act, such as for a Local Environmental Plan (LEP) and a Development Control Plan (DCP) operate independently of the preparation of FRMPs under the FDM. While these two processes could be overlapped, it has been the usual practice to undertake the processes separately. Ultimately the planning recommendations of the FRMP will need to be reflected in planning instruments and policies brought into force in accordance with the EPA Act.

Ultimately the planning recommendations of the FRMP will need to be reflected in planning instruments and policies brought into force in accordance with the EPA Act. Accordingly the FRMP can provide appropriate input to the EPA Act planning processes in three ways:

- Providing direction at a local (and state) strategic planning level in addressing FRM (e.g. where urban growth should occur and the distribution of land uses therein);
- Recommending development controls to be incorporated in appropriate planning instruments (e.g. LEPs and DCPs) to mitigate the risk to development where permitted in the floodplain; and
- Ensuring that the planning controls and associated documents (e.g. S149 Planning Certificates) contribute to ensuring the community is appropriately informed about the flood risk.

To understand how these FRMP outcomes may be best achieved, the existing EPA Act framework and guidelines that relate to FRM are discussed later in this section.

4.3 Existing Policies & Planning Controls

The imposition of planning controls can be an effective means of managing flood risks associated with future development (including redevelopment). Such controls might vary from prohibiting certain land uses to specifying development controls such as minimum floor levels and building materials.

In principle, the degree of restriction that is imposed on development due to flooding relates to the level of risk that the community is prepared to accept after balancing economic, environmental and social considerations. In practice, the planning controls that may ultimately be imposed are influenced by a complex array of considerations including state imposed planning policy and directions, existing local planning strategies and policies and ultimately the acceptability of conditions that could be imposed through the development application process.

The following provides an outline of policy that is potentially relevant because it either directs the FRM planning controls that could be adopted or affects the way flood risk is identified in the planning controls.

4.3.1 State Environmental Planning Policies

A State Environmental Planning Policy (SEPP) is a planning document prepared in accordance with the EPA Act and eventually approved by the Minister, which deals with matters of significance for environmental planning for the State. Clause 1.19 of the Codes SEPP has been amended so that land identified as 'flood control lot' is no longer excluded from the application of the General Housing Code. Instead, specified development and development standards have been added to the General Housing Code for development on low hazard flood control lots. The development standards have been designed to ensure that complying development is not allowed on high hazard or high risk flood control lots including floodways, flood storage areas, a flowpath or areas identified in local flood plans as high hazard or high risk.

4.3.2 Climate Change Policies

Climate change is expected to have adverse impacts upon rainfall intensities which may have a significant influence on flood behaviour in Blayney. Blayney is located inland and hence sea level rise would have no impact on flood behaviour.

Scientific data regarding the effect of climate change on rainfall intensities is not sufficiently advanced to provide specific guidance for the assessment of flood risk. No relevant planning benchmarks have been adopted by Government related to rainfall intensity changes. However, NSW Government guidelines recommend the undertaking of a sensitivity analysis, which assumes nominal increases in rainfall intensities of 10%, 20% and 30%.

A preliminary assessment indicates that a 10% increase in rainfall intensity for the 2% AEP event would be similar to the 1% AEP intensity and a 30% increase in rainfall intensity for the 5% AEP event would be similar to the 1% AEP intensity. A detailed assessment of the impact of climate change was outside the scope of this study.

4.3.3 Section 117 Directions

Ministerial directions pursuant to Section 117(2) of the EPA Act specify matters which local councils must take into consideration in the preparation of LEPs. Direction 4.3, as currently applies, deals specifically with flood [liable] prone land and has the following two objectives:

"(a) To ensure that the development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the Floodplain Development Manual, 2005.

(b) To ensure that the provisions of an LEP on flood prone land is commensurate with flood hazard and includes consideration of the potential flood impacts both on and off the subject land".

The Direction applies to all councils that contain flood prone land when an LEP proposes to "*create, remove or alter a zone or provision that affects flood prone land*." In such cases, the Direction requires draft LEPs to ensure the following:

(4) A planning proposal must include provisions that give effect to and are consistent with the NSW Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005 (including the Guideline on Development Controls on Low Flood Risk Areas).

(5) A planning proposal must not rezone land within the flood planning areas from Special Use, Special Purpose, Recreation, Rural or Environmental Protection Zones to a Residential, Business, Industrial, Special Use or Special Purpose Zone.

(6) A planning proposal must not contain provisions that apply to the flood planning areas which:

a. permit development in floodway areas,

b. permit development that will result in significant flood impacts to other properties,

c. permit a significant increase in the development of that land,

d. are likely to result in a substantially increased requirement for government spending on flood mitigation measures, infrastructure or services, or

e. permit development to be carried out without development consent except for the purposes of agriculture (not including dams, drainage canals, levees, buildings or structures in floodways or high hazard areas), roads or exempt development.

(7) A planning proposal must not impose flood related development controls above the residential flood planning level for residential development on land, unless a relevant planning authority provides adequate justification for those controls to the satisfaction of the Director-General (or an officer of the Department nominated by the Director-General).

(8) For the purposes of a planning proposal, a relevant planning authority must not determine a flood planning level that is inconsistent with the Floodplain Development Manual 2005 (including the

Guideline on Development Controls on Low Flood Risk Areas) unless a relevant planning authority provides adequate justification for the proposed departure from that Manual to the satisfaction of the Director-General (or an officer of the Department nominated by the Director-General).

4.3.4 Local Environmental Plan (LEP)

Blayney Local Environmental Plan 2012 applies to the township of Blayney. The township of Blayney contains land within a number of standard zones such as B2 Local Centre, B5 Business Development, R1 General Residential, R5 Large Lot Residential, IN1 General Industrial, IN2 Light Industrial, RE1 Public Recreation, RU2 Rural Landscape, and SP2 Infrastructure Facilities. These zones are shown in **Figure 4-2**.

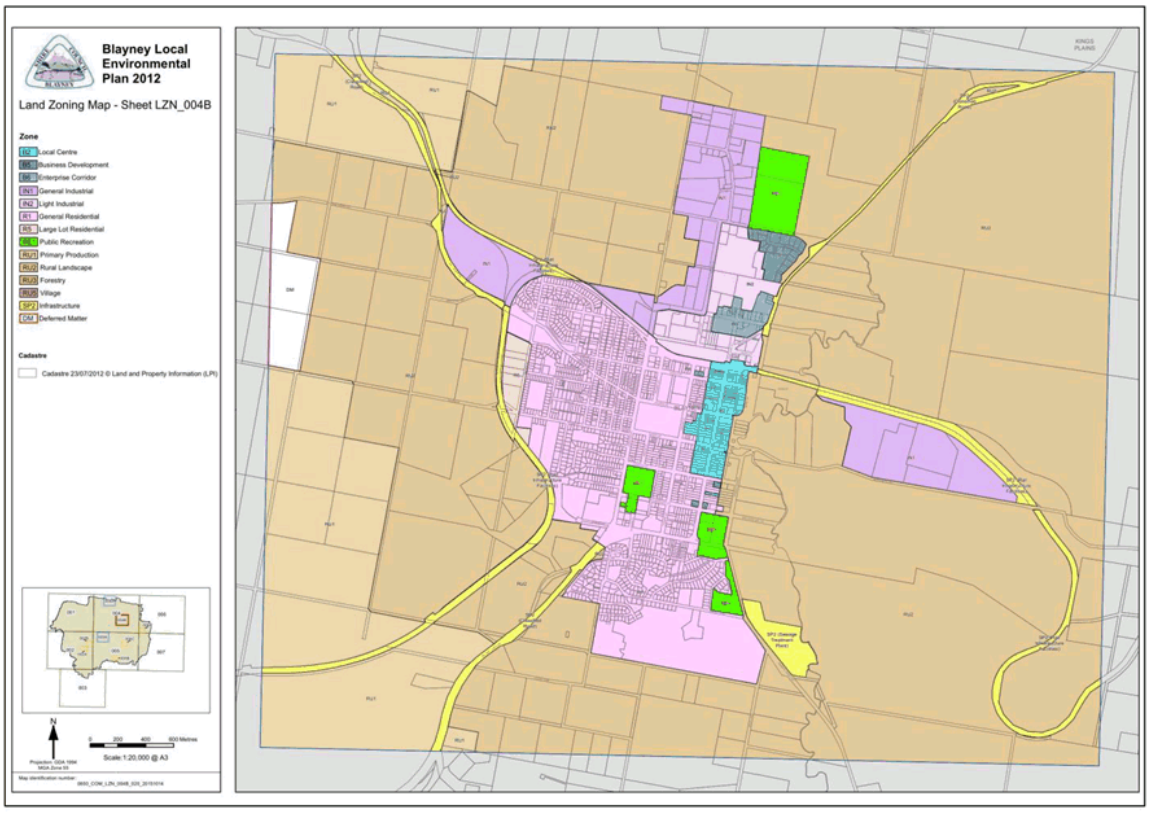


Figure 4-2 Blayney LEP 2012 Zoning Map

Additional local provisions identified in the LEP include clauses on flood planning and stormwater:

Flood planning:

(1) The objectives of this clause are as follows:

(a) to minimise the flood risk to life and property associated with the use of land,

(b) to allow development on land that is compatible with the land's flood hazard, taking into account projected changes as a result of climate change,

(c) to avoid significant adverse impacts on flood behaviour and the environment.

(2) This clause applies to:

(a) land identified as "Flood planning area" on the Flood Planning Map (refer **Figure 4-3**) *and*

(b) other land that is flood liable land.

(3) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development:

(a) is compatible with the flood hazard of the land, and

(b) will not significantly adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties, and

(c) incorporates appropriate measures to manage risk to life from flood, and

(d) will not significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses, and

(e) is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding.

(4) A word or expression used in this clause has the same meaning as it has in the Floodplain Development Manual (ISBN 0 7347 5476 0) published by the NSW Government in April 2005, unless it is otherwise defined in this clause.

Recommendation

Council needs to amend its LEP to apply the model local provisions clause 6.1 (flood planning) based on the flood planning area map. Part of this model local provision requires the identification of a freeboard area for the definition of "flood planning level". Council should amend its LEP to apply the model local provisions clause 6.1 (flood planning) to all lands located within the flood planning area defined in this study. Council should adopt the flood planning levels defined in this study based on the following freeboards above the 1% AEP flood levels:

- 0.5m for areas impacted by mainstream flooding; and
- 0.3m for areas impacted by overland flooding.

Stormwater:

(1) The objective of this clause is to minimise the impacts of urban stormwater on land to which this clause applies and on adjoining properties, native bushland and receiving waters.

(2) This clause applies to all land in residential, business and industrial zones.

(3) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development:

(a) is designed to maximise the use of water permeable surfaces on the land having regard to the soil characteristics affecting on-site infiltration of water, and

(b) includes, if practicable, on-site stormwater retention for use as an alternative supply to mains water, groundwater or river water, and

(c) avoids any significant adverse impacts of stormwater runoff on adjoining properties, native bushland and receiving waters, or if that impact cannot be reasonably avoided, minimises and mitigates the impact.

Figure 4-3 Flood Planning Map defined in Blayney LEP 2012

4.3.5 Development Control Plan (DCP)

Currently there are 6 DCPs for Blayney Shire covering certain land uses (e.g. medium density housing and rural residential development) and specific places (e.g. North Blayney industrial area; Millthorpe, Carcoar and North Millthorpe residential areas). Council is in the process of preparing a comprehensive DCP and a Draft DCP will be available for public exhibition and comment during 2016. Once adopted by Council the new DCP will work alongside the Blayney LEP 2012 to create a comprehensive set of controls for development in the Blayney Shire, which would replace the earlier documents.

4.3.6 Section 149 Certificates

Council under the provisions of Section 149 of the Environmental Planning and Assessment Act 1979 issues Certificates which are also known as zoning certificates. The certificate provides information on planning controls and any development restrictions which may apply to a particular parcel of land within the Council area. They are usually required upon the sale or purchase of a property.

There are two types of certificates:

- 149 (2) Certificate - Provides information about the zoning of the property, the relevant state, regional and local planning controls, other planning affectations such as heritage, land contamination and road widening and whether or not complying development can be carried out on the land.

- 149 (2) & (5) Certificate - Provides additional advice regarding demolition, foreshore building lines, other heritage considerations and general advice.

Recommendation

Given that information on flooding for the study area is available to Council from this study, Council should include information on flooding in Section 149 Certificates. In particular, information on flood levels, flood hazards and FPL is to be included in Section 149 Certificates.

4.4 Other Environmental Legislation

4.4.1 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is administered by the Commonwealth Department of the Environment, Water, Heritage and the Arts and aims to ensure that actions likely to have a significant impact on matters of national environmental significance are subject to a rigorous assessment and approval process. Matters of national significance that may be impacted by flood control works include Ramsar wetlands, nationally threatened species and ecological communities, and migratory species. An assessment of the potential impacts on matters of national environmental significance, as defined and listed under the EPBC Act, would need to be undertaken before any flood control works are implemented.

4.4.2 Fisheries Management Act 1994 (NSW)

The *Fisheries Management Act 1994* (FM Act) is administered by the Fisheries division of the NSW Department of Primary Industries. The broad objectives of the FM Act are to conserve, develop and share the fishery resources of NSW for the benefit of present and future generations. Floodplains provide important spawning, nursery and feeding habitat for a number of native freshwater fish species. The Act makes provision for the conservation of key fish habitats (including floodplains) through habitat protection plans, and for the conservation of threatened species, populations and ecological communities of fish.

Most fish species undertake local or large-scale migration, with some species such as golden perch and silver perch migrating onto the floodplain to spawn. The Act requires that NSW Fisheries be notified whenever any barrier to fish passage is constructed, altered or modified. The Act also requires a permit from NSW Fisheries for dredging and reclamation works on wetlands and floodplains. These works may include the construction of levees, drains, storages and other works.

4.4.3 National Parks and Wildlife Act 1974 (NSW)

The NSW National Parks and Wildlife Service (NPWS), a division of the OEH, is responsible for the protection and care of Aboriginal relics, the protection and care of native fauna, and the protection of native plants under the *National Parks and Wildlife Act 1974* (NPW Act). The NPW Act also allows for the establishment, preservation and management of areas of cultural, environmental and archaeological significance.

Of particular relevance to flood control works, it is an offence to knowingly destroy or disturb any Aboriginal site or relic in NSW. Aboriginal sites that may be relevant to the outcomes of the Floodplain Risk Management Plan would include any carved or scarred trees that may rely on flooding for their longevity and any sites of spiritual significance that are sustained by periodic flooding. An Aboriginal archaeological and cultural heritage assessment, to identify the presence of and potential impacts on Aboriginal objects and sites of Aboriginal cultural significance within the floodplain, would need to be undertaken before any flood control works are implemented.

4.4.4 Threatened Species Conservation Act 1995 (NSW)

The *Threatened Species Conservation Act 1995* (TSC Act) is administered by the OEH and provides for the protection of threatened species, populations, ecological communities, and their habitats (with the exception of fish and marine plants). The Act ensures that threatened species are taken into consideration during the

development planning process and in decision making by authorities. Threatened species whose ecology may depend on flood inundation will be an important consideration when identifying environmentally important areas and determining outcomes in the FRMP.

In relation to development assessment, the provisions of the TSC Act are linked to the EP&A Act. Specifically, Section 5A of the EP&A Act identifies the factors that must be taken into account in determining whether there is likely to be a significant impact on threatened species, populations or ecological communities, or their habitats (the 'Seven Part Test'). An assessment of the potential impacts on threatened species, populations and ecological communities would need to be undertaken before any flood control works are implemented.

4.4.5 Dams Safety Act 1978 (NSW)

The Dams Safety Act 1978 is administered by the NSW Dams Safety Committee (DSC). The DSC interprets its statutory role as being to ensure the safety of dams and their storage reservoirs in order to adequately protect the interests of the community. It is the responsibility of the DSC to define its requirements for the safety of dams and their storages and to ensure compliance by owners with those requirements. The DSC will prescribe those dams with the potential for a failure which could have a significant adverse effect on community interests.

4.5 Current Gaps or Limitations of Planning Instruments

Neither Blayney Shire LEP 2012 nor DCPs refer to planning controls for floodplain risk management. Council needs to adopt a flood policy to control development/re-development in the town of Blayney.

Recommendation

As a minimum, Council needs to adopt the planning controls for all lands located within the Flood Planning Area. Some examples include:

- Floor levels of all new residential buildings or buildings proposed for development/ redevelopment are to be located above the 1% AEP flood levels with an appropriate freeboard. A 0.5m freeboard is to be adopted for areas impacted by mainstream flooding and a 0.3m freeboard is to be adopted for areas impacted by major overland flooding;
- All new/redeveloped buildings are to constructed with flood compatible materials to withstand the hydrostatic force and flow velocity;
- New developments or redevelopments should not impact on flooding of neighbouring properties;
- Council to issue Section 149 certificates to property owners containing information on flooding; and
- A detailed flood assessment should be undertaken for new developments or redevelopments which have the potential to impact on flooding.

Council's DCP should be updated with planning controls such as these. Specific details about each control can be determined when Council is updating the DCP.

5. Flood Behaviour

5.1 Existing Condition

The existing flooding conditions were investigated and reported in the "Blayney Flood Study" report (Jacobs 2015). Available LiDAR data and a ground survey were the main source of topographic data utilised in the flood study. The topographic data was used in the development of a hydrologic model using XP-RAFTS program and a hydraulic computer model using TUFLOW. An available RORB hydrologic model for the catchment area of Carcoar Dam and the XP-RAFTS hydrologic model for the urban areas of the township of Blayney were utilised in the estimation of rainfall runoff from the catchment area of the Belubula River. Rainfall runoff simulated by the hydrology models were utilised in the TUFLOW model to define peak water levels, flood depths and velocities with the study area for the 20%, 5%,1%, 0.5% annual exceedance probability (AEP) events and the probable maximum flood (PMF). Flood depths and flood level contours are included in the Blayney Flood Study" report (Jacobs 2015).

A review of the map indicates widespread shallow flooding in the central area of Blayney bounded by Adelaide Street, Water Street, Carcoar Street and Mid Western Highway in the 20% AEP event. Shallow flooding occurs in the 20% AEP event along Henry Street, Martin Street, Mitchell Street, Mount Errol Street, Hobbys Yards Road, Polona Street, Napier Street, Plumb Street, Orange Road, Ogilvy Street and a number of other streets within the township of Blayney implying that the township can be inaccessible by car from Orange, Bathurst and Carcoar in a 20% AEP flood event

In the case of the 5% AEP event, more extensive flooding occurs along the Belubula River than the 20% AEP event. Extents of flooding along Abattoir Creek and unnamed water courses running through the township are generally similar to the 20% AEP event.

The flood extent for the 1% AEP event is similar to that for the 5% AEP event with increased depth of flooding in the 1% AEP event. In the case of the 1% AEP event a number of properties in central Blayney and northern Blayney are subject to flood depths of 0.2m to 0.5m. A number of the properties are subject to flooding up to 1m depth in the 0.5% AEP event.

A review of the modelling results for the PMF event indicated instability in the TUFLOW model results and hence it was necessary to update the TUFLOW model for the PMF event as part of this study. During the PMF event, a number of streets in the central and northern parts of Blayney are subject to flooding up to 1m in depth and more than 2m depth of flooding occurs along Mid Western Highway, Farm Lane and Henry Street. Bathurst is completely inaccessible by road and Orange may only be accessible by trucks and large vehicles during the PMF event.

The flood maps for the 20%, 5%, 1% and 0.5% AEP events and the updated PMF event are included in **Appendix B**. A cutoff depth of 150mm has been applied to all flood maps. Updated peak water level profiles in the Belubula River and Abattoir Creek are also included in **Appendix B.**

5.2 Hydraulic Categorisation

Hydraulic categories classify the floodplain based on its hydraulic function. Hydraulic categories for Blayney have been delineated based upon the 1% AEP flood event. The three flood hydraulic categories identified in the *Floodplain Development Manual* (NSW Government, 2005) are:

- Floodway, where the main body of flow occurs and blockage could cause redirection of flows. Generally characterised by relatively high flow rates; depths and velocities;
- Flood storage, characterised by deep areas of floodwater and low flow velocities. Floodplain filling of these areas can cause adverse impacts to flood levels in adjacent areas; and
- Flood fringe, areas of the floodplain characterised by shallow flows at low velocity.

There is no firm guidance on hydraulic parameter values for defining these hydraulic categories, and appropriate parameter values may differ from catchment to catchment. For example, the minimum threshold flows and depths which might define a floodway in an urban overland flow catchment may be markedly lower than those for a large lowland river due to the different scale of flooding. For Blayney, the criteria outlined in **Table 5-1** was employed.

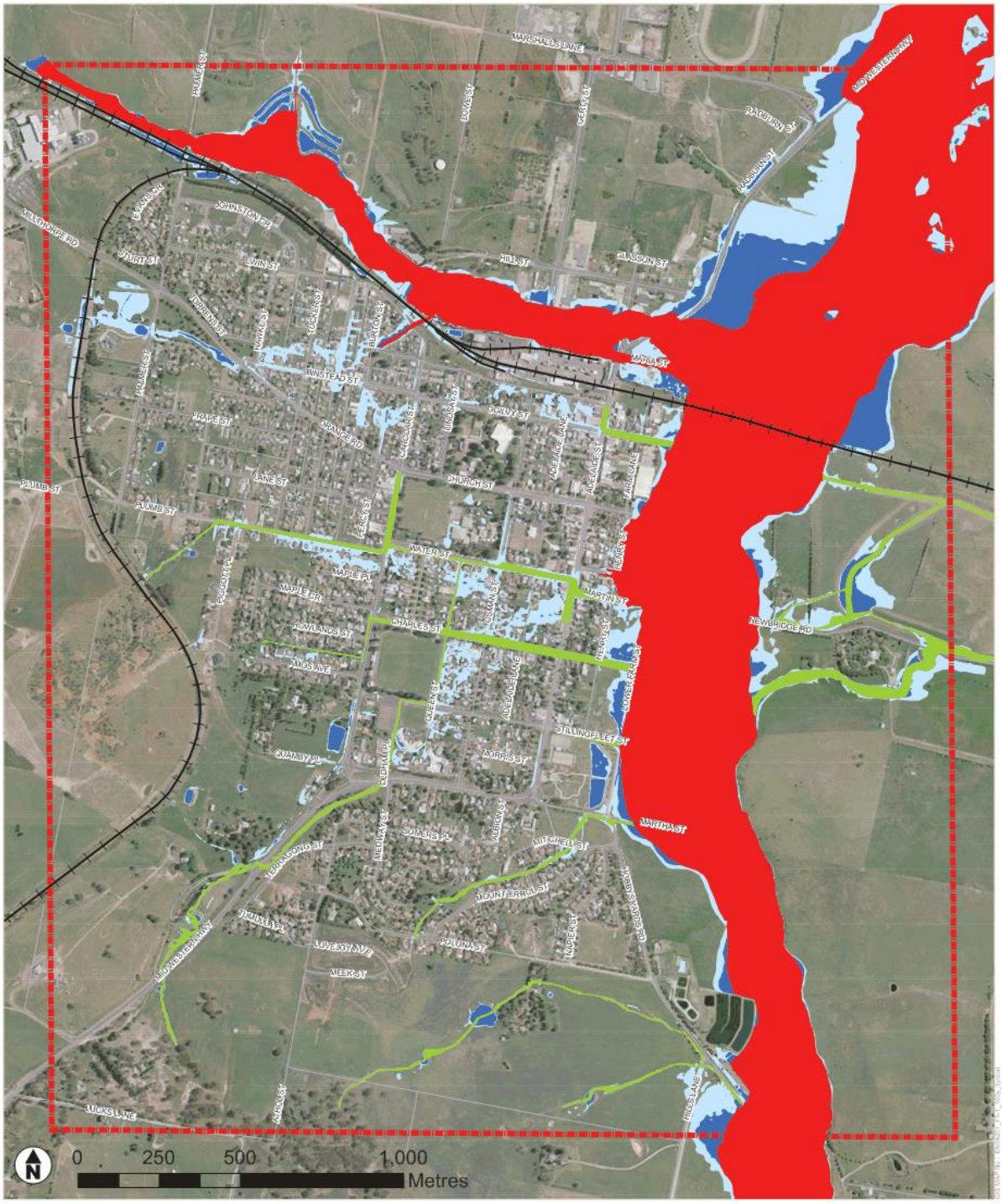
Table 5-1 Hydraulic Categories Criteria

Hydraulic Category	Criteria
Floodway	Area within the 1% AEP flood extent where a significant portion of the flow is conveyed. This was calculated based on a number of criteria[1] and joined to form a continuous floodway. Using the defined floodway and Major Overland Flowpath (MOF), an encroachment analysis was undertaken and the increase in the 1% AEP flood level was confirmed to be no more than 0.1m.
Flood Storage	Area within the 1% AEP flood extent, outside the Floodway, where depth > 0.5m.
Flood Fringe	Area within the 1% AEP flood extent outside the Floodway and Flood Storage areas. Flood depths below 150mm were trimmed from the flood fringe.

1 A combination of peak velocity (V), peak depth (D) and velocity-depth product (VD) was used as a preliminary delineation of the floodway. The following criteria were applied to the peak 1% AEP flood results:

- [VD > 0.25 and V > 0.25] or [V > 1]
- [VD > 0.5 and V > 0.5] or [V > 1]

These results were also compared with the 20% AEP flood extent and the 1% AEP high hazard area. Based on engineering judgement, a synthesis of these four criteria were used to delineate a continuous floodway. The delineated floodway was then refined through an encroachment analysis, whereby the delineated floodway was used as the domain for the two-dimensional hydraulic model and run for the 1% AEP flood event. The peak flood levels were compared to quantify the increase in flood level. The aim is to achieve an increase in flood level of no more than 0.1m. This iterative process was used to achieve the final delineated floodway. The hydraulic categories are mapped in **Figure 5-1**.



Legend

Hydraulic Category

- Major Overland Flowpath
- Floodway
- Flood Storage
- Flood Fringe
- Railway
- Study Area

Note: Depths below 150mm have been trimmed from this map

JACOBS

SCALE	A3
SHEET	1 of 1
	GDA 1994 MGA Zone 55
TITLE	1% AEP Flood Hydraulic Category
PROJECT	Blayney FRMS
CLIENT	Blayney Shire Council
DRAWN MR	PROJECT # EN04201
MAP #	Figure 5-1
REV	1
VER	1
CHECK AH	DATE 22/09/2016

5.3 Hazard Categorisation

The TUFLOW modelling results were used to delineate the preliminary flood hazard areas for the study area from interpretation of the 5% and 1% AEP event results, based on the hydraulic hazard category diagram presented in the *Floodplain Development Manual* (DECC, 2005), shown in **Figure 5-2**. The TUFLOW model calculates the hazard rating at each cell and computational time step, rather than calculating the rating based on the peak depth and peak velocity, which may not necessarily coincide.

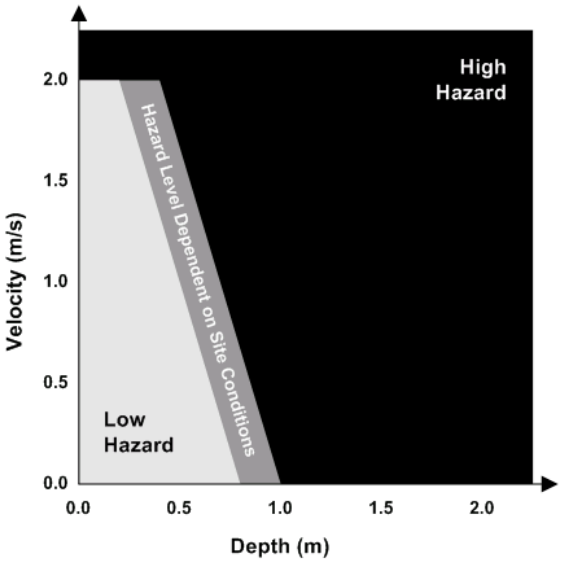
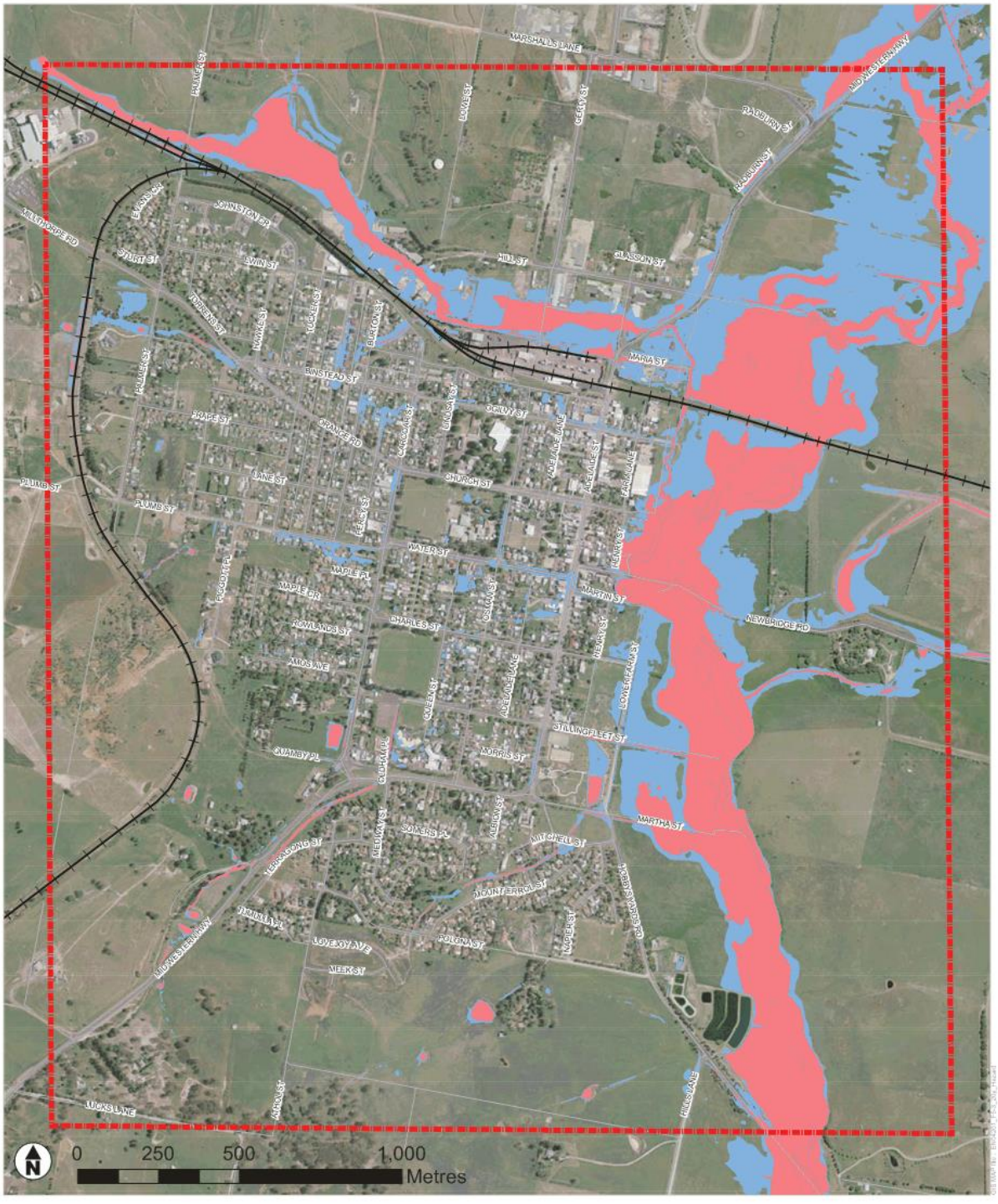


Figure 5-2 Hydraulic Hazard Category Diagram (adapted from the *NSW Floodplain Development Manual*)

The preliminary flood hazard map has been revised to determine the 'true' hazard. The flood hazard for the 20% and 1% AEP events has been determined based on the peak depth and peak velocity (as defined in **Figure 5-2**). Other factors, such as isolation, effective warning time, flood readiness, etc. have been considered in determining the 'true' hazard for these events. The flood hazard maps for the 5% and 1% AEP flood events are shown in **Figure 5-3** and **Figure 5-4** respectively. The flood hazards for the 5% AEP event are generally restricted to the Belubula River and Abattoir Creek, with some isolated areas where there is deep ponding of water and along designated drainage channels. The flood hazards for the 1% AEP event for Blayney are generally low for the majority of the overland flooding that occurs through the town, with some areas of high hazard flooding along designated drainage channels, the lower portion of Water Street and Martin Street, and a section of Plumb Street and Binstead Street. The Belubula River and Abattoir Creek contain the majority of high hazard area which encroaches on the town.



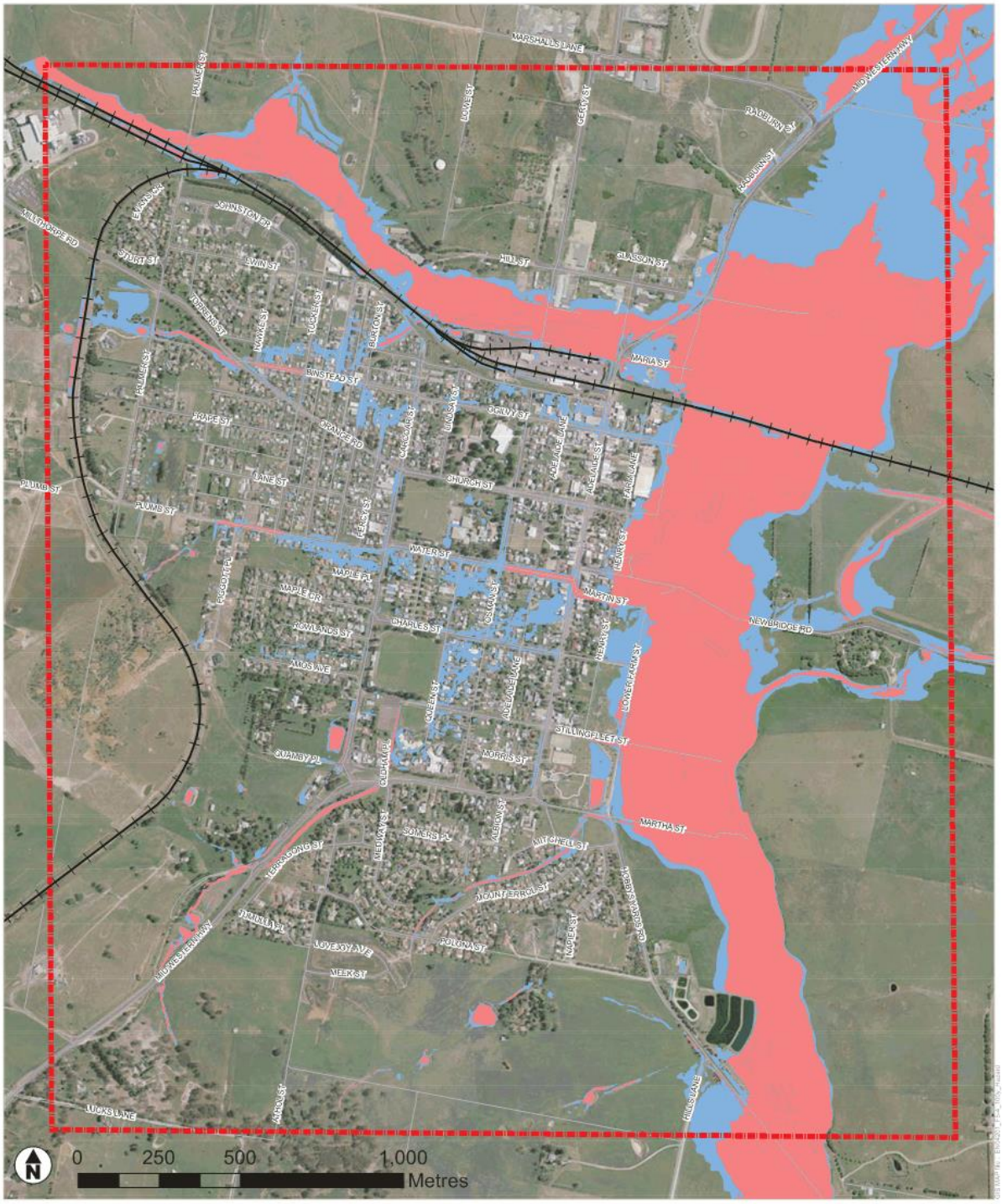
Legend

Flood Hazard Category
- Low Flood Hazard
- High Flood Hazard
- Railway
- Study Area

Note: Depths below 150mm have been trimmed from this map

JACOBS

SCALE	A3
SHEET	1 of 1
	GDA 1994 MGA Zone 55
TITLE	5% AEP True Flood Hazard
PROJECT	Blayney FRMS
CLIENT	Blayney Shire Council
DRAWN MR	PROJECT # EN04201
MAP #	Figure 5-3
REV	1
VER	1
CHECK AH	DATE 22/09/2016



Legend

Flood Hazard Category
- Low Flood Hazard
- High Flood Hazard

Railway

Study Area

Note: Depths below 150mm have been trimmed from this map

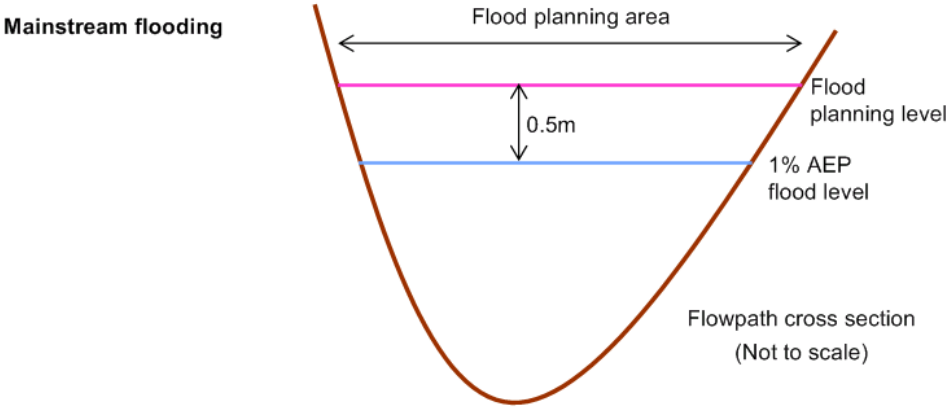
JACOBS

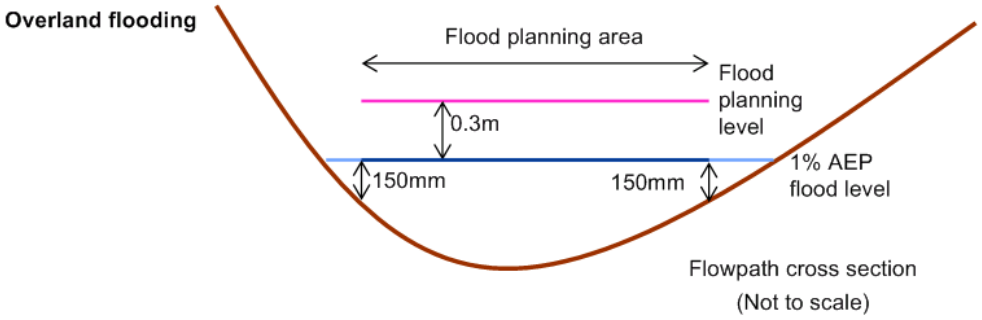
SCALE	A3
SHEET	1 of 1
	GDA 1994 MGA Zone 55
TITLE	1% AEP True Flood Hazard
PROJECT	Blayney FRMS
CLIENT	Blayney Shire Council
DRAWN MR	PROJECT # EN04201
MAP #	Figure 5-4
REV	1
VER	1
CHECK AH	DATE 22/09/2016

5.4 Flood Planning Area

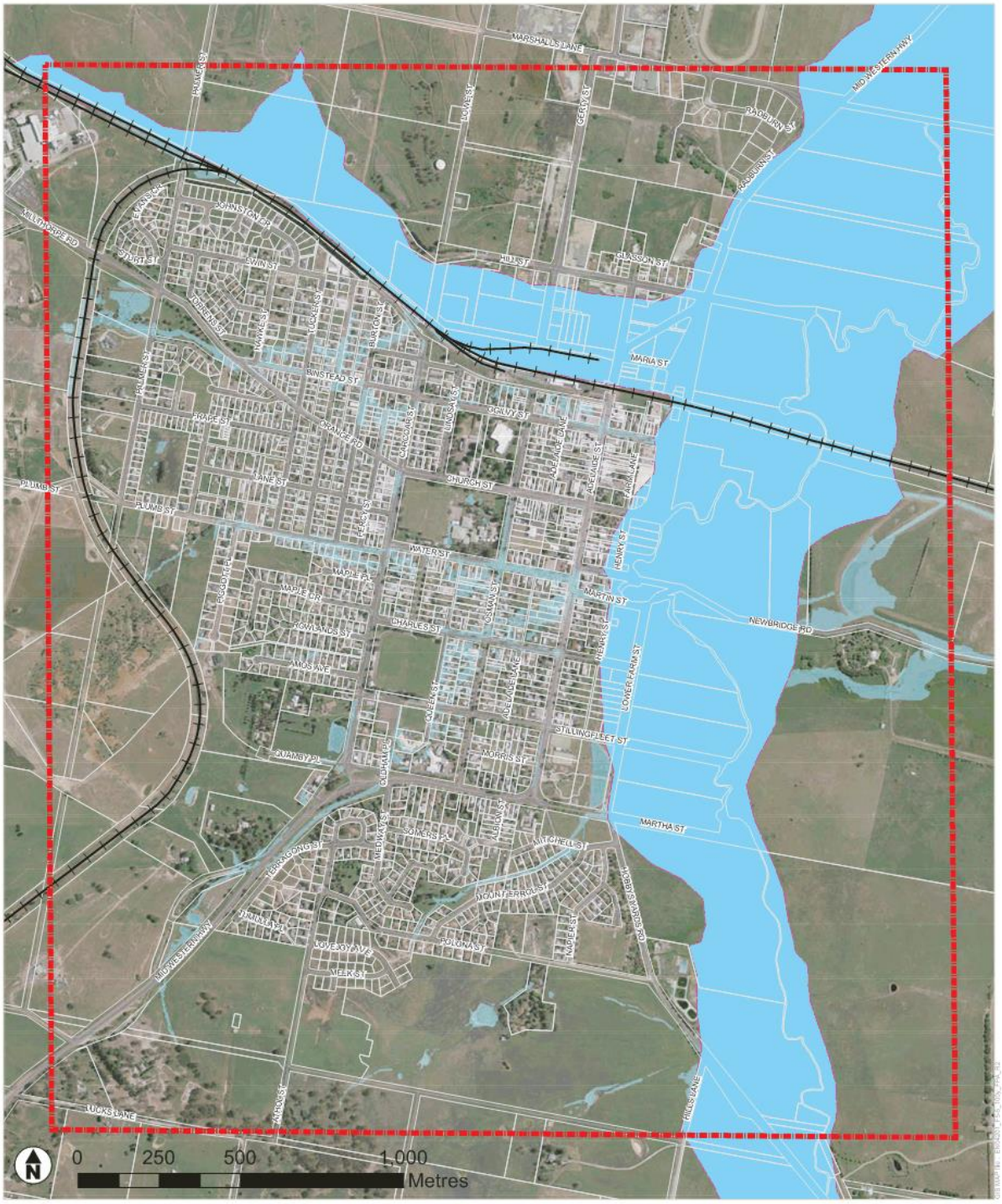
The flood planning area (FPA) is defined by the extent of the area below the flood planning level (usually the 1% AEP flood plus freeboard) and delineates the area and properties where flood planning controls are proposed, for example, minimum floor levels to ensure that there is sufficient freeboard of building habitable floor levels above the 1% AEP flood. Other controls may be considered, such as policies on fence construction or rezoning.

A freeboard of 0.5m is often selected for defining the flood planning level on mainstream floodplains, however, a reduced freeboard of 0.3m may be more appropriate in areas affected by overland flows. Since Blayney is subject to both mainstream and overland flooding, a combination of freeboards has been considered in defining the flood planning level. A freeboard of 0.5m has been used for those areas affected by mainstream flooding of the Belubula River and Abattoir Creek. This flood planning level is then extended until it intersects with the ground. This defines the flood planning area. An illustration of this is provided below. The flood planning area for the areas subject to overland flows uses the 1% AEP flood extent, with flood depths below 150mm filtered out of the flood results as well as small areas of isolated and shallow inundation that could be considered 'drainage' issues rather than 'flooding'. For the overland flows, it is recommended that a 0.3m freeboard be added to the 1% AEP flood level to define the flood planning level on lands subject to overland flooding.





The flood planning area map for Blayney is shown in **Figure 5-5**, based on the 1% AEP flood extent. These areas would be subject to the flood planning level defined as the 1% AEP flood level plus freeboard (0.5m for areas subject to mainstream flooding and 0.3m for areas subject to overland flooding).



