APPENDIX L

DUNGOWAN DAM AND PIPELINE EIS

Social Impact Assessment

NSW GOVERNMENT | EMM creating opportunities

Dungowan Dam and pipeline project

Social Impact Assessment

Prepared for Water Infrastructure NSW

September 2022

Dungowan Dam and pipeline project

Social Impact Assessment

Water Infrastructure NSW

J200042 EN-RPT-0016

September 2022

Version	Date	Prepared by	Approved by	Comments
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Executive Summary

ES1 Overview

The Peel River, part of the Namoi River catchment, provides water for irrigation as well as being the primary water supply for the city of Tamworth. Prompted by the millennium drought, investigations into the future water supply and demand for bulk water were undertaken for the regional city of Tamworth and the Peel Valley water users. The Dungowan Dam and Pipeline Project (the project) is a critical project to improving long-term water security for the region. Water Infrastructure NSW (the proponent) proposes to build a new dam at Dungowan (new Dungowan Dam) approximately 3.5 km downstream of the existing Dungowan Dam and a new section of pipeline about 32km long between the proposed Dam outlet and the tie in point to an existing pipeline from Dungowan Showground to the Calala Water Treatment Plant (WTP).

The construction phase of the project would take about 6 years to complete and would require up to 125 persons at peak construction. The workforce would be housed in an accommodation camp with a capacity for 140 workers, or in existing accommodation in Tamworth. The project is designed to last for 100 years, with certain elements to be replaced during that timeframe. It is expected that during the operational timeframes, the project will employ one to two new full time workers plus part time work for the existing WaterNSW operations team.

ES2 Existing Environment

While the project footprint is localised, direct and indirect impacts may be farther reaching. The project is considered to have two key areas of social influence: a local area and regional area.

The local area includes the communities of Dungowan and Ogunbil, who will have the most direct social impacts of the project (ie impacts related to local social infrastructure and services, workforce, business and industry, housing and accommodation, and community health and wellbeing).

The regional area consists of the Tamworth Regional Local Government Area (LGA), which is likely to experience fewer direct and more indirect social impacts of the project. Indirect impacts are due to use of infrastructure, supply chains, roads, transportation of goods, materials and equipment, the movement of workers (some of which may have drive in drive out arrangements) and cumulative impacts arising from other projects in the area.

Challenges for the regional area include decreasing housing affordability and rental accessibility, outmigration of young people, an ageing population and specialist skill and labour shortages, which present a barrier to diversifying local economies. The regional area has relatively lower educational attainment but comparable youth unemployment, disadvantaged persons, homelessness and disability when compared with NSW overall. The regional area has a high number of Indigenous residents.

Agriculture, construction, health care and social assistance are the leading industry sectors with respect to employment share in the local area. In the regional area, the leading employment industry sectors in 2016 were health care and social assistance, retail trade, education and training and tourism.

ES3 Assessment of impacts

This report has identified impacts that may occur during project construction and/or operation, and which affect different groups of people in the community.

Mitigation and management strategies have been proposed for each of the identified potential social impacts to minimise negative consequences and to maximise social benefits for the local community. Mitigations proposed in this report and other supporting technical studies are anticipated to effectively reduce the risk and enhance the benefits of most of these impacts. Detailed discussion of the impacts and mitigations is provided in Chapters 7and 8.

The key social impacts and benefits identified as having the potential for **High** or **Very High** risk or benefit without implementation of mitigation or enhancement are summarised in Table ES1.

Table ES1 Summary of Key Impacts

Impact categorisation	Impact
Way of Life	Road safety impacted by the increased number vehicle movements during the project construction
	Increase in housing demand may impact housing and rental affordability, thereby increasing housing stress in the local and regional area
	Improved water security, as identified by the community (Benefit)
	Economic benefits of improved water security
	Social benefits of improved water security (Benefit)
	Environmental benefits of improved water security (Benefit)
Community	Community cohesion due to project decision making
Culture	Potential for intergenerational loss of material culture and opportunity and cumulative loss to material culture
	Loss of access to land and cultural sites
Health and Wellbeing	Health and wellbeing relating to (and from) workers living and working on site (including bushfire risks)
Surroundings	Biosecurity concerns for weeds and invasive plant species being spread on agricultural land through construction machinery and worker vehicles
	Project construction and operation may impact native flora and fauna through inundation or changes to water flows.
Livelihood	Impacts on agricultural activity and productivity
	Benefits related to growth and economic development (very high if enhanced) (Benefit)
	Local workforce and employment opportunities (Benefit)
Decision making systems	Community perception of lack of transparency and open communication

An adaptive approach is proposed for the project, allowing Water Infrastructure NSW to manage and respond to changing circumstances and new information over time through ongoing monitoring and periodic review of mitigation strategies, allowing for modification if required and appropriate. This adaptive approach will ensure that the management of social impacts identified in this Social Impact Assessment minimises negative social consequences and maximises social benefits for the community.

TABLE OF CONTENTS

Annexures

Tables

Figures

1 Introduction

1.1 The project

The Peel River, part of the Namoi River catchment, provides water for irrigation as well as being the primary water supply for the city of Tamworth. Prompted by the millennium drought, investigations into the future water supply and demand for bulk water were undertaken for the regional city of Tamworth and the Peel Valley water users. The Dungowan Dam and pipeline project (the project) is a critical project to improving long-term water security for the region. The project includes a new dam at Dungowan (new Dungowan Dam) approximately 3.5 km downstream of the existing Dungowan Dam and a new section of pipeline about 32km long between the proposed Dam outlet and the tie in point to an existing pipeline from Dungowan Showground to the Calala Water Treatment Plant (WTP).

In September 2022, the Minister for Planning and Homes declared the project to be Critical State Significant Infrastructure (CSSI) as it is a development that is essential for the State for economic and social reasons. This requires Schedule 5 of the *State Environmental Planning Policy (Planning Systems) 2021* to be updated to reflect the CSSI status of the project. As CSSI, the project is subject to Part 5, Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), which requires the preparation of an environmental impact statement (EIS) and the approval of the NSW Minister for Planning and Homes.

The EIS has been prepared for the planning approval application for the project. This Social Impact Assessment (SIA) has been prepared to support the EIS.

In addition to requiring approval from the NSW Minister for Planning and Homes, the project has been deemed a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and requires approval from the Commonwealth Minister for the Environment and Water. The Minister for the Environment and Water has accredited the NSW planning process for the assessment of the project. Therefore, a single EIS has been prepared to address the requirements set out by the NSW Department of Planning and Environment (DPE) and the Commonwealth Department of Climate Change, Energy, the Environment and Water.