Legend

- Mainstream Flood Planning Area
- Overland Flood Planning Area
- Cadastre
- Railway
- Study Area

Note: Depths below 150mm have been trimmed from this map

JACOBS

SCALE	A3
SHEET	1 of 1
	GDA 1994 MGA Zone 55
TITLE	Flood Planning Area
PROJECT	Blayney FRMS
CLIENT	Blayney Shire Council
DRAWN MR	PROJECT # EN04201
MAP #	Figure 5-5
REV	1
VER	1
CHECK AH	DATE 17/10/2016

5.5 Flood Emergency Response

Flood emergency response is an important outcome of the Floodplain Risk Management Process. The State Emergency Service (SES) will use the information contained in the studies to update the Blayney Shire Local Flood Plan.

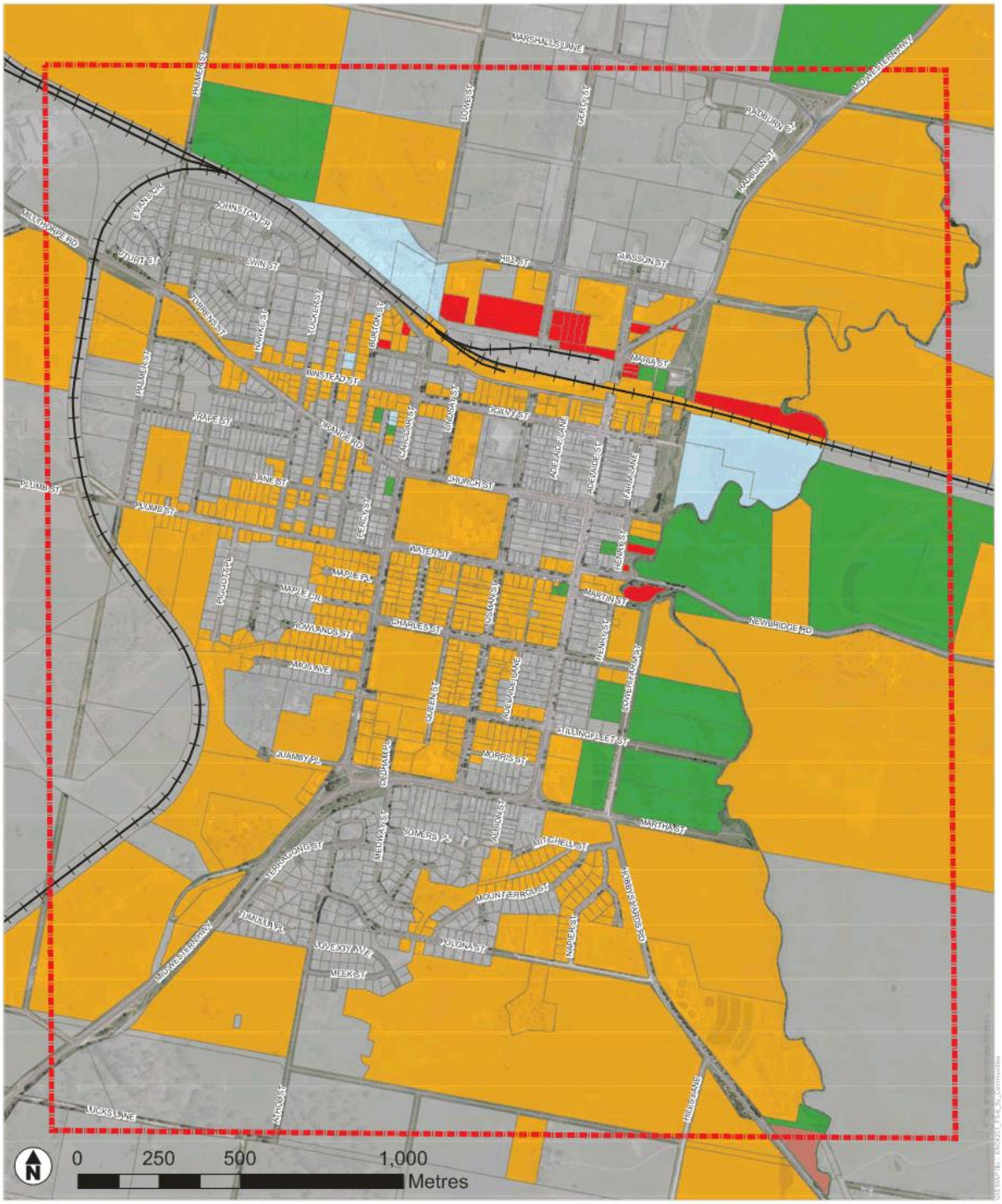
Areas within the catchment have been classified based on the floodplain risk management guideline *Flood Emergency Response Planning – Classification of Communities* (DECC, 2007). The classification indicates the relative vulnerability of different areas of the catchment and considers the ability to evacuate certain parts of the community. The classification has been undertaken for the 20% AEP, 1% AEP and PMF events, with mapping provided in **Figure 5-6**, **Figure 5-7** and **Figure 5-8** respectively.

The categories identified included:

- Indirectly Affected: Areas which are not flood affected and whose access is not cut-off, but may be affected by flood impacts to services and infrastructure in the area.
- Rising Road Access: Areas that become inundated by flooding which can be evacuated by vehicles on roads with continuously rising grade to high ground.
- Overland Escape Route: Areas where vehicular access is cut-off but can be evacuated on foot to high ground.
- High Trapped Perimeter: Areas which are partially or wholly above the peak flood level but whose evacuation routes are cut-off. These areas are not surrounded by flood waters but there may be a physical barrier preventing evacuation overland.
- Low Trapped Perimeter: Areas which are above the peak flood level during early stages of the flood, and which become submerged as the flood peaks, cutting off evacuation routes and there may be a physical barrier preventing evacuation overland.
- High Flood Island: Areas which are above the peak flood level but surrounded by flood waters and whose evacuation routes are cut-off.
- Low Flood Island: Areas which are surrounded by flood waters during early stages of the flood, and which become submerged as the flood peaks.

The guideline is largely geared towards classification of communities in mainstream floodplains with longer flooding response times. Hence some assumptions were made to suit the shorter-duration overland flooding which is present in Blayney:

- For overland escape routes, the maximum depth considered safe for humans is 0.5m (for children in floodwater of any velocity) and/ or a maximum velocity of 3m/s (independent of the depth) (AR&R 2016).
- For vehicle evacuation to be possible it was considered that a depth of approximately 0.2-0.3m was the limit of stability for small passenger cars, subject to the velocity of flows (AR&R 2016).
- Some properties are located on overland flow paths and their dwellings become surrounded by flooding. While there may be a rising road or overland evacuation routes available, due to the rapid rise in flood level, there may be insufficient warning time before the dwelling is surrounded by floodwaters and subsequently inundated. These areas were treated as 'low flood islands'.
- It was considered that all residential properties have fences that are barriers to overland escape routes as they may be too high for some members of the community to climb. For example if a property has flooding in the front yard and it cuts off street access then an overland escape route would not be possible through the sides or rear of the property and hence it would be a 'high trapped perimeter' classification.



Legend

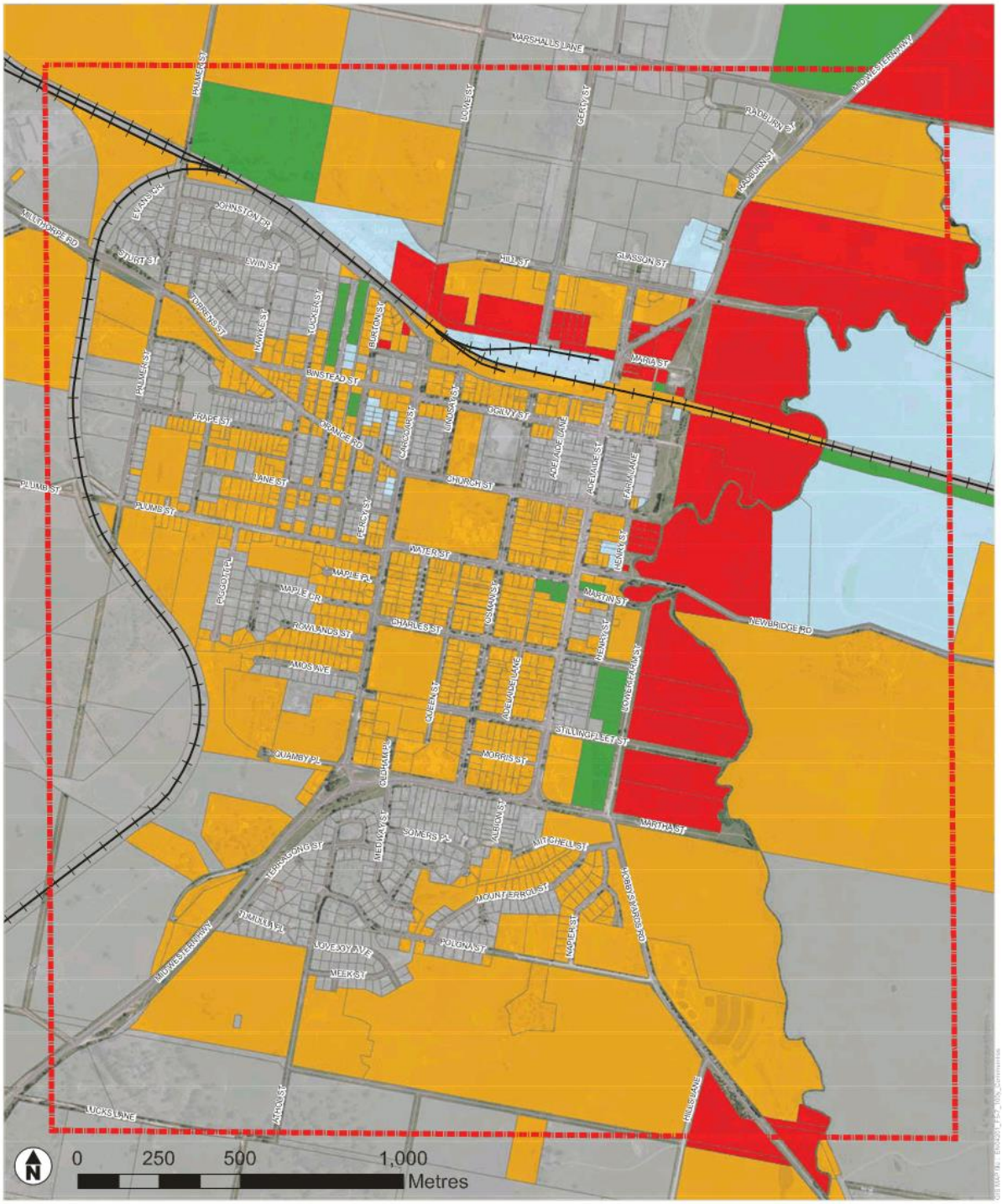
Classification of Communities

- Indirectly Affected
- Low Flood Island
- High Flood Island
- Low Trapped Perimeter
- High Trapped Perimeter
- Overland Escape Route
- Rising Road Access

- Cadastre
- Railway
- Study Area

JACOBS

SCALE	A3
SHEET	1 of 1
	GDA 1994 MGA Zone 55
TITLE	Classification of Communities 20% AEP Event
PROJECT	Blayney FRMS
CLIENT	Blayney Shire Council
DRAWN MR	PROJECT # EN04201
MAP #	Figure 5-6
REV	1
VER	1
CHECK AH	DATE 22/09/2016



Legend

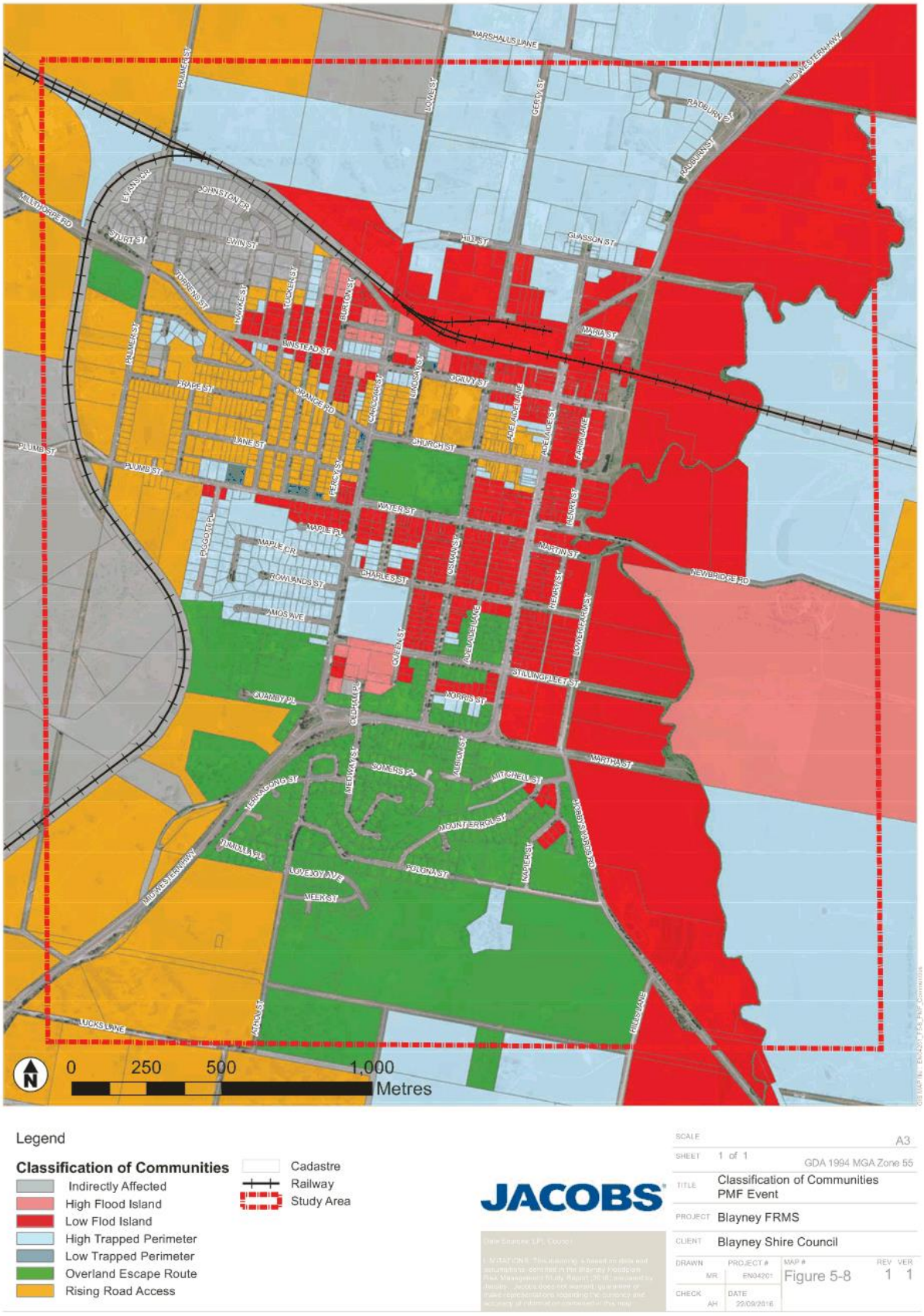
Classification of Communities

- Indirectly Affected
- High Flood Island
- Low Flood Island
- High Trapped Perimeter
- Low Trapped Perimeter
- Overland Escape Route
- Rising Road Access

- Cadastre
- Railway
- Study Area

JACOBS

SCALE	A3
SHEET	1 of 1
	GDA 1994 MGA Zone 55
TITLE	Classification of Communities 1% AEP Event
PROJECT	Blayney FRMS
CLIENT	Blayney Shire Council
DRAWN MR	PROJECT # EN04201
MAP #	Figure 5-7
REV	1
VER	1
CHECK AH	DATE 22/09/2016



Legend

Classification of Communities

- Indirectly Affected
- High Flood Island
- Low Flod Island
- High Trapped Perimeter
- Low Trapped Perimeter
- Overland Escape Route
- Rising Road Access

- Cadastre
- Railway
- Study Area

JACOBS

SCALE	A3
SHEET	1 of 1
	GDA 1994 MGA Zone 55
TITLE	Classification of Communities PMF Event
PROJECT	Blayney FRMS
CLIENT	Blayney Shire Council
DRAWN MR	PROJECT # EN04201
MAP #	Figure 5-8
REV	1
VER	1
CHECK AH	DATE 22/09/2016

- High Flood Island and High Trapped Perimeter are generally not a serious concern for Blayney, since the duration of overland flooding is expected to be relatively short. These areas do not require evacuation.
- Properties with full vehicular access to the street that were not affected by flooding have been classed as 'indirectly affected' since there may be impacts to them such as damaged road infrastructure, loss of normal transport links, electricity supply, water supply, sewage or telecommunication services.

There are five main roads that lead in to/out of Blayney – the Mid Western Highway to the north, Millthorpe Road to the west, Mid Western Highway to the south-west, Hobbys Yard Road to the south-east and Newbridge Road to the east. All of these roads experience some degree of flooding. Each of these routes is discussed below:

Mid Western Highway to the north: Abattoir Creek starts to overtop the Mid Western Highway in the 1% AEP flood event, but with approximately 0.2m of floodwater over the road, should remain trafficable. In the 0.5% event the flooding is more extensive over the road and may not be trafficable by small vehicles but will be accessible by larger vehicles and emergency services. In the PMF event this access route is completely cut off.

Millthorpe Road to the west: Millthorpe Road / Orange Road experiences minor flooding in the 0.5% AEP event, but remains trafficable. In the PMF event, flood depths are typically between 0.2 and 0.35m between Binstead Street and Beaufort Street. While small vehicles may not be able to cross this, it is assumed that larger vehicles and emergency services will be able to use this road. This road is also subject to overland flooding, so the road is expected to be flooded for a relatively short period of time. For the purpose of the classification of communities, it is assumed that this road is a viable evacuation route.

Mid Western Highway to the south-west: This road only experiences flooding in the PMF event. Floodwater overtops the road near Patrick Close, with depths between 0.2 and 0.3m. It is expected that this would be trafficable. The road (which becomes Martha Street) acts as a flowpath between Medway Street and Adelaide Street and is unlikely to be trafficable. Flooding also occurs along Carcoar Street which would restrict access to this evacuation route.

Hobbys Farm Road to the south-east: The bridge over the Belubula River remains accessible in events up to and including the 0.5% AEP event. The bridge deck is overtopped in the PMF event. There is a breakout flow of the Belubula River, however, to the north-west of the bridge that is inundated in the 20% AEP event to a depth of just over 0.3m. While the road may be trafficable to large vehicles and emergency services, the route is entirely cut off south of Hills Lane in events larger than the 20% AEP.

Newbridge Road to the east: Newbridge Road crosses the Belubula River and heads east from the town. While the bridge is only overtopped in the PMF event, overland flows from the east fill a table drain running along the northern side of the road and encroach onto the road in more frequent flood events. Breakout flows from the Belubula River can also contribute to the overtopping of the road, which occurs to the east of the bridge and culvert crossing. In the 20% AEP event, with flood depths over the road are between 0.2 and 0.3m. This route may be trafficable by vehicles in the 20% event, but is completely cut off in events larger than this.

Since the majority of the flooding issues in Blayney is due to short-duration overland flooding, it is considered more important that flood affected properties are able to access higher ground to avoid floodwaters rather than evacuation out of the town. Properties classed as 'high trapped perimeter' or high flood island' do not pose a significant problem since the residents would have access to higher ground in the event of a flood and will not be displaced for long due to the short duration of overland flooding expected in Blayney. Properties with 'rising road access' provide the best method of evacuation for those who are required to evacuate. Overland escape routes provide the next best option, where evacuation can occur on foot. 'Low flood island' and 'low trapped perimeter' properties are those of most concern, as if they do not evacuate when flooding starts to occur, they may be trapped in their dwelling.

Access to the Blayney district hospital is only compromised in the PMF event, with Martha Street and Osman Street experiencing inundation. An appropriate evacuation centre within the town is Blayney Public School and the Centrepoint Sport and Leisure Centre. The school and leisure centre have large buildings that could temporarily accommodate residents if required. The site remains flood-free in the PMF event and accessible via the Church Street / Orange Road / Millthorpe Road route.

5.6 Flooding with Future Development

Blayney Settlement Strategy (2012) estimated that approximately 382 lots/dwellings could be made available for development within 2036 on existing vacant land for infill development which was considered adequate to satisfy the demand for residential uses over the next 20 years.

It is recommended that a detailed flood study be undertaken to address any flooding issues that may occur as a result of new residential development on existing vacant lands. On-site retention/detention is to be considered to maintain site runoff at pre-development level.

6. Flood Damages

6.1 Introduction

The quantification of flood damages is an important part of the floodplain risk management process. By quantifying flood damages for a range of design events, appropriate management measures can be evaluated in terms of their benefits (reduction in flood damage) versus the cost of implementation.

The cost of flood damage and disruption to a community depend on a number of factors which include:

- Flood magnitude (depth, velocity and duration)
- Type of structures at risk and their susceptibility to damage
- Nature of the development at risk (residential, commercial, industrial)
- Awareness and readiness of the community to flooding
- Effective warning times
- Availability of Evacuation Plans

The potential damage associated with a particular sized flood can be divided into a number of components, which are grouped into two major categories;

- Tangible damages – financial costs of flooding quantified in monetary terms
- Intangible damages – social costs of flooding reflected in increased levels of mental stress, physical illness, inconvenience to people, etc.

Intangible damages are difficult to measure and impossible to meaningfully quantify in dollar terms. For this reason, intangible damages have not been assessed for Blayney and the following damage assessment focuses on tangible damages only. Tangible damages can be further sub-divided into two categories, direct and indirect damages, as illustrated in **Figure 6-1**.

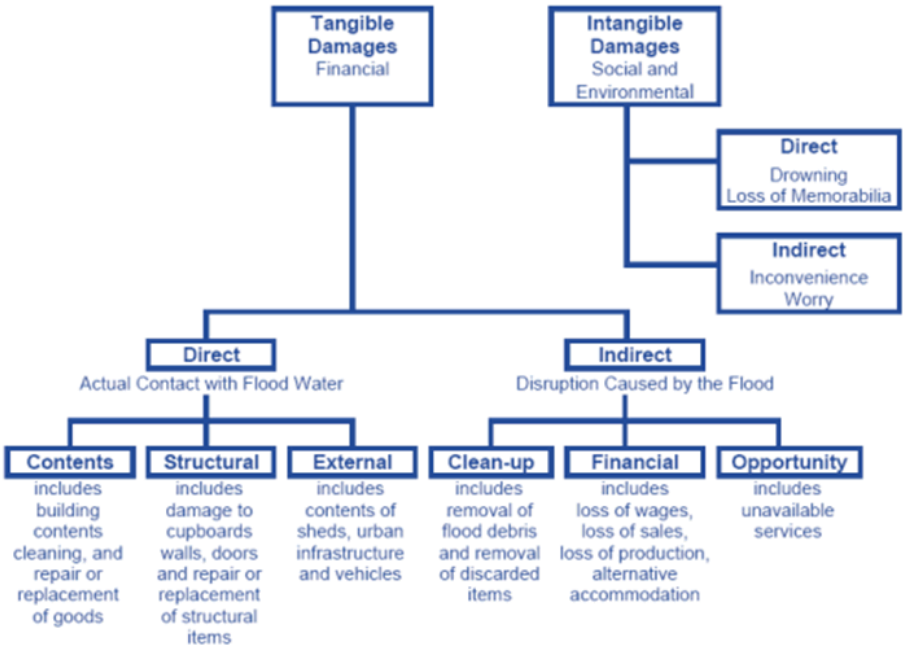


Figure 6-1 : Types of flood damages *(Source: NSW Floodplain Development Manual, 2005)*

Flood damage estimation procedures have been formulated using data collected following real flood events. Information collected includes identification of properties flooded, the extent of flooding, depth of flooding experienced, flooding mechanism etc. This information can then be used to guide and calibrate models used to calculate flood damages for a particular area. One of the most thoroughly studied flood damage assessments was that undertaken at Nyngan, following the flood in 1990.

The most common approach to present flood damage data is in the form of flood-damage curves for a range of property types, i.e. residential, commercial, public property, public utilities etc. These relate flood damage to depth of flooding above a threshold level (usually floor level).

6.2 Approach

Estimation of flood damage has focussed on residential and commercial properties in the Study Area using guidelines issued by the Department of Environment and Climate Change (DECC, October 2007) and recognised damage assessment methodologies. The estimation of damage is based upon flood depth above 'protection level', where protection level relates to the floor level minus 0.5m for properties affected by mainstream flooding, and floor level minus 0.3m for properties affected by overland flooding. It is recommended by DECC (October, 2007) that the freeboard allowance is included to ensure calculation of damage is not under-estimated.

6.2.1 Property Database

A property database was assembled using available survey and contour data. The database includes the following information for each property identified within the PMF extent in Blayney; address, floor level, ground level, modelled flood levels for each event and data source. A total of 185 buildings had floor levels surveyed as part of this study. These buildings were identified as potentially affected by the 1% AEP flood event from the aerial photography. This included 15 commercial buildings, 2 schools and 5 shed/amenity structures. For the PMF event, a large number of properties are potentially impacted. Ground levels for these buildings were estimated based on LiDAR data. Floor levels for each affected property not surveyed were estimated by assuming the floor level is 0.15m above the ground level. Flood levels were assigned to each property based on

the modelled flood surface at the building. The database was used to determine the number and extent of properties inundated above protection level for the range of flood events modelled (20%, 5%, 1%, 0.5% AEP and the PMF).

6.2.2 Residential Damage

Flood damage of residential buildings was calculated using a residential damage spreadsheet developed by the NSW Department of Environment, Climate Change and Water (DECCW, now NSW Office of Environment and Heritage) in 2007. This includes a representative stage-damage curve derived for a typical house on a floodplain to estimate structural, contents and external damage. The amount of damage is based on the flood inundation depth, for a suite of annual exceedance probability events. These values are then summed to provide a total damage for each flood event analysed. The AEP of the Probable Maximum Flood has been estimated using Figure 6 from Book VI of AR&R 2003. The AEP of the PMF event for Blayney was estimated to be 1 in 10^7.

A number of input parameters are required to determine which stage-damage curve will be adopted. The key parameters used in this assessment are shown in **Table 6-1**.

Table 6-1 Parameters adopted in residential damages assessment

Parameter	Adopted Value	Comment
Building Damage Repair Limitation Factor	0.85	Suggested range of 0.85 to 1.00 (short to long duration events). The majority of properties are impacted by overland flooding and the typical flood duration in Blayney is short.
Contents Damage Repair Limitation Factor	0.75	Suggested range of 0.75 to 0.90 (short to long duration events). The majority of properties are impacted by overland flooding and the typical flood duration in Blayney is short.
Effective Warning Time (hrs)	0	While there may be some warning of a flood for the Belubula River, it has been conservatively assumed as 0 hours for Blayney.
Level of flood awareness	Low	Guidelines suggest 'low' is adopted unless 'high' can be justified. While flooding has been experienced in Blayney, it is assumed that the level of awareness of the extent of flooding for large events is low.
House type and size	Single Storey, 240m^2	The houses in Blayney are typically single storey detached dwellings (supported by evidence gathered during site visits and Google Street View). House size was taken to be the recommended average size.

The DECCW stage-damage curves within the spreadsheet are derived for late 2001, and have been updated using an Average Weekly Earnings (AWE) factor to August 2007. AWE is used to update residential flood damage curves rather than the inflation rate measured by the Consumer Price Index (CPI). The most recent AWE value from the Australian Bureau of Statistics (ABS, 2015) at the time of the assessment was November 2015, and a factor of 1.69 was applied to all ordinates in the residential stage-damage curves based on the increase from August 2007. Similarly, the spreadsheet was developed for the Sydney urban area. A regional cost variation factor of 1.08 was applied for Blayney based on an interpolation between the value at Bathurst (1.05) and Cowra (1.12), as presented in the Australian Construction Handbook (Rawlinsons, 2016).

6.2.3 Non-residential Building Damage

While the majority of development at risk from flooding in Blayney is residential, there are a number of commercial developments, industrial buildings and community facilities impacted by flooding. To account for the non-residential flood damages in Blayney, typical damage rates were adopted from the Town of Young Floodplain Risk Management Study and Plan (Lyall and Associates 2015). These damage rates are based on the type of enterprise and the floor area of the building. These rates are considered appropriate for potential external and internal damages and clean-up costs for both commercial and industrial damages. They are indexed to a depth of inundation of 2 metres (100%), with floor level being 0% and 1.2m inundation being 70% of the damage costs presented in **Table 6-2**.

Table 6-2 Commercial and industrial flood damage rates

Enterprise type	Flood damage estimate	Examples
Low value enterprise	$280/m^2	**Commercial**: small shops, cafes, joinery, public halls. **Industrial**: auto workshop with concrete floor and minimal goods at floor level, Council or Government Deports, storage areas.
Medium value enterprise	$420/m^2	**Commercial**: food shops, hardware, banks, professional offices, retail enterprises, with furniture/fixtures at floor level which would suffer damage if inundated. **Industrial**: Warehouses, equipment hire.
High value enterprise	$650/m^2	**Commercial**: Electrical shops, clothing stores, bookshops, newsagents, restaurants, schools, showrooms and retailers with goods and furniture, or other high value items at ground or lower floor level. **Industrial**: service stations, vehicle showrooms, smash repairs

6.2.4 Vehicle Damage

An estimation of vehicle damage has been excluded from this assessment. Significant damage can be attributed to vehicles but these can be readily moved from the path of flood waters and have not been included in the flood damages calculations.

6.3 Estimated Tangible Flood Damages

An estimation of the number of properties impacted (flooding occurring on the property), number of properties with above floor flooding and total damage costs for each modelled flood event for the Blayney township was undertaken. The assessment was performed with the recommended protection level of 0.5m for mainstream flooding and 0.3m for overland flooding, and by using nominal floor levels also (no freeboard applied). Residential external damages are assumed to start accumulating when floodwater is within 0.5m of the nominal floor level or floor level minus protection level (i.e. the property is impacted). The results are divided into those properties affected by mainstream flooding (**Table 6-3**) and those affected by overland flooding (**Table 6-4**).

The most convenient way to express flood damage for a range of flood events is by calculating the Annual Average Damage (AAD). The AAD value is determined by multiplying the damages that can occur in a given flood by the probability of that flood actually occurring in a given year, and then summing across a range of floods. This method allows smaller floods, which occur more frequently to be given a greater weighting than the larger catastrophic floods. The AAD for the existing case then provides a benchmark by which to assess the merit of flood management options. The AAD for the existing situation for Blayney is $2.51 Million for residential

and $0.15 Million for non-residential properties based on nominal flood levels. The AAD is $7.47 Million for residential and $0.52 Million for non-residential properties based on nominal flood levels with the freeboard applied.

Table 6-3 : Estimated Tangible Flood Damage for Blayney for Mainstream Flooding

Flood Event AEP	Nominal Flood Levels		Nominal Flood Levels Plus Freeboard	
	Number of properties flooded above floor level	Estimated Flood Damage $ Million	Number of properties flooded above protection level	Estimated Flood Damage $ Million
Residential				
20%	2	0.17	4	0.34
5%	2	0.18	4	0.34
1%	3	0.41	12	1.00
0.5%	9	0.70	12	1.03
PMF	61	6.76	64	7.66
Non-residential				
20%	2*	0.00	3	0.07
5%	3	0.07	5	0.25
1%	6	0.14	6	0.33
0.5%	6	0.16	6	0.36
PMF	23	4.59	24	8.76

*These sheds are subject to flooding essentially 'at floor level'. Due to the indexing of costs due to depth, the depth is rounded to 0.0m and hence no costs are assigned.

Table 6-4 : Estimated Tangible Flood Damage for Blayney for Overland Flooding

Flood Event AEP	Nominal Flood Levels		Nominal Flood Levels Plus Freeboard	
	Number of properties flooded above floor level	Estimated Flood Damage $ Million	Number of properties flooded above protection level	Estimated Flood Damage $ Million
Residential				
20%	43	5.81	248	18.47
5%	58	7.58	305	22.81
1%	84	11.09	416	31.02
0.5%	115	12.33	436	32.64
PMF	494	36.49	666	51.80
Non-residential				
20%	8	0.25	11	1.08
5%	10	0.35	14	1.38

1%	13	0.60	21	2.21
0.5%	13	0.68	22	2.41
PMF	43	4.59	45	6.52

6.4 Summary

Flood damage in Blayney is primarily attributed to residential dwellings that are impacted by overland flooding. There are 55 properties that are estimated to experience above floor flooding (nominal flood levels) for the 20% AEP event and this number increases to 106 properties for the 1% AEP event. In the PMF, 569 properties are estimated to experience above floor flooding, with damages reaching $55 million. The total flood damages for the 20% to 1% AEP events, however, range from $6.23 Million to $12.24 Million when considering flood damages using nominal flood levels only. The AAD for Blayney based on nominal flood levels is $2.66 Million.

These numbers increase significantly if freeboard is allowed for (0.3m for overland flooding and 0.5m for mainstream flooding). The number of properties with flooding above the protection level is 266 for the 20% AEP event and 455 for the 1% AEP event. Flood damages range from $19.95 Million to $34.56 Million for these events. The AAD is estimated at $7.99 Million based on flooding above the protection level.

It can also be seen that the majority of costs associated with flood damages is from residential dwellings, contributing approximately 90-95% of the flood damages in each flood event up to the 0.5% AEP flood. From the assessment it is also evident that the flood damages due to overland flooding are far greater than those related to mainstream flooding in Abattoir Creek and Belubula River. Overland flooding contributes at least 95% of the flood damages in events up to the 0.5% AEP flood. Together, residential dwellings impacted by overland flooding contribute at least 90% of flood damages in events up to the 0.5% AEP.

Although this damage assessment is based upon tangible damages only, it is worthy to note that intangible damages could be significant for Blayney. This is due to the duration of flooding being more than a day and lack of warning of an event occurring. While flood damage estimates for Blayney are indicative only, they are useful in the evaluation of flood management options, aimed at reducing flood damage estimates while being economically viable to implement.

7. Review of Potential Floodplain Risk Management Measures

7.1 Overview

This section provides a review of available measures for flood management in Blayney. A number of floodplain measures were selected based on feedback from the community. A detailed assessment of these is included in **Section 8**.

7.2 Floodplain Risk Management Options

One of the objectives of this Floodplain Risk Management Study is to identify and compare various floodplain risk management options to deal with existing flood risk in the study area, considering and assessing their social, economic, ecological and cultural impacts and their ability to mitigate flood impacts. A Floodplain Risk Management Option can be formulated by a combination of Floodplain Risk Management Measures for the study area.

The *Floodplain Development Manual* (NSW Government, 2005) describes floodplain risk management measures in three broad categories:

- **Property modification measures** involve modifying existing properties (for example, house-raising) and/or imposing controls on new property and infrastructure development (for example, floor height restrictions)
- **Response modification measures** involve modifying the response of the population at risk to better cope with a flood event (for example improving community flood readiness)
- **Flood modification measures** involve modifying the behaviour of the flood itself (for example, construction of a levee to exclude floodwaters from an area)

A summary of the potential floodplain risk management measures is provided in **Figure 7-1**.

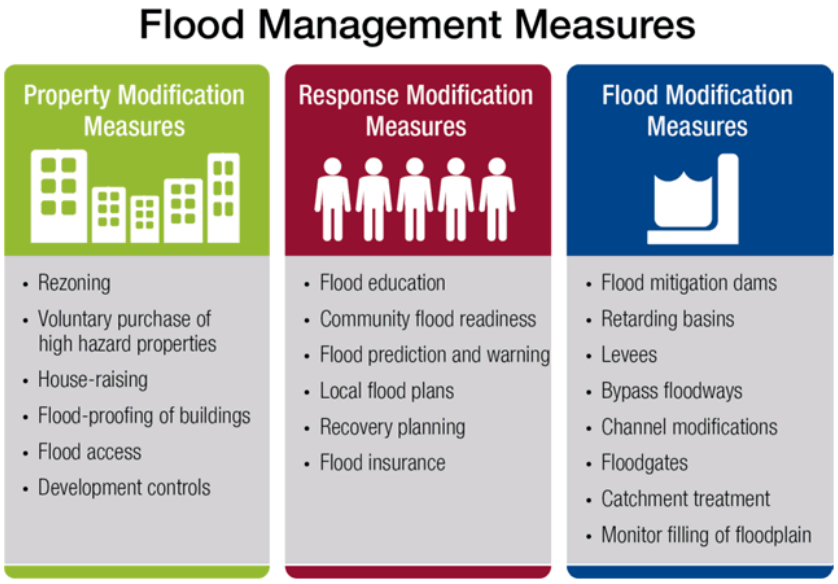


Figure 7-1 : Floodplain risk management measures

8. Floodplain Risk Management Measures

8.1 Flood Modification measures

8.1.1 Flood retarding basin

An option of retaining floodwaters in basins was considered for the town of Blayney through a review of the topographic data, nature of flooding and land use. These basins would retard a significant portion of the rainfall runoff generated from catchments which drain through the town of Blayney and discharge into the Belubula River/ Abattoir Creek. In total nine (9) potential basin sites (refer to **Table 8-1** and **Figure 8-1**) were identified. Eight of these basins would be located upstream of the urban area and store floodwaters which would be released at a much lower rate. Only one small basin is proposed within the urban area. The following assumptions were made for the basins:

- Maximum height of embankment is up to 1.5m high;
- A 0.3m diameter pipe forms the low flow outlet; and
- No spills from the basin in the 0.5% AEP event.

Table 8-1 Basin areas and peak flood depths

Basin Number	Basin Area (ha)	5% AEP - Peak flood depth (m)	1% AEP - Peak flood depth (m)	0.5% AEP - Peak flood depth (m)
1	1.81	0.84	1.16	1.18
2	2.37	0.32	0.39	0.42
3	1.53	0.76	1.13	1.23
4	1.79	0.18	0.24	0.25
5	2.62	0.40	0.59	0.64
6	0.55	0.65	1.02	1.21
7	0.98	1.21	1.46	1.48
8	3.66	0.35	0.48	0.50
9	0.32	0.94	1.22	1.43

The basins were represented in the TUFLOW model and the model was run for a range of storm durations for the 5%, 1% and 0.5% AEP events. Peak flood depths in the basins for the 5%, 1% and 0.5% AEP events are shown in **Table 8-1**. Changes in peak flood depths within the township for the 1% AEP event are shown in **Figure 8-1**. Reduction in peak flood depths up to 0.1m occurs on extensive areas within the township in the 1% AEP event. Peak flood depths are reduced between 0.1 to 0.2m in a few localised areas. Peak flood depths are reduced up to 0.5m in isolated areas.

The AAD for Blayney based on nominal flood levels with adopted freeboards with the proposed basins is estimated at $5.4 Million which is approximately 71% of the AAD under the existing conditions.

The proposed basins would require approximately 16 ha of land and it would cost approximately $5.2 Million (assuming $0.30 Million/ha cost for construction in Sydney and 8% more cost for Blayney than Sydney) excluding the cost involved in acquiring the land.

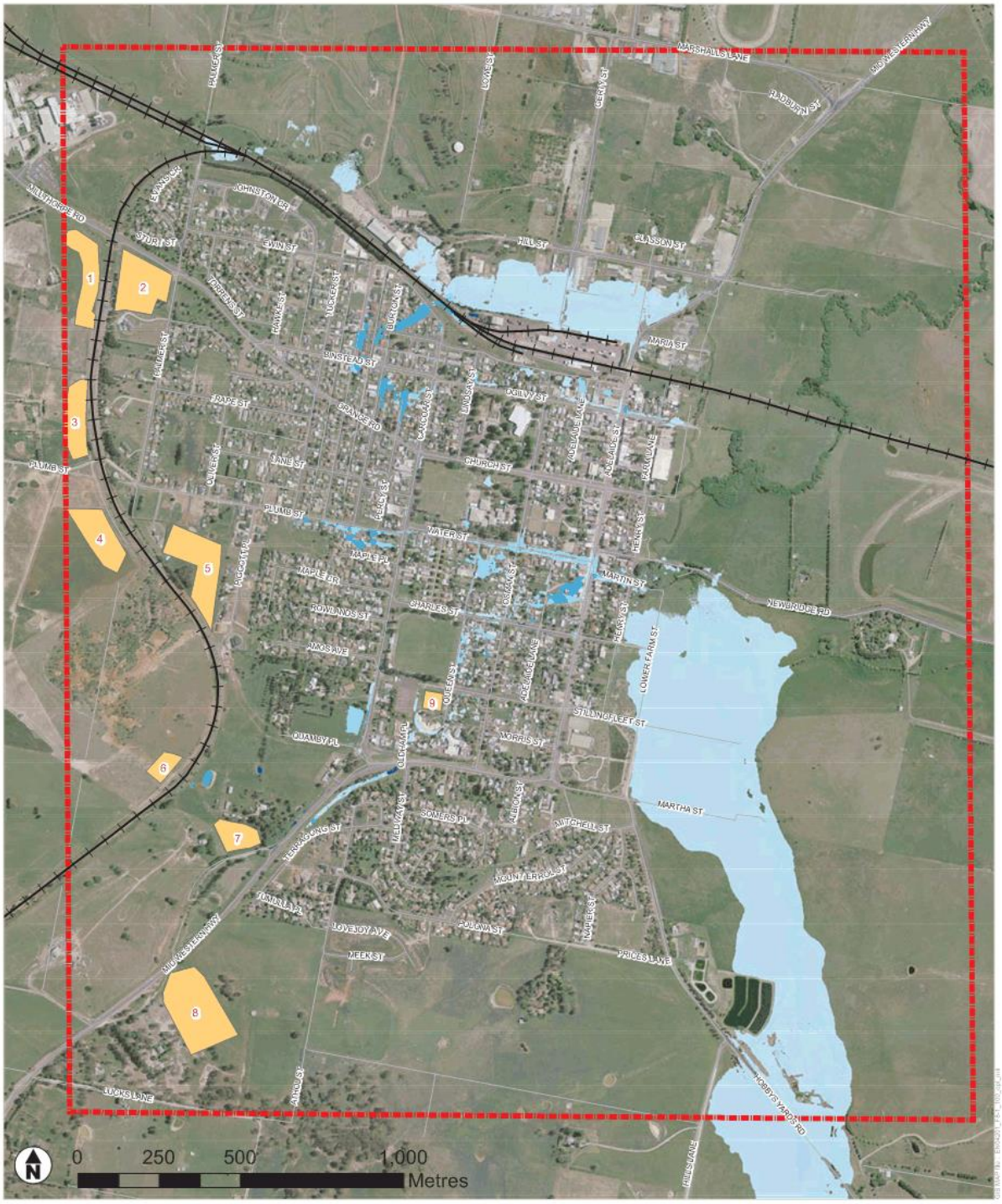
The Net Present Value (NPV) is a way of comparing the cost of the proposed mitigation measures and the savings in the annual flood damage due to the mitigation measure being implemented. NPV works by discounting or reducing the cost of future flood damages to a present value. The recommended discount rate is

7%, using guidelines from the NSW Treasury. The NPV is the present value of the savings in flood damages, which can then be compared with the present cost of implementing and maintaining the mitigation measure. The Benefit-Cost Ratio (BCR) compares the present value of benefits divided by the present value of costs to indicate the economic viability of the mitigation measure.

Based on the savings in AAD, the NPV of the savings was estimated at $79.5 Million for protection against nominal flood levels with the adopted freeboards assuming a 7% discount rate and 50 year life of the proposed flood retarding basin. The BCR for the flood retarding basins is very attractive.

8.1.2 Upgrade of railway bridges

Railway bridges across the Belubula River and Abattoir Creek are major hydraulic controls. A sensitivity analysis was undertaken by doubling the existing waterways area at the two bridges for the 1% AEP event. Augmentation of waterway areas at both bridges would reduce 1% AEP flood level in Abattoir Creek downstream of Mid Western Highway up to a maximum of 0.3m. In the case of the Belubula River, the 1% AEP peak water level at the railway bridge is reduced up to a maximum of 0.4m and peak water levels downstream of the bridge are increased up to 0.15m. Given that almost all properties impacted by flooding in the Belubula River are located downstream of the railway bridge, augmenting the bridge waterway areas would aggravate flooding further. Hence, this option is not considered further in recognition of the negative impacts downstream and operational constraints of the railway and huge costs involved in duplicating the existing waterway areas at the two bridges.



Legend

Flood level difference (m)

- < -0.3
- -0.2 to -0.3
- -0.1 to -0.2
- -0.05 to -0.1
- -0.01 to -0.05
- No change

- Potential Basins
- Railway
- Study Area

JACOBS

SCALE	A3
SHEET	1 of 1
	GDA 1994 MGA Zone 55
TITLE	Difference in peak 1% AEP flood levels with potential basins
PROJECT	Blayney FRMS
CLIENT	Blayney Shire Council
DRAWN MR	PROJECT # EN04201
MAP #	Figure 8-1
REV	1
VER	1
CHECK AH	DATE 29/11/2016

8.1.3 Upgrade of stormwater system

Overland flooding is the main source of flood damages for the town of Blayney. It is noted in the Blayney Flood Study Report (Jacobs 2015) that a selected number of main branches in the overall stormwater network were represented in the TUFLOW model and typically, the selected branches were aligned with the main overland flow paths in the study area. A number of upgrade options was considered for three areas which did not result in discernible improvement in overland flood behaviour. The existing stormwater network needs to be assessed first prior to investigating options involving stormwater upgrade. In addition, there are opportunities to implement principles of water sensitive urban design to manage both quantity and quality of stormwater runoff.