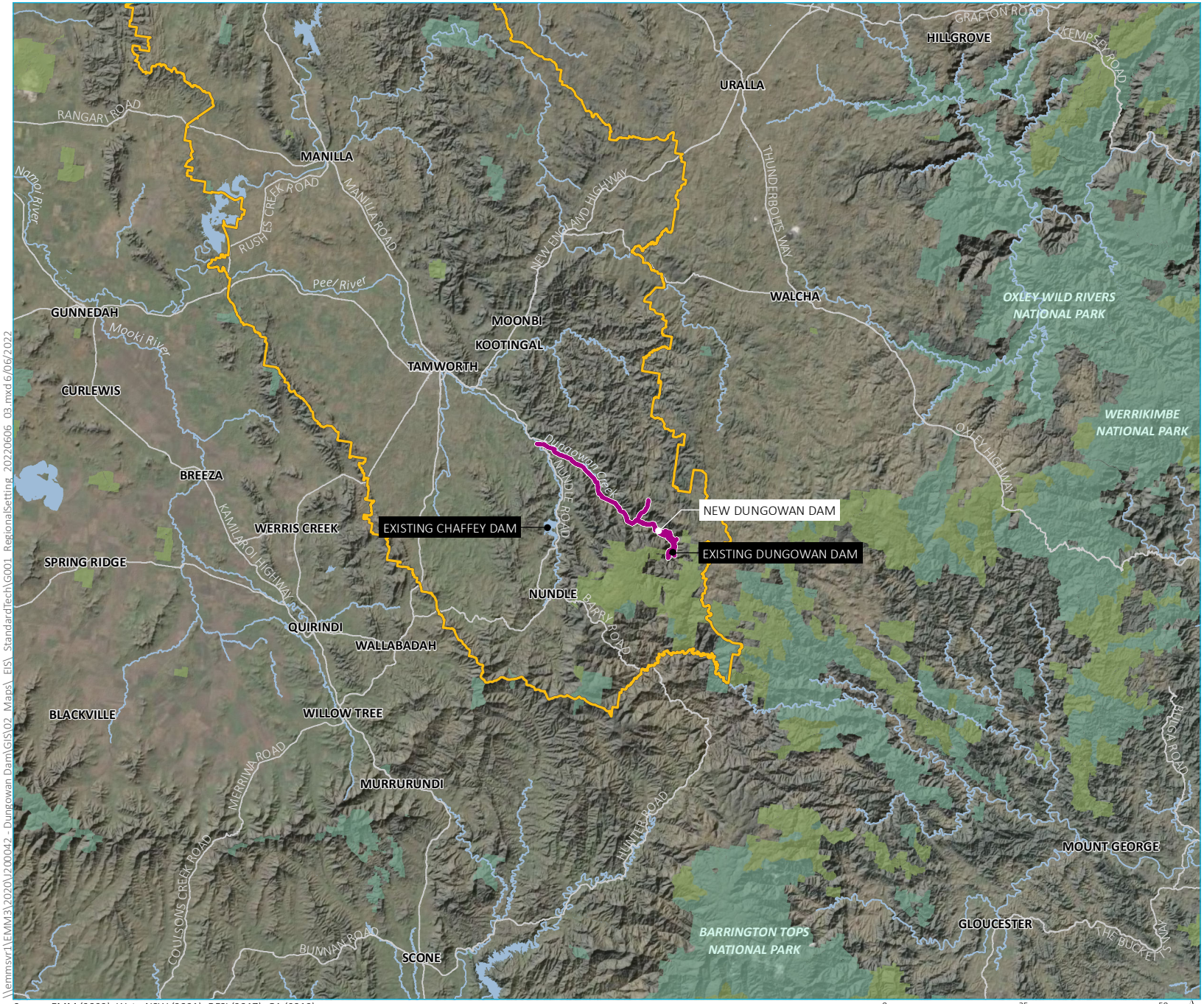
1.2 Project location

The project is located in the Tamworth Regional local government area (LGA), the New England Tablelands bioregion and part of the New England and North West region of NSW, west of the Great Dividing Range (DPE 2017). The New England and North West region is home to approximately 186,900 people and has a total area of around 99,100 km^2 (ABS 2018).

The city of Tamworth is the nearest (and largest) town to the project with over 40,000 residents. Other nearby regional towns include Quirindi (70 km west), Manilla (90 km north-west), Gloucester (90 km south-east), Armidale (100 km north) and Gunnedah (110 km west of the project).

The existing Dungowan Dam is in the Namoi River catchment approximately 50 km south-east of Tamworth in NSW. The Namoi catchment covers 4,700 km^2 and borders the Gwydir and Castlereagh catchments and is bounded by the Great Dividing Range in the east, the Liverpool Ranges and Warrumbungle Ranges in the south, and the Nandewar Ranges and Mount Kaputar to the north.

The existing Dungowan Dam is on Dungowan Creek, which is a tributary of the Peel River. Dungowan Creek is confined by the existing Dungowan Dam, while the Peel River system is regulated by Chaffey Dam, located in the upper catchment near the town of Woolomin, approximately 45 km from Tamworth. The project's regional setting is shown in Figure 1.1. The site of the project is in proximity to Dungowan (24 km south-east of Tamworth) and Ogunbil (50kms southeast of Tamworth).



\\emmsvr1\EMM3\2020\200042 - Dungowan Dam\GIS\02 Maps\ EIS\ StandardTech\G001 RegionalSetting 20220606 03.mxd 6/06/2022

Source: EMM (2022); WaterNSW (2021); DFSI (2017); GA (2013)

Regional setting

Dungowan Dam and pipeline project
Figure 1.1

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1.2.1 Project impact areas

In outlining the project, a project footprint has been defined to facilitate the assessment of direct impacts from the project:

- Project footprint: all areas where direct impacts may be experienced during construction and/or operation.

The project footprint has an area of 315 ha and is comprised of the construction and operational footprints, of which there is some overlap:

- Construction footprint: areas where vegetation clearing and/or ground disturbance is required for construction of the dam, pipeline and ancillary facilities, including the area needed to decommission and rehabilitate the existing dam.

- Operational footprint: areas where there will be permanent operational elements or easements, including infrastructure needed to operate the new Dungowan Dam and pipeline. The operation footprint includes the inundation area, being the area defined by the proposed full supply level (FSL) for the project.

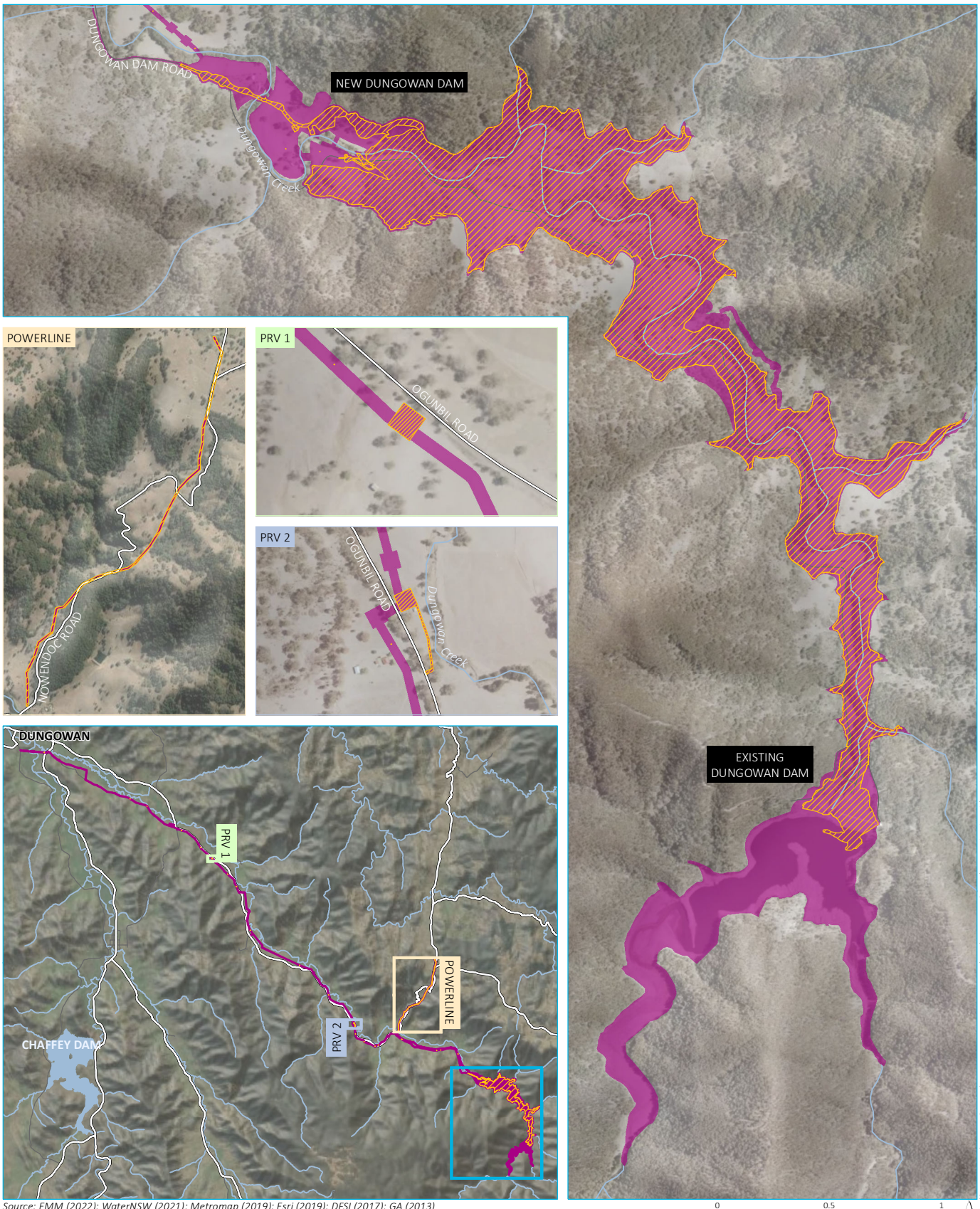
The project construction and operational footprints are shown in Figure 1.2.

Additional areas outside the project footprint have also been considered where relevant to the assessment of project impacts and include:

- Upstream flood extent: An area above the FSL to the level of a probable maximum flood (PMF) event that would be inundated for relatively short periods during operation associated with extreme rainfall events;

- Project area: A 10 km buffer around the project footprint defined to allow for assessment of potential indirect impacts.

- Downstream impact area: the area where hydrological changes may occur due to the project. This area is discussed in detail in the Surface Water Assessment (EMM 2022) as well as other technical reports subject to changed flow regimes as a result of the new Dungowan Dam operation. The downstream impact area includes Dungowan Creek and also the Peel River downstream of Chaffey Dam.



Source: EMM (2022); WaterNSW (2021); Metromap (2019); Esri (2019); DFSI (2017); GA (2013)

0 0.5 1 km

GDA 1994 MGA Zone 56

N

KEY

- Construction footprint
- Operational footprint

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody

Project footprint

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Dungowan Dam and pipeline project

Figure 1.2

EMM creating opportunities

1.3 Purpose of this report

This SIA supports the EIS for the project. It documents the assessment methods and results, the initiatives built into the project design to avoid and minimise associated impacts to the local community, and the mitigation and management measures proposed to address any residual impacts not able to be avoided.

The specific objectives of this assessment are to:

- describe the existing social conditions and demographic profile;
- identify and assess the extent and nature of potential social risks;
- evaluate the significance of the social impacts, positive and negative arising from the project including cumulative impacts;
- provide mitigation measures to reduce the negative social impacts and enhancement measures for significant positive impacts; and
- develop a monitoring and management framework.

1.3.1 Assessment guidelines and requirements

This SIA has been prepared in accordance with the Secretary's Environmental Assessment Requirements (SEARs) for the Dungowan Dam and pipeline project as well as relevant government assessment requirements, guidelines and policies, and in consultation with the responsible government agencies, including:

- the *Social Impact Assessment Guideline for State Significant Projects* (SIA Guideline 2021) (DPE 2021a);
- the *Technical Supplement: Social Impact Assessment Guideline for State significant Projects* (SIA Technical Supplement 2021) (DPE 2021b); and
- the *Cumulative Impact Assessment Guidelines for State Significant Projects* (DPE 2021d)) 2021.

The SEARs must be addressed in the EIS. Table 1.1 lists the matters relevant to this assessment and where they are addressed in this report.