Recommendation

It is recommended that Council develops a stormwater management strategy to address both the quantity and quality of stormwater runoff.

8.1.4 Removal of willows

Willows are present along the Belubula River and its tributaries and one respondent identified removal of willows as a flood mitigation measure.

Willows can have a significant impact on channel morphodynamics and can alter flow hydraulics, due to their establishment within the channel or at its margins. Willows established on channel bed obstruct channel flow and thus has the potential to reduce bankfull capacity. In the case of the Belubula River and Abattoir Creek, widespread overbank flooding occurs in the 20% AEP event and the floodplain is the major carrier of flood flow during significant flood events. Hence willows are expected to have limited influence on movement of floodwaters during significant flood events. A detailed assessment on impacts on willows in the Macquarie River at Marebone was undertaken by Sinclair Knight Merz (at present, Jacobs) in 2008 for the then Department of Environment & Climate Change. Key outcomes from the study are summarised in the following paragraphs.

The scope of the 2008 study involved desktop reviews, site investigations and flood modelling. The desktop assessment included a review of photographs of willows captured from a helicopter in 2005. The following observations were made from a review of the photographs:

- Willow infestations were more pronounced in sinuous reaches and less a problem in the straight reaches of the Macquarie River.
- Further study would be required of earlier aerial photography to determine if the sinuous reaches where willow infestation are more evident, were also more sinuous prior to willow establishment and determine the extent of channel changes that took place since establishment.
- It is possible that sinuosity increased in sections of the channel where willows established and the effect they caused in altering channel hydraulics, greater bank scour and development of meanders. The increase in sinuosity arises due to the deflection of flows caused by willows established within the channel bed and at the margins. Accelerated scour of banks and growth of meanders occur to compensate the willow blockage.

The general impression gained from the site investigations was that the channel adjusts fairly rapidly to encroachment and quickly reinstates its former cross sectional area. During the site inspection, three main types of willow encroachment were observed:

- Willows encroach from inside bend with channel adjustment on outer bank. The pointbar is deposited such that the inside bankline migrates laterally and effectively follows the willows across the channel.
- Willows encroach from inside bend usually with some adjustment of the outer bank but this time their rate of encroachment outstrips the rate of pointbar development and they give rise to a vegetated mid-channel bar with the low flow bifurcated around them.

- Willows encroach from both sides, usually on a straight reach, to narrow the waterway. Channel adjustments appeared to be local incision of the bed and bank toes to retain cross sectional area through a deeper and narrower channel.

The hydraulic modelling undertaken for the study indicated negligible improvement in bankfull capacity due to removal of willows. There was however a slight increase in peak flow velocity. As noted above, the channel is able to accommodate its morphology so that hydraulic capacity is not compromised by willow encroachment but at the price of loss of agricultural lands on the opposite bank to the willows. In addition, willows have significant impact on river health, and if no action is taken further encroachment and establishment of willows in areas presently unaffected can be expected to occur. The likely endpoint if untreated will be a monoculture of willows through this section of the Macquarie River.

Recommendation

On the basis of the above, it is recommended that Blayney Shire Council in association with The Central West Acclimatisation Society would continue to remove willows from the Belubula River and its tributaries in consultation with Central Tablelands Local Land Services and the OEH from the Belubula River. Removal of willows would improve the health of the waterways.

8.1.5 Improved flood access to the retirement village

Shallow flooding occurs in the 20% AEP event along Henry Street and access to the retirement village located on Henry Street between Church Street and Burns Street is lost during larger flood events. This section of Henry Street is classified as floodway and two units within the retirement village are subject to above floor flooding in the 1% AEP event. Both Burns Street and Church Street are overland flowpaths and raising the section of Henry Street between Church and Burns Street would impede overland flooding and drainage from the retirement village would be problematic. Vehicular access to the retirement village during significant flood event would be hazardous.

Recommendation

It is recommended that existing internal walkways within the village are to be used to evacuate to Church Street.

8.2 Property Modification Measures

8.2.1 Voluntary purchase

There are two residential properties in Blayney which are located on high hazard area. One property encroaches the floodway and the other property is located on flood storage area. Both properties may be considered for voluntary purchase. The voluntary purchase of residential properties is part of the subsidised floodplain management programs in NSW. After purchase of the property, the land is subsequently cleared and the site re-developed or re-zoned as public open space. Once the owner is notified of the offer to purchase the property, the owner can decide when to sell the property. The price of the property is determined by an independent valuation and there is no compulsion to sell.

While voluntary purchase is the preferred option for these houses situated on a high hazard area, alternatively, these properties may be considered for voluntary house raising (discussed in Section 8.2.2 below).

8.2.2 House raising

There are 87 residential properties which are subject to above floor flooding in Blayney in the 1% AEP event and three of the residential properties are impacted in the 1% AEP event due to flooding in the Belubula River. Whilst it would be possible to mitigate flooding to properties subject to overland flooding by flood modification measures (eg. flood retarding basins and upgrade of stormwater network), these three properties (including

those two properties identified as candidates for voluntary house purchase) which are impacted by mainstream flooding, voluntary house raising is considered the most economically feasible option.

House raising is generally applicable to timber framed (non-brick) residences, such as weatherboard, metal or fibrous cement dwellings, where the house need only be raised up to 2 metres to be above the planning level flood and generally be located in low hazard zones. The houses would require raising above the 1% AEP flood level plus a 0.5m freeboard. This would protect the dwellings from damage due to above-floor flooding up to the 1% AEP event. House raising typically involves the disconnection of services, jacking up the house and building new supports and access (e.g. stairs) for the building. Voluntary house raising which is part of an adopted Floodplain Risk Management Plan can attract State and Federal Government funding. In accepting schemes for eligibility, the Government has laid down several conditions to be met:

- Voluntary house raising is part of an adopted Floodplain Risk Management Plan
- The scheme is administered by the local authority (Council)
- There is no retrospective payment of subsidy for houses previously raised by the owner.

The Government also requires that Council carry out ongoing monitoring in subsidised voluntary house raising areas to ensure that redevelopment does not occur to re-establish habitable areas below the designed floor level. In addition, it is expected that Council will ensure that subsequent owners are made aware of restrictions on development below the design floor level by documentation (Section 149 certificates) during the conveyancing process.

8.2.3 Flood proofing

Flood proofing measures may also be applied to the houses that experience above floor flooding up to the 1% AEP event. This may take the form of measures such as making lower levels water tight or providing bunding around houses to divert floodwaters around the building. These options, however, are not considered feasible due to potential impacts on neighbouring properties.

8.3 Response Modification Measures

8.3.1 Local flood plan

Having a local flood plan is important for the community and State Emergency Service (SES) to be prepared when there is a flood. The plan would outline preparedness measures and the response to flooding in the area. The strategies and personnel responsible for their implementation would be detailed along with the plan for recovery afterwards. A local flood plan may prove to be a valuable resource in times of flood in order to coordinate a strategy to reduce flood risks. A Local Flood Plan for the Shire of Blayney is available and the SES needs to update the Plan using information available in this report and the Blayney Flood Study Report (Jacobs 2015).

8.3.2 Flood education and awareness

Flood education and awareness should be promoted throughout the town of Blayney. Residents living on an overland flow path should be aware of this and have personal safety plans in place in case of a flood. This is most effectively implemented through signposting. On all roads that experience a high flood hazard during the 1% AEP event, flood signage should be implemented. This includes a “Road subject to flooding” sign, along with a flood depth indicator. Signposting alerts residents to the issues of flooding in the local area and provides information about real time flooding conditions during an event and helps people manage where they travel. Additionally, Council or SES may run educational workshops or distribute information sheets to help people plan and prepare for a flood. Knowledge about local flooding issues is a valuable tool to equip the public with.

Section 149 certificates issued by Council could be used to inform property owners about flood risk to their properties.

8.3.3 Development control planning

Development controls should be in place and applicable to the flood planning area (FPA). Minimum floor levels should be set at least, 0.5m for areas subject to mainstream flooding and elsewhere a 0.3m freeboard above the adopted 1% AEP flood level. No new development or re-development allowed on floodways and Main Overland Flowpath. New residential buildings should be constructed using flood-compatible materials to withstand hydrostatic pressures and debris load. Allowance for the passage of water should be considered, including the porous fencing. All new developments/redevelopments should be assessed in light of the findings presented in the 'Blayney Flood Study Report' (Jacobs, 2015) and in this Floodplain Risk Management Study (Jacobs, 2016).

8.3.4 Flood warning

A flood warning system for Blayney has the potential to reduce flood risk. Overland flooding in Blayney is generally very shallow and there are minimal areas where a high flood risk is present. Overland flooding as a result of catchment flows will also occur within a short space of time, providing very little warning.

Flood warnings are issued by the Bureau of Meteorology to advise that flooding is occurring or expected to occur in a geographical area based on defined criteria. Flood warnings may include either qualitative or quantitative predictions or may include a statement about future flooding that is more generalised. The type of prediction provided depends on the quality of real-time rainfall and river level data, the capability of rainfall and hydrological forecast models and the level of service required.

A quantitative or qualitative flood warning of **Minor**, **Moderate** or **Major** flooding is provided in areas where the Bureau has specialised warning systems. They provide advanced warning about the locations along river valleys where flooding is expected, the likely class of flooding and when it is likely to occur. Predictions of expected water levels and the timing of flood peaks are provided at key forecast locations.

The Bureau also provides generalised flood warnings when there is not enough data to make specific predictions or in the developing stages of a flood. They typically rely on forecast rainfall and knowledge of historical flood response. Generalised warnings contain statements advising that flooding is expected in particular river valleys but do not provide information about flood class nor precise locations.

As part of its Severe Weather Warning Service, the Bureau also provides warnings for severe weather that may cause flash flooding. SES needs to consider providing flash flood warnings in Blayney.

8.3.5 Improved flood evacuation

Flood evacuation from Blayney is under the control of the SES and the SES needs to update the current evacuation planning based on information presented in this report.

9. Draft Floodplain Risk Management Plan

9.1 Recommended Measures for Blayney

Measures considered	Required Funding	Features of the Measure	Recommended Priority Rankings
1. Update the Local Flood Plan for Blayney.	SES costs	• SES to update the flood intelligence for the town of Blayney and monitor flood behaviour in Abattoir Creek and the Belubula River. • SES to update the Local Flood Plan for Blayney utilising information in this study and the Blayney Flood Study Report (Jacobs 2015).	**High Priority:** this measure has a high priority for inclusion in the FRMP. It does not require Local Government funding and it has a high priority in terms of managing flood risk to people.
2. Implement controls over future development/ re-development in flood prone areas in Blayney.	Council costs	• Floor levels of new developments[1] are to be located at the adopted Flood Planning Level (1% AEP flood levels plus the adopted freeboard). • A detailed flood assessment should be undertaken prior to Council approval of any proposed works within the Floodways and Major Overland Flowpaths identified in the Blayney Floodplain Risk Management Study (Jacobs 2016). • All new development within the Flood Planning Area are to be constructed using flood compatible materials to withstand hydrostatic pressures and debris load • Council to provide information on flooding in Section 149 certificate • A cumulative flood impact assessment is to be undertaken for all development applications involving significant earthworks within the Blayney Flood Planning Area. • Evaluation of development proposals to use data presented in the Blayney Flood Study Report (Jacobs 2015) and in this FRMS, 2016 • Council to develop a stormwater management strategy to implement principles of water sensitive urban	**High Priority:** this measure has a high priority for inclusion in the FRMP. It does not require additional Local Government funding.

Measures considered	Required Funding	Features of the Measure	Recommended Priority Rankings
		design for the town of Blayney. 1 While it is recommended that this floor level requirement be applied to residential buildings, the DCP may detail alternative requirements or exceptions for commercial and industrial buildings as determined by Council.	
3. Provide flood signage and flood depth indicators at major road crossings to enhance flood education and preparedness.	$15,000	• Provide flood signage and flood depth indicators at major road crossings and public areas within the study area (approximately 30 signs)	**High Priority:** this measure would improve flood education and flood preparedness for residents and has a high priority in terms of managing flood risk to people.
4. Protect existing development from overland flooding.	$0.20 Million	• Initial investigations and assessments required in the preparation of concept design and cost estimates for the required works involving flood retarding basins.	**High Priority:** this measure would ensure that concept design and cost estimates are prepared to improve flood affection to existing developments from overland flooding.
5. Voluntary house purchase/ voluntary house raising	$0.65 Million	• Initial investigation to identify willingness of owners for voluntary house purchase/raising of two residential properties and voluntary house raising of one residential property impacted by mainstream flooding. • Capital costs of voluntary purchase and demolition and landscaping of two properties and voluntary house raising of one residential property.	**Medium Priority:** this measure would ensure that no residential buildings are damaged in the 1% AEP event by mainstream flooding. A high priority is to be given to the initial investigation so that the preference of property owners are known and the cost of managing flood risk to properties can be finalised.

10. Acknowledgement

The study was carried out by Jacobs Group Australia Pty Ltd with funding provided from Blayney Shire Council and the Commonwealth and NSW Governments, through the NSW Office of Environment and Heritage.

A number of organisations and individuals have contributed both time and valuable information to this study. The assistance of the following in providing data and/or guidance to the study is gratefully acknowledged:

- Residents of Blayney;
- Councillors and Council staff from Blayney Shire Council;
- Members of the Floodplain Management Committee, and
- Office of Environment and Heritage.

11. References

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12. Glossary

Annual Exceedance Probability (AEP)	The chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage.
Australian Height Datum (AHD)	A common national surface level datum approximately corresponding to mean sea level.
Average Annual Damage (AAD)	Depending on its size (or severity), each flood will cause a different amount of flood damage to a flood prone area. AAD is the average damage per year that would occur in a nominated development situation from flooding over a very long period of time.
Average Recurrence Interval (ARI)	The long-term average number of years between the occurrences of a flood as big as or larger than the selected event. For example, floods with a discharge as great as or greater than the 20 year ARI flood event will occur on average once every 20 years. ARI is another way of expressing the likelihood of occurrence of a flood event.
Catchment	The land area draining through the main stream, as well as tributary streams, to a particular site. It always relates to an area above a specific location.
Development	Is defined in Part 4 of the EP&A Act In fill development: refers to the development of vacant blocks of land that are generally surrounded by developed properties and is permissible under the current zoning of the land. Conditions such as minimum floor levels may be imposed on infill development. New development: refers to development of a completely different nature to that associated with the former land use. Eg. The urban subdivision of an area previously used for rural purposes. New developments involve re-zoning and typically require major extensions of exiting urban services, such as roads, water supply, sewerage and electric power. Redevelopment: refers to rebuilding in an area. Eg. As urban areas age, it may become necessary to demolish and reconstruct buildings on a relatively large scale. Redevelopment generally does not require either re-zoning or

	major extensions to urban services.
DRAINS	DRAINS is a comprehensive program for designing and analysing urban stormwater drainage systems
Effective Warning Time	The time available after receiving advise of an impending flood and before the floodwaters prevent appropriate flood response actions being undertaken. The effective warning time is typically used to move farm equipment, move stock, raise furniture, evacuate people and transport their possessions.
Flood	Relatively high stream flow 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 major drainage before entering a watercourse, and/or coastal inundation resulting from super-elevated sea levels and/or waves overtopping coastline defences excluding tsunami.
Flood fringe areas	The remaining area of flood prone land after floodway and flood storage areas have been defined.
Flood liable land	Is synonymous with flood prone land (i.e.) land susceptibility to flooding by the PMF event. Note that the term flooding liable land covers the whole floodplain, not just that part below the FPL (see flood planning area)
Floodplain	Area of land which is subject to inundation by floods up to and including the probable maximum flood event, that is flood prone land.
Floodplain risk management options	The measures that might be feasible for the management of particular area of the floodplain. Preparation of a floodplain risk management plan requires a detailed evaluation of floodplain risk management options.
Floodplain risk management plan	A management plan developed in accordance with the principles and guidelines in this manual. Usually include both written and diagrammatic information describing how particular areas of flood prone land are to be used and managed to achieve defines objectives.
Flood plan (local)	A sub-plan of a disaster plan that deals specifically with flooding. They can exist at state, division and local levels. Local flood plans

	are prepared under the leadership of the SES.
Flood planning levels (FPLs)	Are the combination of flood levels (derived from significant historical flood events or floods of specific AEPs) and freeboards selected for floodplain risk management purposes, as determined in management studies and incorporated in management plans. FPLs supersede the "designated flood" or the "flood standard" used in earlier studies.
Flood proofing	A combination of measures incorporated in the design, construction and alteration of individual buildings and structures subject to flooding, to reduce or eliminate flood damages.
Flood readiness	Readiness is an ability to react within the effective warning time.
Flood risk	Potential danger to personal safety and potential damage to property resulting from flooding. The degree of risk varies with circumstances across the full range of floods. Flood risk in this manual is divided into 3 types, existing, future and continuing risks. They are described below. Existing flood risk: the risk a community is exposed to as a result of its location on the floodplain. Future flood risk: the risk a community may be exposed to as a result of new development on the floodplain. Continuing flood risk: the risk a community is exposed to after floodplain risk management measures have been implemented. For a town protected by levees, the continuing flood risk is the consequences of the levees being overtopped. For an area without any floodplain risk management measures, the continuing flood risk is simply the existence of its flood exposure.
Flood storage areas	Those parts of the floodplain that are important for the temporary storage of floodwaters during passage of a flood. The extent and behaviour of flood storage areas may change with flood severity, and loss of flood storage can increase the severity of flood impacts by reducing natural flood attenuation. Hence, it is necessary to investigate a range of flood sizes before defining flood storage areas

Floodway areas	Those areas of the floodplain where a significant discharge of water occurs during floods. They are often aligned with naturally defined channels. Floodways are areas that, even if only partially blocked, would cause a significant redistribution of flood flow, or a significant increase in flood levels.
Freeboard	Provides reasonable certainty that the risk exposure selected in deciding on a particular flood chosen as the basis for the FPL is actually provided. It is a factor of safety typically used in relation to the setting of floor levels, levee crest levels, etc. Freeboard is included in the flood planning level.
Full supply level (FSL)	The normal maximum operating water level of a water storage when not affected by floods. This water level corresponds to 100% capacity.
Hazard	A source of potential harm or situation with a potential to cause loss. In relation to this manual the hazard is flooding which has the potential to cause damage to the community.
Local overland flooding	Inundation by local runoff rather than overbank discharge from a stream, river, estuary, lake or dam.
m AHD	Metres Australian Height Datum (AHD)
m/s	Metres per second. Unit used to describe the velocity of floodwaters.
m^3/s	Cubic metres per second or "cusecs". A unit of measurement of creek or river flows or discharges. It is the rate of flow of water measured in terms of volume per unit time.
ML	Megalitres. Unit used to describe large volumes.
Mainstream flooding	Inundation of normally dry land occurring when water overflows the natural or artificial banks of a stream, river, estuary, lake or dam.
Modification measures	Measures that modify the flood, the property or the response to flooding.
Overland flow path	The path that floodwaters can follow as they are conveyed towards the main flow channel or if they leave the confines of the main flow

	channel. Overland flow paths can occur through private property or along roads.
Probable Maximum Flood (PMF)	The largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation couplet with the worst flood producing catchment conditions. Generally, it is not physically or economically possible to provide complete protection against this event. The PMF defines the extent of flood prone land, that is, the floodplain.
Risk	Chance of something happening that will have an impact. It is measured in terms of consequences and likelihood. In the context of the manual it is the likelihood of consequences arising from the interaction of floods, communities and the environment.
RORB	A computer program used in the estimation of rainfall runoff
Runoff	The amount of rainfall which actually ends up as a streamflow, also known as rainfall excess.
Stage	The amount of rainfall which actually ends up as streamflow, also known as rainfall excess.
SES	State Emergency Service of New South Wales.
Stage hydrograph	A graph that shows how the water level at particular location changes with time during a flood. It must be referenced to a particular datum.
XP-RAFTS	A computer program used in the estimation of rainfall runoff

Appendix A. Questionnaire

Flood Study for the Town of Blayney

Blayney Shire Council has contracted the Consultant, Sinclair Knight Merz (SKM), to undertake a flood study for the Town of Blayney. The flood study area for the Town of Blayney is shown in the attached Map 1.

The study is aimed at addressing the flooding issues due to riverine (Belubula River and its tributaries) and overland flooding and their combined impacts on flooding within the Town of Blayney. The Consultant would like to receive feedback from the community on a number of issues and topics already highlighted by the Council with regard to flooding in the Town of Blayney.

If you cannot answer any question in the questionnaire, or do not wish to answer a question, then leave it unanswered and proceed to the next question. **Your input to this important study will be greatly appreciated.** If you need additional space, please add sheets. **Please send your response** to this questionnaire **by 31 August 2013 using the attached reply paid envelope**.

If you would prefer to provide a letter with your comments to the Consultant, this would also be welcomed. Contact details of the Consultant's Project Manager are provided below:

Akhter Hossain
P O Box 164
St Leonards, NSW 1590
email: ahossain@globalskm.com

Place a tick or write a number in the relevant box as per instruction or write answers.

Quest-ion No.	Question and Answer
1.	**Do you live (reside) or have lived in the study area shown on Map 1?** A Yes (Please provide your address and put an 'X' on the relevant map) .... B No (Go to Question 3)
2.	**Do you own or rent your residence in the study area shown on Map 1?** A Own B Rent C How long have you lived in the study area? (Please write number of years)……..... ***If you are not sure whether you are in the map or not, please provide address
3.	**Do you own or manage a business in the study area?** A Yes, For how many years? …… B No (go to Question 5)
4.	**What kind of business is yours?**

Quest-ion No.	Question and Answer
	A Home based business B Shop/commercial premises C Light industrial D Heavy industry E Others, please write type of business ……
5.	**Have you had any experience of flooding (due to both Belubula River/ Farm Creek and/or storm events as well) in and around where you live or work?** A Yes B No (Go to Question 15)
6.	**How deep was the floodwater (from both Belubula River/ Farm Creek and/or storm water as well) in the worst flood/ storm event that you experienced?** Please estimate the depth ……..... What was the year of this flood?…… Where was this flood? A At your house? B At work? C Elsewhere? Please provide the street address for this flood? …….....
7.	**How long did the floodwaters stay up?** A Less than 2 hours B less than 6 hours C Approximately 1 day
8.	**What damage resulted from this flood in your residence?** (Please indicate either "none", "minor", "moderate" or "major". A Damage to garden, lawns or backyard B Damage to external house walls C Damage to internal parts of house (floor, doors, walls etc) D Damage to possessions (fridge, television etc) E Damage to car F Damage to garage G Other damage, please list……. H What was the cost of the repairs, if any?…….....
9.	**What damage resulted from this flood in your business?** (Please indicate either "none", "minor", "moderate" or "major".) A Damage to surroundings B Damage to building C Damage to stock D Other damages, please list…….. E What was the cost of the repairs, if any?…….
10.	**Was vehicle access to/from your property disrupted due to floodwaters during the worst flooding/ storm event?** A Not affected B Minor disruption (roads flooded but still driveable) C Access cut off
11.	**Did you or members of your family required assistance from SES during flood events?**

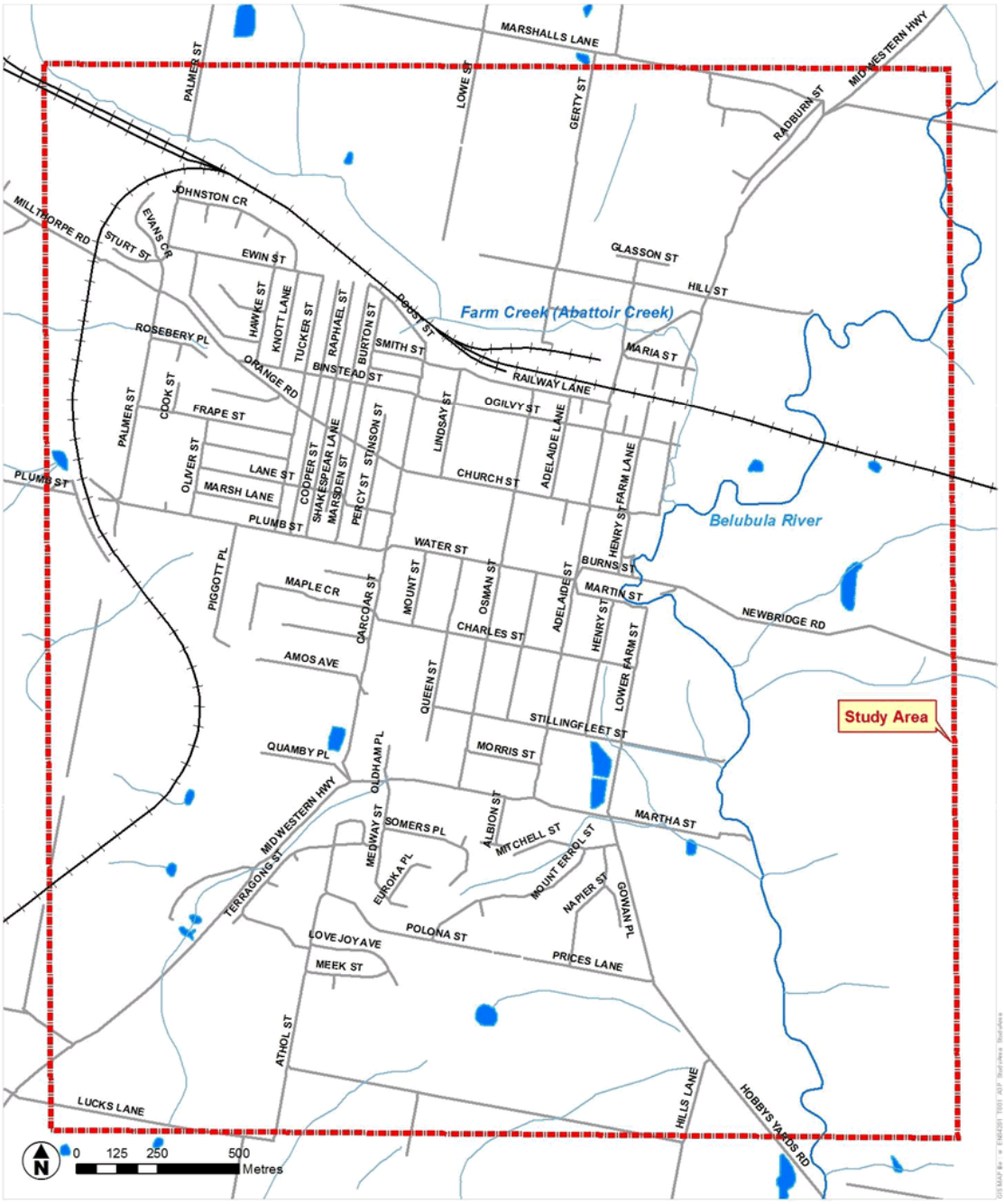
2

Questionnaire for the Town of Blayney

Quest-ion No.	Question and Answer
	A No B Yes, Please specify how many times (in total) members of your family required assistance? .....
12.	**What information can you provide on past floods/ storm events that created flooding?** (You can tick more than one item). Please write any descriptions at the end of the questionnaire A No information B Information on extent or depth of floodwater at particular locations, newspaper clippings or other images on the past floods C Any permanent marks indicating maximum flood level for particular floods D Memory of flow directions, depth or velocities
13.	**Do you consider that flooding of your property has been made worse by works on other properties, or by the construction of roads or other structures?** A Yes (please provide further details and attach extra pages if necessary. Please provide a sketch if possible). B Unsure C No
14.	**Do you have any photographs of past floods that would be useful for the consultant to help him understand the area flooded or other flood effects and are you willing to provide copies?** If possible please attach the photographs (with dates and location) which will be copied and returned. A Yes (either attach or the consultant will contact you to arrange for a copy to be made and returned) B No
15.	**Do you expect to undertake any further development on your land in the future?** A No B Minor extensions C New building D Unsure E Other (please specify) _____
16.	**Please rank the following development types according to what you consider should be assigned greatest priority in protecting from flooding** (1 = greatest priority to 7 = least priority). **Please identify specific items if necessary**. A Commercial B Heritage items, please specify _____ C Residential D Community facilities (schools, halls, etc.) _____ E Critical utilities (power substations, telephone exchanges, etc.) _____ F Emergency facilities (Hospital, Police Station, etc.) _____ G Recreation areas and facilities _____
17.	**Please rank the following by placing numbers from 1 to 6 (1 = greatest priority to 6 = least priority) next to A, B, C, D, E and F.** A Protecting residents/business from flooding B Protecting land of residents/businesses from flooding

Quest-ion No.	Question and Answer
	C Maintaining an emergency flood free access D Providing flood signage for public safety E Support from SES F Providing flood warning
18.	**Do you wish to comment on any other issues associated with this study? Please add comments at the end of the questionnaire or please indicate your willingness to answer questions over the phone?** _____ _____ _____ _____
19.	**Do you wish to remain on the mailing list for further details, Newsletters etc?** A Yes (please provide contact details, see next question) B No
20.	If you would like, please provide details of where you live and how we can contact you if we need to follow up on some details or seek additional comment. **Name:** _____ **Address:** _____ _____ **Telephone: .....** **Fax: .....** **Email:…….....**
	Space for additional comments _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

Map 1 – Study Area for the Town of Blayney



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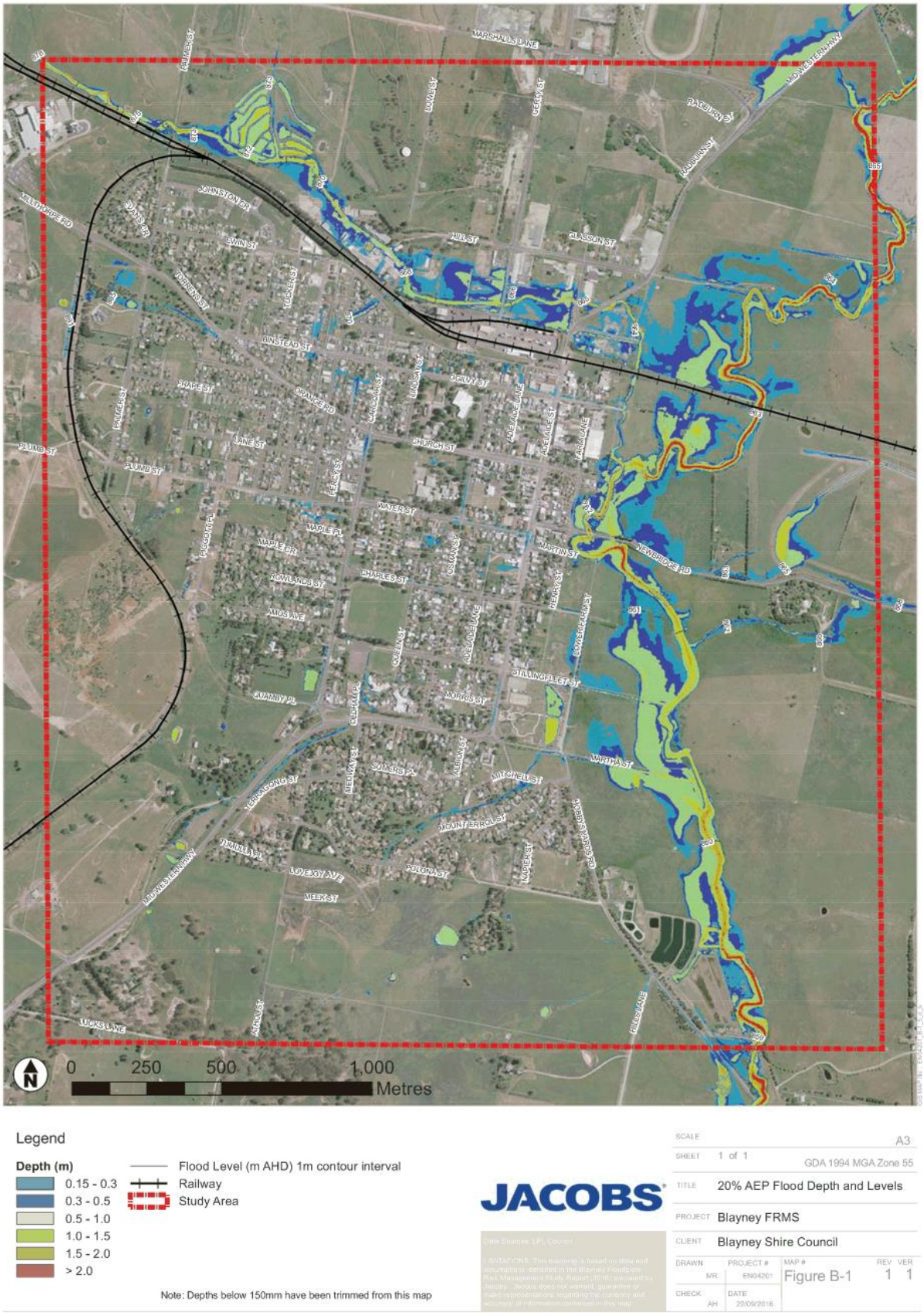
Questionnaire for the Town of Blayney

Do you have any information about flooding in your area?

Appendix B. Flood Maps and Peak Water Level profiles



Legend

Depth (m)

- 0.15 - 0.3
- 0.3 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0

Flood Level (m AHD) 1m contour interval

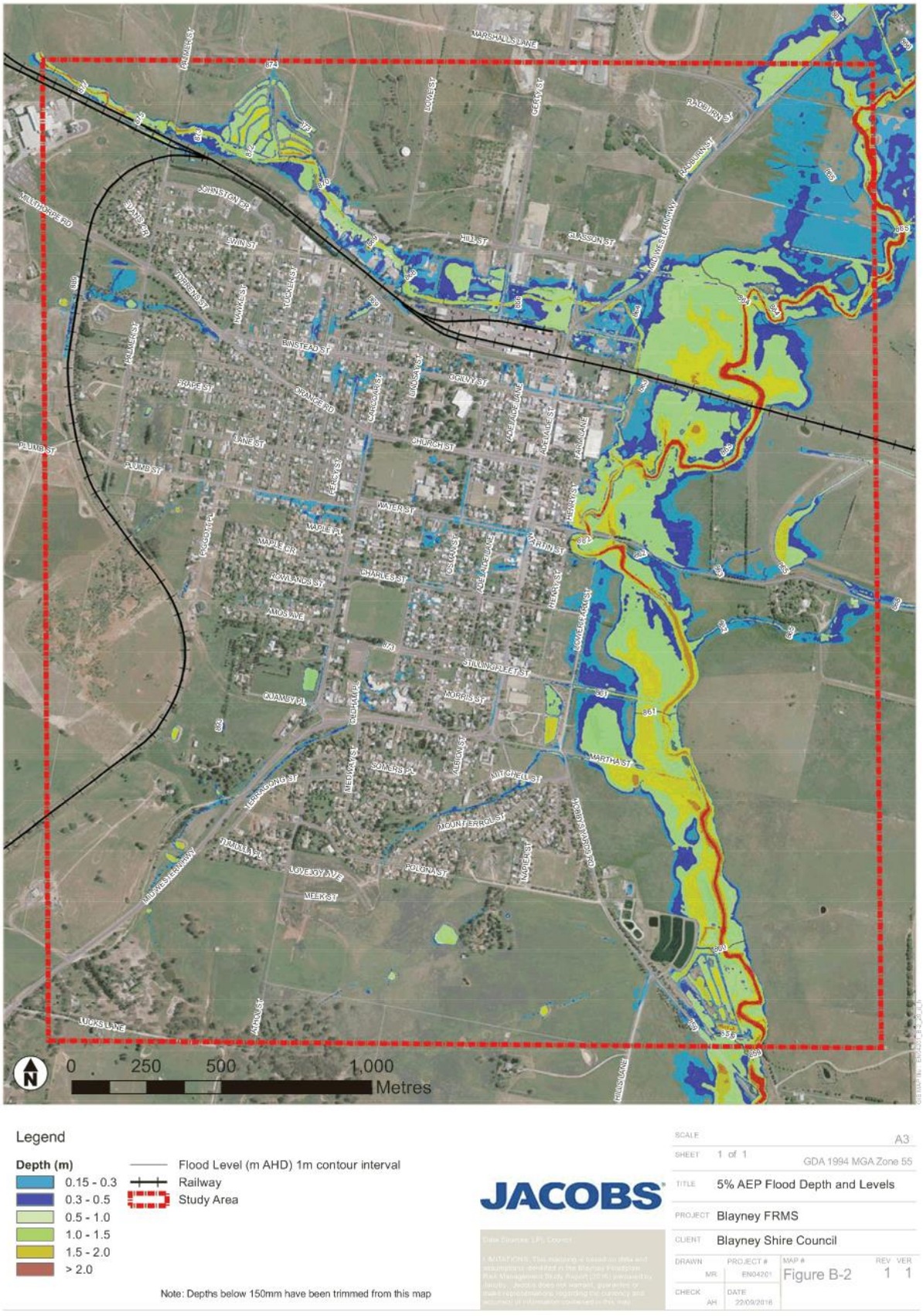
Railway

Study Area

Note: Depths below 150mm have been trimmed from this map

JACOBS

SCALE	A3
SHEET	1 of 1
	GDA 1994 MGA Zone 55
TITLE	20% AEP Flood Depth and Levels
PROJECT	Blayney FRMS
CLIENT	Blayney Shire Council
DRAWN MR	PROJECT # EN04201
MAP #	Figure B-1
REV	1
VER	1
CHECK AH	DATE 22/09/2016



Legend

Depth (m)

- 0.15 - 0.3
- 0.3 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0

Flood Level (m AHD) 1m contour interval

Railway

Study Area

Note: Depths below 150mm have been trimmed from this map

JACOBS

SCALE	A3
SHEET	1 of 1
	GDA 1994 MGA Zone 55
TITLE	5% AEP Flood Depth and Levels
PROJECT	Blayney FRMS
CLIENT	Blayney Shire Council
DRAWN MR	PROJECT # EN04201
MAP #	Figure B-2
REV	1
VER	1
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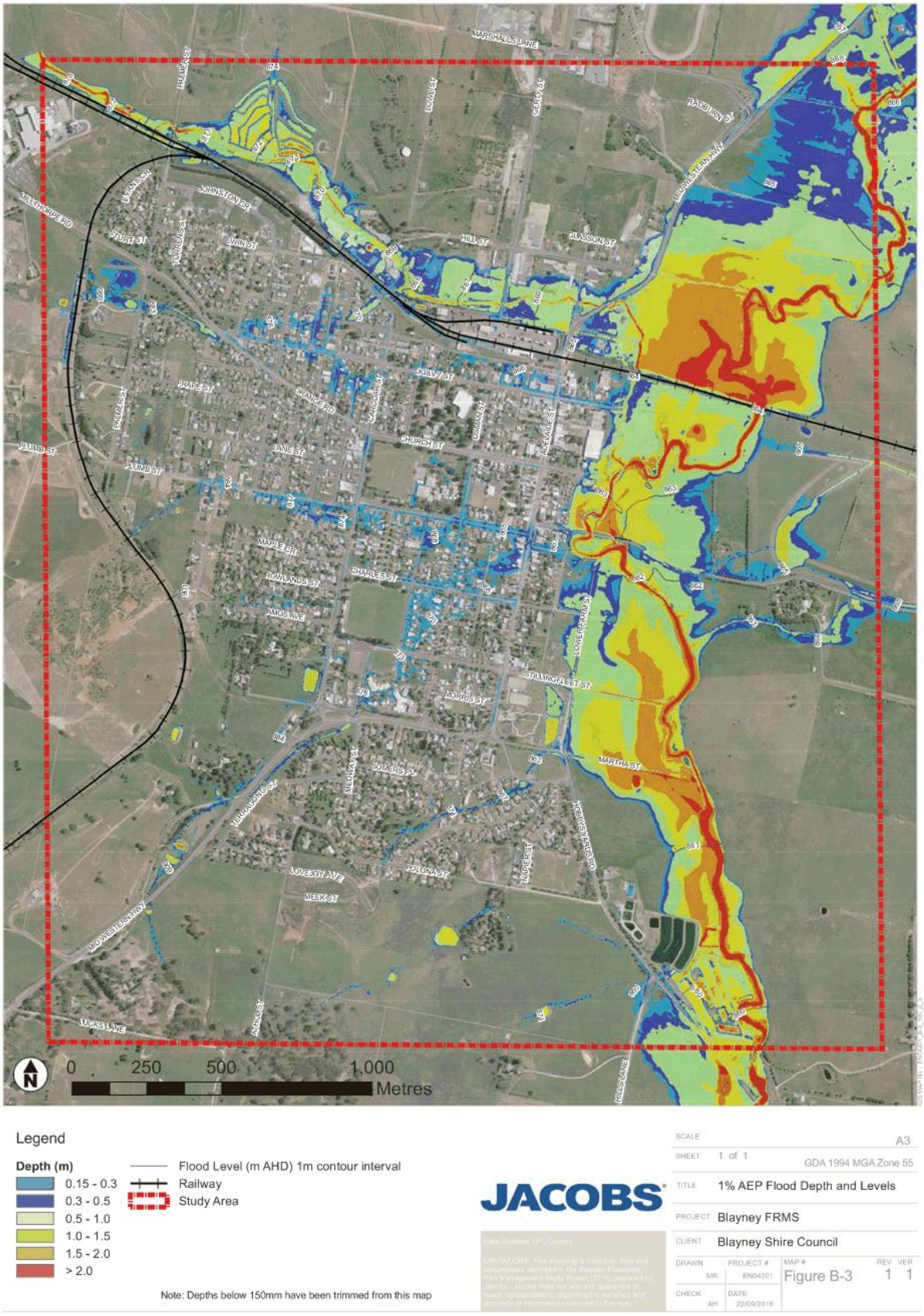


Legend

Depth (m)

- 0.15 - 0.3
- 0.3 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0

Flood Level (m AHD) 1m contour interval

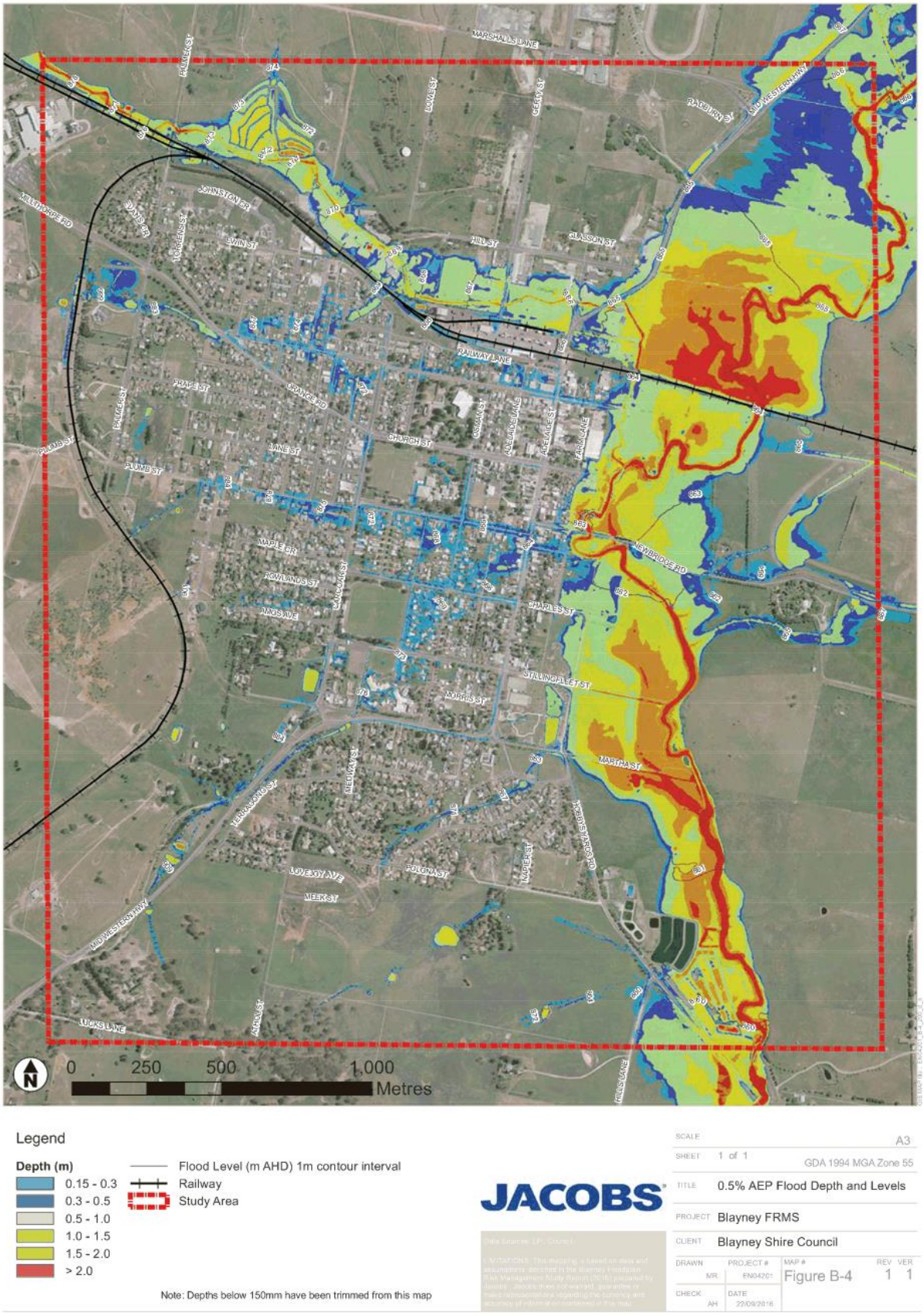
Railway

Study Area

Note: Depths below 150mm have been trimmed from this map

JACOBS

SCALE	A3
SHEET	1 of 1
	GDA 1994 MGA Zone 55
TITLE	1% AEP Flood Depth and Levels
PROJECT	Blayney FRMS
CLIENT	Blayney Shire Council
DRAWN MR	PROJECT # EN04201
MAP #	Figure B-3
REV	1
VER	1
CHECK AH	DATE 22/09/2016