Table 1.1 SEARs requirements relating to social impact assessment

Reference	Requirements	Chapter/Section addressed
Social - including a Social Impact Assessment, that:		
52.	Identifies and assesses the potential social impacts of the project, from the points of view of the affected community/ies and other relevant stakeholders, ie how they expect to experience the project.	Chapter 6, Chapter 7
53.	Assesses the existing recreational opportunities associated with the site, how these will be impacted by the project, and any proposed design measures to improve the recreational amenity of the site.	Section 7.6
54	Assesses the significance of positive, negative and cumulative social impacts considering likelihood, extent, duration, severity/scale, sensitivity/importance, and level of concern/interest.	Chapter 7
55	Includes mitigation measures for likely negative social impacts and any proposed enhancement measure.	Chapters 7, Chapter 8

Table 1.1 SEARs requirements relating to social impact assessment

Reference	Requirements	Chapter/Section addressed
56	Provides details of how social impacts will be adaptively monitored and managed over time.	Chapter 8
57	Assesses potential impacts to the electricity network, including infrastructure identified by Essential Energy, and proposed measures to avoid such impacts to the electricity network.	Section 2.1.3, Section 7.3.1, Section 7.3.2, Chapter 8
58.	Assesses impacts to agricultural businesses in the area during construction and operation of the project, including farmland and farm infrastructure, ancillary business activities (such as farm tourism and direct sales) and road access.	Section 7.1, Section 7.6, Section 7.7
59.	Considers the Dark Sky Planning Guideline for any proposed development within 200 kilometres from the Siding Spring Observatory.	Section 7.6.1, Landscape and Visual Impact Assessment (Appended to the EIS)

To inform preparation of the SEARs, DPE invited relevant government agencies to advise on matters to be addressed in the EIS. These matters were taken into account by the Secretary for DPE when preparing the SEARs. Social matters identified under other headings have been addressed in the relevant reports appended to the EIS, though this report does provide a context addressing a spectrum of social issues and benefits, which may be related.

The SIA Guideline 2021 (DPE 2021a) sets review questions, which SIA projects should demonstrate alignment with. The SIA questions and corresponding responses are presented in Annexure A (Table A.1). The responses in both Table 1.1 and Table A.1 identify where each SEARs and SIA Guideline requirement is addressed in this report.

This SIA has also been informed by best practice guidance and standards set out by the International Association for Impact Assessment (IAIA) and International Finance Corporation (IFC).

1.3.2 Other relevant reports

This SIA has been prepared with reference to other technical reports that were compiled as part of the Environmental Impact Statement (EIS) (EMM 2022). The other relevant reports referenced in this SIA are listed below.

- Aboriginal Cultural Heritage Assessment (EMM 2022) – appended to the EIS;
- Air Quality and Greenhouse Gas Impact Assessment (EMM 2022) – appended to the EIS;
- Aquatic Ecology Assessment (Austral Ecology and Research 2022) – appended to the EIS;
- Biodiversity Development Assessment Report (EMM 2022) – appended to the EIS;
- Bushfire Risk Assessment (BlackAsh 2022) – appended to the EIS;
- Climate Change Risk and Adaptation Report (Edge Environment 2022a) – appended to the EIS;
- Ecologically Sustainable Development Pathway (Edge Environment 2022b) – appended to the EIS;
- Local Effects Analysis (Marsden Jacobs 2022) – appended to the EIS;

- Groundwater Assessment (EMM 2022) – appended to the EIS;
- Health Impact Assessment (EnRiskS 2022) – appended to the EIS;
- Statement of Heritage Impact (EMM 2022) – appended to the EIS;
- Land Use and Property Assessment (Tremain Ivey 2022) – appended to the EIS;
- Landscape and Visual Impact Assessment (EMM 2022) – appended to the EIS;
- Noise and Vibration Impact Assessment (EMM 2022) – appended to the EIS;
- Preliminary Site Contamination Investigation (EMM 2022) – appended to the EIS;
- Soils and Land Capability Assessment (EMM 2022) – appended to the EIS;
- Traffic Impact Assessment (EMM 2022) – appended to the EIS;
- Waste Management Report (EMM 2022) – appended to the EIS; and
- Surface Water Assessment (EMM 2022) – appended to the EIS.

1.3.3 Authorship and SIA Declarations

The authorship and SIA Declarations for this report are provided in the following sections.

i Authorship

This report has been prepared by a suitably qualified and experienced lead author (Breannan Dent) and co-author (Caroline Wilkins), consistent with SIA Guideline requirements and reviewed and approved by a suitably qualified and experienced co-author. All contributors hold appropriate qualifications and have the relevant experience to carry out the SIA for this project. The curriculum vitae for each author is provided in Annexure B.

ii SIA Declarations

The authors declare that this SIA report:

- was completed on 19 August 2022;
- has been prepared in accordance with the EIS process under the *Environmental Planning and Assessment Act 1979* (EP&A Act);
- has been prepared in accordance with the SIA Guideline 2021;
- contains all reasonably available project information relevant to the SIA; and
- as far as EMM Consulting Pty Limited (EMM) is aware, contains information that is neither false nor misleading.

Assumptions and limitations of this report are outlined in Section 1.4.

1.4 Limitations of the SIA and level of confidence

1.4.1 Limitations of secondary data sources

At the time of writing the social baseline (May 2022), the most recent census data available was from the 2016 ABS Census. Some ABS Census data for 2021 became available by July 2022 when this report was prepared, and where feasible this has been incorporated into the assessment. Where more up-to-date data was not available, this report endeavours to capture potential impacts and vulnerabilities using historical data or proxy measures, such as references to alternate sources like id Consulting (2020) to identify trends. Information drawn from the 2016 ABS Census of Population and Housing is understood to potentially be dated and not reflective of current community social and economic conditions. Changes in the local, regional and national economy arising from the COVID-19 pandemic are not captured in the 2016 census data. However, further analysis of these impacts is provided using other available data sources in Chapter 5.

Data presented from the SIA field study program is based on the interviewed community member's knowledge and experience and on their willingness to participate and share data openly.

1.4.2 Limitations of primary data

The data collected through the SIA field study program may not be representative of the perspectives of all community members in the SIA study area. Landholder participants in the SIA field study program were primarily selected based on proximity to the study area and confidence in willingness to participate.

The data collected through a combination of the SIA field study program and literature reviews resulted in a moderate to high level of confidence in the identification and assessment of social impacts being an accurate representation of the concerns and issues of the local and regional area.

2 Project description

This chapter provides a summary of the Dungowan Dam and pipeline project. It outlines the permanent infrastructure required to operate the project, as well as the key construction elements and activities required to construct the project. A comprehensive and detailed description of the project is provided as Annexure B1 of the EIS, which has been relied upon for the basis of this technical assessment.

2.1 Project overview

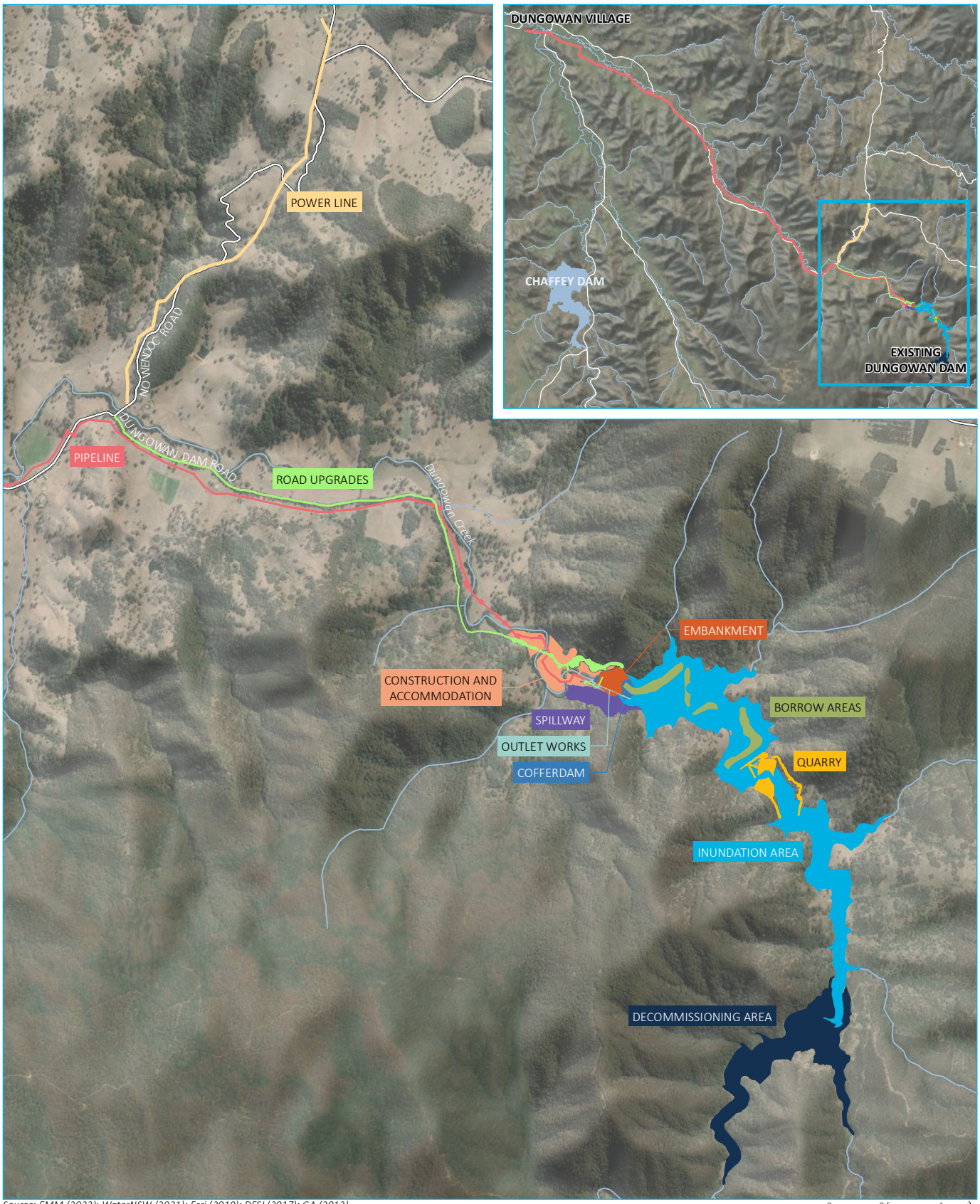
Water Infrastructure NSW proposes to build a new dam at Dungowan (new Dungowan Dam) about 3.5 km downstream of the existing Dungowan Dam and an enlarged delivery pipeline from the new Dungowan Dam outlet to the tie in point to the existing pipeline from Dungowan Showground to the Calala WTP. The existing pipeline from Dungowan Showground to the Calala WTP is not part of the Dungowan Dam and pipeline project. A summary of project elements is provided in Table 2.1. An overview of the project is provided in Figure 2.1.

Table 2.1 Overview of the project

Project element	Summary of the project
New Dungowan Dam infrastructure	Earth and rockfill embankment dam with height of ~58 m and a dam crest length of ~270 m.
	Storage capacity of 22.5 GL at full supply level (FSL) of RL 660.2 m AHD.
	The new Dungowan Dam on Dungowan Creek has a catchment size of 175 km^2 and is part of the Peel Valley and Namoi River catchment.
	Inundation extent (to FSL) of 130 ha (1.3 km^2)
	Spillway to the south of the dam wall including an approach channel, uncontrolled concrete ogee crest, chute and stilling basin. Free standing multiple-level intake tower connected with a bridge to the embankment, diversion tunnel with outlet conduit, valve house and associated pipework and valves.
	A permanent access road over the Dam crest to the valve house for operation and maintenance.
	Water diversion works including a diversion tunnel and temporary pipeline and upstream and downstream cofferdams to facilitate construction of the dam wall embankment.
Pipeline infrastructure	31.6 km of buried high density polyethylene (HDPE) pipe between 710 mm to 900 mm nominal diameter.
	Maximum 71 ML/day from the proposed dam to the junction with the pipeline from Chaffey Dam to the Calala Water Treatment Plant, to replace the existing 22 ML/day pipeline. The pipeline would connect to the valve house on the left abutment of the embankment. Valve infrastructure would include control valves installed in two above ground buildings along the pipeline.
	10 m wide easement for the 31.6 km length of the pipeline. The replacement pipeline extends from the new Dungowan Dam to a connection point with the existing pipeline between Dungowan Showground and Calala WTP.
Ancillary infrastructure and works	Road works to improve existing roads to provide construction access, temporary establishment and use of a construction compound, an accommodation camp, two upstream quarries and four borrow areas within the inundation area.
	A new 4.2 km long 11 kV overhead powerline (including a new easement and access track) connecting to an existing overhead line approximately 6 km north west of the dam. The existing overhead line that extends approximately 13.2 km to the Niangala area would also require minor upgrades, including re-stringing of new overhead wiring and replacement of some poles.

Table 2.1 Overview of the project

Project element	Summary of the project
Decommissioning of existing Dungowan Dam	Dewatering of existing dam, removal of existing Dungowan Dam infrastructure and full height breach of the existing Dungowan Dam wall. Rehabilitation of inundation area of the existing Dungowan Dam.
Disturbance	Areas of disturbance have been identified based on the direct impacts of the project. There is some overlap in the areas disturbed during construction and operation, with a resulting total disturbance area proposed for the project of 315 ha (project footprint). Disturbance would occur in a staged manner, with construction requiring disturbance of approximately 315 ha (construction footprint). Following construction and once rehabilitation is completed, there would be a permanent disturbance of approximately 158 ha comprising the inundation area and permanent infrastructure (operational footprint).
Construction	Construction duration of approximately 6 years.
	Construction workforce of approximately 125 workers at construction peak.
Operation	WaterNSW will be responsible for management, operation and general maintenance of the new dam. Tamworth Regional Council will be responsible for the management, operation and general maintenance of the pipeline. Public use and access to the dam would not be permitted and there would be no public facilities available during operation.
	One to two new full time workers plus part time work for existing WaterNSW operations team. Due to the new Dungowan Dam being prioritised over Chaffey Dam for Tamworth's future water supply, the water reserved for town water in Chaffey Dam would increase from 14.3 GL to 30 GL to ensure that water is set aside to meet Tamworth's town water supply water demand in years when rainfall is low.
Design life	100 years for zoned earthen embankment, structural concrete elements of the dam and the pipeline. 15 to 50 years for other non-structural project elements and pavements.
Assessment period (operational)	The assessment end point is when the water system performance reaches a level when an additional water supply option or change to the Water Sharing Plan is required. This has been estimated to be when the mean average annual water demand from Tamworth increases to 11 GL/year.