Legend

Depth (m)

- 0.15 - 0.3
- 0.3 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0

Flood Level (m AHD) 1m contour interval

Railway

Study Area

Note: Depths below 150mm have been trimmed from this map

JACOBS

SCALE	A3
SHEET	1 of 1
	GDA 1994 MGA Zone 55
TITLE	0.5% AEP Flood Depth and Levels
PROJECT	Blayney FRMS
CLIENT	Blayney Shire Council
DRAWN MR	PROJECT # EN04201
MAP #	Figure B-4
REV	1
VER	1
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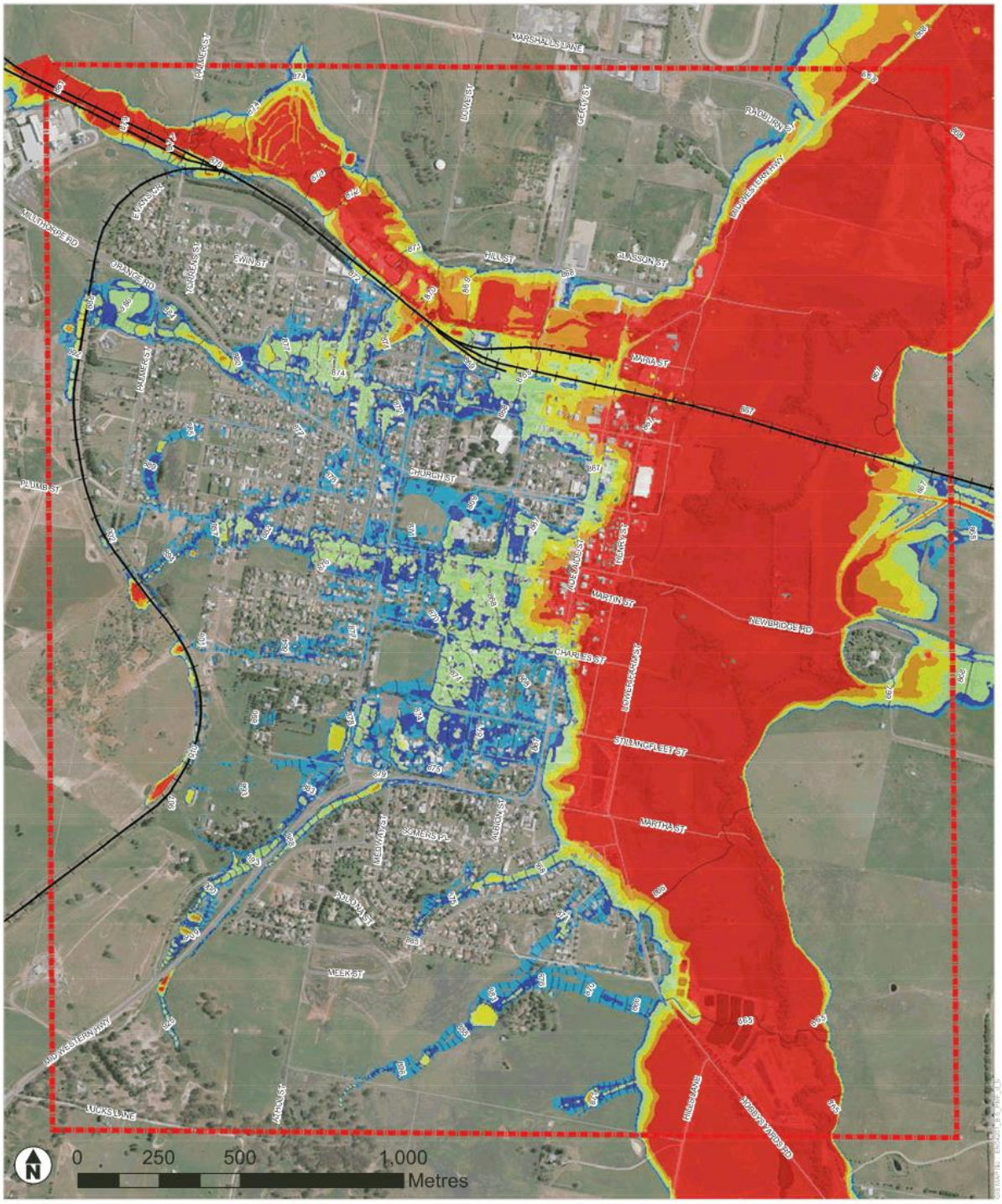

Legend

Depth (m)

- 0.15 - 0.3
- 0.3 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0

Flood Level (m AHD) 1m contour interval

Railway

Study Area

Note: Depths below 150mm have been trimmed from this map

JACOBS

SCALE	A3
SHEET	1 of 1
	GDA 1994 MGA Zone 55
TITLE	PMF Flood Depth and Levels
PROJECT	Blayney FRMS
CLIENT	Blayney Shire Council
DRAWN MR	PROJECT # EN04201
MAP #	Figure B-5
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VER	1
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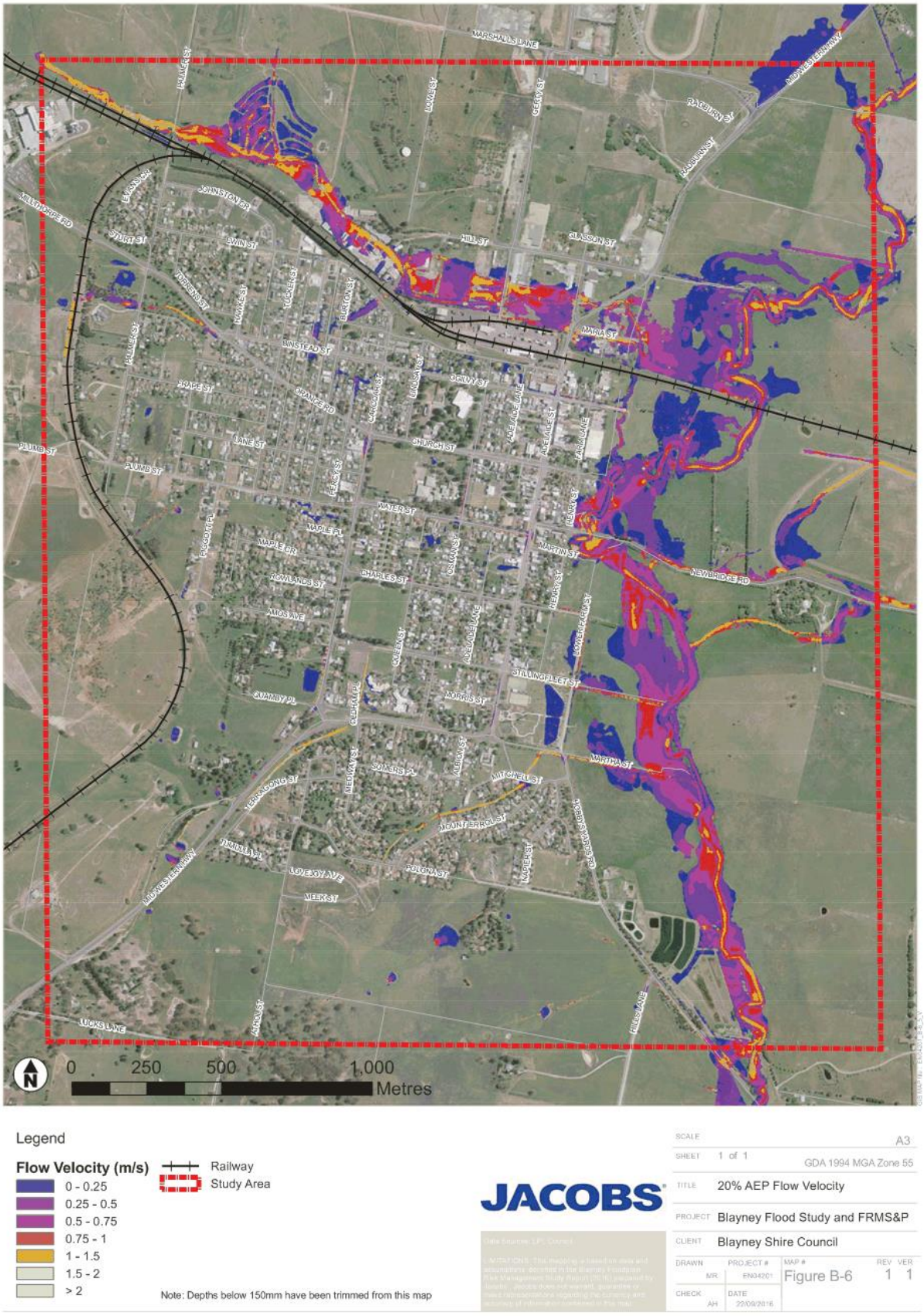

Legend

Flow Velocity (m/s)

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Railway

Study Area

Note: Depths below 150mm have been trimmed from this map

JACOBS

SCALE	A3
SHEET	1 of 1
	GDA 1994 MGA Zone 55
TITLE	20% AEP Flow Velocity
PROJECT	Blayney Flood Study and FRMS&P
CLIENT	Blayney Shire Council
DRAWN MR	PROJECT # EN04201
MAP #	Figure B-6
REV	1
VER	1
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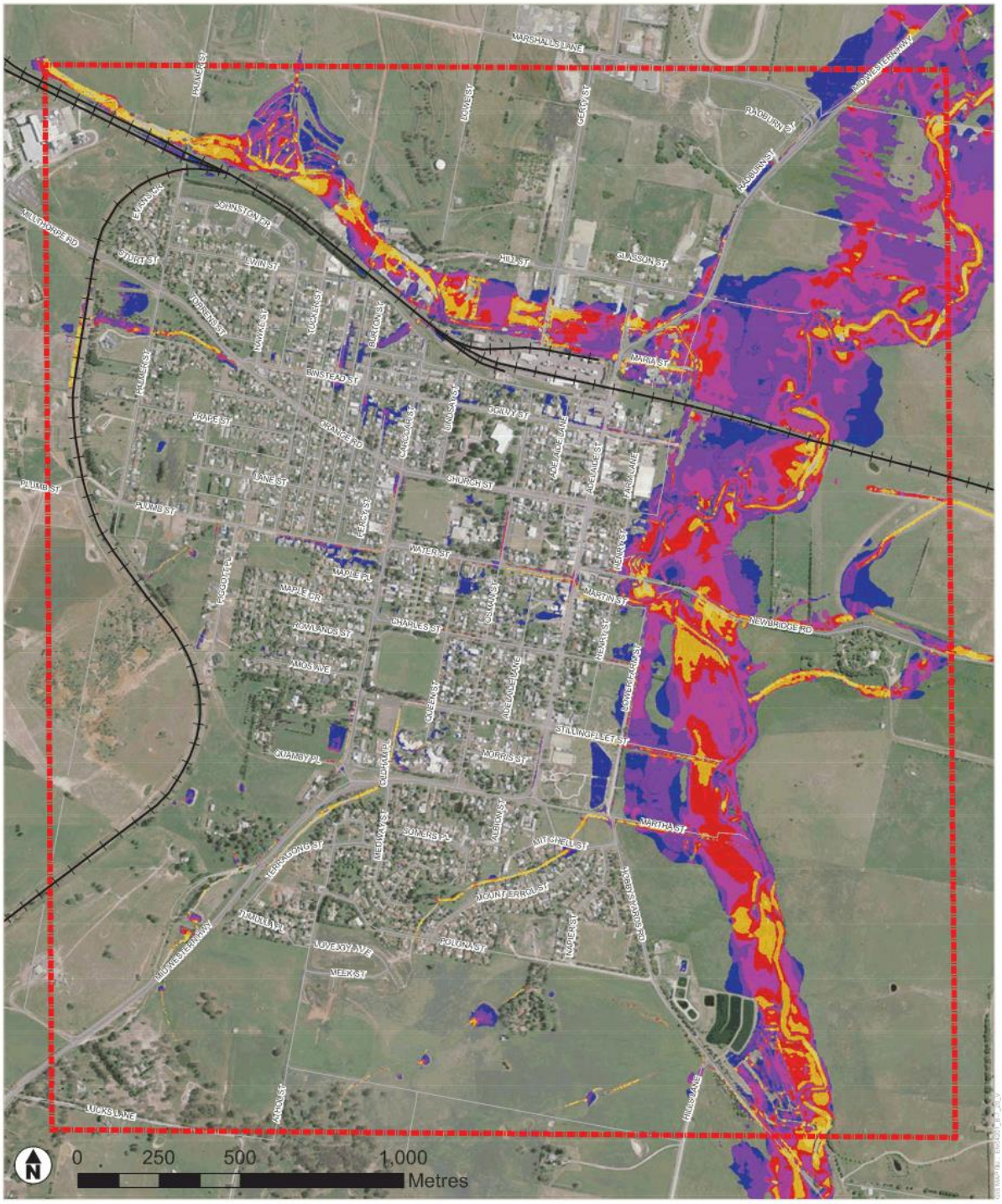

Legend

Flow Velocity (m/s)

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Railway

Study Area

Note: Depths below 150mm have been trimmed from this map

JACOBS

SCALE	A3
SHEET	1 of 1
	GDA 1994 MGA Zone 55
TITLE	5% AEP Flow Velocity
PROJECT	Blayney Flood Study and FRMS&P
CLIENT	Blayney Shire Council
DRAWN MR	PROJECT # EN04201
MAP #	Figure B-7
REV	1
VER	1
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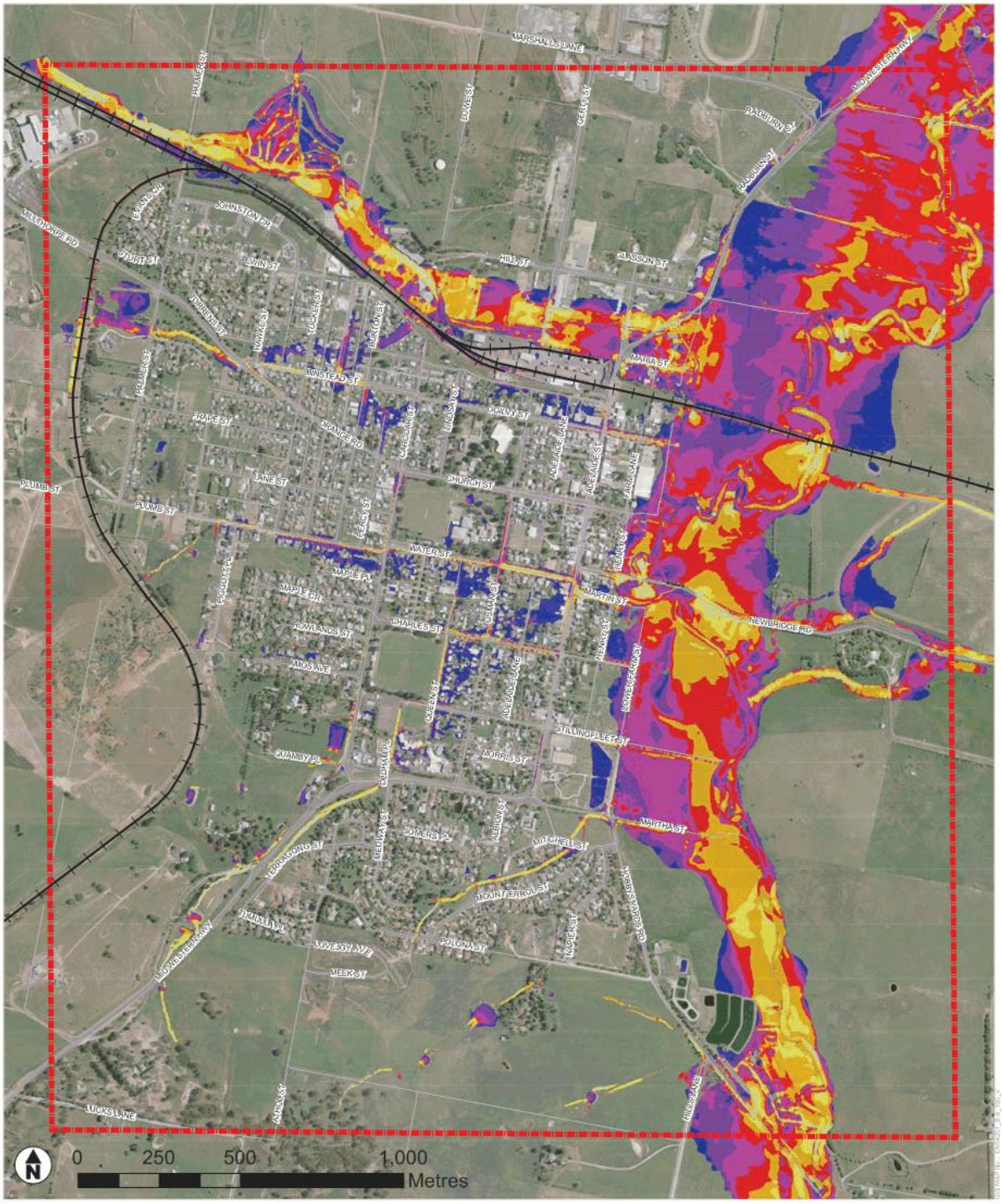

Legend

Flow Velocity (m/s)

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Railway

Study Area

Note: Depths below 150mm have been trimmed from this map

JACOBS

SCALE	A3
SHEET	1 of 1
	GDA 1994 MGA Zone 55
TITLE	1% AEP Flow Velocity
PROJECT	Blayney Flood Study and FRMS&P
CLIENT	Blayney Shire Council
DRAWN MR	PROJECT # EN04201
MAP #	Figure B-8
REV	1
VER	1
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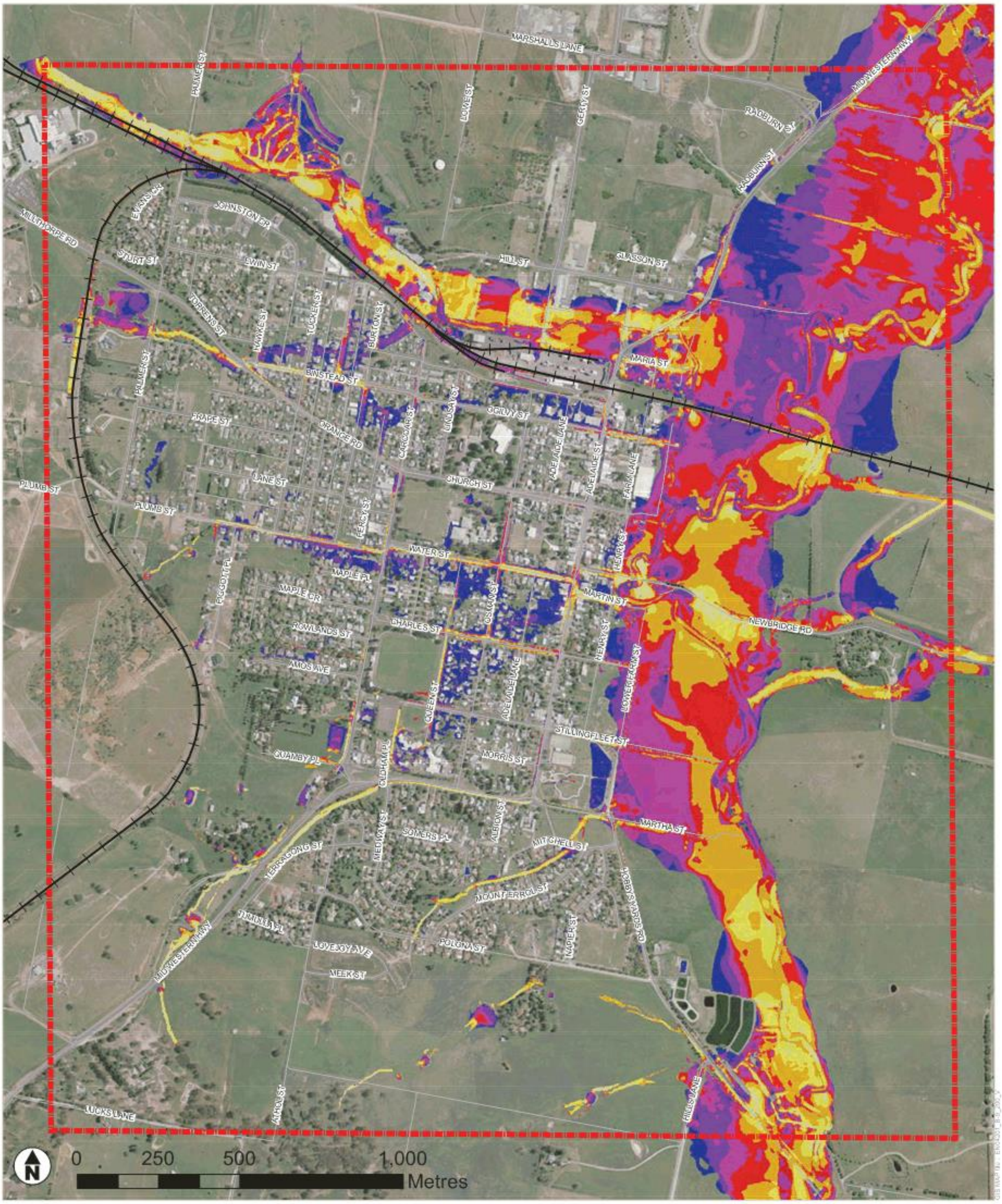


Legend

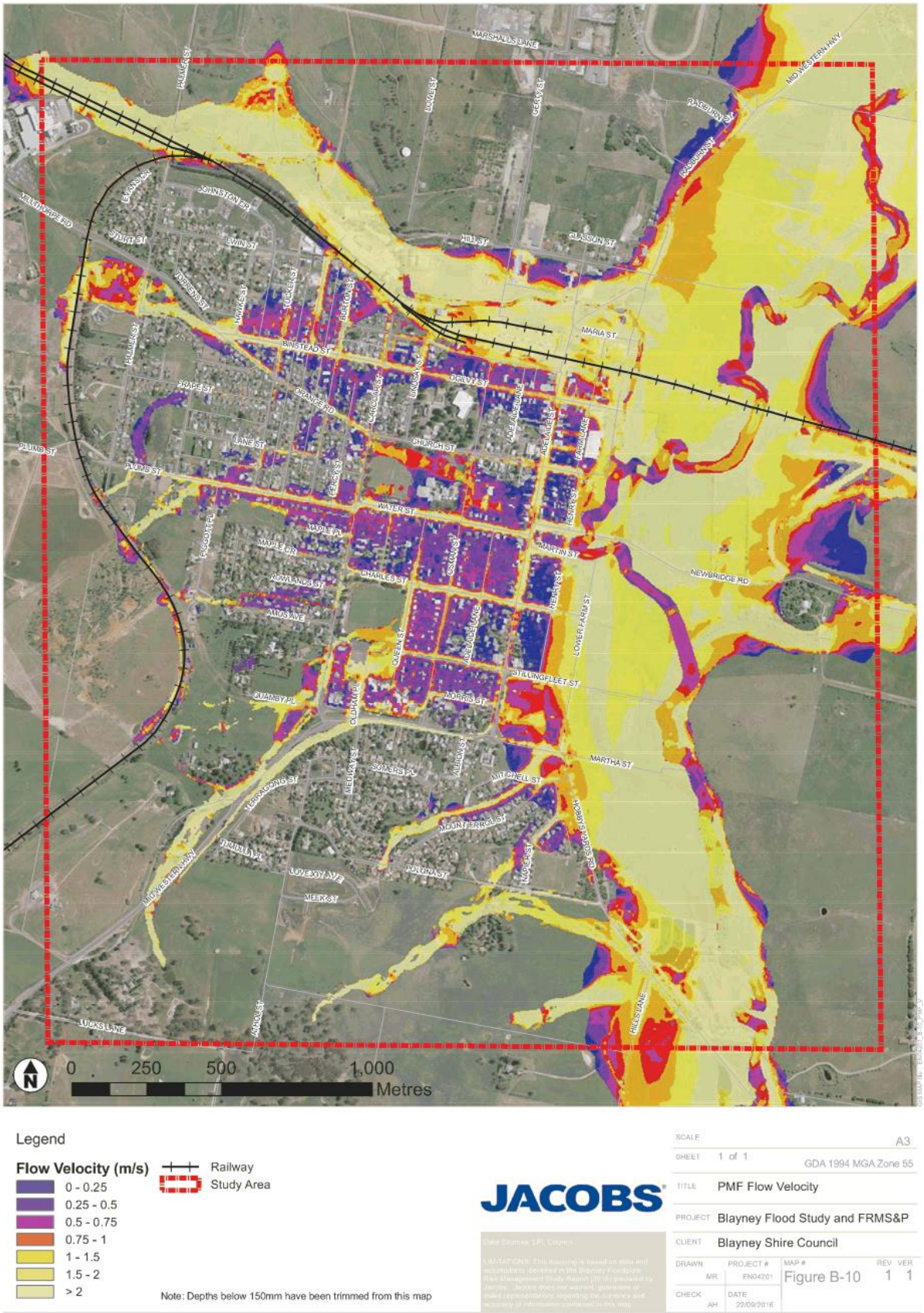
Flow Velocity (m/s)
- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Railway
Study Area

Note: Depths below 150mm have been trimmed from this map

JACOBS

SCALE	A3
SHEET	1 of 1 — GDA 1994 MGA Zone 55
TITLE	0.5% AEP Flow Velocity
PROJECT	Blayney Flood Study and FRMS&P
CLIENT	Blayney Shire Council
DRAWN	MR — PROJECT # EN04201 — MAP # Figure B-9 — REV 1 VER 1
CHECK	AH — DATE 22/09/2016



Legend

Flow Velocity (m/s)

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- > 2

Railway

Study Area

Note: Depths below 150mm have been trimmed from this map

JACOBS

SCALE	A3
SHEET	1 of 1
	GDA 1994 MGA Zone 55
TITLE	PMF Flow Velocity
PROJECT	Blayney Flood Study and FRMS&P
CLIENT	Blayney Shire Council
DRAWN MR	PROJECT # EN04201
MAP #	Figure B-10
REV	1
VER	1
CHECK AH	DATE 22/09/2016

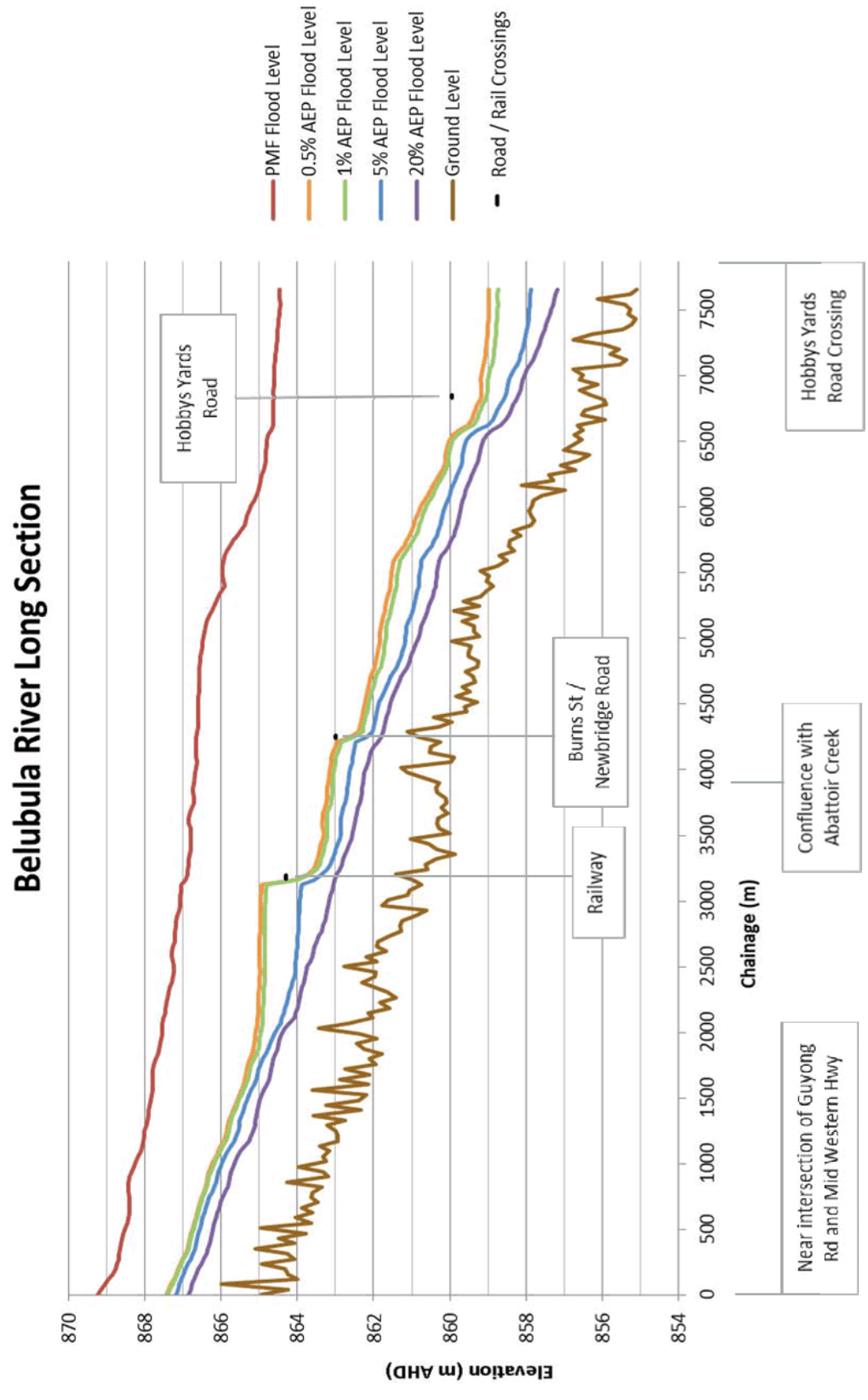


Figure B-11 Modelled Peak Water Level Profiles along the Belubula River

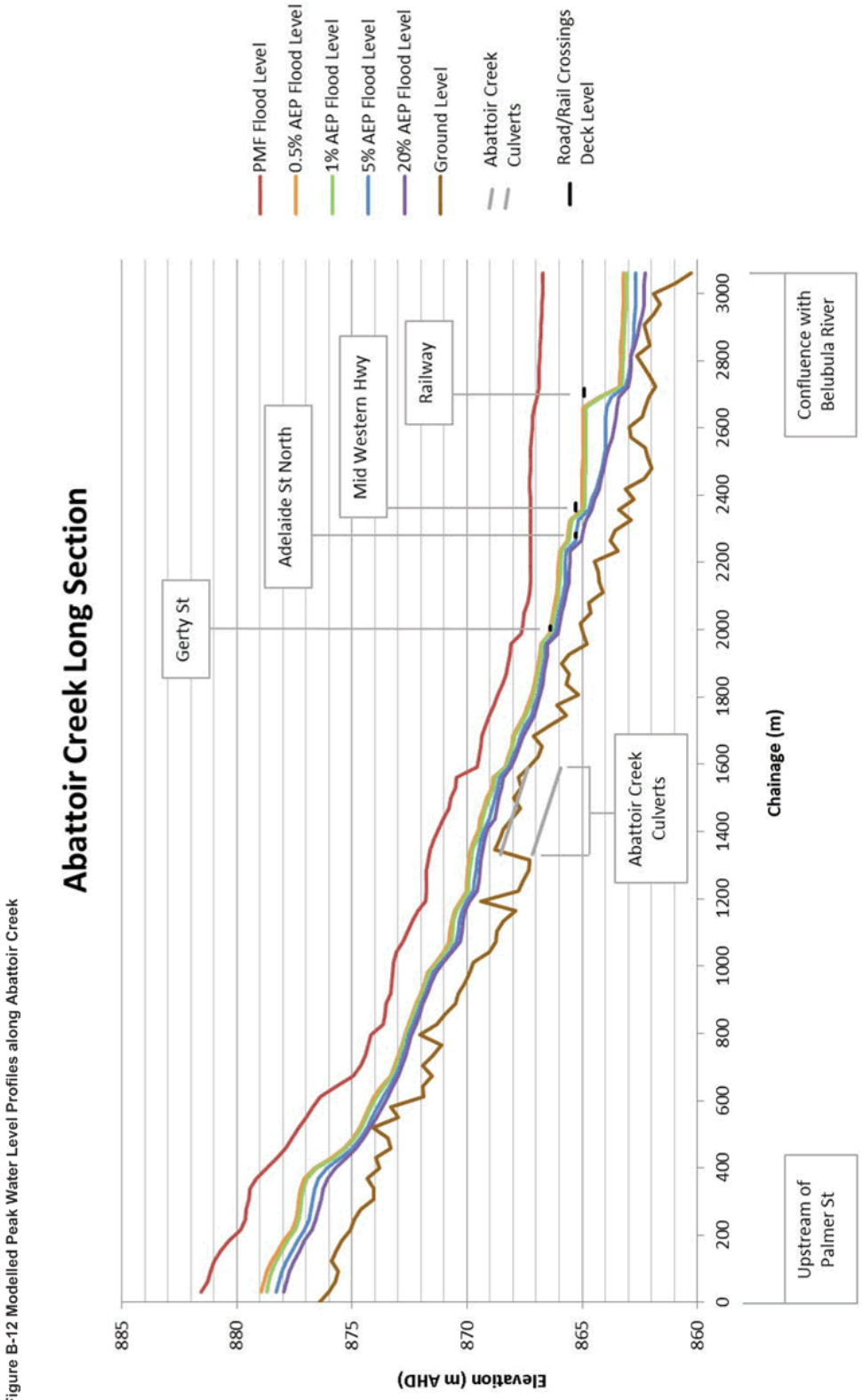


Figure B-12 Modelled Peak Water Level Profiles along Abattoir Creek

Appendix C. Public Submissions and Responses

Public submission 1

Concerns raised:

1. **Flooding on Newbridge Road**

   It was identified that the overtopping of Newbridge road to the east of the existing crossing is due to overland flows rather than Belubula flows. The report states (section 5.5) that "breakout flows from the Belubula River" overtop Newbridge Road to the east of the river crossing in the 20% AEP event. It has been observed that overtopping of the road in this location is not due to breakout flows, which are adequately diverted under the second or overflow bridge crossing and the raised road embankment. While it is considered true that the road overtops in events larger than 20% AEP, the overtopping is solely due to overland flows being captured from industrial developments upstream and draining down to this location. It has been observed that while the Belubula River is still within its banks that the road has been partially (50%) blocked by water after heavy rain. This is thought to be due to both the diversion of stormwater from upstream development and the blockage of the natural secondary stream flows by Newbridge Road itself. It was suggested that the natural flow be restored by a culvert under Newbridge Road and the extent to which the industrial developments have contributed to the problem be investigated.

2. **Removal of willows**

   It is considered that the report (section 8.1.4) relies too heavily on drawing a parallel between the Macquarie River at marebone near Warren (for which a previous study was undertaken) and the Belubula River at Blayney. The river morphology at both locations is quite different. It is considered that the willows occupy a much larger proportion of the cross sectional bankfull area in the Belubula River than the Macquarie River and therefore, conclusions cannot be drawn based on the previous study. It is suggested that removal of willows in the Belubula River would greatly assist during periods of high bankfull flows, before a 20% AEP event is reached and perhaps avoid it being reached.

Response to submission

Responses to concerns raised:

1. **Flooding on Newbridge Road**

   While the modelling indicates that Belubula flows can break out in the 20% AEP event and overtop Newbridge Road, overland flows from the industrial developments identified that are channelised along the northern side of Newbridge Road can also contribute to flooding over Newbridge Road. As indicated, this is certainly true when the Belubula River remains in-bank and a frequent rainfall event may produce overland flows that can impact the road. The text in the report has been updated to reflect this. However, it remains that both the overland flows and riverine flooding mechanisms have been simulated in each design flood event and the results produced in the flood maps display the maximum flood depths produced as a result of both flooding mechanisms. It is the aim of the Floodplain Risk Management process to reduce the flood hazard and risk to people and property in the community and since there are no residential dwellings affected by flooding up to the 1% AEP in this area, solutions to flooding in this area have not been investigated in this study as there are other areas of a higher priority.

2. **Removal of willows**

The comments regarding the removal of willows are valid. In the absence of a detailed investigation of willow removal along the Belubula River, information was obtained from the available report that involved a detailed study, including flood modelling, of willow removal in the Macquarie River. Given the high frequency at which the Belubula is estimated to exceed bank full capacity (20% AEP flood event), the removal of willows would not have a large impact on reducing flood levels once over bank flooding occurs. The channel area represents only a small portion of the entire floodplain. The removal of willows would therefore not result in a significant reduction of flood damages in Blayney. As recommended in the report, the willow removal program should continue, however, it will not attract government funding through a floodplain management program and hence has not been a recommended flood mitigation measure in the report.

Public submission 2

Concerns raised:

1. **Limited historical flood data**

This point highlights the limitations of the study as there is a lack of observed data to be able to calibrate the flood model to. There was also only a small response the community survey.

2. **Flood plans require real and observed data**

There is concern over the modelled extent of the PMF in Blayney. It seems too extreme to be realistic. Recent rainfall and flood events of 2016 were used as demonstration that the flooding in the Belubula River could not reach the levels indicated by the PMF modelling. There were also specific concerns regarding the mapping of the hydraulic categories, hydraulic hazard and flood planning area along a section of the Belubula River.

3. **Existing development concerns**

Concerns were raised about the approval of certain developments in Blayney and how the flood risk to residential properties has been increased. The increase in impervious area and subsequent increase in stormwater runoff has been raised. The classification of communities of properties in this area in relation to the PMF was also questioned.

4. **Flood liable land**

The concern of classifying land as flood prone was raised. The incorrect categorisation of flood liable land is deemed to increase insurance costs or void the policy altogether.

5. **Willow removal**

Further investigation is suggested for willow removal as there is evidence for their usefulness to uptake water, strengthen river banks and provide fish shelters, and also their hindrance as a meandering river weed.

6. **Flood mitigation measures**

An additional flood mitigation option is proposed – construction of a small wall or levee bank to block the lowest point on the eastern side of Henry Street to avoid the flooding of the retirement village on the western side.

Response to submission

Responses to concerns raised:

1. **Limited historical flood data**

It is correct that the study was undertaken with a lack of observed historical data. The amount of data required to calibrate a flood model can be extensive and the town of Blayney lacks this data. In the absence of such data, best practice methods have been used to estimate the runoff and flood levels throughout Blayney. While the flood model has not been calibrated, validation was undertaken for the hydrologic models against other flow estimates for this area. Typical model parameters were used in both the hydrologic and hydraulic models and are within recommended ranges. This reflects the best practice that is possible for Blayney, following guidelines such as Australian Rainfall and Runoff. The report has also been reviewed by technical specialists and the Office of Environment and Heritage.

2. **Flood plans require real and observed data**

The probable maximum flood (PMF) has been estimated using the Generalised Short Duration Method from the Bureau of Meteorology (2003). This reflects the current industry standard for estimating the flows for the PMF across Australia. The PMF represents the largest conceivable flood that could occur in an area, so it is reasonable that this flood is much larger than even the 0.5% AEP flood event and could represent conditions that have not even come close to being observed historically. The average recurrence interval for the PMF for Blayney is approximately 1 in 10,000,000 years. Depending on the characteristics of the floodplain, the difference between the 1% AEP and the PMF may be large. For example, the Hawkesbury Nepean River PMF can be about 10m higher than the 1% AEP flood. The design PMF discharge for the Belubula River is within reasonable bounds. The specific concerns regarding flooding at one particular location along the Belubula River were also addressed through an explanation of how the mapping was undertaken and how the modelled flooding closely matches the observations that were noted in the submission.

3. **Existing development concerns**

It is not the scope of this study to address the change in flood behaviour due to existing approved developments. The Flood Study is designed to characterise the existing flooding situation and the Floodplain Risk Management Study and Plan are to assess potential flood management and mitigation measures. The classification of communities in the PMF event has been justified based on the modelling results for the area specified.

4. **Flood liable land**

It is understood that there is concern regarding the impact the report will have on properties in Blayney. It is not Council's intention to bring about any disadvantage to the public through the production of this report. The purpose of the floodplain risk management process is to correctly characterise the existing flooding behaviour and assess potential flood risk mitigation options. This has been done using the latest available information and best practice techniques. The PMF extent is by definition the flood prone land.

5. Willow removal

The study does not recommend removal of willows as a flood mitigation measure as there would be minimal benefit to this. The report instead recommends that Council continue to work with the Central West Acclimatisation Society, Central Tablelands Local Land Services and the Office of Environment and Heritage to investigate and remove willows for waterway health.

6. Flood mitigation measures

The raising of Henry Street was considered as a preliminary option to protect the retirement village units located along Henry Street. Both Burns Street and Church Street (leading to either end of Henry Street) are overland flowpaths and raising the section of Henry Street between Church and Burns Street would impede overland flooding and drainage from the retirement village would be problematic. Additionally, the extent of the levee or road raising required is not feasible to stop all water from entering the area.

Orange City Council

Rural and Industrial Sub-Regional Strategy

Section 16 Review and Update

CONTENTS

Orange City Council Sub-Regional Review

Section 16 Review and Update

EXECUTIVE SUMMARY

In July of 2008 the "Blayney Cabonne Orange Sub-Regional Rural and Industrial Land Use Strategy" (BCO) was finalised and adopted by all three member Councils. Section 16.1 of the BCO states:

> *While the Strategy provides a vision for the Sub-Region to around 2036, it is inevitable that the opportunities and constraints affecting the Sub-Region will change over time. As the vision and actions arising from this Strategy must be responsive to this change, they should be reviewed regularly to ensure that the Strategy remains current. This review process will also provide for continued community involvement in the development of the Blayney, Cabonne and Orange LGAs.*
>
> *Monitoring of the actions outlined in this Strategy will be undertaken annually to determine completion or continued compliance. Review of this Strategy will be undertaken every three to five years to ensure the issues covered in the Strategy are still current and comply with State government initiatives.*

While acknowledging the role and function of the neighbouring LGA's within the broader vision, this document undertakes a review of the BCO from the perspective of Orange City Council. Consultation with both Blayney Shire and Cabonne Shire Councils during the review has however provided formal guidance to the issues from their perspectives.

As this review has shown the growth of Orange since the original BCO was undertaken has been at a faster pace than was anticipated. This is due in part to the timing of the BCO which was prepared following an unusually slow period of growth for Orange between 2001-2006. The subsequent return to trend and major developments such as the Cadia mine expansion, new hospital and other factors have resulted in an accelerated uptake of industrial land in the Orange LGA.

The role and importance of the Orange economy within the sub-region is vital for the surrounding shires as well as significant amounts of activity in the neighbouring shires can be a mix of spill over from Orange itself, providing opportunities for some firms that may be priced out of the Orange market and absorbing traditional rural industries that have less need for urban customers.

The review has confirmed much of the original BCO logic, principles and criteria, supplementing as needed given the pattern of development observed since the BCO. The found a need for additional industrial / technology / employment lands within Orange and examined five broad areas for further investigation. The review finds that of the candidate sites one site has clear advantages over the remainder, three sites have some reasonable potential and may be worth investigating in the longer term, and one site should be discounted from any further consideration.

The most promising location involves land around the Orange airport, which has natural advantages in terms of topography, availability of infrastructure, connections to road, rail and air transport modes and would be co-located with an existing noise generating land use, thereby containing impacts to land that is already affected.

However this site is located on the edge of the LGA and as such has some potential to affect the industrial sectors of the neighbouring LGAs (Cabonne Shire and Blayney Shire). Accordingly the review has examined the composition of the respective local economies and their interrelationship. The

review finds that there are considerable differences in the make-up of the respective economies that establishing an employment estate at the Orange airport is unlikely to draw activity away from other LGAs. Conversely, while it is expected that the majority of the workforce would commute from Orange, the proximity to Blayney shire could result in some additional residential demand around Blayney through to Millthorpe as well as rural-residential demand in the southeastern parts of Cabonne Shire particularly around Spring Hill. An increase in population in this area would reinforce the existing local economies of Millthorpe and Blayney and may foster some expansion of their retail sectors.