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Source: EMM (2022); WaterNSW (2021); Esri (2019); DFSI (2017); GA (2013)

0 0.5 1 km

GDA 1994 MGA Zone 56

N

KEY

- Inundation area
- Borrow areas
- Construction and accommodation camp
- Outlet works
- Cofferdams
- Embankment
- Quarries
- Spillway
- Road upgrade
- Decommissioning area
- Power line footprint
- Pipeline construction footprint

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody

Project overview

Dungowan Dam and pipeline project

Figure 2.1

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2.2 Additional project details relevant to SIA

2.2.1 Timeframes and hours of construction

Construction of the project would take approximately 6 years to complete, with normal operating hours including 7am – 6pm Monday to Saturday, 9am – 5pm on Sunday or public holidays (low noise and low traffic work) and 9am – 5pm Monday to Saturday for blasting. However, it is likely that activities needed to support construction, such as spillway concreting (in summer months) and construction of the diversion tunnel, may be undertaken 24 hours a day, seven days a week.

2.2.2 Workforce

The project would require up to about 125 persons at peak construction, of which it is expected that the contractor would preference recruitment of the workforce locally where suitable skills and capacity are available. The workforce would be housed in either an accommodation camp with a capacity for about 140 workers on site, or in Tamworth or a combination of the two locations. The accommodation camp would be in use throughout construction, and require central facilities, stormwater detention/quality treatment, maintenance areas, drinking water, bus and car parking. Buses are likely to be provided for workers to be transported to site each day. The project is anticipated to generate up to 871 direct and indirect jobs annually over the construction period, with 513 of the annual jobs being direct project employment.

2.2.3 Traffic movements

The primary transport route follows the New England Highway to Nemingha (about 7 km south-east of Tamworth) and turns onto the Tamworth-Nundle Road to Dungowan. Vehicles would then turn off Tamworth-Nundle Road at Dungowan onto Ogunbil Road followed by Dungowan Dam Road. Increased traffic movements would be generated during the project construction to transport construction materials, equipment, personnel, and waste on the main transport route. The project construction traffic is expected to consist predominantly of Heavy Vehicle (HV) movements, with an estimated maximum of 60 daily HV movements during peak construction.

2.2.4 Operations

The new Dungowan Dam would become operational when the diversion tunnel is permanently closed and all discharge pipelines and valves are commissioned and closed. Commissioning the new Dungowan Dam would involve filling the dam to above the minimum operating level, achieved through a combination of rainfall events and emptying the existing Dungowan Dam. Pipeline commissioning would involve flushing of the pipeline with raw water, testing and commissioning of valves and other pipeline control elements and undertaking leak tests.

The new Dungowan Dam will be owned, operated and maintained by WaterNSW and the replacement pipeline will be owned, operated and maintained by Tamworth Regional Council. The new Dungowan Dam's primary function is to increase water security for Tamworth through the supply of raw water to the Calala WTP via the replacement pipeline, while also:

- supplying raw water along the pipeline route;
- providing run of the river discharges to Dungowan Creek Stock and Domestic water licence holders; and
- providing environmental flows through releases and a new Environmental Contingency Allowance (ECA).

The new Dungowan Dam and pipeline would operate in parallel with the existing Chaffey Dam to supply raw water to the Calala WTP. The only change in the operations at Chaffey Dam would be that the water reserved for town water would increase from 14.3 GL to 30 GL. Water quality monitoring in the reservoir would be consistent with WaterNSW's water quality monitoring program, with no water treatment undertaken at the new Dungowan Dam site. Regular and emergency maintenance of the pipeline and associated infrastructure would be required.

i Water supply

The current raw water pipeline from the existing Dungowan Dam supplies water to around 65 existing customers through a series of connections teeing off the existing raw water pipeline. There would be negligible disruption to the supply of raw water to existing customers during the pipeline construction and commissioning. Around three planned interruption periods are proposed that are expected to be between 24-48 hours in duration, with advanced notice provided to customers. All properties on the replacement pipeline alignment would be provided with connection points as a result of the project, with an additional 52 new customers (totalling 117 new and existing connections) able to be supplied raw water from the replacement raw water pipeline, subject to suitable licencing and access agreements with Tamworth Regional Council.

ii Flooding

The new Dungowan Dam has no dedicated flood storage capacity and has an uncontrolled spillway, which does not allow the management of flood waters. When the reservoir water level is below the FSL, the new Dungowan Dam would have a greater capacity to capture flood waters than the existing Dungowan Dam, however, the magnitude of flood mitigation is dependent upon the size of the flood event and the reservoir water level when the flood event begins. In the rare situation when the new Dungowan Dam is at FSL when a major inflow event occurs, there would be a minor increase in flooding downstream of the dam as the new Dungowan Dam would not have capacity to capture flood waters, whilst having a larger catchment area, surface area and spillway than the existing Dungowan Dam.

3 Methodology

The scope of this SIA has been developed in accordance with the SEARS, the social characteristics and community values of Tamworth Regional LGA; and the SIA Guideline 2021 (DPE 2021a).

The assessment of social impacts was conducted using the SIA Guideline 2021 (DPE 2021a) definition of social impacts which refers to potential changes to people's:

- **way of life:** how people live, work, play and interact;
- **community:** its composition, cohesion, character, how it operates and sense of place;
- **accessibility:** how infrastructure provided by public, private or not for profit organisations, including services and facilities is accessed and used;
- **culture:** shared beliefs, customs, values and stories, and connection to Country, land, places, waterways and buildings, both Aboriginal and non-Aboriginal;
- **health and wellbeing:** physical and mental health;
- **surroundings:** access to and use of ecosystem, public safety and security, access to and use of natural and built environment, aesthetic value and/or amenity;
- **livelihoods:** how people sustain themselves through employment or business, their capacity to do so and whether disadvantage is experienced; and
- **decision-making systems:** extent community can have a say in decisions that affect their lives, access to complaint, remedy and grievance mechanisms.