This review has not undertaken a detailed environmental assessment of the airport site, or any of the other potential areas. However on economic and demographic grounds there is considered to be a sound basis for further consideration and investigation of this potential. The airport itself is an important regional transport resource. Increasing the extent of economic activity at the airport will help to underpin its commercial viability into the future.

Presently, the Orange economy has established a degree of momentum that is driving development, employment and population growth. However, if the industrial supply is allowed to exhaust in the medium term, then the Orange economy is likely to encounter constraints to its continued growth. This would constrain the ability of the local community to provide employment opportunities, leading to increased outward migration to other areas in the region, state or country, lowering and potentially reversing population gains. If such results were sustained the local skills base would begin to be eroded and place established businesses, particularly the construction sector, at risk.

BACKGROUND

Original Strategy

The Councils of Blayney Shire, Cabonne Shire and Orange City joined forces to prepare the BCO which was finalised in July 2008 to guide future land use planning for each Council forming the Sub-Region with a projected lifespan of 30 years. As well as informing decisions on services, development and new facilities the BCO outlines the planning framework for issues affecting the Sub-Region and its representative Councils.

The BCO identified and suggested potential changes to zone boundaries, the types of developments preferred to achieve the community's vision as well as recommending development controls for land resource management. Fundamentally, the BCO identified and evaluated lands for both industrial development and large lot residential "lifestyle" properties while seeking to preserve agricultural and environmental lands.

Growth Management

The Sub-Region experienced considerable population growth in the ten years leading up to the BCO and this has continued in the seven years since its adoption. While the driving factors evolved and changed over the period, the identified challenge between continued rural-residential development and broad acre farming has persisted and remains a central issue for continued development of the Sub-Region along with maintaining the balance between growth pressures and environmental sustainability.

Orange City Council Sub-Regional Review

Section 16 Review and Update

The key issues affecting the Sub-Region remain related to the protection of agriculture and primary production including mineral resources, forestry and energy generation, development of industry, impacts of residential and rural subdivision, protection of the natural and scenic environment as well as heritage and culture.

CORE INFRASTRUCTURE

While not the focus of the BCO, core infrastructure underpins the development potential and economic performance of the member Councils and their communities and is a key issue which has become significant in the region in recent years.

Water Security

Water security for Orange has improved since the BCO with the completion of stormwater harvesting schemes and the commissioning of the Macquarie River pipeline as well as improved demand management. Further work in water security for the Sub-Region has been identified and is likely to be a focal point for the member Councils in the period ahead. In particular significant concerns exist about the long term secure yield of Lake Rowlands, which is the main source of water for Blayney and much of Cabonne LGAs

The Suma Park Dam water catchment area is protected under the Orange LEP 2011 by way of clause 7.7 Drinking Water Catchments. This clause establishes additional Heads of Consideration for development applications within the catchment to ensure that the potential impact upon water quality is assessed and avoided, managed or minimised.

Energy Security

Anecdotally, the Orange community have been keen adopters of roof top solar energy systems, with panels appearing in most streetscapes around the City. Reticulated gas supplies are available throughout the urban footprint of the City. According to a wind atlas produced by the sustainable energy development authority (SEDA) in 2001 Orange is on the north-western edge of an area of strong wind resources, which stretches to the Blayney wind farm in the south and as far east as Lithgow. Orange is served by gas mains from the APA gas trunk network which sources gas from the main Moomba-Sydney pipeline. While there have been numerous upgrades to the power network over the last 5 years, a prospective gas power plant at Wellington remains a possibility

Communications

At the time of writing the National Broadband Network rollout has commenced in the Central west with many rural residents throughout the Orange LGA able to access the Fixed Wireless service, however some areas to the north east and east of the city are yet to be covered, with coverage in Clifton Grove being patchy due to topography.

The main Orange urban area is currently in the build preparation phase for Fibre to the Node. Latest advice is that fixed line services are anticipated to be available throughout the main Orange urban area around Mid 2016.

Orange City Council Sub-Regional Review

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Telstra and Optus have both enhanced their respective mobile phone network coverage in recent times within the Orange LGA to remove and reduce service blackspots.

On the whole Orange has access to high quality communications services and infrastructure that are actively being enhanced.

Transport

Since the BCO was adopted the Northern Distributor Road has been completed and the Southern Feeder Road commenced, driven to a large degree by the significant changes in traffic movements in Orange as a result of the development of the new Orange Hospital in the south of the city. Orange airport has been extended and the terminal upgraded to cater for larger aircraft. Rail services have been maintained and a new "Bathurst Bullet" service now operates with connecting bus services enabling Orange residents to access the early morning service. The potential development of the Inland Rail from Melbourne to Brisbane, with Parkes as a key node on this route, offers increased rail freight opportunities for Orange via the main western line from Orange to Parkes. The local road network continues to be upgraded over time and the Roads and Maritime Service continue to oversee the operation of the Mitchell Highway and other state roads in the area.

Orange is strategically located in the central west, well served with infrastructure the city provides higher order goods and services to the region. As an economic hub for the region the continued growth and development of Orange benefits the region as a whole.

KEY ISSUES

AGRICULTURE

The BCO highlighted the importance of agriculture to the local and regional economy. Potential threats to the continued success of agriculture included encroachment of rural settlement, particularly residential developments, maintaining the supply and health of environmental resources such as water and soil and external factors related to national and global markets and fiscal policies. Factors that support local agriculture were seen to include population growth, tourist expenditure and a positive brand. Benefits the sector brings to the rest of the community include employment opportunities and visual and landscape amenity.

The BCO was prepared while the Rural Lands SEPP was being formulated. It was anticipated that the SEPP would offer more guidance on interface issues between agriculture and other forms of development, particularly residential. The SEPP was gazetted in 2008 and is principally concerned with establishing principles for rural subdivision, which also need to be considered during rezoning processes.

INDUSTRY

The BCO recommended that existing and proposed industrial areas within Orange, Blayney and some villages be appropriately zoned under new LEPs. Planning for mining and tourism is also highlighted in the strategy, both to protect the environment from adverse consequences and to avoid land use conflicts arising from the encroachment of residential forms into areas better suited to economic activities.

Orange City Council Sub-Regional Review

Section 16 Review and Update

Currently there are 26 vacant lots in Narrambla, 12 vacant lots in Clergate, 38 lots total. In addition the Orange saleyards site comprises 6.8ha. The available supply generally comprise lots in the 2,100m^2 to 8,600m^2 size range. Given an annual take up rate of 5.7 lots (or 2-3ha) this indicates that there is currently 5-7 years amount of supply remaining.

However, the size of the lots offers limited/no opportunity for those firms or industries requiring much larger lots to be accommodated within the Orange LGA. In addition the available areas of vacant land are located in the north of the LGA. Beyond the saleyards there are no vacant lots in the south of the city, an area of increased economic activity centred around the new hospital and cadia mine, and where Council has a strong focus on improving key infrastructure, particularly roads with the development of the SFR and Forest Rd

This review finds there is a need for additional employment lands (being a combination of industry and business activity). Five broad areas were examined for their potential taking into account a range of opportunities and constraints. One site centred on the Orange airport emerged as having distinct advantages over the other potential sites.

RedeConsult were engaged by Council to undertake a review of the employment potential for the airport site taking into account the established pattern and distribution of industrial and business forms that have historically been attracted to Orange.

Residential and Rural Subdivision

A key focus of the BCO was to identify appropriate locations for residential and rural residential subdivision. The stated goal was to direct the location and range of lifestyle allotments away from outer areas of the Sub-Region. This acknowledges overflow from Orange as a major driver of lifestyle estates. The BCO identified several locations that may be suitable, but stated that they were indicative only and that each would need more detailed investigation and environmental assessment prior to any rezoning.

Natural and Scenic Environment

The BCO reinforces the need to consider the four principles of ESD and protection of water resources and catchments. The strategy also emphasises provision of buffers to development where this facilitates positive outcomes for natural resources including groundwater, surface water, remnant vegetation, threatened flora and fauna and riparian corridors. By inference these natural assets are central to the protection of scenic qualities evident across the Sub-Region.

Heritage and Culture

The BCO encouraged heritage provisions be included in new LEPs. Since then all member Councils have prepared standard template LEPs which include standardised provisions and mapping requirements. Amendment 1 to the Orange LEP 2011 saw considerable expansion to the list of heritage items and new heritage conservation areas identified. Further refinement to the heritage mapping of items is being examined as part of a separate LEP housekeeping amendment process. That amendment will ensure that where heritage items are located on large parcels only the relevant area of the lot, and a suitable curtilage, will be mapped for heritage conservation.

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SUMMARY OF STRATEGY AREAS – ORANGE CITY LGA

The BCO defined and examined a range of land unit areas throughout the subregion known as Strategy Areas (SA). A total of four SA units were located within the Orange LGA. SA 1 and SA 2 were investigated for potential lifestyle residential development of 1ha or above. SA A and SA B were investigated for potential industrial development. The following tables provide an overview and update these land units.

Lifestyle Allotment Strategy Areas		
SA 1 Leeds Parade Approx 150 ha	Original Reason for Inclusion	• Close proximity to Orange and existing urban areas • Unaffected by bushfire, drinking water catchment, topographical constraints and contains no significant remnant vegetation • Access to services • Likely lot size of 1 hectare or lower, due to likelihood that lots will be serviced
	Current Status	SA 1 has been zoned for a combination of R1 and R5 with a small local centre zone. The first subdivision DAs have been assessed and approved and are currently under development. SA 1 is therefore entering into the immediate to short term supply of residential and lifestyle housing.
SA 2 University Approx 635 ha	Original Reason for Inclusion	• Close proximity to Orange and existing urban and rural residential areas • Unaffected by bushfire, slope affected or within drinking water catchments. • Access to services • Likely lot size of 1 hectares or lower, due to likelihood that lots will be serviced
	Current Status	Predominantly consists of the Charles Sturt University campus, which has been zoned SP2 Infrastructure "University". The remainder of SA 2 along the north of the LGA has yet to be evaluated for rezoning and lot sizes but is considered to provide a suitable location for urban residential development in the mid-term, subject to master planning and environmental constraint analysis.

Industrial Strategy Areas		
SA A Narrambla Extension	Original Reason for Inclusion	• Immediately adjacent to existing industrial areas • Provides a buffer to future lifestyle development • Located on the fringe of the Orange urban area • Fragmented subdivision pattern precludes highly productive agriculture

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Approx 145 ha	Current Status	The western portion extending along Leeds Parade frames the primary approach to the Charles Sturt University campus in SA2. This area was zoned B7 Business Park in order to provide opportunity for start-ups and other enterprises that may seek to leverage opportunities and resources at the University. The southern portion to the east of Leeds Parade has been zoned SP2 Infrastructure in recognition of its proximity to the sewerage treatment plant and the associated potential for odour. SA A therefore does not provide conventional industrial land but contributes to the stock of employment lands in the form of a business park for higher order uses.
SA B North Clergate Approx 190 ha	Original Reason for Inclusion	• Extension to the existing North Clergate industrial area • Fragmented subdivision pattern precludes highly productive agriculture • Provides opportunities for industrial development that requires large lots, due to size or impacts
	Current Status	Currently remains zoned RU1 Primary Production. Given the intention of SA2 for residential development to the east and potential future expansion of urban residential lands to the south and west of the site, potential land use conflicts with industrial uses is a concern. Interface issues between the existing North Orange urban area and industrial land needs to be evaluated before any final decision on SA B is made. The BCO suggested the site may provide opportunities for industrial development that requires large lots due to size or impacts. If residential development does occur on either side of SA B then the ability to ameliorate noise impacts, for example, would be compromised. Steep topography in the south-western third of SA B further reduces the attractiveness of the site for industrial development. Large lot industrial development will typically serve as an attractor for other smaller footprint industrial / business development to meet the supply side needs of the major industry. In this regard, if a major industry were to establish within SA B it would likely consume the majority of the flat land available, leaving minimal opportunity for the flow on effects to take hold.

It should be noted that draft versions of the BCO had identified further land around Towac as potential industrial land. The Towac site was removed from the final version of the BCO after opposition from local residents.

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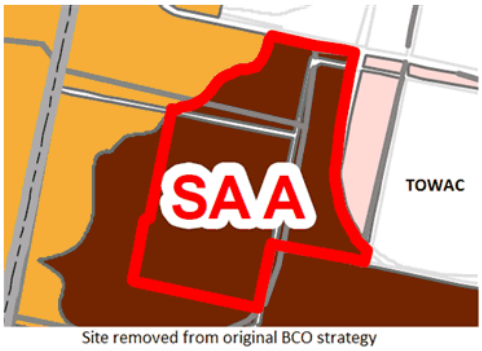
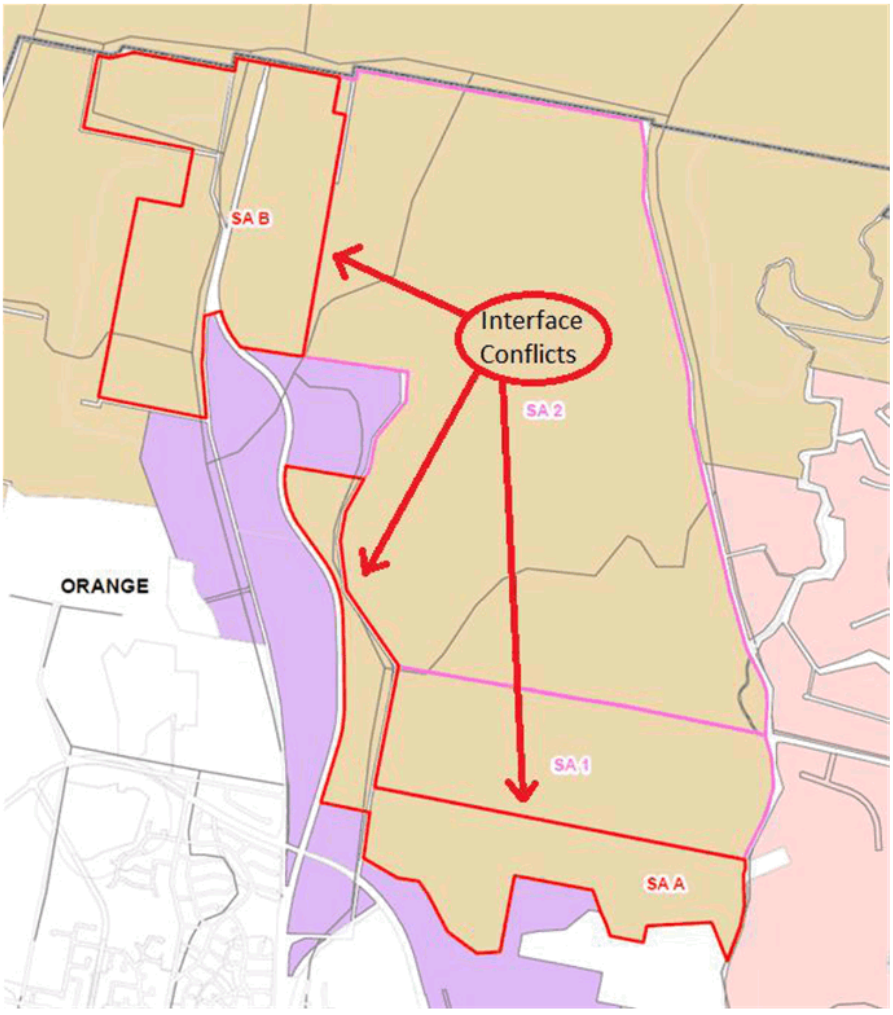


Site removed from original BCO strategy

However, when the Towac site, approximately 97ha in size, was removed it was not replaced with any alternative site or location but rather by reducing the size of SA1. The final BCO effectively identified 97ha less land overall than the underpinning logic would suggest was required. That reduction in identified industrial land has essentially shortened the lifespan or planning horizon of the strategy.



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By converting part of SA1 to SA A the BCO created the potential for a direct industrial-residential interface between land units SA A and SA1/2 as well as between SA2 and SA B. The potential land use conflicts that may arise from such an interface are generally not desirable.

Consequently during preparation of Orange LEP 2011 land unit SA B was deemed to be suitable for a range of urban functions. Council did not rezone the land for industry due to the potential land use conflicts that may arise in the longer term. SA B is positioned between land proposed for residential development to the east (SA 2) and a growing residential corridor to the southwest. Consequently the merits of encouraging industrial development in a location likely to be surrounded by residential development is questionable.

As the original BCO cautioned *"it should be noted that inclusion as a Strategy Area … does not automatically translate into rezoning … Detailed local environmental studies will be required for all Strategy Areas to determine their suitability for rezoning"* Accordingly, during preparation of Orange LEP 2011 an alternative zoning pattern was developed for the land units SA A and SA B.

SA A was converted to a mix of SP2 Infrastructure and B7 Business Park. This reflected proximity to the sewerage treatment plant and associated odours, and the need for Council to provide a substantial buffer zone around this piece of key infrastructure in the city to ensure its long term viability, as well as recognising the important link that Leeds Parade has connecting the city with the Charles Sturt University campus. This presents an opportunity to guide development of this corridor to create an attractive linkage with campus style development of enterprises that can relate to and leverage off the university campus. Generic industry in this corridor would jeopardise this potential urban design outcome.

By not proceeding with industry in SA B and most of SA A and refocussing the remainder of SA A towards a business park, which still permits light industry, the question arises of where to accommodate future industrial demand. The combined reduction (SA B and part SA A) of prospective industrial land is approximately 295ha.

Accordingly, this review has examined potential areas across the Orange LGA where industrial land could potentially be provided to restore the supply that was originally proposed in the BCO. Several criteria have been considered with each area scored and a weighting applied to the criteria to reflect the relative significance of each issue. The review finds the most suitable location to supplement the industrial land supply, within the Orange LGA, is likely to be land around the Orange airport.

The airport site has a number of advantages that distinguish it from other sites. This includes:

- Access to all three modes of transport (road, rail and air),
- Abundance of flat land (reducing the need for significant earthworks),
- Minimal interface with residential development especially urban densities (reducing the potential for land use conflict),
- Access to gas.
- Proximity to a nearby village (Spring Hill) that could benefit from supplying support functions to the workforce.

Additionally, the curtilage of the airport is already affected by noise emissions from aircraft movements and land is already fragmented to some extent, limiting the potential of the land for alternative uses like broad scale agriculture.

Obviously, no site is perfect and should the airport be selected for industrial / business park development a number of issues will need to be resolved. Transport corridors from the City to the

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airport will need to be suitable for workforce commuting and in the longer term connections from the airport to the Mitchell Highway for freight movements will also need to be considered. The land is at the upper reaches of the Orange water supply catchment and protection of water tables and runoff water quality will need to be addressed. Suitable buffer zones to adjoining landowners would protect their ongoing agricultural operations and the residential amenity of Spring Hill.

Further detailed site investigation forming the basis of a Planning Proposal would be needed to resolve the above matters, but on balance this review considers the airport curtilage to be the most viable option to provide for future employment lands within the Orange LGA.

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PART A – INTRODUCTION AND BACKGROUND

POPULATION GROWTH

At the time of the BCO strategy the most recent census figures available were from the 2006 census and when contrasted with 2001 figures this suggested that growth in the Sub-Region was largely driven by a trend toward rural living in the Blayney and Cabonne Shires with the population of the Orange LGA remaining static.

By relying on only the five year window from 2001-2006 the impression created by the original BCO for the Sub-Region as a whole is considerably slower growth than when a longer timeframe is examined. For this review figures from 1996 – 2014 were available.

Original BCO (2001 – 2006)

2006:	54,327	–
2001:	53,430	
	897	(5 years = 179 p.a.)

BCO Review (1996 – 2014 ERP)

2014:	62,616	–
1996:	51,933	
	10,683	(18 years = 593 p.a.)

The longer term trend is 3.3 times the annual rate of the period referenced in the original BCO. This strongly suggests that the period referenced by the BCO may have been an a-typical experience for the Sub-Region and forecasts derived from that period should at best be viewed as providing the conservative estimate.

Original BCO Orange LGA only (2001 – 2006)

2006:	35,338	–
2001:	35,446	
	-108	(5 years = -21.6 p.a.)

BCO Review Orange LGA only (1996 – 2014 ERP)

2014:	41,431	–
1996:	33,964	
	7,467	(18 years = 414.8 p.a.)

Data from the census' between 1996 and 2011 as well as the most recent Estimated Resident Population figures for 2014 show that Orange normally outgrows Blayney and Cabonne shires, both in raw numbers and percentage terms. As can be seen in the chart below the rate of growth has clearly accelerated since the BCO period.

This may have been driven by both the Cadia mine expansion and new hospital. Anecdotally growth has continued beyond the construction phase at the mine and Hospital recruitment drive completing and despite the forthcoming closure of the Electrolux factory in Orange, suggesting that the local economy has a greater level of resilience than traditionally attributed to it. For example the

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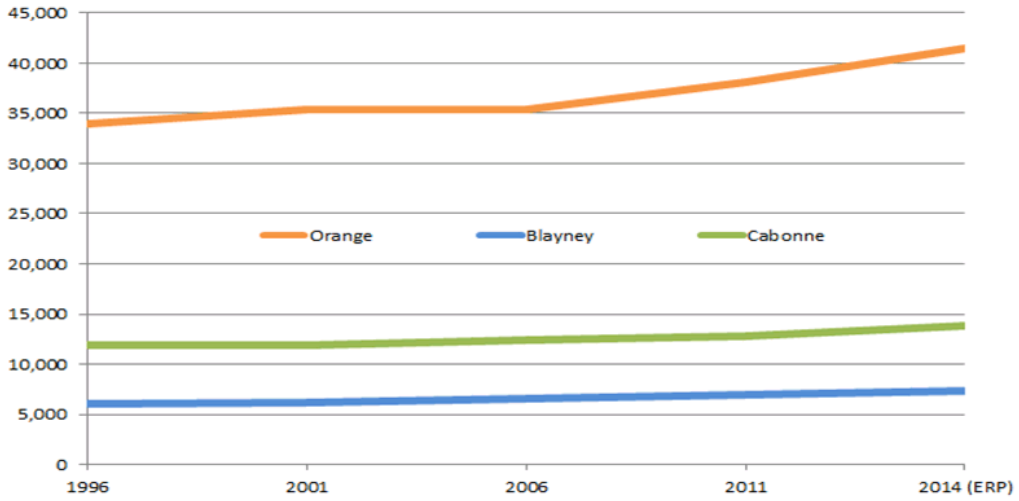
development of CSU, the construction of the new Anglican Grammar School, substantial developments in the areas of seniors living and aged care, as well as major retail/commercial developments and mining support businesses all indicate a broadening of the economic base of the city

In seeking to explain the pattern observed between 2001 – 2006 the BCO attributed growth in Blayney and Cabonne Shires to demand for small lifestyle lots within commuting range of Orange, recognising that growth was not even across the Sub-Region with the outer areas (beyond commuting range of Orange) experiencing significantly lower growth.

This period also included a surge in real estate prices across eastern Australia in the 2002/3. It is therefore reasonable to attribute part of the "static" performance of Orange to the opportunity created by the surge in real estate prices, whereby some Orange home owners were able to sell in-town and buy out-of-town acreage for potentially the same or less money.



POPULATION FIGURES BY LGA OVER TIME: SOURCE ABS

LGA	1996	2001	2006	2011	2014 (ERP)
Orange	33,964	35,446	35,338	38,057	41,431
Blayney	6,025	6,120	6,593	6,985	7,409
Cabonne	11,944	11,864	12,396	12,821	13,776

POPULATION OF MEMBER COUNCILS OVER TIME. SOURCE: ABS (ERP = ESTIMATED RESIDENT POPULATION).

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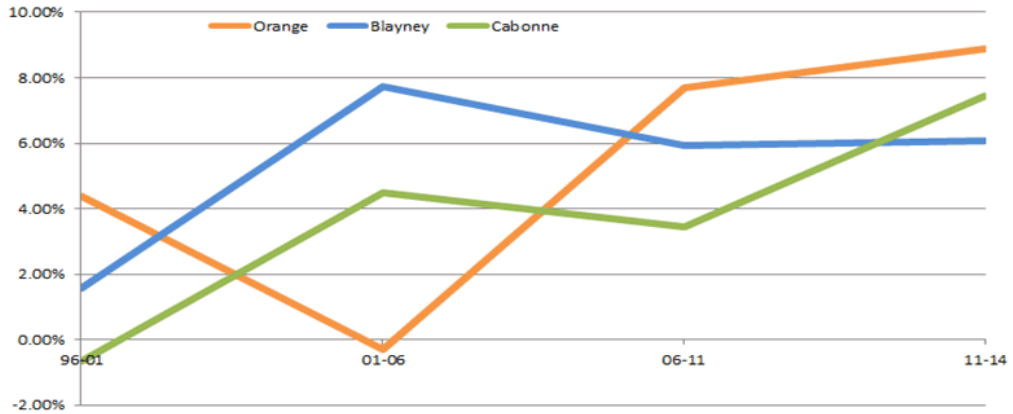

PERCENTAGE CHANGE IN POPULATION OF MEMBER COUNCILS OVER TIME

Importantly the trading up pattern, indicated by static growth in Orange and simultaneous growth in Blayney and Cabonne Shires, does not represent a lack of interest in Orange. In fact a key driver of this trend would be Orange attracting new residents from beyond the Sub-Region, who had accumulated wealth that allowed them to bid up house prices in Orange, creating equity for local homeowners that could then bid up prices in the surrounding area. That the growth in Blayney and Cabonne during this time was located close to the Orange LGA boundary further confirms this view as it is indicative of new residents remaining engaged in the Orange economy.

The hypothesis set out above would be strongest during a period of strong growth in real estate values. The surge in values during 2002 – 2003 was clearly temporary and has since settled into more normal rates of growth. In turn population growth in the Sub-Region has resumed the pattern of City growth matching or outpacing town, village and lifestyle allotment growth.

Building approval figures help to illustrate the relative scale of each LGA economy. In Blayney and Cabonne the value of non-residential development is comparable to the value of residential development, whereas in Orange residential development is substantially larger than non-residential development.

This pattern suggests that commercial and industrial developments in Blayney and Cabonne rely to a significant extent on a workforce commuting from surrounding communities, in the case of Blayney Shire this would likely include workers commuting from Bathurst as well as Orange. Conversely the Orange workforce is more likely to reside within the Orange LGA. This difference between Orange and neighbouring LGAs is again reflective of the different factors affecting commercial and industrial location choice between city and rural LGAs.

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FIGURE 1 VALUE OF NEW BUILDING APPROVALS ($'M), 2009 - 2012 AND 2013-14 (SOURCE: NSW CENTRAL WEST REGIONAL ECONOMIC PROFILE)

LGA	Residential ($'m)				Non-residential ($'m)			
	09-10	10-11	11-12	13-14	09-10	10-11	11-12	13-14
Bathurst	$43.0	$30.5	$44.0	$64.9	$26.6	$10.5	$25.1	$64.5
Blayney	$6.4	$8.1	$16.5	$5.4	$7.5	$8.8	$8.5	$5.1
Cabonne	$19.0	$13.3	$14.6	$12.1	$13.2	$4.5	$2.5	$6.2
Cowra	$3.2	$6.0	$5.6	$5.3	$4.2	$4.4	$8.7	$7.5
Forbes	$3.4	$3.4	$1.4	$3.9	$6.4	$13.0	$16.8	$1.0
Lachlan	$2.5	$2.5	$3.0	$1.4	$7.1	$0.6	$6.8	$1.3
Lithgow	$31.2	$27.1	$23.5	$25.1	$16.9	$10.9	$18.6	$11.9
Oberon	$8.0	$3.1	$2.5	$2.8	$2.3	$1.3	$0.5	$0.4
Orange	$100.6	$67.6	$76.0	$86.4	$29.8	$39.7	$36.7	$107.1
Parkes	$8.3	$8.3	$7.2	$9.9	$18.7	$2.3	$17.3	$10.7
Weddin	$2.9	$2.4	$3.5	$4.2	$4.8	$2.7	$0.1	$1.2
Total	$228.5	$172.3	$197.8	$221.5	$137.5	$98.7	$141.6	$216.8

CHALLENGES

Naturally, past performance is no guarantee of future outcomes. In this regard there are three potential scenarios.

1. Precisely the right amount of land is zoned for industrial and employment needs, or
2. Insufficient land is zoned for industrial and employment needs, or
3. Excessive land is zoned for industrial and employment needs.

While the first scenario should always be the objective the longer the timeframe involved the more difficult it becomes to maintain. As such hindsight will reveal most strategies fall into either the second or third scenarios.

Where insufficient land is zoned for industry and employment purposes it will inflate employment land prices, discouraging new and external firms from locating in the area and may prompt local firms to relocate away from the area in order to sell their land at the inflated price. The reduced employment prospects will act as a further drag on the local economy, reducing the disposable income of local household to spend in local establishment potentially creating a negative flow on effect. A depressed local economy would in turn impact on housing prices, discouraging investment in new housing stock.

Where excessive land is zoned for industry and employment purposes it will have the opposite effect, deflating or at least holding employment land prices. This may encourage some new firms to open, existing firms to expand and outside firms to relocate to the area. Such demand will in turn bring employment land prices up, but importantly the prices achieved will be driven by demand rather than a shortage of supply. The increased employment would generate a positive flow on effect through the local shopping centres and housing sectors.

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Given that achieving a perfect forecast for employment lands is increasingly difficult the longer the horizon involved. It is marginally preferable to err on the side of extra supply as this will discourage speculative land banking and ensure that the local economy can respond rapidly to new and emerging opportunities. Importantly however, this logic must not be used to justify creating a deliberate surplus or glut of land as the downward pressure on prices may cause employment land development to become uneconomic.

PART B – STRATEGY VISION AND PRINCIPLES

The BCO vision established a preferred future for the Sub-Region. Acknowledging that the vision can change over time it was articulated to provide a frame of reference to understand the changing needs of the communities that make up the region.

Vision for rural and industrial development in the Sub-Region

Economic development and growth within the Sub-Region is managed within sustainable resource management principles, and the following are achieved:

- *A sustainable and productive agricultural industry;*
- *Balanced economic development and settlement;*
- *Preservation of natural resources and cultural assets; and*
- *Ecologically sustainable development.*

The vision is embodied into six guiding principles which are repeated here. Each section lists the principle as set out in the BCO, additions suggested by this review are shown highlighted in yellow.

1. Ecologically Sustainable Development (ESD)

Everything the community does must be sustainable – socially, environmentally and economically. Our ability to make the Sub-Region sustainable and prosperous in the future depends to a large extent on development decisions made now.

ESD and its core objectives and guiding principles are defined in the *National Strategy for Ecologically Sustainable Development* (1992) as:

> *"Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased."*

The BCO and this review are guided by the principles of ESD.

This review supports the continued application of the Ecologically Sustainable Development principle as articulated in the original BCO.

2. Economy

Developing a diverse and sustainable industrial and agricultural base:	– Encourage further development of a significant and sustainable tourism industry that promotes the unique characteristics of the Sub-Region.
– Ensure agriculture carries on into the future as a significant, environmentally and economically sustainable industry with the capacity to capitalise on opportunities for intensification and diversification.	- Encourage the development of the information technology and digital services sector of the local economy.
– Ensure that adequate opportunities are provided for industrial activities that will	

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provide employment opportunities for the community. – Promote and facilitate local communities to stimulate and act on local ideas for business. – Ensure that opportunities for future mining, conservation, nature-based tourism and recreation within non-urban areas not suitable for agriculture or other rural land uses are protected. – Encourage the development of a mining industry including downstream processing opportunities.	***Provide a spatial development strategy that supports existing centres:*** – Establish a settlement hierarchy that supports existing infrastructure and services, commercial and retail business at the local and regional levels. – Ensure planning provisions support and promote sustainable employment, industrial lands and specialised centres. - Establish and encourage a range of light industry, technology, commercial and business activities at the Orange aerodrome, including aviation related and supporting activities, as a means of ensuring long term economic viability of an important regional asset.

This review supports the continued application of the Economy principle as articulated in the original BCO with the additions highlighted above:

3. Environment

Conserving our natural and cultural assets: – Ensure areas of environmental and cultural significance are protected and that land use and development within the Sub-Region is environmentally sustainable. – Work with residential and business communities to implement practices that use fewer natural resources, address climate change and reduce the regions ecological footprint. – Ongoing infrastructure upgrades and operational reviews will continuously improve sustainability and reduce pollution.	– Through its planning and development role, the Sub-Region will achieve a high standard of sustainability in new buildings ***The natural resources of the Sub-Region are recognised as part of global systems, part of global commons and the natural heritage of all peoples:*** – There is a community-wide recognition of our responsibility for the preservation of this common heritage. Our actions at a local level are a part of a global response to the need to protect and enhance economic, ecological and social sustainability.

This review supports the continued application of the Environment principle as articulated in the original BCO.

4. Community

Providing a quality lifestyle: – Enable rural living, in a manner that makes efficient use of scarce land, adjacent to existing towns and villages to provide additional housing and lifestyle options. – Provide an expanded range of health and education services for the Sub-Region.	***Ensure community cohesion:*** – Provide opportunities for community engagement in decision making. – Ensure clear communication of planning processes to the whole community. – Facilitate communication, education and information sharing between communities.

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– Manage growth by identifying a development footprint for all areas and containing development in those areas. - New or expanded development footprints, catering for the needs of a growing community, are to be selected on strategic merit making efficient use of land that responds to site constraints and opportunities.	– Advocate communities be active in defining the character of their rural areas. ***Recognition that the indigenous traditional owners possess a unique relationship with, and knowledge, of the land:*** – Acknowledgement of their right to maintain that relationship with the land and respect for their intellectual property rights

This review supports the continued application of the Community principle as articulated in the original BCO with the additions highlighted above.

5. Infrastructure

Supporting rural and industrial growth and development: – Ensure the road network of the Sub-Region is adequate to meets the needs of residents, visitors and industry. – Provide adequate air services to meet Sub-Region and industry needs. – Provide a reliable and competitively priced power supply to meet the current and future needs of the Sub-Region. - Facilitate the provision and extension of gas reticulation to enhance commercial, industrial and residential power options.	– Provide affordable and equitable telecommunications services to the Sub-Region. – Ensure an adequate supply of water to meet the current and future needs of the Sub-Region. – Ensure the appropriate treatment and disposal of solid waste and wastewater. - Promote and support the adoption of solar and other renewable energy sources.

This review supports the continued application of the Infrastructure principle as articulated in the original BCO with the additions highlighted above.

6. Governance

Carefully monitor and manage the implementation of the Strategy: – The planning framework should be robust and regularly reviewed. It shall not be subject to constant alteration that erodes the integrity of the planning principles.	– The planning framework is to be clear and concise, reflecting the needs of the community and the Councils. – Introduce a land use monitor for rural settlement.

This review supports the continued application of the Governance principle as articulated in the original BCO.

Growth Management Strategy

The growth management strategy for the Sub-Region is to:

- Preserve and promote a wide range of agricultural land uses, including rural industries that are compatible with agriculture;
- Encourage industry and other forms of employment generating activities, particularly in or near existing centres;

- Limit increased residential development to those villages that have capacity for growth;
- Provide for rural lifestyle development only where it will not conflict with existing and future agricultural land uses, and where appropriate services can be provided and environmental impacts minimised.

Growth Management Principles

A series of development principles have been developed to achieve the vision and growth management strategy. These principles should be used when considering development applications and proposals for rezoning of land.

The development principles are:

- Provide for the continued economic and social well-being of the whole community;
- Consider the impacts on sustainable agriculture and ensure development will not unreasonably increase agricultural land values or incrementally reduce the size of agricultural holdings;
- Consider the potential for conflicts to arise between various land uses, including lifestyle allotments, small holdings, tourism, extensive and intensive agriculture, forestry and mining;
- Consider land capability, including soils, erosion potential, slope, and hazards (contamination, bushfire and flooding);
- Consider consistency with Catchment Action Plans to guide policy and planning instrument preparation;
- Consider water resources, including impact on water catchments, adequacy of water supply, access to water entitlements, and location of effluent disposal;
- Consider the impacts on biodiversity, including threatened species, habitat, natural ecosystems, and wildlife corridors; and
- Consider existing infrastructure, including the capacity of the existing road network and utility services.

PART C – STRATEGY ANALYSIS

The spatial analysis of the BCO first considered two approaches to constraints mapping, hard constraints and soft constraints. Hard constraint mapping assigns an equal value to each constraint encountered, while soft constraint mapping assigns a relative weighted value. Soft constraint mapping provides a more accurate impression of the factors influencing development.

However as the BCO noted thematic mapping only provides an abstract representation of the nominated constraints. Subsequent subjective analysis is required to apply more specific planning logic to the exercise. For example a noise or odour source may represent a significant constraint to residential development but be far less of an issue for industrial development.

PART D – LAND USE STRATEGIES

The BCO outlined a series of strategies across five key groups:

- Agriculture
- Industry
- Residential and Rural Subdivision
- Natural and Scenic Environment
- Heritage and Culture

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Overall objectives were prepared for each theme and within each theme area key issues identified. The strategies expanded upon the objectives to explain how they would be achieved and the range of policies and actions required. The BCO suggested three general time frames:

- Short term – up to two years;
- Medium term – two to five years; and
- Long term – five years and beyond.

This review looks at the strategies of each of the key groups and highlights what progress has been made in each area.

INDUSTRIAL LAND SUPPLY

As outlined in the summary of strategy areas the extent of industrial land identified in the BCO was reduced by removal of the Towac West location. The replacement land north of Narrambla and north of Clergate were found to have issues during the preparation of the Orange LEP 2011. As a result the Orange LGA has 295ha less industrial land supply than anticipated.

Additionally the Population and Growth analysis in Part A of this review has shown that the original BCO projections were predicated on below trend growth during the inter-census period of 2001-2006. This was the weakest inter-census period for Orange in recent history.

Based on the analysis in Part A the historic demand clearly needs additional supply to be identified in order to maintain a strong and prosperous local and regional economy. Five prospective sites have been examined during this review. Initially chosen for their connectivity to transport links the sites have then been evaluated against weighted criteria to define the relative strengths and weaknesses. From this one site has emerged with a distinct set of advantages and has then been studied in more detail.

SITE EVALUATION CRITERIA

Section 10.2 of the BCO established 6 criteria to evaluate candidate industrial sites. This includes whether the candidate site:

- Will be protected from encroachment by activities that could hinder their effective operation, such as residential development;
- Are located near to transport and freight routes;
- Are located near existing zoned industrial land;
- Are located close to reticulated services (water and sewerage, and where necessary, natural gas) that have the capacity to accommodate the development level;
- Are free of hazards, such as flooding and bushfire; and
- Are located adjacent to areas with good access to a suitable workforce.

The above criteria have been reviewed and the following modified criteria have been adopted to provide an initial appraisal of the potential sites. The criteria were modified to build upon and enhance the previous approach given what has emerged since the BCO was undertaken. In particular land use conflicts arising from the interface between residential and industrial developments, which saw areas in the Orange LGA removed from the original BCO have been given more emphasis. Similarly avoiding natural hazards and other site constraints has been elevated in significance both for ease of development and in order to minimise disturbance of natural landforms. The emphasis on locating adjacent to existing industrial land and maintaining close proximity to workforces, while desirable from a traffic management and commuting perspective, were found to be at odds with avoiding interface land use conflicts. Those criteria, particularly the adjacency of industrial land, was seen to be based on encouraging the location of noise and traffic generators into areas that are already

impacted in order to minimise the extent of land affected. In this regard the new land use conflicts criteria seeks to achieve the intent of the original BCO criteria.

- **Flat Land:** The availability of flat land, or land requiring minimal site works, to accommodate large footprint structures and yards typically required by industry.

- **Large Sites:** The ability to accommodate larger scale developments that require a large footprint as well as those that can provide an anchor role that stimulates or attracts further developments within the estate. Some forms of industry have operational requirements that dictate large footprints and manoeuvring areas which may preclude setting up in smaller lot sized areas. Others may seek to establish in a campus style area either for operational reasons or due to having a significant level of customers attending the site directly and therefore needing a more presentable environment. Additionally large scale industry will often spur the development of supporting enterprises. This criteria therefore considers the ability of a site to accommodate both one or more large footprint developments with sufficient space to also provide for supporting smaller scale enterprises.

- **Infrastructure:** The availability of reticulated services (water, sewer, gas, electricity and telecomms) or the ease of extending such services.

- **Transport:** Connections with and distance to collector roads and highways, suitable for both workforce commuting and service vehicles.

- **Commuting range:** Distance to/from the urban part of the City and ease with which those routes can penetrate into the urban centre. The potential to support alternative modes of travel such as public transport and cycling can help to reduce the volume of workforce commuter traffic, resulting in easier movement for heavy and service vehicles. .

- **Water catchment:** The ideal is to be clear of the water catchment entirely, however modern employment estates and industries have high levels of protection against spills and leakages to reduce the risk of contamination. Where a site is within the catchment the rating reflects distance from major storages, with greater distance being preferable as it provides greater opportunity for spills or discharges to be intercepted before entering storages.

  It needs to be recognised that with the development of stormwater harvesting in Orange in recent years the entire city footprint is now contained within the city's water supply catchment. Extensive ongoing water quality testing along with a pro-active approach to whole-of-catchment management and a series of initial water treatment processes ensures that run-off captured from the catchment is of an appropriate standard for ultimate use in the city's potable water supply system. All raw water, regardless of its source, ultimately undergoes an extremely high standard of water treatment to ensure compliance with expected water quality criteria, with Orange delivering water of the highest quality of any inland water utility in NSW ad recognised as a leader in this field by NSW Health.

- **land use conflicts:** Employment estates are sources of noise and traffic that are objectionable to residential areas in particular. The location of such lands therefore needs to be segregated from other urban areas. Expansion of existing industrial estates and/or location in areas that are already subjected to such impacts can help to reduce the overall extent of affected areas. This rating therefore reflects the potential for conflict and the number of properties likely to be affected and the potential to minimise external impacts through co-location and/or expansion of existing industrial areas.

POTENTIAL SITES

Given the evaluation criteria set out above, five broad locations have been examined and ranked. The results are intended to inform further investigation leading to rezoning additional lands to meet the medium and longer term needs.

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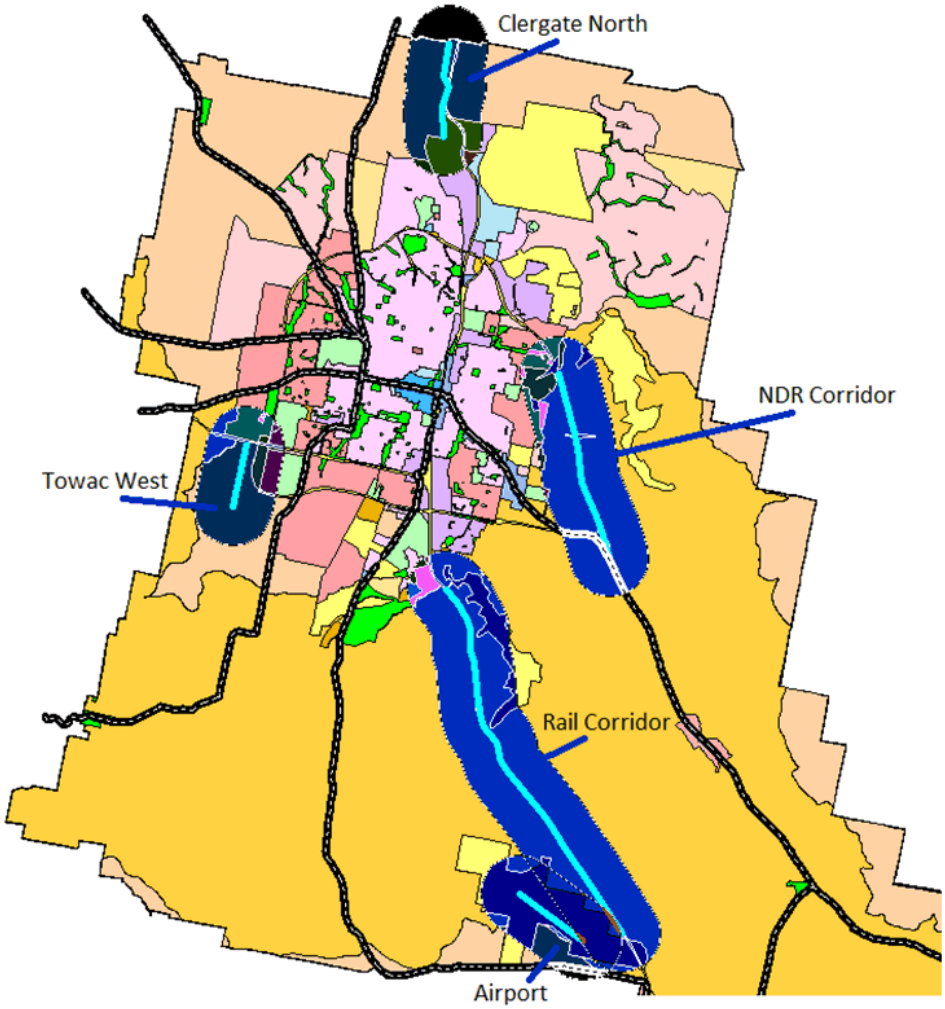
The sites examined are illustrated on the map below based on a central axis with an 800m radius on all sides, this does not mean that the site comprises all of the area or that land beyond the radius was not considered. The area shown is therefore meant to be purely illustrative.