This SIA has been informed by best practice guidance and standards set out by the International Association for Impact Assessment (IAIA) and International Finance Corporation (IFC).

3.1 SIA study area

This SIA addresses the social impacts and benefits of the project to the local area, the region and to NSW. It considers whether the project increases the demand for community infrastructure and services. The SIA study area has been determined in accordance with the SIA Guideline 2021 (DPE 2021a) and considered the following in its identification:

- the scale and nature of project activities, and potential direct, indirect and cumulative impacts;
- who may be affected by the project, how they may be affected and their interests, values and aspirations;
- potentially affected built or natural features identified as socially valuable, including infrastructure, facilities and amenities;
- relevant local and regional area social trends or change processes, for example, availability of rented accommodation and population and demographic changes; and
- the history of the project and how local and regional communities experience the project and others like it.

Refer to Section 5.1 of this report for further detail on the SIA study area for the project.

3.2 Potentially affected communities

This assessment also identifies potentially impacted (negatively or positively) communities in the local and regional areas. Factors considered in defining the SIA scope include:

- proximity of properties and communities to the project and its access routes;
- the role, culture and identity of communities in the region and vulnerable groups potentially affected by this or other projects within the region;
- availability and capacity of housing and other social infrastructure to attract and support potential growth;
- native title rights and other interests held by Aboriginal and/or Torres Strait Islander groups;
- location of businesses who could supply the project;
- vulnerabilities that increase risk, and/or magnitude of potential impacts on communities or groups;
- availability of skilled workforce and experienced personnel, or ability of residents to gain the skills required; and
- likelihood of social impacts and opportunities for each town.

3.3 Methodological approach

The phases of the SIA methodology are described in Figure 3.1. This report comprises Phase 2, which will be placed on public exhibition where submissions are received during Phase 3.

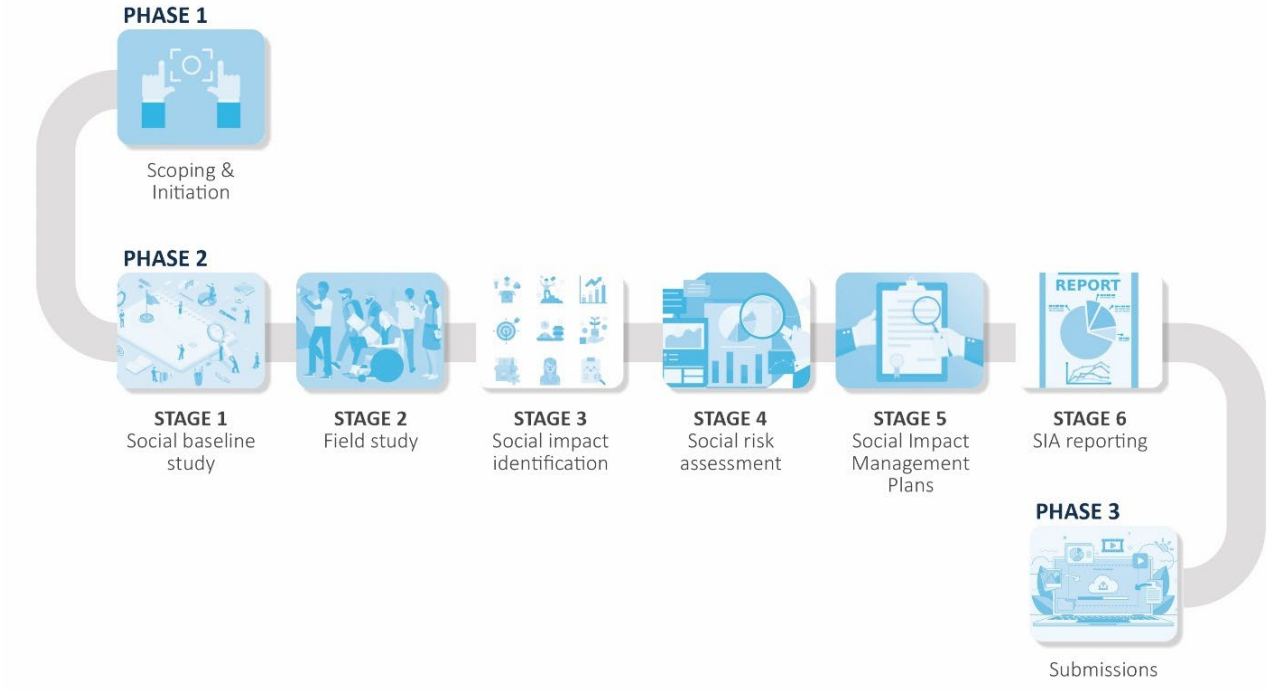


Figure 3.1 Phases of the SIA methodology

3.3.1 Phase 1

Scoping and initiation

A scoping report for the project was prepared by EMM and submitted to DPE in March 2020. A demographic profile was developed through stakeholder consultation and the SIA study area was identified during the scoping phase and proposed in the scoping report submitted to DPE in Phase 1. SEARs for the project were received on 27 July 2020 referencing the SIA Guideline 2017 (DPE 2017), however these have since been superseded. The SIA has therefore been prepared in accordance with the SIA Guideline 2021 (DPE 2021a). Through the development of the EIS and concept design for the project, changes were made to the project design in 2021-2022, and as such the SIA study area was reviewed again in April 2022 and no changes were made.

3.3.2 Phase 2

Stage 1 – Social baseline study

Understanding the existing social environment and identifying trends relevant to potential social impacts was the first step in the preparation of the SIA. A social baseline study was prepared using existing demographic, health, housing, and socio-economic data from the Australian Bureau of Statistics (ABS), government agencies, and local government; published literature and social research; government policies and plans; and documents relating to similar projects. A wide range of social indicators were reviewed and assessed for relevance.

The selection of social baseline indicators was informed by the social impact categories defined in the SIA Guideline 2021 and the outcomes of initial scoping and background literature review. The social baseline study provides a community profile, including a socio-economic profile and analysis of the social infrastructure and capacity within the SIA study area.

The social baseline study provides the benchmark against which potential social impacts are identified and assessed and informs subsequent stages. Section 3.4 of this report addresses the impact the COVID-19 pandemic has had on results of this assessment. The social baseline study is presented in Chapter 5.

Stage 2 – Field study

The field study was conducted in accordance with Annexure A of the SIA Guideline 2021, which prescribes key engagement objectives and how to conduct community engagement. Due to the COVID-19 pandemic, social distancing requirements were enforced during all SIA field study activities and engagement activities. The specific methods and outcomes of the community engagement and SIA field studies are presented Chapter 6.