Each site is then briefly described alongside a topographic map of the location and ranked using the evaluation criteria. Weightings have then been applied to the criteria to reflect the relative importance and/or effort required to address a constraint.

FIGURE 2: LOCATION OF POTENTIAL CANDIDATE SITES



Note: the areas indicated are highly generalised based on a radius of 800m from the feature or site concerned.

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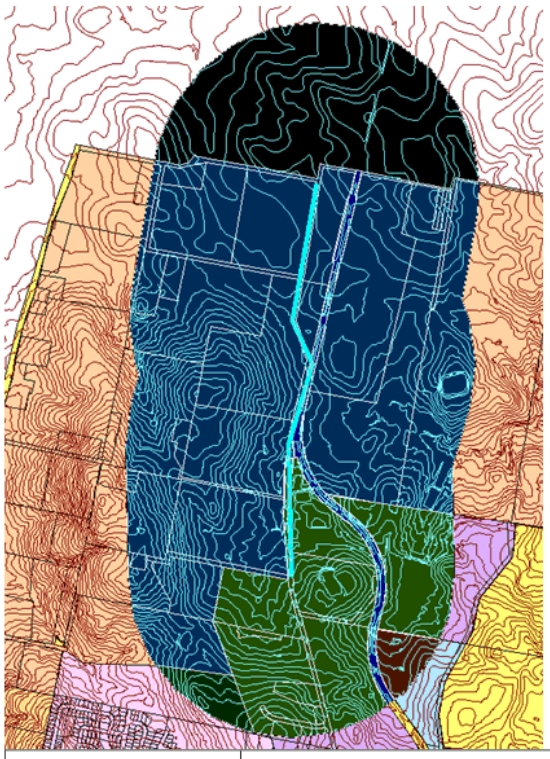
CLERGATE NORTH



Clergate North extends from the end of the currently zoned industrial land on Clergate Road to the Cabonne Shire Boundary. The topography is generally undulating, particularly toward the southern end. The extent of flat land at the northern end, around Auberson Road is modest. Advantages are proximity to the established Orange area and proximity to the rail line, however the line is generally either cut-in or elevated relative to surrounding land and therefore establishing a siding with a typical 1 – 1.5km length would be difficult. Development in this area would place additional heavy vehicle traffic onto Clergate Road.

Criteria	Comments	Rating X / 10	Weight	Score
Flat land	Minimal	5	100%	5
Large sites	Minimal and would effectively consume land for smaller operators	4	75%	3
Infrastructure	Requires extending mains a modest distance past the undulating land to reach the more level ground (limited capacity of existing watermains could require significant upgrading as this area is at the extremity of the water supply network and at a relatively high elevation	5	75%	3.75
Transport	Clergate Road connects to NDR, Dawson Gates Road connects to Burrendong Way (would require upgrades) Rail line (need approx. 1 km of straight track for a siding-in cut or fill)	8	75%	6
Commuting Range	Minimal	10	30%	3
Water Catchment	Clear	10	40%	4
Land use conflict potential	Residential potential east of the railway and to southern end	6	100%	6
Overall			30.75 / 49.5 = 62.1%	

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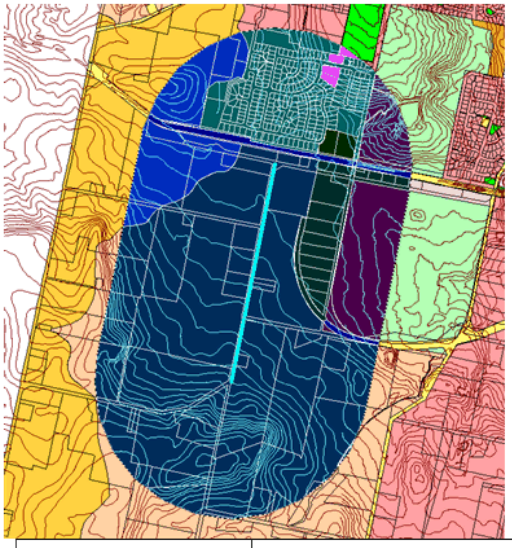
TOWAC WEST



The land to the west of Towac Park was previously considered during preparation of the original BCO. The site was removed from the final BCO due to pressure from residents in and near the site. Of particular concern was the likelihood that an industrial estate would draw heavy vehicles into the area by traversing predominantly residential lands to the north and east.

This is some of the best agricultural land in the city, with extensive orchards in the area. The site is on the fringe of the city's water and sewer networks, requiring extensive work to extend these services to this area

Criteria	Comments	Rating X / 10	Weight	Score
Flat land	Moderate amount available toward the northern end	8	100%	8
Large sites	Potential for a few large developments and a modest amount of supporting smaller developments	6	75%	4.5
Infrastructure	Outside reticulated area, moderate cost to extend services	7	75%	5.25
Transport	Situated toward western end of Southern Feeder Road, Rail line to north is inaccessible due to elevation.	7	75%	5.25
Commuting Range	Minimal	10	30%	3
Water Catchment	Generally clear with minor exposure to Molong catchment	9	40%	3.6
Land use conflict potential	High risk, residential land north of rail line, new suburb emerging to east. Site was previously rejected due to conflict	2	100%	2
Overall			31.6 / 49.5 = 63.8%	

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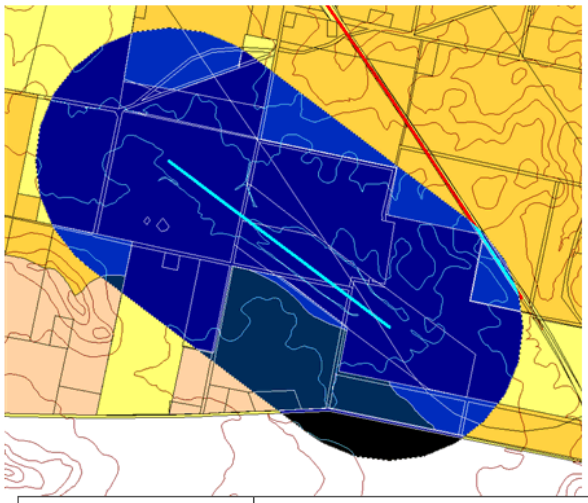
AIRPORT CURTILAGE



The lands surrounding the Orange Airport have been identified as possessing many attributes suited to industrial and business needs. This includes expansive areas of flat land in proximity to good road connections with rail and air services nearby. The potential availability of reticulated gas is an additional benefit for employment generating activities.

Criteria	Comments	Rating X / 10	Weight	Score
Flat land	Ample flat land	10	100%	10
Large sites	Opportunity to cater for a wide mix of developments across various sizes	9	75%	6.75
Infrastructure	Gas line available, sewer and water can be extended during Huntley Road extension	7	75%	5.25
Transport	Forest Road, Huntley Road, Railway with potential for siding	8	75%	6
Commuting Range	Moderate	6	30%	1.8
Water Catchment	Located on the uppermost reaches of the catchment	7	40%	2.8
Land use conflict potential	Minor. Between industry and agriculture. Nearest urban residents at Spring Hill can be buffered as can the residents at Huntley village	7	100%	7
Overall			39.6 / 49.5 = 80 %	

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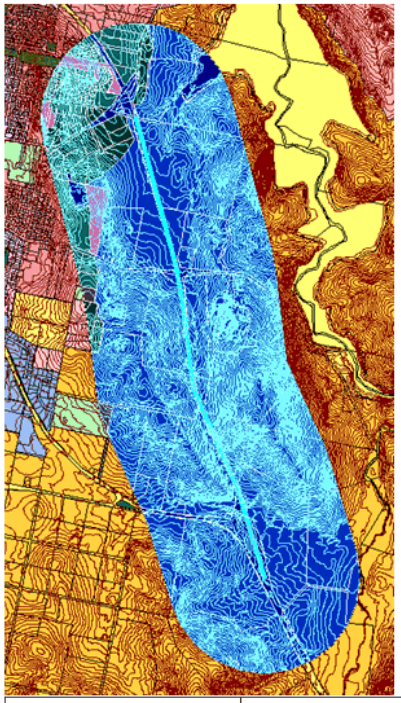
NDR CORRIDOR



The eastern end of the Northern Distributor Road has three direct connections into the urban part of the city, with the Ophir Road intersection, Icely Road intersection and connection to the Mitchell Highway. While these connections appear to provide excellent connection and access to the City, the site is otherwise limited in potential due to topography, the presence of Naturally Occurring Asbestos and being located close to Suma Park Dam limiting opportunities to intercept and treat any runoff.

It is considered that this corridor is not suited to intensification of built form while other, less constrained, options exist.

Criteria	Comments	Rating X / 10	Weight	Score
Flat land	Minimal. Site is highly undulating	1	100%	1
Large sites	Minimal. Due to topography any large development would likely need an excessive amount of raw land.	1	75%	0.75
Infrastructure	Cost to service is high due to topography	3	75%	2.25
Transport	NDR provides clear connection to Mitchell Highway, however may impact upon NDR efficiency levels. Not proximate to rail line, cross roads give good commuter access but may draw service vehicles through the urban area	6	75%	4.5
Commuting Range	Modest	6	30%	1.8
Water Catchment	Within the catchment and close to storages (minimal opportunity for natural pollutant filtering between source and storage)	3	40%	1.2
Land use conflict potential	Moderate. Urban residential development does not adjoin but the site forms a key approach into the city and likely to impose upon general amenity.	5	100%	5
Overall	Additionally subject to Naturally Occurring Asbestos in various locations.		16.8 / 49.5 = 33.9%	

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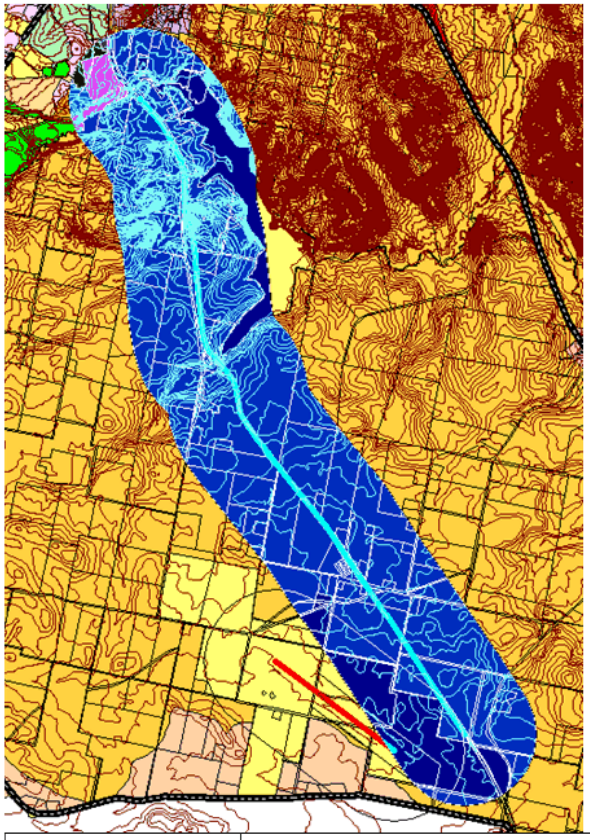
RAIL CORRIDOR



The rail corridor to the southeast of the City extends from the City to Spring Hill. The northern half of the corridor is constrained by undulating topography and proximity to Gosling Creek dam. The southern end of the corridor overlaps the airport site and extends through Huntley. The southern end is less constrained with generally flat land and increasing distance from water storages.

While there is good access to Huntley Rd, the eastern side of the railway would have limited road access. The southern end, where the flat land is, gets close to Huntley village and surrounding rural residential area which is quite densely settled and hence would have major interface issues

Criteria	Comments	Rating X / 10	Weight	Score
Flat land	Flattens out toward the southern end but is undulating through the northern end	8	100%	8
Large sites	Good availability in the southern end	9	75%	6.75
Infrastructure	Rail throughout, and airport at southern end. However road connections minimal through the central portion.	5	75%	3.75
Transport	Variable along the length of the corridor	6	75%	4.5
Commuting Range	Variable along the length of the corridor	5	30%	1.5
Water Catchment	Within catchment – distance to storages varies along the length of the corridor.	4	40%	1.6
Land use conflict potential	Minimal except towards the northern end of the corridor and in the area near Huntley Village as well as the general interface with rural residences in the area.	5	100%	5
Overall	The corridor is primarily constrained towards the northern end and less constrained towards the southern end. This transition suggests support for the airport site which it overlaps.		31.1 / 49.5 = 62.8%	

SUB-REGION PERSPECTIVE

While this review considers the BCO from an Orange perspective, it is nonetheless important to recognise the role of the BCO as a sub-regional strategy. Identifying the need for Orange to increase it's industrial and

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employment land supply raises the question of whether this would impact upon the uptake of similar land in Blayney and Cabonne Shires.

The potential for impact relates to which industrial/employment estate or shire a given business is likely to select when searching for premises. There are numerous factors that affect locational decision making, such as:

- Proximity to workforce and the availability of required skillsets.
- Proximity to marketplace
- Proximity to supply chain
- Freight connections and other logistical facilities
- Raw price of land

In addition to which the business or "land use" needs to be permissible with consent on the land being considered. Considering the above factors it should be apparent that Cabonne, Blayney and Orange will each attract different types and scales of industry. In essence, the shires are likely to attract those firms whose customer base is dispersed (statewide, national or international) and Orange is more likely to attract firms that primarily serve the local market.

The NSW Central West Regional Economic Profile, published by Regional Development Australia Central West highlights this distinction. The available skills base in each LGA can be inferred from the difference in education qualification levels of the respective populations.

FIGURE 3 TERTIARY QUALIFICATIONS BY LGA (SOURCE: NSW CENTRAL WEST REGIONAL ECONOMIC PROFILE)

LGA	Bachelor or Higher degree	Advanced Diploma or Diploma	Vocational/ Certificate level	Not stated	Not qualified	Qualified
Bathurst	14.0%	6.9%	22.4%	13.0%	43.8%	56.2%
Blayney	10.4%	7.3%	22.8%	11.2%	48.3%	51.7%
Cabonne	12.5%	7.5%	23.0%	9.7%	47.2%	52.8%
Cowra	7.6%	5.9%	20.2%	13.9%	52.4%	47.6%
Forbes	8.7%	5.6%	21.7%	11.5%	52.5%	47.5%
Lachlan	8.1%	5.5%	16.9%	11.1%	58.4%	41.6%
Lithgow	7.5%	5.3%	23.3%	14.1%	49.7%	50.3%
Oberon	8.9%	5.4%	23.6%	12.3%	49.8%	50.2%
Orange	14%	7.4%	21.5%	11.4%	45.7%	54.3%
Parkes	8.2%	5.1%	21.6%	13.3%	51.8%	48.2%
Weddin	8.0%	5.7%	19.2%	10.8%	56.3%	43.7%
NSW CW (av)	9.8%	6.1%	21.5%	12.0%	50.5%	49.5%
Regional NSW	12.4%	7.1%	22.1%	11.7%	46.8%	53.2%
NSW	19.9%	8.3%	17.7%	11.4%	42.8%	57.2%

Note: Proportion of residents over the age of 15. 'Qualified' includes 'Not stated'. Based on Place of usual residence.
Source: ABS Census 2011, Profile id

Orange has a distinctly higher proportion of "Bachelor or Higher degree" qualification holders, the three LGAs are comparable on "Advanced Diploma or Diploma" and both Blayney and Cabonne Shires have more "Vocational/Certificate level" qualification holders.

Gross regional product (GRP) identifies the value of final goods and services produced in the local economy. Obviously, in nominal terms Orange City GRP is considerably greater than the two neighbouring shires. However, a fairer comparison is derived by comparing the percentage change in GRP over time. In this regard Orange has experienced between double and triple the growth rate of Blayney and Cabonne in recent years 2011-2014.

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FIGURE 4 GROSS REGIONAL PRODUCT CONTRIBUTIONS BY LGA 2011-2014 (SOURCE NSW CENTRAL WEST ECONCOMIC PROFILE)

LGA	GRP 2014 $m	GRP 2011 $m	% Change 2011-14	% Average annual growth 2010-11 to 2013-14	% of NSW CW GRP
Bathurst	$1,859.4	$1,767.4	5.2%	1.3%	19.3%
Blayney	$472.7	$429.8	10.0%	2.5%	4.9%
Cabonne	$849.5	$792.7	7.2%	1.8%	8.8%
Cowra	$437.3	$425.7	2.7%	0.7%	4.5%
Forbes	$398.3	$355.5	12.0%	3.0%	4.1%
Lachlan	$276.0	$272.2	1.4%	0.3%	2.9%
Lithgow	$1,540.9	$1,361.2	13.2%	3.3%	16.0%
Oberon	$222.3	$233.7	-4.9%	-1.2%	2.3%
Orange	$2,697.4	$2,187.5	23.3%	5.8%	27.9%
Parkes	$774.1	$752.0	2.9%	0.7%	8.0%
Weddin	$126.3	$127.0	-0.6%	-0.1%	1.3%
NSW CW	$9654.1 (total)	$8704.5 (total)	10.9% (av)	2.7%	100.0

Note: GRP at Market Prices. 2014
Source: NIEIR, A.P. SHEERE CONSULTING

Accordingly, export oriented industry based on a low / unskilled workforce is likely to preference Blayney and/or Cabonne shires. Local and domestic oriented industry and/or industry needing a medium to high skilled workforce will be likely to preference the larger market and labour pool offered by Orange. The distinction between the types of industry attracted to each LGA is reflected in the land use table of their respective LEPs. While there is considerable overlap there are also numerous areas of divergence, illustrating that each LGA has tailored their respective planning controls to serve the kinds of industry and employment generation for which they are best suited. In Orange's case stringent rules around environmental issues such as trade waste discharges and minimising impacts on the water supply catchment have resulted in a predominance of "clean" industries in the city. The overall good quality of stormwater discharges from the city provides strong evidence that there is little environmental impact from the industries which exist within Orange.

Establishing an additional estate at the airport would provide for a similar level of demand and a continuation of similar types of industries which have historically set up in Orange. In addition the site most likely attract aviation and related industries, technology, research and development firms and supporting services as well as firms needing to operate 24 hours a day, including being able to accommodate larger scale enterprises than can be currently accommodated in Orange's exiting industrial/business estates. An airport based estate is not likely to draw firms that would otherwise establish in Blayney or Cabonne Shires, as those shires will remain competitive on price of land and have the workforce profiles typically sought by rural and produce industries.

Figure 5 shows the value of different economic activities to each LGA in nominal terms. The percentage values show the relative significance of each sector within that LGA. The Orange economy is clearly more diversified than either Cabonne or Blayney given the relative significance of Mining is 23% of the Orange economy compared to 45% in Cabonne and 50% in Blayney. The manufacturing sector occupies a larger share of the Cabonne(8.2%) and Blayney(8.98%) economies than it does in Orange(6%) however the types of industries attracted to each LGA varies in response to the nature of each LGA economy. For example Blayney Shire has attracted goat abattoir, galvanising works and the linen service, while Orange has attracted a 24 hour freight and logistics operation.

Agriculture, Forestry and Fishing is almost non-existent in Orange(0.94%) compared to the substantial share it occupies in Blayney(7.85%) and Cabonne(15.42%) economies. (Farmers) This strongly suggests that rural industries and downstream processes of agricultural and forestry products are far more likely to be attracted to Blayney and Cabonne than Orange. Conversely professional, Scientific and Technical services are 3.52% of the Orange economy compared to Blayney(1.85%) and Cabonne(2.06%) while these may be smaller percentages the sector is almost twice as significant to Orange than it is to Blayney and 70% more signifant than it is to Cabonne. Other sectors such as Construction, Transport, Postal & Warehousing and Wholesale trade are similarly more significant to the Orange economy as they are to the neighbouring shires. This suggests that the

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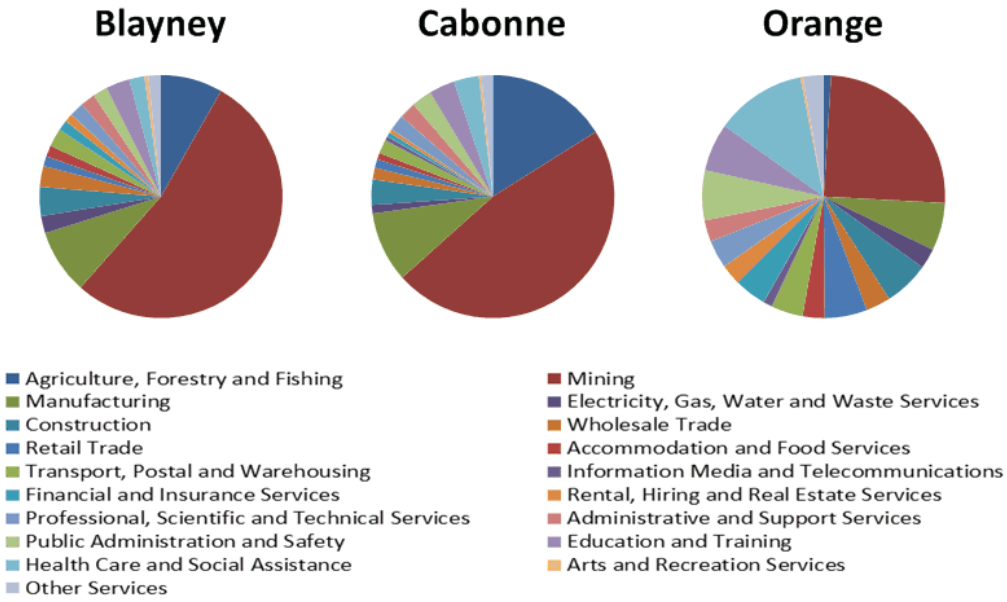
range and type of industries and businesses that would be attracted to Orange, including any employment estate at the airport, will be qualitatively different than would be likely to consider either Blayney or Cabonne.

FIGURE 5 GROSS REGIONAL PRODUCT BY INDUSTRY PER LGA (SOURCE: NSW CENTRAL WEST ECONOMIC PROFILE)

Industry Sector	Blayney	Cabonne	Orange	Blayney	Cabonne	Orange
Agriculture, Forestry and Fishing	37.14	131.04	25.49	7.85%	15.42%	0.94%
Mining	240.50	385.77	631.50	50.87%	45.39%	23.41%
Manufacturing	38.77	76.37	162.00	8.20%	8.98%	6.00%
Electricity, Gas, Water and Waste Services	10.33	9.39	68.34	2.18%	1.10%	2.53%
Construction	17.45	27.41	152.87	3.69%	3.22%	5.66%
Wholesale Trade	12.49	12.67	83.59	2.64%	1.49%	3.09%
Retail Trade	5.96	9.35	144.18	1.26%	1.10%	5.34%
Accommodation and Food Services	6.69	7.08	74.05	1.41%	0.83%	2.74%
Transport, Postal and Warehousing	10.98	14.98	107.52	2.32%	1.76%	3.98%
Information Media and Telecommunications	0.00	4.56	30.84	0.00%	0.53%	1.14%
Financial and Insurance Services	6.32	4.91	108.89	1.33%	0.57%	4.03%
Rental, Hiring and Real Estate Services	4.93	3.87	69.78	1.04%	0.45%	2.58%
Professional, Scientific and Technical Services	8.78	17.52	95.01	1.85%	2.06%	3.52%
Administrative and Support Services	8.77	18.01	72.10	1.85%	2.12%	2.67%
Public Administration and Safety	8.80	22.21	169.43	1.86%	2.61%	6.28%
Education and Training	14.24	27.84	161.72	3.01%	3.27%	5.99%
Health Care and Social Assistance	9.18	27.26	307.04	1.94%	3.20%	11.38%
Arts and Recreation Services	2.38	2.77	8.20	0.50%	0.32%	0.30%
Other Services	7.55	12.35	69.81	1.59%	1.45%	2.58%
(Ownership of dwellings)	21.46	34.16	155.04			
Total ($m)	$472.74	$849.50	$2697.40	100%	100%	100%

Source: NIEIR, GRP at Market Prices 2014



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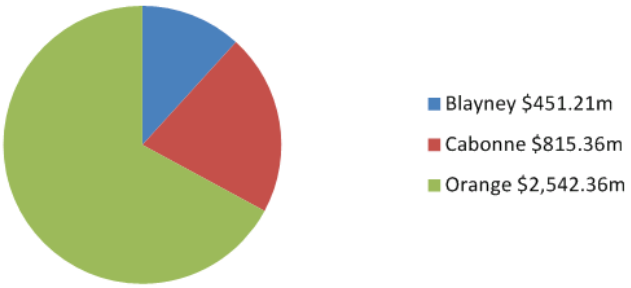
The number of mining support related businesses, fabricating, earthworks, building/automotive businesses etc which predominantly supply the local Orange market and rely on the strong local labour market and the Orange lifestyle benefits also influence where these businesses locate and their workers live. Several of these attributes are related to the scale of the Orange economy as compared to the neighbouring shires. Co-location of similar industries emerges as a result of the local economy attaining a critical mass to maintain the future value of investment. The scale of the local economy would influence the ability of firms to gain finance for expansion as any lender would have regard to the ability of the firm to be on-sold, which relates at least in part, to the overall size of the market.

Relative size of local economies



The following table compares the range of land uses that are currently permissible in the Blayney, Cabonne and Orange LEP's respectively. The indentation of the land use terms column reflects the relationship of group terms and sub terms. Each entry with a ✓ mark indicates the use can be permitted subject to a development application. Each entry with a × mark indicates the use is prohibited in the zone.

Sub-Regional Industrial Land Use Permissibility Comparison Chart

✓ Permitted with consent × Prohibited

Land Use Term	Blayney LEP 2012		Cabonne LEP 2012		Orange LEP 2011		
	IN1	IN2	IN1	IN2	IN1	IN2	B7
Agricultural Terms							
Agriculture	×	×	×	×	×	×	×
Aquaculture	✓	✓	✓	✓	×	×	×
Extensive Agriculture	×	×	×	×	×	×	×
Bee Keeping	×	✓	×	×	×	×	×
Dairies (Pasture Based)	×	×	×	×	×	×	×
Industrial Terms							
Industries	✓	✓	✓	✓	✓	×	×
Heavy Industries	✓	✓	✓	×	✓	×	×
Hazardous Industries	✓	✓	✓	×	✓	×	×
Offensive Industries	✓	✓	✓	×	✓	×	×
Light Industries	✓	✓	✓	✓	✓	✓	✓
High Technology Industries	✓	✓	✓	✓	✓	✓	✓
Home Industries	✓	✓	✓	✓	✓	✓	✓
General Industries	✓	✓	✓	✓	✓	×	×
Boat Building and Repair Facilities	✓	✓	✓	✓	✓	✓	×
Vehicle Body Repair Workshops	✓	✓	✓	✓	✓	✓	×
Vehicle Repair Stations	✓	✓	✓	✓	✓	✓	✓
Rural Industrial Terms							
Rural Industries	✓	×	✓	✓	✓	×	×
Agricultural Produce Industries	✓	✓	✓	✓	✓	×	×
Livestock Processing Industries	✓	×	✓	✓	✓	×	×
Sawmill or Log Processing Industries	✓	×	✓	✓	✓	×	×

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Sub-Regional Industrial Land Use Permissibility Comparison Chart

✓ Permitted with consent × Prohibited

Land Use Term	Blayney LEP 2012		Cabonne LEP 2012		Orange LEP 2011		
	IN1	IN2	IN1	IN2	IN1	IN2	B7
Stock and Sale Yards	×	×	×	✓	✓	×	×
Storage Premises Terms							
Storage Premises	✓	✓	✓	✓	✓	✓	×
Self Storage Premises	✓	✓	✓	✓	✓	✓	×
Depots	✓	✓	✓	✓	✓	✓	×
Warehouse or Distribution Centres	✓	✓	✓	✓	✓	✓	✓
Air Transport Facility Terms							
Air Transport Facilities	×	×	×	×	×	×	×
Airport	×	×	×	×	×	×	×
Heliport	✓	✓	✓	×	×	×	×
Airstrip	×	×	✓	×	×	×	×
Helipad	✓	✓	✓	✓	✓	✓	×
"Other" Infrastructure terms							
Car Parks	✓	✓	✓	×	✓	×	×
Electricity Generating Works	SEPP	✓	SEPP	✓	SEPP	✓	✓
Freight Transport Facilities	✓	✓	✓	✓	✓	✓	×
Passenger Transport Facilities	✓	✓	×	×	✓	✓	✓
Port Facilities	✓	✓	✓	✓	✓	✓	✓
Roads	✓	✓	✓	✓	✓	✓	✓
Transport Depots	✓	✓	✓	✓	✓	✓	×
Truck Depots	✓	✓	✓	✓	✓	✓	✓
Wharf or Boating Facilities	×	×	×	×	✓	✓	✓
"Other" Community Infrastructure terms							
Industrial Training Facilities	✓	✓	✓	✓	✓	✓	×
Child Care centres	×	×	×	✓	×	×	✓
Community Facilities	✓	✓	×	✓	×	×	✓
Correctional Centres	✓	×	×	×	×	×	✓
Information and Education Facilities	✓	✓	×	✓	×	✓	✓
Public Administration Buildings	×	×	×	×	×	×	✓
Research Stations	✓	✓	✓	✓	✓	✓	✓
Respite Day Care Centres	×	×	×	×	×	×	✓
Commercial Terms							
Commercial Premises	×	×	×	×	×	×	✓
Business Premises	×	×	×	×	×	×	✓
Funeral Homes	×	×	×	✓	×	✓	✓
Office Premises	×	×	×	×	×	×	✓
Retail Premises	×	×	×	×	×	×	✓
Bulky Goods Premises	×	×	×	×	×	×	✓
Cellar Door Premises	×	×	×	×	×	×	✓
Food and Drink Premises	×	×	×	×	×	×	✓
Pubs	×	×	×	×	×	×	✓
Restaurants or Cafes	×	×	×	×	×	×	✓
Take-Away F&D Premises	✓	✓	×	✓	×	×	✓
Garden Centres	×	✓	×	✓	×	×	✓
Hardware and Building Supplies	×	✓	×	✓	✓	×	✓
Kiosks	✓	✓	✓	✓	✓	✓	✓
Landscaping Material Supplies	✓	✓	✓	✓	✓	✓	✓
Markets	×	×	×	×	×	×	✓
Plant Nurseries	✓	✓	×	×	×	×	✓
Roadside Stalls	×	×	×	×	×	×	✓
Rural Supplies	×	✓	×	✓	×	✓	✓
Shops	×	×	×	×	×	×	✓
Neighbourhood Shops	✓	✓	✓	✓	✓	✓	✓
Timber Yards	✓	✓	✓	✓	×	✓	✓

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Section 16 Review and Update

Sub-Regional Industrial Land Use Permissibility Comparison Chart

✓ Permitted with consent × Prohibited

Land Use Term	Blayney LEP 2012		Cabonne LEP 2012		Orange LEP 2011		
	IN1	IN2	IN1	IN2	IN1	IN2	B7
Vehicle Sales or Hire Premises	✓	✓	✓	✓	✓	✓	✓
Amusement centres	×	×	×	×	×	×	×
Entertainment facilities	×	×	×	×	×	×	×
Function Centres	×	×	×	×	×	×	×
Highway Service Centres	×	✓	×	×	×	×	×
Industrial Retail Outlets	✓	✓	✓	✓	✓	✓	×
Registered Clubs	×	×	×	×	×	×	×
Restricted Premises	×	✓	×	×	✓	✓	✓
Service Stations	×	✓	×	×	✓	✓	×
Sex Services Premises	✓	✓	×	✓	✓	×	×
Veterinary Hospitals	✓	✓	×	✓	✓	✓	×
Wholesale supplies	×	✓	×	✓	✓	✓	×

Preferred Site Analysis

Orange City Council engaged RedeConsult to evaluate the economic merits of the preferred site around the Orange regional airport. This was done by examining the historic and current use of industrial land and development application statistics in Orange to derive employment estimates that could be achieved if the same (or similar) development patterns emerge at the airport. Clearly the location of the site in conjunction with a regionally significant airport will alter the conventional mix of businesses and services that develop to include more aviation and related activities.

Key findings from RedeConsult include:

- Average land area per business of 5,086m^2 (with considerable variation between business types)
- Average employment per business of 13 employees,
- Average employment per hectare of 25.6 full time equivalent (FTE) positions
- A 200ha estate at the airport would take over 27 years to be fully occupied.
- Total direct employment generated when the estate is fully occupied of 2,045 FTE positions.

The RedeConsult analysis deliberately excluded flow-on effects due to the difficulty in separating out those business that are the result (or flow on effect) of others. In other words, some firms may represent entirely new activity which would have flow on effects spurring other firms to start up or expand, while some firms would be the result of that effect. Consequently, it is inappropriate to assign flow-on effects to all industrial developments as this would in some cases result in double-dipping. The more conservative approach is to just consider the direct effects of development only.

Even under the more conservative approach the potential contribution to the Orange and sub-regional economies is significant. RedeConsult have estimated the effect on household income and industry value added per FTE job. When expressed in 2013-14 $ values the estate is projected to deliver, over a 27 year horizon, $699.5m to household income and $1,213.2m of industry value add.

If the airport site, or an alternative site within the Orange LGA, does not proceed much of this value would be lost to the sub-region. Some portion may be transferrable within the sub-region but as detailed above, many of the firms that would be interested in Orange are seeking a specific set of conditions and market factors that are not replicated in the neighbouring Shires. Furthermore, pursuing the airport site could result in some of the flow on economic benefits spilling over into Blayney Shire and Cabonne Shire, both in the form of increased residential demand from the workforce looking to reduce commuting times and in the form of support industries and firms seeking to operate out of Millthorpe and Blayney to service other firms at the airport site.

Orange City Council Sub-Regional Review

Section 16 Review and Update

Update on Blayney Cabonne Orange Sub-Regional Strategy adopted Strategies and Actions

The BCO outlined 11 Agriculture strategies and 17 Industrial strategies. Additionally the BCO outlined 11 Residential and Rural Subdivision strategies. The following table re-states these strategies and there accompanying actions with a brief synopsis of the progress since the BCO was adopted.

Natural and Scenic Environment

Strategy	Policy Action	Progress and Update
Water quality **Objective:** To identify surface and groundwater water bodies and ensure the quality of water bodies is not adversely affected by development.		
1. Ensure development does not have a detrimental impact on nearby water bodies.	1.1 Development to be located an appropriate distance from waterways. 1.2 Develop performance criteria to be applied to all development to ensure impact on water bodies is maintained or improved through applying the principal of avoiding impacts in the first instance followed by minimising, repairing and offsetting where development is allowed to proceed. 1.3 All development to utilise best practice management for soil and water management on the site 1.4 On-site effluent disposal is to be in accordance with an adopted DCP for On- Site Sewage Management and the NSW Government's Environment and Health Protection Guidelines (On-site Sewage Management for Single Households) 1.5 Promote water sensitive urban design (WSUD), through a DCP, in Development Plans and development proposals to achieve multiple catchment water management objectives such as reducing runoff and flooding; protecting waterways and their biotic communities; conserving and harvesting water; and enhancing the amenity of urban environments. 1.6 Identify and map environmentally sensitive waterways.	• Ongoing matters to be considered during DA assessments. • On-site effluent disposal managed in accordance with DCP provisions and land capability assessments during DA assessment processes. • WSUD principles to be considered for inclusion in citywide DCP review • Sensitive waterways mapped as part of Orange LEP 2011

Orange City Council Sub-Regional Review

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	Strategy	Policy Action	Progress and Update
2.	Control development in drinking water catchments.	2.1 Implement a specific environmental protection zoning for land within the drinking water catchments. 2.2 Restrict the type and intensity of development permissible in the drinking water catchment. 2.3 Develop specific performance criteria based on the most current government endorsed Water Quality and River Flow Objectives, to be applied to all development in the drinking water catchment to further minimise adverse impacts.	• Drinking water catchment placed in the E3 Environmental Management Zone and further protected by clause 7.7 Drinking Water Catchments under Orange LEP 2011 • Permissible land uses tailored under the E3 zone • Performance criteria to be considered as part of draft citywide DCP project.
3.	Increase community awareness and involvement in water quality and catchment issues.	3.1 Develop an education program informing the community on typical water quality problems. 3.2 Promote best practice in riparian corridor management. 3.3 Provide assistance to Landcare groups and primary producers in obtaining grants for restorative works.	• Council stormwater harvesting scheme has been instrumental in raising community awareness. • Stormwater harvesting program complements riparian corridor management.

Biodiversity

Objective: To ensure that the biodiversity and conservation values of the Sub-Region are maintained and enhanced.

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	Strategy	Policy Action	Progress and Update
4.	Recognise and protect the biodiversity and conservation values from the impacts of settlement and development intensification.	4.1 Identify significant areas of native vegetation and wildlife corridors. 4.2 Establish a land use management approach consistent with State, regional and local biodiversity goals, including Regional Vegetation Management Plans and Catchment Action Plans. 4.3 Implement a specific zoning for National Parks and Nature Reserves. 4.4 Implement environment protection zoning for areas of significant remnant vegetation or endangered ecological communities. 4.5 Identify and map environmentally sensitive land, being land with significant native vegetation (particularly Crown land), and aquatic environments. 4.6 Prepare general biodiversity and vegetation provisions to be applied to all development, through DCPs requiring impacts be avoided in the first instance backed by minimisation, rehabilitation and offsetting impacts in instances where development is allowed. 4.7 Implement ESA Overlays and associated special enhanced requirements through the LEP.	• No National Parks within Orange LGA (Standard LEP template reserves a zone for National Parks (E1)) • Environmental zones (E2, E3 and E4) adopted under Orange LEP 2011 to provide additional protection in sensitive areas • High and moderate biodiversity land mapped under Orange LEP 2011 • Matters being given further consideration as part of draft citywide DCP, which is in preliminary stages.
5.	Prepare management guidelines for land uses	5.1 Prepare a development control plan to support the LEP and provide additional detailed guidelines for development.	• Draft citywide DCP in preliminary stages
6.	Increase community awareness and involvement in identifying, protecting and enhancing biodiversity	6.1 Develop an education program informing the community on the values of native flora and fauna, habitat and corridors, and the threats to these from feral animals, weeds, grazing and clearing. 6.2 Provide assistance to Landcare groups and farmers in obtaining grants for restorative works.	• Biodiversity sensitivity mapping adopted as part of Orange LEP 2011
Scenic Quality **Objective:** Ensure that development has a minimal impact on the scenic and cultural landscape of the Sub-Region.			

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Strategy	Policy Action	Progress and Update
7. Preserve, conserve and enhance major landscape features.	7.1 Identify significant natural and modified landscapes and zone these as Rural Landscape. 7.2 Require landscape and visual impact assessment for development in these identified areas. 7.3 Prepare general performance criteria relating to scenic quality and visual impact to be applied to all development. 7.4 Develop guidelines for the siting and design of buildings in the rural landscape.	• Orange survey of significant landscape features • Policy actions to be developed as part of draft city-wide DCP project. • Extensive green spaces/drainage lines, native vegetation retained
8. Prepare management guidelines for land uses in the Shire	8.1 Prepare a development control plan to support the LEP and provide additional detailed guidelines for development.	• Draft citywide DCP in preliminary stages
Environmental Hazards **Objective:** Ensure environmental hazards are fully understood and taken into account when considering impact if development		
9. Limit development within areas identified as having an environmental hazard	9.1 Prepare performance criteria relating to environmental hazards to be applied to development within identified areas.	• Generally addressed through application of SEPPs and existing State government policies. • Additional consideration to be given as part of draft city-wide DCP project.
10. Ensure land development is minimised and hazards avoided in the first instance with minimisation, rehabilitation and offsetting impacts in instances where development is allowed.	10.1 Limit development that would require the removal of native vegetation that may result in erosion or an increase in dryland salinity.	• Addressed during assessment of Das • Proposed development retains significant areas of native vegetation and existing drainage/creek corridors as well as extensive green spaces

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Strategy	Policy Action	Progress and Update
11. Recognise bush fire prone lands and ensure development is directed away from these lands.	11.1 Identify and implement the strategic fire protection zones as contained in the Bushfire Risk Management Plan. 11.2 Provide information on the bushfire regulations covering the LGA. 11.3 Provide information on Emergency Services Disaster Management and Response Plan.	• Orange Bushfire map updated in 2015 in consultation with RFS.
12. Identify and direct development away from flood prone lands	12.1 Prepare Floodplain Management Studies and Plans for all flood prone lands in accordance with the *NSW Floodplain Development Manual 2005.*	• To be undertaken as part of future greenfield rezonings.
13. Identify and manage Derelict Mines	13.1 Ensure those mines which represent risks to public health and safety are mapped. 13.2 Provide information on Derelict Mines Program to assist in community understanding. 13.3 Work with DPI to address contamination at derelict mine sites.	• Mines identified in the Lucknow scoping study. • Future planning of Lucknow to be responsive to the constraint of mine subsidence.
14. Develop policies that manage dryland salinity	14.1 Promote land uses that will not exacerbate dryland salinity, irrigation-induced salinity or water salinity and encourage those that will assist to reduce salinity in affected areas. Intensified development and settlement should be directed away from saline landscapes.	• Dryland salinity not present in the Orange LGA
15. Protect new developments and settlement opportunities from the hazard of land contamination.	15.1 Manage land contamination as per Planning Guidelines SEPP 55 – Remediation of Land.	• Continued application of SEPP 55 to relevant development applications • Naturally Occurring Asbestos (NOA) identified, mapped and advised on Section 149(5) certificates. • NOA policy and guidelines developed and adopted.
Karst Landscapes **Objective:** To protect significant karst landscape values from the impacts of development and settlement intensification.		

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Strategy	Policy Action	Progress and Update
16. Limit development opportunities within significant karst landscape	16.1 Identify significant karst landscapes via the ESA process. 16.2 Protect Karst Conservation Reserves with E1 zoning. 16.3 Protect other significant karst landscapes with the use of other E zoning in the Standard Instrument. 16.4 By way of ESA Overlays with associated clauses, protect karst areas through minimum lot provisions and DCP requirements, avoiding impacts in the fist instance backed by minimisation, rehabilitation and offsetting impacts in instances where development is allowed.	• Karst Landscapes are not present in the Orange LGA

Heritage and Culture

Strategy	Policy Action	Progress and Update
Heritage **Objective:** Preserve the rural heritage and culture of the Sub-Region.		
1. Identify items and places of European heritage significance in Sub–Region.	1.1 Review existing heritage lists to identify what is important to the community in terms of heritage conservation. 1.2 Ensure that adequate community consultation is undertaken with respect to identification of heritage items. This is to include discussions with affected landowners.	• Orange LEP heritage schedule expanded by over 200 items.
2. Identify the Aboriginal heritage significance of Sub–Region.	2.1 Undertake an assessment of the Aboriginal heritage of the LGA, in consultation with local Aboriginal groups, including the identification of landscapes of significance.	• Aboriginal community were consulted during preparation of Orange LEP 2011

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	Strategy	Policy Action	Progress and Update
3.	Protect and enhance identified heritage values.	3.1 Develop heritage provisions for identified heritage items, conservation areas and Aboriginal places and landscapes. 3.2 Include a list of heritage items, conservation areas and Aboriginal areas (where appropriate) in the LEP. 3.3 Review the existing development control plans for villages with identified heritage character, and amend where necessary. 3.4 Develop streetscape protection measures for all villages.	• Heritage items, conservation areas included in Schedule 5 of Orange LEP 2011 • Spring Hill conservation area amended. • Streetscape enhancement and protection being considered as part of village scoping studies.
4.	Prepare management guidelines for land uses in the Sub-Region.	4.1 Prepare a development control plan to support the LEP and provide additional detailed guidelines for development in relation to heritage	• Orange DCP heritage provisions continue to apply. Matter to be considered during city-wide DCP review
5.	Increase community awareness and involvement in identifying, protecting and enhancing heritage.	5.1 Develop and implement an education program informing the community on the benefits of heritage conservation. 5.2 Continue to provide free heritage advice to residents. 5.3 Encourage landowners to prepare conservation plans for significant items and places.	• Council heritage advisor available on a monthly basis to provide free advice to residents.
6.	Promote and support the rural heritage and culture of the Sub-Region.	6.1 Public information on heritage places and items and include in community and tourist information. 6.2 Support cultural and tourist activities which promote rural heritage.	• Councils heritage advisor supplies information and updates the heritage register.

Community Services

Objective: The provision of a range of health and community services facilities such as hospitals, primary care and community care centres, and the creation of healthy living environments to support and encourage physically and socially active communities.

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Strategy	Policy Action	Progress and Update
7. Create living environments in rural areas with access to services and facilities to support healthy lifestyles and active communities.	7.1 Support the physical, mental and social health of individuals and communities by ensuring good access to a range of education facilities, employment and training, affordable housing, social services, health centres and hospital facilities. 7.2 Manage the interface areas between living environments and other uses such as industry, arterial roads and primary industry, to minimise any adverse health impacts on the community. 7.3 Manage rural settlement patterns to ensure the effective and efficient provision of waste and recycling services. 7.4 Manage rural settlement patterns to minimise the creation of commuter dependent communities in the context of the emerging issues of fuel constraints and climate change.	• Council planning scheme enables and supports a wide range of facilities and services across the LGA. • Selection of industrial lands, road corridors and primary industry is informed by interface issues and potential for land use conflicts. • Rural settlement patterns have been limited to locations that can be served efficiently. • New and expanded settlement areas have been chosen and designed with public transport requirements in mind.
8. Integrate service provision for new developments to support the function of new neighbourhoods or developments.	8.1 Review the overall impacts of rural residential development, and determine whether this type of development should continue to be made available in new release areas. 8.2 Allow for provision of services and facilities in residential areas to encourage exercise and neighbourly activity (for example, parklands and play equipment, footpaths, post boxes and public phones).	• Review undertaken as part of Orange LEP 2011. Determined that larger rural residential development (2ha and above) is more appropriately accommodated in the neighbouring shires. Orange LGA is better suited to providing for urban through to small lifestyle blocks (0.2 – 1ha) • Provision of services and facilities in residential areas is ongoing and has informed latest urban expansion corridor known as the Shiralee suburb.

Orange Airport and Surrounds Rural Land Analysis

The purpose of this document is to respond to condition 1(c) of the gateway determination PP_2015_ORANG_001_00 dated 18 December 2015. The condition requires

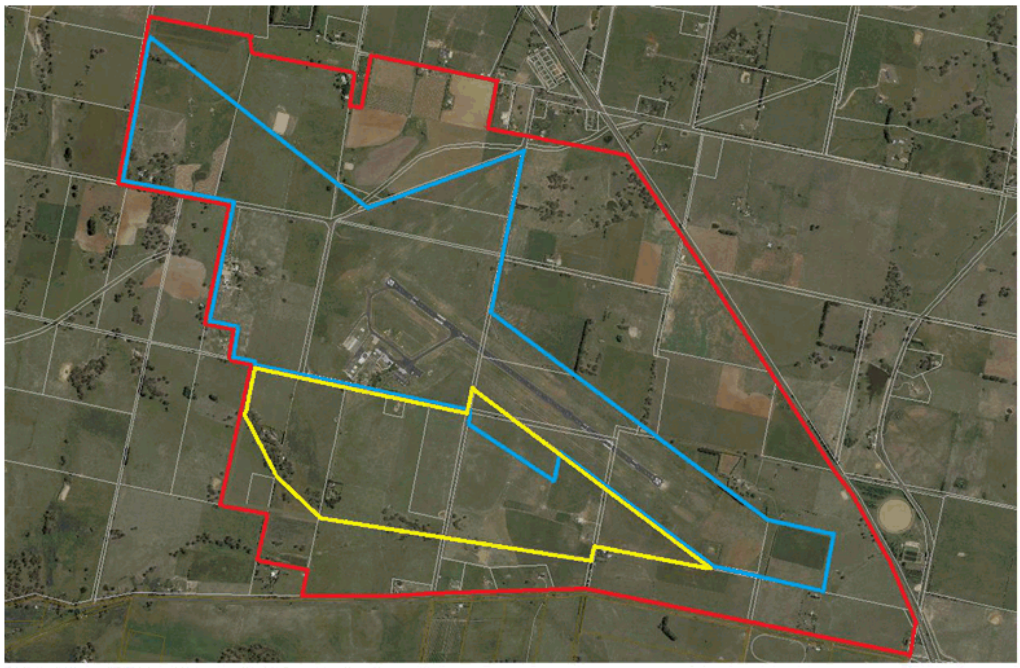
1. *Prior to community consultation, the planning proposal is to be amended to include additional information and justification in support of the planning proposal, including:*

   ...

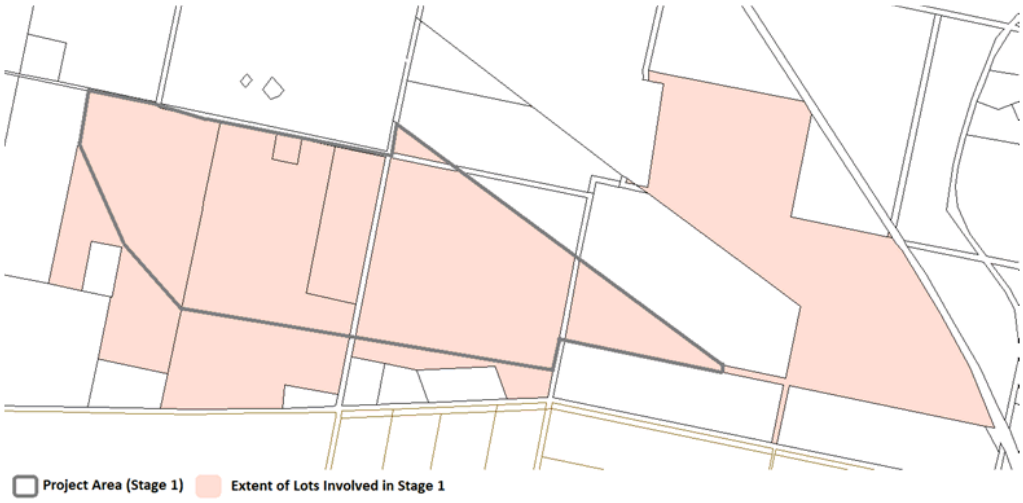
   (c) *A rural land analysis and justification of removing land from production, considering the BSAL status of agricultural land in the locality;*

Study Area

The overall study area comprises an area of ~296ha (inclusive of public recreation land and future road reserves) of land in the E3 and RU1 zones. The current proposal has been narrowed down to an initial stage 1 gross area of approximately 114ha. It is anticipated that stage 1 will deliver a nett area of 75ha of IN1 General Industrial and B7 Business Park land with the remainder forming buffer areas of RE1 Public Recreation.



The project area consists of 7 parcels of land ranging in size from 0.8ha to 74ha with several being partially outside of the project area. 4 of the parcels are Council owned 2 are in private ownership and 1 is owned by a public authority. 4 of the parcels are only partially within the subject area, the following table outlines how much of each parcel is within the study area.



The current agricultural activities across these parcels comprise low intensity extensive agriculture such as agistment, grazing, etc. The current level of primary production occurring on the land is set out below.

Lot & DP	Raw land Size (ha)	ha involved	Current usage	Ownership
Lot 11 DP 1187717	**74**	**8.8**	**grazing**	**MR RT & Mrs EE & Mr SH Moad**
Lot 1 DP 503021	**0.8**	**0.8**	**Airport navigation facility**	**Air Services Australia**
(part) Lot 10 DP 1208693	**37.4**	**23.3**	**grazing**	**Orange City Council**
Lot 209 DP 391543	**9.8**	**9.8**	**grazing**	**Orange City Council**
(part) Lot 21 DP 624975	**47.7**	**30.6**	**grazing**	**Orange City Council**
(part) Lot 307 DP 1061640	**46.1**	**39.4**	**grazing**	**Mr GJ Stevenson**
Lot C DP 399985	**1.1**	**1.1**	**airport**	**Orange City Council**
Totals	219.2	113.8		

BSAL Status

The *Frequently Asked Questions Biophysical Strategic Agricultural Land Mapping across NSW*[1] document (published by the NSW government and dated January 2014) clearly relates BSAL mapping to regulating the location and assessment of state significant mining and Coal Seam Gas (CSG) activities in NSW.

It is considered that this is driven by the potential for Mining and CSG impacts to extend beyond the immediate area of activity. For example, interference or contamination of underground aquifers has the potential to impact upon the agricultural activities far beyond the geographical limits of any particular mine or CSG site.

This focus is reflected in the provisions of *SEPP (Mining, Petroleum Production and Extractive Industries) 2007*. Part 4AA of the SEPP relates explicitly to Mining and Petroleum production on biophysical strategic agricultural land. Sections 17C – 17E establish a mechanism for proponents to seek site verification certificates (SVC) but only in relation to projects under the Mining Act 1992 or the Petroleum (Onshore) Act 1991. There is no opportunity for any other form of development such as industrial, commercial or other urban forms to seek an SVC under the SEPP.

It is noted that *SEPP (Rural Lands) 2008* also exists to provide rural planning principles. General principles are set out in section 7 and rural subdivision principles are set out in section 8 of the SEPP.

Rural Planning Principles (s.7 SEPP (Rural Lands) 2008)

(a) the promotion and protection of opportunities for current and potential productive and sustainable economic activities in rural areas,

All lots involved are already below the 100ha minimum lot size applying the area. The 100ha standard was established as representing a commercially viable agricultural holding. 6 of the lots involved are below half of this standard with 3 at less than a tenth of the standard. This serves to illustrate the already fragmented nature of the land involved.

The largest parcel involved is 74ha of this only 8.8ha is part of the proposal area, leaving approximately 65.2ha available for continued agricultural use.

The next 3 largest lots are 47.7ha, 46.1ha and 37.4ha in size. Two of these are Council owned and the 46.1ha site is privately owned. At these sizes the lands are considered to be marginal for primary production with intensive plant agriculture being a possibility. Should intensive plant agriculture be sought on these lands they would be likely to be subject to various restrictions due to being in the drinking water catchment.

Presently none of the land involved has established any orchard / vineyard. These properties are currently used for a mixture of grazing and associated rural lifestyle residences.

As none have pursued a more intensive form of agriculture, despite their modest size, they are not considered to provide full time equivalent income.

(b) recognition of the importance of rural lands and agriculture and the changing nature of agriculture and of trends, demands and issues in agriculture in the area, region or State,

The contribution of agriculture to the local area, region and State are acknowledged. Most of the subject land is in Council ownership, having been acquired over a prolonged time to protect the operation of the aerodrome. Experience has shown that many former vineyards and orchards in Orange that were created on either 40ha or 16ha minimums have not been maintained and in many instances the commercial enterprise has been abandoned resulting in the property becoming in effect a very large non-productive lifestyle property.

(c) recognition of the significance of rural land uses to the State and rural communities, including the social and economic benefits of rural land use and development,

The current level of social and economic benefit flowing to the rural community in the vicinity of Spring Hill comprises 2 private properties, neither of which are significant employers. Household expenditure of the 2 properties is a minor contribution to the local economy. From a social perspective the 2 households are members of the Spring Hill community and may presently participate in local social events and activities.

The reduction of 2 private properties is offset by the consistent, albeit small, growth of the Spring Hill community. It is noted that land immediately west and south of Spring Hill in Cabonne Shire has undergone subdivision for lifestyle allotments of 2+ha in size. Together with infill developments in Spring Hill itself the community has been growing at a modest pace over the last decade.

(d) in planning for rural lands, to balance the social, economic and environmental interests of the community,

The proposal is considered to have a minimal impact on the social interests of the Spring Hill community, given that the land is not contiguous with the village and results in a net reduction of 2 households.

From an economic perspective creation of an industrial technology precinct at the airport is expected to yield a substantial number of jobs over the long term. While most workers are anticipated to commute from Orange, Millthorpe and Blayney it is probable that some will seek to establish in Spring Hill itself and/or on the adjoining lifestyle blocks. An incoming population would be limited by the scarcity of housing lots in and around Spring Hill, however new arrivals are likely to contribute positively to the community. School enrolments are likely to be maintained or increase over time and the additional disposable incomes may stimulate the establishment of small businesses in the village. These changes are anticipated to occur gradually such that the existing community will adapt to the rising population and activity incrementally over the coming decades.

Environmentally, the proposal has included several generous buffers that will be embellished over time and allow the creation of cycle paths and walking trails around the airport, enhancing the passive recreation opportunities to a minor extent.

(e) the identification and protection of natural resources, having regard to maintaining biodiversity, the protection of native vegetation, the importance of water resources and avoiding constrained land,

Existing vegetation is sparse and not considered to be of significant ecological value as it does not provide linkages to more substantial vegetation stands. Nonetheless the proposal seeks to retain current stands of trees and incorporate them into public recreation zones that will in turn be embellished.

The proposal benefits from an extension of Councils reticulated sewer helping to ensure protection of groundwater resources. Surface water runoff is within the city drinking water catchment and will be managed through inclusion of detention basins and other water sensitive urban design principles.

(f) the provision of opportunities for rural lifestyle, settlement and housing that contribute to the social and economic welfare of rural communities,

The proposal does not involve the creation of additional rural lifestyle, settlement or housing opportunities. It is considered that further investigation of Spring Hill could result in some increase in supply of a variety of lot sizes. That issue is being investigated separately to this project.

(g) the consideration of impacts on services and infrastructure and appropriate location when providing for rural housing,

The proposal does not involve providing rural housing. Notwithstanding this the proposal is anticipated to result in the extension of reticulated utilities to the airport and nearby Spring Hill village.

(h) ensuring consistency with any applicable regional strategy of the Department of Planning or any applicable local strategy endorsed by the Director-General.

The proposal is considered to be consistent with all applicable Department of Planning strategies. The proposal involves amending the Blayney Cabonne Orange Sub-Regional Rural and Industrial Lands Strategy 2008 by way of an addendum that examines the supply and demand of industrial lands in the Orange LGA and the relationship of proposed changes to the neighbouring LGAs of Blayney and Cabonne Shires.

The Rural Lands SEPP also contains a dedicated mechanism for identifying and protecting *State Significant Agricultural Land* by way of listing such land in Schedule 2 of the SEPP. At the time of writing the Schedule was blank.

The BSAL status of the land is not considered to preclude the planning proposal, given that:

- The State has established two distinct SEPPs in relation to agricultural land,
- Only the mining SEPP directly references BSAL mapping,
- Only mining and CSG proposals have a mechanism to confirm or refute BSAL classification,
- The planning proposal does not involve or seek to permit mining or CSG on the land,
- The Rural Lands SEPP has, through section 13 and schedule 2, a distinct mechanism for identifying State significant agricultural land,
- The subject land has not been identified in schedule 2 of the Rural Lands SEPP, and
- The planning proposal incorporates a series of perimeter buffers and screen landscaping intended to reduce and avoid interface land use conflicts.

Justification of removing land from production

In establishing whether or not the land can be justifiably removed from agricultural production consideration needs to be given to the contribution of the current land use pattern and contrasted with the potential contribution that may arise from rezoning the land for industrial / business purposes.

The current contribution of the land is considered in terms of economic value, ecological services, scenic and social value.

Economic value to the local and regional economy is considered to be minor and derived principally from low intensity extensive agriculture, principally livestock grazing. Owing to the modest lot sizes and the fragmented pattern of ownership in the area the potential for more substantial commercial agricultural output is unlikely, the potential constraints of the airport limits aerial spraying. Intensive agriculture has also been alienated by recent rural residential development on the southern side of Forest Road (Cabonne shire). Notwithstanding this the economic value provided is considered to be sustainable in an inter-generational sense – that is the current limited agricultural production could be maintained indefinitely.

Ecological services value of the land is comprised of potential habitat and linkages, water quality and groundwater protection. In this regard the current land use pattern provides only minor habitat potential as the land is predominantly cleared for grazing. Low intensity use does ensure water runoff is of a high quality and groundwater resources are largely protected (however some agricultural activities have potential to contaminate soils which in turn may leach into groundwater resources). The number of dwellings in the area, with associated septic systems also has potential to impact upon groundwater resources.

Scenic and social values of the land arise from the bucolic rural landscape. The flat terrain provides an open and spacious character punctuated by occasional homesteads and outbuildings, occasional tree clusters and grazing livestock. These views and values are generally derived from views from the public realm such as Forest Road and Spring Hill village looking across the landscape.

The potential contribution of the land arising from a rezoning is considered against the same values.

Economic value of the land if developed for a range of industrial and business purposes is significantly greater. The potential employment is outlined in the RedeConsult analysis. Such employment potential would also be sustainable and inter-generational subject to the fluctuating cycles of the national, regional and local economies. That is to say that industrial and business development can be perpetuated over generations in a way that mining, which extracts a finite resource, cannot.

Both agriculture and industry experience booms and busts and periodic structural adjustments – but even when a down turn appears endemic it can be reversed and the value of the land restored. The agricultural sector also benefits from appropriate local industrial development, with many firms serving both urban and rural clients. The resilience and performance of both agriculture and industry is strengthened by easy access to the other.

Additionally, an industrial and business estate would help to secure the operational performance of the Orange airport. The airport is undeniably an important regional infrastructure asset. Yet there is constant pressure to reduce landing fees to maintain regular services. In this context other forms of economic activity can help to boost revenue streams through leasing hangars, servicing contracts, improved turnover of terminal facilities and the like. Diversifying activities at and around the airport the proposal, whether related to air services or more generically, helps to sustain the economic performance of the airport.

Ecological Services of the land are not improved by industrial development as such. However to the extent that an industrial estate provides a feasible opportunity to extend reticulated sewer to the area this can reduce the number of septic systems and associated contamination risks to groundwater. Additionally, master planning of an industrial estate can incorporate additional vegetation through street landscaping, inclusion of parks and landscaped cycle ways. This gives an opportunity to enhance canopy cover providing habitat and nesting potential for birdlife.

Scenic and social values of an industrial estate are rarely significant. However the current proposal seeks to provide a visual screening of the estate through judicious use of landscaping and buffer zones. Combined with cycle ways and parkland the social value of the estate would be greater than just the employment potential and the industrial sheds should be largely screened from direct view of the public realm in most instances. The intention is to deliver a high quality standard of industrial urban design in a parklike setting, views toward the site from outside will be changed but need not be adverse.

Summary

The proposed rezoning of agricultural lands in proximity to the Orange airport represents a marginal reduction of agricultural potential. The loss is mitigated by the limited potential of commercial agricultural by virtue of the existing land fragmentation, presence of dwellings scattered through and around the area and airport operations. Ecological values are currently minimal and social and scenic values can be protected through design responses.

Conversely, the potential contribution of the proposed industrial and business estate to the local and regional economy is considered to be substantial. Importantly, there is no alternative site that brings together all three modes of transport (road, rail and air) as well as gas connectivity in a location that can be provided with reticulated services. Additionally, the proposed rezoning will diversify the range of activities occurring at and in the vicinity of the airport serving to underpin its continued success as a regionally significant transport and infrastructure asset.

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[1] *Frequently Asked Questions Biophysical Strategic Agricultural Land Mapping across NSW* http://www.planning.nsw.gov.au/Policy-and-Legislation/Mining-and-Resources/~/media/C53910CA79E14DE6A2B69134D2429A51.ashx

Contaminated Land Policy

Policy	Contaminated Land Policy
Officer Responsible	Director Planning & Environmental Services
Last Review Date	XXXX

Strategic Policy

1 Background

Contaminated land is managed by Council to minimise the impacts of past land use on the orderly development of land in the future. Land may have become contaminated by actions in the past when issues around contamination, pollution and waste management were not considered important by the community and the long-term effects of some chemicals on the environment and human health were poorly understood.

The Environment Protection Authority (EPA) is the State body that regulates contaminated land under the *Contaminated Land Management Act 1997*; however, Council has responsibility to ensure that when exercising its statutory planning functions in relation to the development of contaminated land, all the relevant information is considered.

To do this Council must:

- Consider the likelihood of land contamination as early as possible in the planning and development control process;
- Link decisions about the development of land with the information available about contamination possibilities;
- Adopt a policy approach which will provide strategic and statutory planning options based on the information about contamination; and
- Exercise statutory planning functions with a reasonable standard of care.

This policy is made to guide Council on how it will carry out its planning functions, and to provide a local context for decision making in relation to contaminated land. This policy is intended to supplement, and should be read together with, the *Managing Land Contamination Planning Guideline* (1998) with reference to Part 7A of the *Environmental Planning and Assessment Act 1979*.

It is expected that the reader of this policy will be familiar with the general contaminated land management framework that is set out in the *Managing Land Contamination Planning Guideline* (Department of Urban Affairs and Planning and EPA 1998), *State Environmental Planning Policy 55 Remediation of Land* (SEPP 55), the *National Environmental Protection (Assessment of Site Contamination) Measure 1999*, and other applicable legislation.

This policy sets out the local requirements for Blayney Shire Council and must be read in conjunction with the other documents mentioned. Further information about the general principles of contaminated land management and how Council's policy may relate to the sale or redevelopment of your land may be found on www.blayney.nsw.gov.au.

This policy is based on the Central West Councils Regional Contaminated Land Policy Template, developed with assistance from the New South Wales Government through the EPA's Contaminated Land Management Program under funding by the NSW Environment Trust.

2 Policy Objectives

The objectives of the policy are to describe how Council will keep relevant records, provide information to interested parties and make decisions regarding contaminated land. Specifically this policy will describe how:

- Information about potentially contaminated land is collected;
- Information is to be maintained in a Contaminated Lands Information System (CLIS);
- Council will use information to appropriately manage the use of land and what information is required for the development of the land;
- Information will be provided to owners of affected land and the public;
- Information will be provided on s149 planning certificates;
- Council should be notified of remediation activities within it LGA;
- Clarify where Category 1 remediation activities will be identified;
- how remediation activities should be conducted;
- Consultants should report on contaminated sites;
- A Site Audit Statement may be required;
- A Site Management Plan will be enforced;
- Council will use contaminated land standards and principles to address illegal land filling;
- The UPSS (Underground Petroleum Storage System) Regulation is to be administered by Council.

3 Application

This policy applies to all land within the Blayney Shire Council Local Government Area and includes:

1. Where Council is duly exercising one of the following planning functions:
    a. Preparation of a planning proposal;
    b. Processing and determination of a development application or the modification of a development consent;
    c. Processing and determination of an application for a complying development certificate; and
    d. Furnishing of advice in a certificate under section 149; or
2. Where Council is:
    a. Investigating or remedying illegal land filling; or
    b. Administering the *Protection of the Environment (Underground Petroleum Storage System) Regulation 2012*.

Note: the functions described in paragraph 2 above are not 'planning functions' to which Council is afforded protection from liability under section 145B of the EP&A Act.

4 Policy Statement

Where Council is aware of any past or present potentially contaminating land uses or activities (as described in this policy) it will maintain relevant information about the land on which that use or activity occurred or is occurring to ensure:

- That land owners and other interested parties may be made aware of those uses; and
- Council can assess land contamination issues and monitor remediation under *State Environmental Planning Policy 55 Remediation of Land* (SEPP 55).

The information held is intended to aid decision-making regarding contaminated land investigations, land use planning and determinations.

This policy will restrict the use of land by:

1. Prescribing the circumstances where land is required to undergo some level of assessment for land contamination, or remediation, before consent can be granted for any development on that land or the land can be rezoned; and
2. Enforce the restrictions that, in the opinion of the consultant or auditor, are required through the imposition of a Site Management Plan that may be imposed on the land following remediation.

Council will set standards for the conduct of remediation and reporting of contaminated land matters to ensure that contamination and remediation can be effectively managed and monitored for the benefit of the community.

While Council will endeavour to develop and maintain a comprehensive collection of relevant information, it does not guarantee the completeness or accuracy of all the information held. To the degree that information is not required to be provided to Council or hitherto has not been required to be kept by Council, Council may not be in possession of all the relevant information for any given property at any given time.

5 Abbreviations

CLIS	Contaminated Land Information System
CLM	Contaminated Land Management
CLM Act	*Contaminated Land Management Act 1997*
DA	Development Application
DSI	Detailed Site Investigation
EPA	NSW Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Reg	*Environmental Planning and Assessment Regulation 2000*
EPI	Environmental Planning Instrument
LEP	Local Environment Plan
NEPM	*National Environmental Protection (Assessment of Site Contamination) Measure 1999*
POEO Act	*Protection of the Environment Operation Act 1997*
PSI	Preliminary Site Investigation
RAP	Remediation Action Plan
SAS	Site Audit Statement
SEPP 55	*State Environmental Planning Policy 55 Remediation of Land*
SMP	Site Management Plan
UPSS	Underground Petroleum Storage System
UST	Underground Storage Tank

6 Glossary

Assessment of site contamination	A formal investigation and report carried out by a contaminated land consultant in accordance with the Planning Guideline, the Reporting Guidelines or the UPSS Regulation and may include a preliminary site investigation, a detailed site investigation, a remediation action plan or a validation report.
Category 1 remediation	As defined in SEPP 55, being remediation that requires development consent.
Category 2 remediation	As defined in SEPP 55, being remediation that may be undertaken without development consent.
Contaminated Land Management	In regard to Council's responsibilities: The management of records relating to past or present land use, assessment of site contamination, provision of relevant information, monitoring of remediation and the determination of suitability for rezoning and development consents as described within this policy.
Contamination	As defined in EP&A Act: ***contaminated land*** means land in, on or under which any substance is present at a concentration above the concentration at which the substance is normally present in, on or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment. or in CLM Act: ***Contamination*** of land, for the purposes of this Act, means the presence in, on or under the land of a substance at a concentration above the concentration at which the substance is normally present in, on or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment. Note: Contamination and Pollution have similar statutory definitions, and while Council has statutory powers to regulate pollution (in particular under the *Protection of the Environment Operations Act 1997*)

	this policy is primarily concerned with contamination. A pollution incident is considered to be a matter that is dealt with in the short term by the relevant powers. Pollution can result in contamination if the pollution is not cleaned up in the short term or Council does not become aware of the issue within a reasonable time to be able to enforce a suitable remedy.
Contamination assessment	See Assessment of site contamination.
Deferred Commencement	A development consent is granted subject to a condition that the consent is not to operate until the applicant satisfies the consent authority as to any matter specified in the condition, in accordance with s 80 (3) of the *Environmental Planning and Assessment Act 1979*.
Detailed Site Investigation	Stage 2 – Detailed Investigation as defined in Planning Guideline, the Reporting Guidelines and the NEPM. An investigation that will define with high precision the nature, extent and risks posed by contamination.
Environmental Management Plan	See Site Management Plan.
Phase	A term commonly used to refer to the formal stages of contamination assessment; however, it is not reliably consistent with the terms defined in this policy.
Planning Guideline	*Managing Land Contamination Planning Guideline* (Department of Urban Affairs and Planning and EPA 1998) or otherwise specified by s 145C *Environmental Planning and Assessment Act 1979*.
Pollution	As defined in POEO Act ***pollution*** means: a water pollution, or b air pollution, or c noise pollution, or d land pollution. ***pollution incident*** means an incident or set of circumstances during or as a consequence of which there is or is likely to be a leak, spill or other escape

	or deposit of a substance, as a result of which pollution has occurred, is occurring or is likely to occur. It includes an incident or set of circumstances in which a substance has been placed or disposed of on premises, but it does not include an incident or set of circumstances involving only the emission of any noise. ***land pollution*** or ***pollution of land*** means placing in or on, or otherwise introducing into or onto, the land (whether through an act or omission) any matter, whether solid, liquid or gaseous: a that causes or is likely to cause degradation of the land, resulting in actual or potential harm to the health or safety of human beings, animals or other terrestrial life or ecosystems, or actual or potential loss or property damage, that is not trivial, or b that is of a prescribed nature, description or class or that does not comply with any standard prescribed in respect of that matter, but does not include placing in or on, or otherwise introducing into or onto, land any substance excluded from this definition by the regulations. See note under **contamination**.
Preliminary Site Investigation	Stage 1 – Preliminary investigation as defined by the Planning Guideline, the Reporting Guidelines and the NEPM. An investigation that defines the potentially contaminating activities carried out on a site, the areas where contamination is most likely to exist and, if necessary, sufficient soil or groundwater sampling to confirm whether the land has been contaminated or not.
Reporting Guidelines	*Guidelines for Consultants Reporting on Contaminated Sites* (EPA 1997 updated 2011).
Remediation	As defined in SEPP 55 remediation means: a. removing, dispersing, destroying, reducing, mitigating or containing the contamination of any land, or b. eliminating or reducing any hazard arising from the contamination of any land (including by

	preventing the entry of persons or animals on the land).
Remediation Action Plan	Stage 3 – Site Remediation Action Plan as defined by the Planning Guideline and the Reporting Guidelines. A plan that sets out how a contaminated site can be made suitable for its intended use including methodology, clean-up criteria and validation procedures.
s149 planning certificate	A planning certificate as defined under section 149 of the EP&A Act.
Site Audit	**Non Statutory Site Audit** means a site audit undertaken by a site auditor that is not a requirement of a statutory instrument such as a development consent or regulation by the *Contaminated Land Management Act (1997)*. **Statutory Site Audit** as defined in section 47 of the *Contaminated Land Management Act (1997) means* a site audit carried out in order to secure compliance with, among other things, a requirement of SEPP55 or a development consent. **Site Audit Statement** contains the Site Auditor's findings and is in the form approved by the EPA. See s53B CLM Act. Further information about Site Audits can be found in the NSW EPA website: http://www.epa.nsw.gov.au/clm/auditorscheme.htm
Site Management Plan	A plan that is intended to manage residual contamination following suitable remediation of a site.
Specific potentially contaminating land use	A land use specified in Appendix A that will, if determined to have been carried out on the land, be used to identify land for contaminated land management under this policy.
Suitably qualified person	Means a person who has such competence and experience in relation to the assessment of site

	contamination as is recognised as appropriate by the contaminated land management industry. They will also be, or be reasonably able to be, or supervised by a consultant who is, certified under a contaminated land consultant certification scheme recognised by the EPA.
UPSS regulation	*Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2014*
Validation Report	Stage 4 – Validation and monitoring as defined by the Planning Guideline and the Reporting Guidelines. A report detailing the results of the post-remediation testing against the clean-up criteria stated in the RAP.

7 Legislation

Contaminated Land Management Act 1997

Provides for Site Auditing (s47), and specific requirements for 149 planning certificates in relation to the Act (s59).

Environmental Planning and Assessment Act 1979

Provides the basis of the planning system in NSW and permits the creation of State Environmental Planning Policies. Part 7A specifically details the liabilities for Planning Authorities in respect of contaminated land and defines the contaminated land Planning Guideline.

Environmental Planning and Assessment Regulation 2000

Sets out the requirements for s149 planning certificates (Schedule 4).

National Environmental Protection (Assessment of Site Contamination) Measure 1999.

Sets a national standard for contaminated site assessment.

Protection of the Environment Operations Act 1997

Enables the EPA, and Councils, to regulate pollution and waste in NSW.

Protection of the Environment Operations (Waste) Regulation 2014

Regulation of waste in NSW.

Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2014

Self-regulation regime of underground fuel storage in NSW

State Environmental Planning Policy No 55-Remediation of Land

Establishes the mandatory considerations for consent authorities when considering development applications in relation to contaminated land, and criteria for remediation of land before development can occur.

Blayney Local Environmental Plan 2012.

The Blayney Local Environmental Plan 2012 is a legal document that contains details about zoning, development controls and other provisions that will affect how land in the Blayney Shire can be developed and used in the future. The written instrument should be read in conjunction with the associated LEP maps.

8 Potentially contaminating land uses

This policy will identify those land uses that have a reasonable potential to result in land contamination that may need to be addressed during development.

The list of land uses and activities that this policy will specifically identify as having the potential to result in land contamination are in Appendix A. These land uses have the potential to cause land contamination because of the materials typically used, processed or stored on-site, the generation of contaminating waste products or the use of thermal processing.

In addition, the storage of significant volumes of petroleum or chemicals or activities involving the maintenance of motor vehicles or mechanical plant will be considered to be potentially contaminating land uses.

Where a property has been identified as having been associated with one or more of these land uses or activities, it will be included in the Contaminated Land Information System so that relevant information can be recorded and used for the purpose of this policy.

9 Information management

Note: Council's records and classifications are not intended to reflect the risk of harm to human health or the environment for a property in its current state or by its current land use. Where there are concerns that need to be addressed in the short term, the Council should use its powers under the *Protection of the Environment Operations Act 1997* or refer the matter to the EPA.

9.1 Contaminated Land Information System definition

Council will maintain a Contaminated Land Information System (CLIS) to record relevant information regarding land, its historical uses and activities carried out on it, assessments for contamination, remediation and Site Audits.

Information pertaining to a specific location shall include:

- Current and historical property description;
- Historical land uses or activities that have the potential to contaminate (See Appendix A);
- The land contamination investigation status;
- Reports and notices relating to contamination assessment;
- Reference to and brief comments relating to development applications, development consents, planning proposals to rezone land approved (or refused on the basis of contamination-related issues) and complying development certificates;
- Site Audit Statements; and
- EPA correspondence.

The information will not include personal information except personal information that is included in an assessment report.

9.2 What the information is used for

The information held in the CLIS will be used for the purpose of fulfilling the policy statement (see Section 4 Policy Statement above).

Specifically the information will be used to:

- Provide information on s149 planning certificate;
- Inform development applications, modification applications, complying development certificate applications and assessments, including pre-DA meetings and assessment;
- Inform strategic planning and the preparation of Planning Proposals;
- Monitor and regulate remediation of contaminated land; and
- Administer the UPSS regulation.

9.3 Including or removing land from Council's CLIS

Land is included in the CLIS based primarily on information known to Council regarding land use and does not necessarily reflect whether the land is actually contaminated or not. Land will be identified on the CLIS if Council:

- Holds records, or is aware, that the land has been used for a potentially contaminating land use as defined in Appendix A;
- Has carried out an inspection that suggests the land is likely to have been affected by contamination, pollution, landfilling, or by being used in an environmentally unsatisfactory manner (refer to definitions in the POEO Act);
- Is aware that the land has been the subject of remediation;
- Believes the land could have lawfully been used for a purpose listed in Appendix A and has no evidence to the contrary; or
- Is aware that the land is, or has been, zoned for industrial purposes.

Any land where a new development is commenced, whether approved by Council, subject to a Complying Development Certificate or exempt development, that is consistent with land uses defined in Appendix A will be included on the CLIS when Council becomes aware of it.

Land will not be included where:

- The use is at a domestic scale;
- The land use is clearly operated at a scale that is unlikely to cause land contamination; or
- The activity is, and has always been, generally of a retail or warehousing nature provided that any fuels, oil and chemicals remain in sealed containers from the manufacturer and are not dispensed or decanted into other containers; and,
- Council is not otherwise aware that the land is likely to be contaminated.

Note: It is acknowledged that both agricultural and residential land can be subject to incidental contamination and that, in some circumstances, could give rise to a risk to human health and the environment, however it is considered unreasonable to apply this policy where there is no evidence of circumstances presenting such a risk. Areas of agricultural land such as fuel storages and stock dips will be considered for contamination assessment when a DA is received however the whole land parcel will not be included in the CLIS unless specific reports are provided to Council.

A maximum of three land use descriptors will apply to each record.

When land is added to the CLIS the owner will be notified.

As it is a requirement that Council review its records every time it issues a s149 planning certificate and considers land contamination before determining a development application, a record of land must not be removed from the CLIS unless Council is satisfied that the information held does not relate to the land, or that any potentially contaminating activity has not taken place on the land.

Where land is subdivided or consolidated, information about the former land uses on the land will be carried onto the new property description(s).

9.4 Land Contamination Investigation Status

To assist Council to monitor and communicate the level and quality of information about contamination on any land parcel, each parcel on the CLIS will be classified according to the significance of the information the Council holds about the parcel. Each parcel on the CLIS will be classified into one of five classifications:

Table 1. Contaminated site investigation status classification

Investigation Class	Description
A - Identified	• Council has identified that the land should be included on the CLIS because a potentially contaminating land use is known to have been undertaken (Appendix A), but the results of any formal investigation have not been provided to Council. • At this status, it is not possible to determine if land could be suitable for any particular use.
B - Assessed	• Council has been provided with a contamination assessment report or other documentation indicating that the land is (or has been) contaminated, but is not satisfied, based on information provided in contamination assessment reports, that the land is suitable for any specific land uses and, therefore, further consideration of investigation, remediation or validation is required to determine a relevant application. Reports may indicate that the land may be suitable for some uses with conditions such as limited depth of excavation or contamination remaining in inaccessible areas due to existing structure etc. • For any land adjacent to identified potentially contaminated land where a contamination assessment report received by Council has identified that contamination has migrated to the adjoining land will be classified as assessed.
C – Site Management Plan	The land has been remediated, however, is subject to a site management plan (SMP). Any new DA must consider the requirements of a SMP that applies to the land.
D - Suitable for Limited Uses	• Council has been provided with a contamination assessment report or other documentation indicating that the land is (or has been) contaminated, but is satisfied, based on information provided in contamination assessment reports, that the land is suitable for some specific land uses without conditions. • Further consideration of investigation, remediation or validation would be required to determine a relevant application for more sensitive land uses.
E - Unrestricted	Council is satisfied based on information provided in contamination assessment reports that the land is suitable for all land uses and, therefore, no further investigation is required to determine a relevant application. This category shall only be used where no

further assessment of contamination is required to determine the suitability of any permissible DA.

The land contamination investigation status classification does not necessarily indicate that land is or is not contaminated but indicates whether or not appropriate information is available to make a decision in respect of the land.

Whenever new information about a land parcel or property is received by Council, the status classification should be reconsidered and changed if necessary.

If contamination investigations standards change, it should be considered whether any land with a status class of "E – Unrestricted" should have its status changed. If investigation thresholds are reduced it may be appropriate that all "D - suitable for limited uses" and "E – Unrestricted" statuses be changed to "B - Assessed" until a thorough review of each assessment report can be carried out.

9.5 Provision of information

Information on the CLIS may be provided to any person in the form of an s149 planning certificate in accordance with the EP&A Act.

Otherwise, a person with a valid interest may seek to view:

1 The CLIS register information; and
2 Reports held by Council.

However, due to Council's privacy policy or copyright restrictions (and the legislative requirements of *Government Information (Public Access) Act 2009* and *Privacy and Personal Information Protection Act 1998*), Council may not be able to provide all information it holds.

A person with a valid interest may include the following people in respect of the relevant land:

1 The owner;
2 The owner of neighbouring land;
3 State Government agencies such as the NSW Environment Protection Authority;
4 Contaminated land consultants investigating the land or neighbouring land;
5 Utilities providers;
6 Conveyancers acting on behalf of the owner; or
7 With the owner's permission:
    a. A potential purchaser;
    b. A purchaser's conveyancer; or
    c. A real estate agent.

The general release of information on the CLIS is not considered to be in the public interest.

9.6 Information provided on the s149 planning certificate

S149 planning certificates provide a range of information regarding the rights and restrictions placed on a parcel of land.

Council is obliged to provide certain information on the s149 planning certificate as specified in Schedule 4 of the *Environmental Planning and Assessment Regulations 2000* and s59 of the *Contaminated Land Management Act 1997*. That is:

1 Clause 7, Schedule 4 of the *Environmental Planning and Assessment Regulations 2000* requires that the certificate identify whether or not the land is affected by any policy (adopted by Council or by a public authority for the express purpose of its adoption being referred to in s149 certificates issued by Council) that restricts the development of land because of the likelihood of any risk. Information pertinent to clause 7 are noted in 1A and 1B below; and
2 Section 59 of the *Contaminated Land Management Act 1997* requires that the certificate address the specific matters relating to the management of contaminated land set out in that section. Information pertinent to s59 is noted in 2A and 2B below.

This Policy intends to be an adopted policy of the kind referred to in numbered paragraph 9.6, 1. above, that restricts the development of land because of the likelihood of contamination risk as set out in the Policy Statement (Section 4. above).

The following wording will be used for each Contamination Investigation Status and where other relevant information is known about the land:

1A Notation to be included on s149 planning certificate issued under s149(2), as required by Clause 7, Schedule 4 of the EP&A Reg – adopted policies that restrict the development of the land because of the likelihood of any risk:

- Land not considered to require restriction under this policy

  Council's adopted Contaminated Land Policy does not place any specific restriction on the land to which this certificate relates at this time.

- Land classed as "A - Identified"

  The land to which this certificate relates has been used for purposes that have the potential to contaminate land. Council records do not have sufficient information to determine whether the land is contaminated. Council's adopted Contaminated Land Policy restricts the development on the land by requiring

that the land undergoes some level of assessment for land contamination, and/or remediation if required, where zoning changes are proposed or consent is required for the carrying out of any development. Council's adopted policy provides information on how these restrictions will be applied in accordance with provisions under relevant State legislation. It is recommended that persons relying on this certificate undertake their own assessment of the land's suitability for purposes that do not require development consent.

- Land classed as "B - Assessed"

  The land to which this certificate relates has been used for purposes that have the potential to contaminate land. Council's adopted Contaminated Land Policy restricts the development on the land by requiring that the land undergoes some level of assessment for land contamination, and/or remediation if required, where zoning changes are proposed or consent is required for the carrying out of any development. Council's adopted policy provides information on how these restrictions will be applied in accordance with provisions under relevant State legislation. It is recommended that persons relying on this certificate undertake their own assessment of the land's suitability for purposes that do not require development consent.

- Land classed as C - Site Management Plan

  The land to which this certificate relates has been used for purposes that have the potential to contaminate land. Council has been advised that the site has undergone some remediation of site contamination; however, remains subject to a site management plan to mitigate the risk posed by land contamination on the land. The site management plan may place restrictions on development or use of the land and may include ongoing obligations by the owner or occupier. Council's adopted Contaminated Land Policy restricts the development of the land by ensuring compliance with the applicable site management plan. Further investigation may be required where zoning changes are proposed or consent is required for the carrying out of any development. Council's adopted policy provides information on how these restrictions will be applied in accordance with provisions under relevant State legislation. It is recommended that persons relying on this certificate undertake their own assessment of the land's suitability for purposes that do not require development consent.

- Land classed as D - Suitable for Limited Uses

  The land to which this certificate relates has been used for purposes that have the potential to contaminate land. An assessment of site contamination has

recommended that the land is suitable for certain types of use. Council's adopted Contaminated Land Policy restricts the development on the land by requiring that the land undergoes some level of assessment for land contamination, and/or remediation if required, where zoning changes are proposed or consent is required for the carrying out of development not consistent with the assessment of site contamination recommendations. Council's adopted policy provides information on how these restrictions will be applied in accordance with provisions under relevant State legislation. It is recommended that persons relying on this certificate undertake their own assessment of the land's suitability for purposes that are not consistent with the assessment of site contamination recommendations and do not require development consent.

- Land classed as E - Unrestricted

  The land to which this certificate relates has been used for purposes that have the potential to contaminate land. An assessment of site contamination has recommended that the land is suitable for all types of use.

1B Notation to be included on s149 planning certificates issued under s149(5) of the EP&A Act – advice on such other relevant matters affecting the land of which Council may be aware.

- Where the site is known to be subject to the UPSS regulation as regulated by Council
  The land is subject to the Protection of the Environment (Underground Petroleum Storage System) Regulation 2014.

- Where the land has been used for specific purposes listed in this policy
  The land has been used for the following purposes:
  (see list from Appendix A for potentially contaminating land uses and activities that may be listed).

- Where Council is in possession of contamination assessment reports
  Council has one or more reports on the assessment of site contamination.

- Where Council is in possession of a Site Audit Statement
  Council has a site audit statement.

- Where remediation has been approved in accordance with SEPP55
  Development consent has been granted to carry out Category 1 Remediation on the land.

- Where remediation has been notified in accordance with SEPP55
  Council has been notified that Category 2 remediation is to be carried out on the land.

2A Notation to be included on s149 planning certificate issued under s149(2) of the EP&A Act, as required by s59(2) of the CLM Act

- Where Council has received a Site Audit Statement that relates to the land

  Council has received a Site Audit Statement that relates to the land.

- Where the site has not been regulated by the CLM Act

  The land to which this certificate relates is not presently subject to regulation under the Contaminated Land Management Act 1997.

- Where the site has been declared significantly contaminated under the CLM Act

  The land to which this certificate relates is significantly contaminated land under the Contaminated Land Management Act 1997.

- Where the site is subject to a management order under the CLM Act

  The land to which this certificate relates is subject to a management order under the Contaminated Land Management Act 1997.

- Where the land is subject to a voluntary management proposal under the CLM Act

  The land to which this certificate relates is subject to an approved voluntary management proposal under the Contaminated Land Management Act 1997.

- Where the land is subject to an ongoing maintenance order under the CLM Act

  The land to which this certificate relates is subject to an ongoing maintenance order under the Contaminated Land Management Act 1997.

2B Notation to be included on s149 planning certificates issued under s149(2) of the EP&A Act, as required by section 59(3) of the CLM Act

- Where the land has been, but is no longer declared significantly contaminated under the CLM Act

  The land to which this certificate relates was, but is no longer significantly contaminated land under the Contaminated Land Management Act 1997.

- Where the land has been, but is no longer subject to a management order under the CLM Act

  The land to which this certificate relates was, but is no longer subject to a management order under the Contaminated Land Management Act 1997.

- Where the land has been, but is no longer subject to a voluntary management proposal under the CLM Act

  The land to which this certificate relates was, but is no longer subject to an approved voluntary management proposal under the Contaminated Land Management Act 1997.

- Where the land has been, but is no longer subject to an ongoing maintenance order under the CLM Act

  The land to which this certificate relates was, but is no longer subject to an ongoing maintenance order under the Contaminated Land Management Act 1997.

10 Rezoning

The rezoning of land is controlled by Part 3 Division 4 of the EP&A Act. A planning proposal is prepared by the Council and submitted for consideration and determination by the Minister (gateway determination). A gateway determination will determine what further studies may be required.

Clause 6 of SEPP 55 has the effect of requiring the consideration of contamination before preparing a planning proposal that would have the effect of zoning or rezoning land. In order to assess the potential for land contamination, Council will need a thorough land use history for the site with reference to the potentially contaminated land uses and activities defined in this policy.

Preliminary Site Investigations may be required prior to the preparation of the planning proposal if such an investigation can reasonably be carried out. A planning proposal may also recommend that further contamination investigations are carried out.

Council must have regard to a Preliminary Site Investigation, where such an investigation has been carried out or it is practicable that such an investigation can be carried out, before making a planning proposal where:

1 The land is declared significantly contaminated land under Part 3 of the CLM Act;
2 An activity referred to in Appendix A is being carried out on the land;

3 Council's records show that an activity or use referred to in Appendix A has been carried out on the land; or
4 Council has incomplete records about the use of the land, and the land is proposed to be used for residential, educational, recreational, childcare or hospital purposes (either as a dominant or ancillary use), and during the periods not covered by those records it would, according to the uses formerly permitted on the land, have been lawful to carry out an activity referred to in Appendix A.

If a planning proposal proposes to change a land use zone in a local environmental plan:

1 For a particular parcel of land, it would not be appropriate to proceed with the planning proposal unless the land was proven suitable for all kinds of development that would be permitted in the new zone or for the development contemplated in the planning proposal or it could be demonstrated that the land could, and would, be remediated to make the land suitable; or
2 For a large area of land (Generalised Rezonings), the planning proposal should seek to adopt measures in the local environmental plan or development control plan to ensure that the potential for contamination and the suitability of the land for any proposed use are assessed before any development consent within the rezoned land is granted.

If a preliminary site investigation indicates that contamination would make land unsuitable for particular uses, and:

1. The land may be appropriately remediated for those uses, provisions are needed in the local environmental plan or development control plan to require the remediation before those uses can occur.
2. Where remediation may not be appropriate for those uses, either the planning proposal should not proceed or the range of permissible uses should be restricted in the local environmental plan for that land use zone; that is, the land use options should be reconsidered.

Information on contamination possibilities can be used to locate uses according to land suitability, for example, sensitive uses only being allowed in areas of low contamination probability.

11 Development Applications

11.1 Pre Development Application Meetings

A pre DA meeting may be held between Council staff and a potential applicant to discuss the matters that need to be considered under heads of consideration (s79C

EP&A Act), the Local Environment Plan and the Development Control Plan for the Council. **Please refer to information about pre DA meetings on Councils website.**

A pre DA meeting is not a planning function covered by Part 7A of the EP&A Act, and any advice provided regarding land contamination matters is subject to the same limitations and liabilities as any other advice provided in a pre DA meeting.

Council's advice in a pre DA meeting should acknowledge:

1 That the potential for land contamination must be considered for each and every development application;
2 That any pre-existing reports, studies or site audit statement need be considered in terms of the specific development proposal;
3 Whether or not the pre-existing reports or studies will meet the reporting requirements of the Council at the time the development application is lodged.

After acknowledging the factors above, Council may be able to provide advice as to whether any further site assessment is required in order to assess the specific proposal. However, Council may not prejudice the assessment of suitability of the site for that proposed use.

The provisions of the Development Assessment section 11.2 below may be applied regardless of any advice provided during any pre DA meeting.

11.2 Development Assessment consideration of contamination

Upon receipt of a Development Application in respect of any land, SEPP 55 (cl7(1)) requires that land contamination must be considered. Any Statement of Environmental Effects or environmental impact statement should address the historical uses of the land.

Land contamination shall be considered by Council's assessing officer by:

1 Referring to the CLIS to determine if any information is held by Council regarding the potential for land contamination;
2 Considering the past known uses for the land having regard to the potentially contaminating land uses listed in Appendix A, and if there is an opportunity confirm past uses through a records search or seeking relevant information from the proponent;
3 Consideration of evidence of possible land contamination or potentially contaminating activities discovered during a site inspection relating to the development application; or
4 Considering information received through the public consultation process.

Where land has been remediated in the past, the issue of land contamination must again be considered for any subsequent development application. Council will need to ensure that any remediation that has been carried out is appropriate in terms of the specific development proposal. Council will need to determine if the remediation standards meet the requirements of the proposed use, if the standards have changed since the time of the remediation or if there is any residual contamination that may cause concern for the new proposal.

Where the information held by Council is not sufficient to determine if the land is suitable for the proposed development, relevant information, studies, investigations and or reports will be requested to assist in making the determination.

Changes of use on contaminated land may proceed provided that:

1 The land is suitable for the intended use; or
2 Conditions are attached to the development consent to ensure that the subject land can and will be remediated to a level appropriate to its intended use prior to or during the development stage.

When considering the suitability of the land for development under s79C(1)(c) of the EP&A Act, the risk to health and the environment from contamination must be included in this assessment. This includes risks during the construction and operation of the development. The former includes work safety issues as well as the potential for construction to disturb contamination and cause off-site movement of chemicals.

The Planning Guideline sets out the four stages of the contamination investigation process and all references to contamination investigations and reports should use the descriptions in the Planning Guideline, the NEPM or this policy.

In order to assess or determine the development application, information may be requested that does not constitute a contamination investigation as specified in the Planning Guideline or the NEPM. In that case the requirements of the 13 Contaminated Land Consultants section may not apply.

Such information may include:

- Confirmation of past land uses;
- Plans identifying where certain activities have taken place; or
- Oral history of the use of the land.

This type of information should be accompanied by a Statutory Declaration from the person providing the information.

If a development consent can be granted without the need to carry out any formal contaminated site investigation or remediation (for example, due the nature of the development or the circumstances of the potential contamination, such as contamination that is present under a building that it not being demolished), but there is a risk that physical evidence of past, potentially contaminating activities will be destroyed if the development goes ahead, then a photographic survey and oral history of the use of the land may be required to be submitted to Council for its records.

11.3 Triggers for preliminary site investigation

As a minimum requirement, a preliminary site investigation will be required when considering a development application for land on which Council:

1 Has knowledge of a potentially contaminating land use specified in Appendix A having occurred; or
2 Has reasonable grounds to believe the land may be contaminated because of the land's history, condition or other information known to Council,

and one or more of the following circumstances have occurred:

3 The circumstances suggest that the past use could reasonably have significantly contaminated the site;
4 The proposed development will involve any disturbance of soil including boring or trenching for foundations or services;
5 The contaminating activity that potentially caused contamination on the land involved illegal or unauthorised work;
6 The proposed development will include construction over land that may be contaminated;
7 The proposed development will interfere with groundwater; or
8 The potential contamination is from an underground storage tank (UST) (not including operating sites subject to the UPSS regulation).

The triggers specified above are in addition to the minimum assessment criteria set by the SEPP 55 in clause 7 (2), (3) and (4).

Note: land used for extensive agriculture should be assessed for site contamination where development applications relate to redevelopment in the vicinity of stock yards, stock dip or farm sheds where fuel or chemicals have been stored or handled.

11.4 Conditions of consent requiring remediation

Where a development will require remediation so that the site can be suitable for the proposed use the development consent may include conditions that require

remediation and validation as well as a site management plan and site audit statement. Such conditions may be included as Deferred Commencement Conditions.

11.5 Unexpected findings protocol

In circumstances where land contamination has not been able to be identified prior to a development being approved and contamination or infrastructure is uncovered during development, work should cease and Council should be advised immediately.

Please be aware that in managing any unexpected finding of contamination, the provisions of SEPP 55 apply and modification to the development consent or a new development consent application may need to be considered.

Council will impose a condition on all development consents to this effect.

12 Remediation

12.1 Remediation Overview and SEPP 55

Remediation is any process that will remove, disperse, destroy, reduce, mitigate or contain contamination of land or eliminate or reduce any hazard arising from the contamination on land (including by preventing the entry of persons or animals to the land).

Remediation activities should be defined in a Remediation Action Plan (RAP), being a plan that sets out how a contaminated site can be made suitable for its intended use including methodology, clean-up criteria and validation procedures. An RAP must be prepared by an appropriately qualified consultant in accordance with the applicable EPA guidelines.

The consultant will determine the most suitable way to remediate a site and prepare an RAP.

State Environmental Planning Policy 55 – Remediation of Land (SEPP55) states as one of its objects:
. . .promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment (SEPP55 cl2(2)).

Where remediation of contaminated land is necessary, the remediation should be carried out (whenever reasonably possibly to do so) within the context of a proposed development to achieve the highest best use. If there is doubt over whether remediation must be carried out to ensure the land is suitable for the use, then it is preferred that remediation be carried out.

Under SEPP 55 there are two categories of remediation Category 1 and Category 2.

Category 1 remediation requires development consent from Council and Category 2 does not. SEPP 55 specifies the criteria for each, if the proposed remediation is considered to be Category 1 remediation, a development Application must be made to the appropriate consent authority, generally Council. Category 2 remediation must be notified to Council prior to works commencing.

Please note that s122 of the EP&A Act requires compliance with SEPP 55 and s123 provides provision by which Council may enforce compliance through the NSW Land and Environment Court.

12.2 Category 1 remediation (requires consent)

Clause 9 of SEPP 55 sets out the criteria for Category 1 remediation and it is recommended that each remediation proposal considers whether or not it should be considered Category 1 or 2.

The following information is provided in order to identify land that is referred to in SEPP 55 clause 9 (b) land declared to be a critical habitat, (c) likely to have a significant effect on a critical habitat or a threatened species, population or ecological community and (e) area or zone to which any classifications to the following effect apply under an environmental planning instrument:

SEPP 55 Clause 9	Equivalent Blayney Shire Council mapped land
(b) land declared to be a critical habitat,	Not mapped and would need to be assessed on a site by site basis.
(c) critical habitat or a threatened species, population or ecological community	Not mapped and would need to be assessed on a site by site basis.
(e) (i) coastal protection	Such an area or zone is not classified by the Blayney Local Environmental Plan 2012
(ii) conservation or heritage conservation	Refer to Blayney Local Environmental Plan 2012 Maps.
(iii) habitat area, habitat protection area, habitat or wildlife corridor	Such an area or zone is not classified by the Blayney Local Environmental Plan 2012.

(iv) environment protection	Such an area or zone is not classified by the Blayney Local Environmental Plan 2012.
(v) escarpment, escarpment protection or escarpment preservation	Refer to Blayney Local Environmental Plan 2012 Flooding Maps.
(vi) floodway	land identified as "Flood Planning Area" on the Flood Planning Map, and other land at or below the flood planning level.
(vii) littoral rainforest	Such an area or zone is not classified by the Blayney Local Environmental Plan 2012.
(viii) nature reserve	Such an area or zone is not classified by the Blayney Local Environmental Plan 2012.
(ix) scenic area or scenic protection	Such an area or zone is not classified by the Blayney Local Environmental Plan
(x) wetland	Such an area or zone is not classified by the Blayney Local Environmental Plan 2012.

Note: any Environmental Planning Instrument (EPI) made or amended after the adoption of this policy should be considered when determining the remediation category under SEPP 55.

The above information does not limit the consideration of SEPP 55 clause 9 (a) designated development and (d) development for which another State environmental planning policy or a regional environmental plan requires development consent.

In accordance with Clause 9(f) of SEPP 55, it is considered that where Category 2 remediation will not or cannot be conducted in compliance with this policy (see section 12.3.2 below), the remediation should be considered as Category 1 remediation. An RAP will be required to be submitted with any application for Category 1 remediation.

In assessing a proposal for Category 1 remediation, the consequences of not carrying out the remediation will need to be considered and weighed up against the environmental impacts of carrying out the remediation. This involves an assessment of matters such as how the work will contribute to a net improvement in

environmental quality, reduce health risks or promote the economic use and development of the land. Both the applicant and Council need to consider this issue.

However, Council must not refuse development consent for Category 1 remediation work unless Council is satisfied that there would be a more significant risk of harm to human health or some other aspect of the environment from the carrying out of the work than there would be from the use of the land concerned (in the absence of the work) for any purpose for which it may lawfully be used (clause 12(1) of SEPP55).

In addition to the matters listed for consideration under section 79C of the EP&A Act, the following issues may also be relevant when assessing a development application for Category 1 remediation:

1 Is the risk to the environment from the remediation actions greater than the consequences of not carrying out the remediation with respect to the matter that triggered Category 1 remediation?
2 Does the Remediation Action Plan meet the criteria set out in the Reporting Guidelines?
3 Is the Site Management Plan acceptable?
4 Does the proposal require other approvals from regulatory authorities?
5 Is the remediation proposed to be supervised by an appropriately qualified consultant?
6 Is the proposal for validating the remediation adequate?
7 Are reporting and monitoring mechanisms and proposals adequate?

12.3 Category 2 remediation (carried out without consent, SEPP 55)

12.3.1 Notification

The Council will be notified in writing using the form available from the Council at the time of notification and consistent with notice requirements set out in clause 16 of SEPP 55.

A copy of the RAP is to be provided with the notification.

Council will acknowledge receipt of the notification and provide any relevant comments as soon as practicable prior to the proposed works start date if possible. The notice period for Category 2 remediation is 30 days, however SEPP 55 permits a lesser notice period in specific circumstances (cl 16(2)).

Failure to notify Council within the prescribed timeframes or to carry out remediation in the manner described in this policy shall be considered as a contravention of s76A of *the Environmental Planning and Assessment Act 1979*.

12.3.2 Conduct of remediation

To reduce the potential for offsite impacts and to comply with the requirements of the POEO Act, Category 2 remediation shall be conducted in the following manner:

Communication

1 *Adjoining property owners must be notified in writing of the commencement date, duration and nature of the remediation activities at least 7 days prior to remediation activities commencing on site.*

2 *A sign identifying the contact details of the remediation contractor must be displayed at the site for the duration of the remediation activities. The sign must identify the phone numbers for the duration of the remediation activities.*

3 *While the remediation activities are being undertaken the contractor must maintain a written record of any complaints received in relation to the conduct of the remediation. The written record must include each complainant's name and address, the time and date that each complaint was made, the nature of each complaint and the actions taken to address the complaint. The record may be requested by Council officers during the conduct of remediation, in which case the record must be made available to Council.*

4 *[Any complaint received by the contractor in relation to the remediation activities must be notified to Council during Council business hours as soon as possible, and in all cases no later than 2 business days following the date that the complaint was received by the contractor.]*

Managing Impacts

5 *Remediation activities must not cause any environmental harm outside of the area nominated for remediation within the site. The remediation area is to be contained by a suitable barrier or fencing to prevent all unauthorised access. Erosion and sediment controls must be in place to prevent any soil leaving the remediation site. Runoff from areas of contaminated soil, whether in situ, stockpiled or in excavation pits, must not be permitted to leave the site without relevant testing or treatment.*

6 *Remediation must not create visible dust that extends beyond any site boundary.*

7 *Remediation activities must not cause offensive noise (as defined by POEO Act) and avoid the production of vibration that may impact nearby properties.*

8 *Remediation activities must be managed to ensure that dust, odour, gases or fumes are not emitted beyond the boundary of the remediation site. Appropriate monitoring equipment must be used to demonstrate compliance with the condition.*

Dealing with Waste

9 *All liquid and solid waste must be classified in accordance with the Protection of the Environment (Waste) Regulation2014 and related guidelines.*

10 *All waste transported from the remediation site must be covered in a vehicle suitable for that waste material. There must be no tracking of soil onto public roads.*

11 *Any receiver of waste material must be properly licensed by the EPA to receive that waste. If a non-licensed premises is intended to receive waste from the site then an approved notice within the meaning of s143(4) of the POEO Act (s143 notice) must be supplied prior to removal of the material from the remediation site.*

12 *Details of material removed including volume, mass, classification, destination and any s143 notices are to be included in the validation report.*

13 *All waste transport routes must avoid where possible all sensitive land uses such as residential areas, schools, preschools, etc., avoid bus routes and particularly school bus pick up and drop off periods.*

Validation report

14 *A validation report shall be provided to Council along with the Summary Document and the notice of completion required under clause 17(2) of SEPP 55 to confirm that the remediation has been carried out in accordance with the requirement of SEPP 55 and provide a statement regarding the suitability of the site for use in accordance with the generic land use settings identified by the National Environmental Protection (Assessment of Site Contamination) Measure (1999). The validation report must be prepared in accordance with Council's Contaminated Land Policy, the Managing Land Contamination Planning Guidelines (1998), relevant EPA Guidelines and the National Environmental Protection (Assessment of Site Contamination) Measure (1999). Please note the requirements specified in Council's Contaminated Land Policy relating to consultants reporting and Site Audits.*

Site Management plan

15 *If the validation report recommends or requires the implementation of an ongoing site management plan or a site management plan is otherwise required, the site management plan must be prepared in consultation with Council in regard to how land use will be restricted, compliance with any ongoing monitoring and responses to unsatisfactory monitoring results. Such a Site Management plan may be required to be subject to a Site Audit in accordance with Part 4 Contaminated Land Management Act 1997.*

16 *A restriction or covenant requiring compliance with the site management plan must be registered on the title under section 88E of the Conveyancing Act 1919 or section 29(3) of the Contaminated Land Management Act 1997.*

17 *Assistance must be provided to Council (including by executing relevant documents) to enable registration (without unreasonable delay) of the restriction or covenant and Council is to be named as the only party able to vary or release the restriction or covenant.*

12.4 Underground Storage Tanks and Underground Petroleum Storage Systems

The presence of an underground storage tank (UST) may not always be associated with an Underground Petroleum System (UPSS) within the meaning of the *Protection of the Environment (Underground Petroleum Storage Systems) (UPSS) Regulation 2014*. In particular USTs used for material that is waste or is not petroleum or if the UST has not been operated since before 1 June 2008 may not necessarily be regulated by the UPSS Regulation.

For the removal of doubt, the removal of any underground storage tank (UST) used for the storage of liquids that in themselves constitute potential contaminants, will be considered to be remediation for the purpose of SEPP 55 only if validation of surrounding soils is carried out. Validation of UST removal or replacement is a requirement for sites that come under the UPSS regulation.

Where no validation sampling and laboratory analysis (in accordance with appropriate guidelines) is carried out, the site will be considered unremediated and will require suitable validation sampling before any determination under SEPP55 can be made. However, to carry out the removal of a UST without validation is considered to be development that requires consent.

The modification of an Underground Petroleum Storage System as defined in clause 3 of the *UPSS Regulation 2014* is deemed to be development that requires consent.

12.5 Validation reports and Notice of completion of remediation

The Planning Guideline highlights the importance of validation reporting to remediation process.

The UPSS Regulation requires that a validation report be submitted in relation to modification and decommissioning of UPSS (ccl 13 and 15).

The Reporting Guidelines state that:

> *Where remedial action has been carried out, the site must be 'validated' to ensure that the objectives stated in the RAP have been achieved. A report detailing the results of the site validation is required.*

SEPP 55 does not explicitly require that a validation report be submitted to Council following remediation works; however a Notice of Completion is required under Clause 17. The Notice of Completion criteria is specified in clause 18 of SEPP 55.

For the purpose of this policy, a validation report is not considered to be the same as a Notice of Completion.

Following any remediation, it is required that:

1. A validation report be provided within 30 days of completion of work (except where legislation or a development consent permits another time period).
2. The Notice of Completion may be incorporated into the Summary Report, as specified in section 13.4, where it is provided with a complete validation report.

13 Contaminated Land Consultants

13.1 Reports

All reports regarding the assessment of site contamination, as set out in the Planning Guideline and the NEPM, must be prepared by a suitably qualified person and be completed in accordance with the Reporting Guidelines.

A report may be provided to Council as:

1. A validation report for Category 2 remediation;
2. A validation report required by clauses 13 and 15 of the UPSS Reg following modification or decommissioning of an UPSS;
3. A contamination assessment report in order for Council to carry out its planning function in relation to development applications or compliance with development consent; or,
4. A report intended to provide information in order to amend the CLIS status.

Council may need to determine whether or not a report meets the requirements of relevant standards, and may enforce compliance with the relevant standards of reporting if necessary.

If a report is to be used for DA assessment or for amending the CLIS, whether or not it was provided in the first instance for that or another purpose, Council will only consider that report if it meets the reporting standards of this policy. Council may not necessarily advise at the time of submission whether a report is considered to be satisfactory for another purpose at a later time.

If Council does consider that it cannot rely on a particular report because it does not meet the standards of this policy, it may request that another report be submitted to address the particular concern.

The matters set out in this section of the Management Plan will be considered by Council in determining if any given report should be relied upon.

Any report received may be subject to review by Council staff and the conclusions and recommendations will not necessarily be accepted or adopted by Council. Before any determination is made that relies on any report submitted to Council at any time; that report may be required to be reviewed by a Site Auditor, subject to the policy statement regarding Site Audits.

All reports must:

1. Reference Council's policy and specifically refer to any conditions for remediation;
2. Be accompanied by a Summary Report as defined in this Policy in section 13.4.
3. Not have liability exclusions that prevent Council from relying on the information provided for carrying out its functions including maintaining and sharing information in accordance with this policy.

Reports provided to Council should contain factual information and avoid subjective opinion, language or analysis that has the potential to mislead Council or a third party to whom the report may be disclosed under s149(5) of the EP&A Act.

13.2 Certification of consultant

All reports submitted to Council for the purposes of fulfilling the SEPP55 and the UPSS regulation are to be prepared, or reviewed and approved, by a consultant who is certified under a contaminated land consultant certification scheme recognised by the EPA.

The front cover of a report submitted to Council is to include the details of the consultant's certification.

Prior to 1 April 2017, consultants who are not certified should provide evidence that their qualifications, experience and breadth of expertise would meet the expectations of a certification scheme and are appropriate for the nature of the investigation or plan being reported on.

Any report received by Council after 1 April 2017 that does not include the consultant's certifications details will not be accepted.

Any report provided to Council following the adoption of this policy that does not meet the requirements set out above may not be recognised for the purpose of any subsequent Development Application.

13.3 Insurance

Consultants must carry professional indemnity insurance that specifically identifies contamination and pollution coverage to a value of at least $20,000,000.

13.4 Summary Report

Council requires that any Assessment of Site Contamination report be accompanied by a summary report which provides a succinct overview of the site investigation or remediation on the parcel of land. The report will assist Council, landholders, purchasers and neighbours in reviewing matters associated with that land. A summary report cannot be relied upon solely for decision making under SEPP 55.

A summary report shall be one A4 page with one A4 page site plan or map. It should be completed on the template available from Council (see Appendix C for an example template). The report will provide a summary of the key facts:

1. Consultant's name and contact details;
2. Real property description (Lot, DP, address);
3. Main areas of concern;
4. Source of contamination;
5. Dates of investigations and remediation;
6. Nature and extent of contamination:
   a. Key contaminants involved;
   b. Highlight concentrations eg highest, % of samples above HSL, HIL etc;
   c. On the plan, an estimate of the lateral extent and depths;
   d. A cross section if useful;
7. What remediation was carried out including waste removed;
8. What contamination remains and where;
9. Brief recommendations of next steps;

10 Recommendation of suitability; and
11 Sign off, certification details and reference to full report.

Council shall be granted the right to copy summary reports for the use of owners or developers of the subject land or adjoining land.

14 Site Auditing

A statutory site audit in accordance with s47 *Contaminated Land Management Act 1997* may be required as a condition of consent or as partial notice of completion of remediation work (cl 18 SEPP55).

The Planning Guideline states:

> *"As a general principle, a site audit is only necessary when the planning authority:*
> - *believes on reasonable grounds that the information provided by the proponent is incorrect or incomplete;*
> - *wishes to verify the information provided by the proponent adheres to appropriate standards, procedures and guidelines;*
> - *does not have the internal resources to conduct its own technical review."*

Under this policy, a site audit statement will be required for reports on sites where:

- Site specific investigations threshold levels are used in a Tier 2[1] risk assessment;
- A Tier 3 risk assessment is relied upon for determination of suitability;
- A groundwater investigation is not carried out where underground tanks or infrastructure has been identified;
- A Site Management Plan is to be imposed;
- Council does not accept the consultant's recommendation; or,
- Council considers it necessary.

A Site Audit Statement (SAS) may be requested at any stage of the investigation (Preliminary, Detailed, RAP Validation or Site Management Plan) to assist Council in making its determinations under SEPP55, however, Council will not require an SAS at every stage without cause.

The SAS needs to establish that the land is suitable, or could be made suitable, subject to any specific requirements of the site auditor for the specified land uses. Council will determine which of the land uses specified on the site audit statement

[1] Details of what is involved in Tier 2 and 3 risk assessments can be found in the NEPM Schedule B4 Section 2.4

best characterises the development and specify this in relevant development assessment or consent conditions.

15 Site Management Plans

A Site Management Plan (SMP) is required when contamination is to remain on site. The SMP should be developed in consultation with Council to determine that it can be reasonably complied with and enforced. It should make provisions for Council to carry out checks of relevant compliance.

Further information of the use and need for an SMP can be found in section 3.4.6 Environmental management plans in the *Guidelines for the NSW Site Auditor Scheme (2nd edition)* (DEC NSW 2006).

Council may charge a fee for inspections or other services in relation to the monitoring of compliance of the SMP in accordance with provisions of the *Local Government Act 1993*.

Any SMP should be provided to Council along with any other report that recommends such a plan. The existence of an SMP will be noted on s149 planning certificates and included in the CLIS.

Where there is an SMP, and where Council is able to do so, a standard condition of consent will require the registration of a covenant on title requiring compliance with the SMP. This shall be a standard condition of consent for all development applications and Category 1 remediation where there is an SMP. It is a requirement relating to the conduct of Category 2 remediation under this policy.

Council will endeavour to have any SMP that Council is aware of, or relating to a consent condition predating this policy, registered on title by the land owner or relevant party.

16 Contaminated land standards for pollution

Individual pollution incidents, illegal dumping or spills of hazardous materials do not necessarily constitute contamination. Pollution incidents and waste offences should primarily be managed under the legislative framework set out in Chapters 4, 5, 7 and 8 of the Protection *of the Environment Operations Act 1997* and Part 6 of the *Environmental Planning and Assessment Act 1979*.

Such offences include but are not limited to:

- Filling land without consent under s76A EP&A Act;

- Filling land with material that is not approved ie where a development consent specifies that imported fill must meet certain standards;
- Water or land pollution as described in the POEO Act; or
- Unlawful waste facility ss143,144 POEO Act

Waste is defined in the POEO Act and may include any type of soil with or without contaminants.

When dealing with matters of waste or pollution, it is not appropriate to use the NEPM as the basis for investigation. Waste classification (as per EPA guidelines) should be used.

When considering clean-up criteria for pollution incidents, illegal dumping or spills of hazardous materials, the original state of the land or "background" levels of contaminants should be used as the clean-up goal.

Only if the land cannot be returned to its original condition or the pollution or waste activities are deemed to be no longer current, may it be considered a potentially contaminated site.

17 The Protection of the Environment Operations (Underground Petroleum Storage System (UPSS) Regulation (2014) enforcement

The *Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2014* requires that the local Council is to be advised of certain matters including the validation reports for UPSS removal or modification and the notification of environmental harm.

All reports for validation of remediation under the UPSS regulation must meet the requirements for consultants' reporting set out in this policy, specifically consultant certification and the provision of summary reports.

The requirement of the UPSS regulation is generally to ensure that:

1) Infrastructure and equipment are properly designed installed, commissioned and operated;
2) A secondary loss detection system is in place; and,
3) An environmental protection plan is in place.

The regulatory authority (the EPA until 1 June 2017, then Council) has the right under the POEO Act to enter the property and request to view records at any reasonable time.

At the time when regulatory responsibility for the UPSS regulation is handed to Council, Council may schedule routine inspections of UPSS sites to ensure compliance with the regulation. A fee may be charged in line with Council's Schedule of Fees and Charges.

Council is able to issue penalty infringement notices for any non-compliance with the regulations.

Council will consider the requirements of the UPSS regulation in regard to Development Applications for removal, modification or installation of underground petroleum storage systems.

Appendix A - potentially contaminating land uses

The following land use definitions generally relate to the land use definitions used in the *Standard Instrument—Principal Local Environmental Plan*. Additional definitions and comments are included in the table to assist in identifying the potential to contaminate land from that land use.

Should only be used where specific information about the site is available.

* Table 1 activities where a Preliminary Investigation is mandatory for change of use DA. See cl 7(2) & (4) SEPP55.

Grouping		Potentially contaminating land use	Definition or comments
Agriculture		Aquaculture	Cultivating or keeping fish or marine vegetation for commercial purposes; Fisheries Management Act 1994
	*	Extensive agriculture#	Used to capture farm shed activities such as chemical storage and handling
		Food manufacturing	All types of food and drink manufacturing that may have included boilers or cooking, needs to be at reasonable scale
	*	Intensive livestock agriculture	Feed lots, piggeries, dairies, concentrated waste products Designated development triggers
	*	Intensive plant agriculture	Vineyards, orchards, irrigated cropping, turf farming
		Livestock processing industries	Production of products derived from the slaughter of animals (including poultry) or the processing of skins or wool of animals, and includes abattoirs, knackeries, tanneries, wool scours and rendering plants.
		Rural supplies	Store large quantities of chemicals but should be only applied where chemicals are decanted or repackaged on site
	*	Sheep and cattle dips	Public or private facilities
		Stock and sale yards	Associated with waste, wash-down facilities and stock dips or other pest treatments

Grouping		Potentially contaminating land use	Definition or comments
	*	Tanning and associated trades	
Asbestos		Asbestos Disposal[#]	Where asbestos containing material has been buried for permanent disposal
	*	Asbestos production and disposal	Includes mining and asbestos product manufacturing
		Demolition without asbestos clearance	A building with significant ACM demolition without providing an asbestos clearance
Chemical	*	Acid/alkali plant and formulation	
		Battery manufacture, storage and recycling	Commercial scale storage of used batteries
		Chemical storage facilities	Includes the bulk storage and handling of chemical in association with other activities
	*	Chemicals manufacture and formulation	
	*	Defence works	UXOs, fuels and chemical use or storage
	*	Dry cleaning establishments	
		Hospitals	Incinerators and boilers, radioactive wastes
		Laboratory	Place equipped to conduct scientific experiments, tests, investigations, etc., or to manufacture chemicals, medicines, or the like. Includes large scale photographic labs etc.
	*	Paint formulation and manufacture	
		Paper and printing works	Commercial printeries with significant stores of ink and solvents

Grouping		Potentially contaminating land use	Definition or comments
	*	Pesticide manufacture and formulation	
	*	Wood preservation	
Fuel		Liquid fuel depots	
	*	Oil production and storage	Oil refineries
	*	Service stations	
		Store and dispense 450l or more of fuel or oils	Fuel storage on land where primary land use is not otherwise listed
Industry		Cement works	
	*	Drum re-conditioning works	
	*	Electrical manufacturing (transformers)	
	*	Electroplating and heat treatment premises	
	*	Engine works	Manufacture of engines
	*	Explosives industry	Includes explosives magazines, ammunition and fireworks manufacture and testing.
	*	Gas works	
		Heavy industrial storage establishment	Storage of goods, materials, plant or machinery for commercial purposes
		Heavy industrial workshops and metal fabrication	Includes welding, sand blasting, spray painting

Grouping		Potentially contaminating land use	Definition or comments
	*	Iron and steel works	
	*	Metal treatment	
	*	Mining and extractive industries	Including mineral or ore processing or coal washing etc.
		Paper pulp or pulp products industries	
		Pet food manufacturing	As distinct from food manufacturing
	*	Power stations	
		Sawmill or log processing works	Relating to often being off grid using steam or liquid fuel driven machinery, also drying kilns and use of pesticides
		Small engine service and repairs	Lawnmowers and other small engine not considered motor vehicles
	*	Smelting and refining	
		Storage of plant and equipment	Generally informal storage of equipment that may lead to land contamination
		Vehicle body repair workshops	Panel beaters and spray painting
Transport	*	Air transport facilities	Includes heliports and all ancillary buildings
		Emergency services facilities	Police, Ambulance Fire, SES have often included fuel storage
		Freight transport facility	
		Motor vehicle service and repairs	Including cars sales yards and tyre shops
	*	Railway yards	

Grouping		Potentially contaminating land use	Definition or comments
		Truck or transport depots	Place used for the servicing and parking of trucks, earthmoving machinery and the like
		Vehicle washing	Where involved in truck washing or engine degreasing for the public or as a standalone operation
Waste		Contaminated soil and groundwater treatment works	
		Junk yard	land used for the collection, storage, abandonment or sale of scrap metals, waste paper, bottles or other scrap materials or goods, or land used for the collecting, dismantling, storage, salvaging, or abandonment of cars or other vehicles or machinery or for the sale of their parts.
	*	Landfill sites	Sites use for the disposal of waste
		Oil Recycling	
	*	Scrap yards	
		Sewage treatment plants	
		Site used for illegal waste disposal	
		Use of uncertified fill	Land has been levelled or reshaped with fill material that has not been certified as suitable and or the filling has not been approved
	*	Waste storage and treatment	
Other		Commercial or industrial fixed plant with liquid fuels, e.g. generator sets.	
		Rifle or shooting range	

Grouping	Potentially contaminating land use	Definition or comments
	Site that includes large electrical transformers or switch gear	Including electrical substations and transformers or switchgear for large industrial premises.
	Site that is impacted by off-site contamination#	Sites that would require contamination assessment due to the impacts of contamination derived from land that is being regulated by the EPA under Part 3 of the CLM Act.

Appendix B Standard Conditions of Consent

Development Applications for contaminated sites

Request for information:

Prior to determination of development application if additional information is required, one or more of the following may be relevant.

Site History

A review of the historical land uses of the site is requested to ensure that any activities that have the potential to cause land contamination are identified. Council requests that this information be forwarded with a statutory declaration by any person furnishing relevant information declaring that the information is true and complete to the best of their knowledge.

Where a potentially contaminating activity is identified, a relevant contaminated site investigation will be required and shall be carried out in accordance with Council's Contaminated Land Policy, the Managing Land Contamination Planning Guideline (1998), relevant EPA Guidelines and the Assessment of Site Contamination NEPM (1999 as amended 2013). Please note the requirements specified in Council's policy for consultants reporting and for Site Audits.

Preliminary investigations

A preliminary contaminated site investigation is required to be submitted prior to further assessment of DA Number/year. The preliminary investigation shall be carried out in accordance with Council's Contaminated Land Policy, the Managing Land Contamination Planning Guideline (1998), relevant EPA Guidelines and the Assessment of Site Contamination NEPM (1999 as amended 2013). Please note the requirements specified in Council's policy for consultants reporting and for Site Audits.

Detailed investigations

A detailed contaminated site investigation is required to be submitted prior to further assessment of DA Number/year. The detail Investigation shall be carried out in accordance with Council's Contaminated Land Policy, the Managing Land Contamination Planning Guideline (1998), relevant EPA Guidelines and the Assessment of Site Contamination NEPM (1999 as amended 2013). Please note the requirements specified in Council's policy for consultants reporting and for Site Audits.

Recommended Condition where development will destroy evidence of potential contamination in an area of the site:

Prior to any works commencing on the site a photographic survey and oral history of the use of the land may be required is to be submitted to Council for its records.

Recommended Conditions for Deferred Commencement or prior to Construction Certificate:

The following conditions may be applied to ensure that the land is remediated in accordance with the development proposal and the information provided in relevant contamination assessments. Each application will be considered on its merit and the use, or modification, of any of the standard condition is at the discretion of Council in each circumstance. Conditions may be tailored to meet the specific circumstance of the development.

The use of deferred commencement is strongly advised if there is any doubt that the remediation will be entirely successful.

Remediation Action Plans

A Remediation Action Plan (RAP) is to be prepared that addresses the contamination identified in [report(s) details *Title, Author, Date*] *and sets out how site can be made suitable for its intended use including methodology, clean-up criteria and validation procedures. The RAP must be prepared in accordance with Council's Contaminated Land Policy, the Managing Land Contamination Planning Guideline (1998), relevant EPA Guidelines and the Assessment of Site Contamination NEPM (1999 as amended 2013). Please note the requirements specified in Council's policy for consultant's reporting and for site audits.*

[A Site Audit statement stating that the land CAN BE MADE SUITABLE (Section B) for the proposed development as [insert SAS land use category of the development] *land use shall be provided to Council. Please note the requirements specified in Council's policy for site audits.]*

[Any remediation carried out prior to commencement is subject to the requirements to either obtain consent or notify Council in accordance with SEPP 55 and Council's policy.]

Validation

A validation report shall be provided to Council along with the summary report and notice of completion required under clause 17(2) of SEPP 55 to confirm that the remediation has been completed generally in accordance with the RAP and that the site is suitable for the development. The validation report must be prepared in accordance with Council's Contaminated Land Policy, the Managing Land

Contamination Planning Guideline (1998), relevant EPA Guidelines and the Assessment of Site Contamination NEPM (1999 as amended 2013). Please note the requirements specified in Council's policy for consultants' reporting and for Site Audits.

Any recommendations identified in the validation report shall be binding on the development.

Site Management Plans

A Site Management Plan (has the same meaning as an Environmental Management plan as defined in the Guidelines for the NSW Site Auditor Scheme (2nd edition) (DEC NSW 2006)), if required to make the site suitable for the development, shall be submitted to Council for approval. The plan shall address what land use restrictions are required, any ongoing monitoring requirements and what responses should be made to any unsatisfactory monitoring results. The Site Management Plan must be prepared in accordance with Council's Contaminated Land Policy, the Managing Land Contamination Planning Guideline (1998), relevant EPA Guidelines and the Assessment of Site Contamination NEPM (1999 as amended 2013). Please note the requirements specified in Council's policy for consultants reporting and for Site Audits.

A restriction or covenant requiring compliance with the approved site management plan must be registered on the title under section 88E of the Conveyancing Act 1919 or section 29(3) of the Contaminated Land Management Act 1997. Assistance must be provided to Council (including by executing relevant documents) to enable registration (without unreasonable delay) of the restriction or covenant and Council is to be named as the only party able to vary or release the restriction or covenant.

Site Audit Statement

A Statutory Site Audit Statement in accordance with Part 4 Contaminated Land Management Act 1997 stating that the land is suitable for the proposed development as [insert SAS land use category of the development] *land use shall be provided to Council. Please note the requirements specified in Council's policy for Site Audits.*

SAS land use categories are found on the Site Audit Statement template available on the EPA website http://www.epa.nsw.gov.au/resources/clm/SAS.doc.

Recommended Conditions for ongoing site management:

All construction, development and use shall be bound by the recommendations of the validation report or any Site Management Plan coming from the remediation of the site.

Category 1 remediation:[2]

1 *Remediation activities shall be carried out in accordance with the RAP [insert details of RAP: title, author, date]. Any variation to the RAP must be communicated to Council before work is commenced to determine if any proposed variation will require reassessment under s96 of the EP&A Act.*

2 *Remediation work is to be carried out by a suitably qualified and experienced contractor under the guidance of a contaminated land consultant who meets the requirements of Council's Contaminated Land Policy in relation to reporting, certification and insurances.*

3 *A site auditor shall oversee the remediation [and where practicable, be the same site auditor that has reviewed the RAP]. A site audit statement in accordance with Part 4 Contaminated Land Management Act 1997 shall be provided to Council for the validation report and any Site Management Plan stating that the land is suitable for the proposed development as* [insert SAS land use category of the development] *land use.*

4 *A Construction Certificate shall be required for any structure required to carry out the remediation.*

Community consultation

5 *Adjoining property owners must be notified in writing of the commencement date of the remediation activities at least 7 days prior to remediation activities commencing on site.*

6 *A sign identifying the contact details of the remediation contractor must be displayed at the site for the duration of the remediation activities. The sign must identify the phone numbers for the duration of the remediation activities.*

7 *While the remediation activities are being undertaken the contractor must maintain a written record of any complaints received in relation to the conduct*

[2] Cat 1 remediation shall not be approved without a satisfactory RAP and Site Audit if deemed necessary.

of the remediation. The written record must include each complainant's name and address, the time and date that each complaint was made, the nature of each complaint and the actions taken to address the complaint. The record may be requested by Council officers during the conduct of remediation, in which case the record must be made available to Council.

Reason: so that any impacts on the surrounding environment are mitigated in a timely manner.

8 *Any complaint received by the contractor in relation to the remediation activities must be notified to Council during Council business hours as soon as possible, and in all cases no later than 2 business days following the date that the complaint was received by the contractor.*

Reason: so that Council is made aware that a complaint has been made and the contractor has dealt with the complaint promptly.

Managing Impacts

9 *Remediation activities must not cause any environmental harm outside of the area nominated for remediation within the site. The remediation area is to be contained by a suitable barrier or fencing to prevent all unauthorised access. Erosion and sediment controls must be in place to prevent any soil leaving the remediation site. Runoff from areas of contaminated soil, whether in situ, stockpiled or in excavation pits, must not be permitted to leave the site without relevant testing or treatment.*

10 *Remediation must not create visible dust that extends beyond any site boundary.*

11 *Remediation activities must not cause offensive noise (as defined by POEO Act) and avoid the production of vibration that may impact nearby properties.*

12 *Remediation activities must be managed to ensure that dust, odour, gases or fumes are not emitted beyond the boundary of the remediation site. Appropriate monitoring equipment must be used to demonstrate compliance with the condition.*

Dealing with Waste

13 *All liquid and solid waste must be classified in accordance with the Protection of the Environment (Waste) Regulation2014 and related guidelines.*

14 *All waste transported from the remediation site must be covered in a vehicle suitable for that waste material. There must be no tracking of soil onto public roads.*

15 *Any receiver of waste material must be properly licensed by the EPA to receive that waste. If a non-licensed premises is intended to receive waste from the site then an approved notice within the meaning of s143(4) of the POEO Act (s143 notice) must be supplied prior to removal of the material from the remediation site.*

16 *Details of material removed including volume, mass, classification, destination and any s143 notices are to be included in the validation report.*

17 *All waste transport routes must avoid where possible all sensitive land uses such as residential areas, schools, preschools, etc, as well as bus routes and particularly school bus pick up and drop off periods.*

Validation report

18 *A validation report shall be provided to Council along with the summary report and the notice of completion required under clause 17(2) of SEPP 55 to confirm that the remediation has been carried out in accordance with the requirement this consent and SEPP 55 and provide a statement regarding the suitability of the site for use in accordance with the generic land use settings identified by the National Environmental Protection (Assessment of Site Contamination) Measure (1999). The validation report must be prepared in accordance with Council's Contaminated Land Policy, the Managing Land Contamination Planning Guideline (1998), relevant EPA Guidelines and the National Environmental Protection (Assessment of Site Contamination) Measure (1999).*

Site Management Plan

19 *If the validation report recommends or requires the implementation of an ongoing site management plan (has the same meaning as an Environmental Management plan as defined in the Guidelines for the NSW Site Auditor Scheme (2nd edition DEC NSW 2006) or a site management plan is otherwise required, the site management plan must be prepared in consultation with Council in regard to how land use will be restricted, compliance with any ongoing monitoring and responses to unsatisfactory monitoring results.*

20 *A restriction or covenant requiring compliance with the site management plan must be registered on the title under section 88E of the Conveyancing Act*

1919 or section 29(3) of the Contaminated Land Management Act 1997. Assistance must be provided to Council (including by executing relevant documents) to enable registration of the restriction or covenant and Council is to be named as the only party able to vary or release the restriction or covenant.

Appendix C Summary Report Template

Contaminated Land Management Summary Document -Pursuant to Blayney Shire Council Contaminated Land Policy

Real property Description and address

Address . Lot DP Parish County

Dates of investigation or remediation

Main Areas of Concern (reason for undertaking the investigation/remediation work)

e.g. fuel tanks, waste area, storage of chemicals, processing area

Notable contaminant concentrations eg maximum specific concentrations and validation results

Maximum soil concentrations in soil removed – Analyte mg/kg,

Residual soil concentration - Analyte mg/kg

Maximum ground water concentration Analyte mg/l

Nature of works carried out

Soil investigation, ground water investigation, excavation, on-site remediation, removal of soil etc. Validation sampling, backfilled with imported soil with ENM classification.

Nature and extent of residual contamination

Contamination identified in investigation, Contamination unable to be remediated within the scope of the work, or areas not assessed.

Risk Factors

Reference to conceptual site model.

Waste removed

Include Soils bore cuttings and groundwater from development and purging of wells

Bulk waste removal from remediation

Remediation Summary

What was removed or treated? Was it successful, is residual remediation remaining?

.

Statement of suitability

The land is considered suitable for [residential, residential with limited soil access, open space, industrial/commercial] land use, other (describe)

.

Endorsement

This is an accurate summary of the report titled:
Produced by:

Dated:

Provided to xxx Council on:

Name: **Signature:**

Certification details

Summary Document - Textual description may not extend beyond one page.

Summary Document – Site Plan. Please note areas of concern, contamination removed or remediated and any residual contamination or risk factors.

Summary Document – Site Plan description may not extend beyond one page.