The field study component of the SIA used social research methods, which included in-depth interviews, service provider interviews and surveys of real estate agents and short-term accommodation providers to collect qualitative and quantitative data to:

- validate baseline data and assumptions;
- identify/test impacts that may be experienced by nearby neighbours and the broader community;
- confirm identified impacts and determine potential management strategies; and
- provide communities with opportunities to express their concerns.

Water Infrastructure NSW will continue to ensure there are opportunities for community members to comment on the project as it progresses through the approvals process.

Stage 3 – Social impact identification

With a clear understanding of the scope of the project, social baseline, and input from the field study, suitably qualified social scientists (see Annexure B) identified the project's potential social impacts. This analysis informed the social risk assessment (approach to Stage 4).

Identification of the project's potential social impacts and benefits was completed through several complementary approaches, helping to triangulate the findings and confirm their accuracy. These approaches included:

- consideration of environmental impacts – review of similar projects in the area, as well as available academic and grey literature to identify potential impacts;
- consideration of the existing social environment – demographic and social analysis in the form of a social baseline study;
- consideration of field findings – findings from SIA field studies contributed to the identification of potential impacts and benefits from the project, as well as potential opportunities;
- consideration of technical reports – findings from other technical disciplines that contributed to the EIS were reviewed and potential social impacts identified;
- consideration of local plans and policies – findings from the review aided to contextualise and understand the local priorities as well as to identify local values; and
- consideration of cumulative impacts – review of documentation from other existing projects in the study area.

Stage 4 – Social risk assessment

The social risk assessment stage assessed each of the social impacts identified to predict the nature and scale of potential social impacts during construction and operation of the project. A social risk approach was adopted to assess the consequence and likelihood of potential positive and negative social impacts with and without mitigation. The social risk assessment matrix, including the assessment framework used for the assessment, is provided in the SIA Guideline Technical Supplement (DPE 2021, Section 2.3). The social impact significance matrix extracted from the Technical Supplement is provided as Figure 3.2.

		Magnitude level				
		1	2	3	4	5
Likelihood level		Minimal	Minor	Moderate	Major	Transformational
A	Almost certain	Low	Medium	High	Very High	Very High
B	Likely	Low	Medium	High	High	Very High
C	Possible	Low	Medium	Medium	High	High
D	Unlikely	Low	Low	Medium	Medium	High
E	Very unlikely	Low	Low	Low	Medium	Medium

Source: SIA Guideline Technical Supplement, Social impact significance matrix

Figure 3.2 Social impact significance matrix

The following data and information has been used to identify the potential social impacts and their associated risks:

- data collected as part of the social baseline analysis including the findings from SIA field study and EIS engagement activities;
- academic research;
- relevant previously conducted SIAs; and
- relevant government and agency reports.

Stage 5 – Social impact management plans

A mitigation and management framework was prepared with consideration of all potential social impacts and benefits to allow for the identification of:

- required impact mitigation measures;
- enhancement measures to maximise the potential benefits; and
- partnership opportunities.

Findings from Stages 1–5 were used to distil and analyse recommendations for the SIA report. This stage used a multidisciplinary approach lead by EMM's social scientists supported by environmental advisers.

Stage 6 – SIA reporting

Development of this SIA technical report and internal peer review were conducted by EMM's social scientists and environmental scientists. The report has also been reviewed by representatives of Water Infrastructure NSW.

4 Policy and planning context

This chapter provides a summary of the relevant plans and strategies across the Tamworth Regional Council area that inform social risk assessment, mitigation and management strategies.

4.1 State strategies and plans

4.1.1 A 20-Year Economic Vision for Regional NSW, 2018–2038

A 20-Year Economic Vision for Regional NSW 2018–2038 (NSW Government, updated 2021) (20 Year Economic Vision) presents a strategy with NSW government priorities for Regional NSW. The strategy provides a picture of the current economic and demographic environment, including the external economic forces impacting regional growth.

The 20 Year Economic Vision identifies that the New England & North West is a diverse economy and produces around one-fifth of NSW's agricultural output. Recent climate events have impacted agribusiness and tourism, while the COVID-19 pandemic has temporarily delayed recovery efforts. To accelerate economic recovery, the NSW Government is investing in a wide range of infrastructure to meet local needs and to support the expansion of agriculture, mining, freight and manufacturing industries.

The project has been identified by the 20 Year Economic Vision as an investment priority as it will:

- contribute to improved long-term water security and ensure drought resilience in the region;
- fast-track critical town water supply projects to meet local demand;
- secure Tamworth's water supply during periods of drought; and
- secure the future of regional industries and townships.

The project is supported by the directions of the 20 Year Economic Vison and recommendations made by this report take the priorities and principles of this strategy into consideration. See Annexure C Section C.2i for the relevant priorities, principles and actions in the Economic Vison for Regional NSW.

4.1.2 Staying Ahead: State Infrastructure Strategy 2022-2042

The *State Infrastructure Strategy 2022-2042* (Infrastructure NSW 2022) sets Infrastructure NSW's independent advice on the current state of NSW infrastructure and needs and priorities over the next 20 years. It identifies policies and strategies needed to provide infrastructure to meet the needs of a growing population and economy.

This strategy makes multiple references to the project identifying that cost and delivery timeframes are of concern, and that alternatives should be considered.

Under the objective to "Design the investment program to endure", the project is identified as a megaproject, which will face significant delivery challenges in the short to medium term.

Outcomes and recommendations of this SIA are proposed in alignment with the relevant objectives of the *State Infrastructure Strategy 2022-2042*, insofar as an SIA prepared to support the EIS process can address the matters raised by this strategy. Further analysis of the project's strategic consistency is provided in Chapter 2 of the EIS. For further information on the relevant objectives, strategic directions, and recommendations, see Annexure C Section C.2i.

4.1.3 New England North West Regional Plan, 2016 – 2036

The *New England North West Regional Plan* (DPE 2016) (Regional Plan) outlines strategies for the region guided by the NSW Government's vision of "nationally valued landscapes and strong, successful communities from the Great Dividing Range to the rich black soil plains". The relevant priorities for Tamworth are to provide access to diverse education offerings suited to local employment, and for development of nature and cultural tourism opportunities. The intent of this project broadly aligns with the goals of this plan, and the recommendations made by this report align with the desirable outcomes presented in the Regional Plan. The relevant goals and strategic directions outlined in the plan are presented in Annexure C Section C.2i.

4.1.4 Draft New England North West Regional Plan 2041

The Draft *New England North West Regional Plan 2041* (DPE 2021e) updates the regional plan and includes directions for regional councils to prepare Local Housing Strategies. Strategy 3.3 from the draft plan is to "Investigate options to access secure water resources through the Namoi Regional Water Strategy and Dungowan Dam Business Case" in order to meet objective 3 of the plan, which is "Expand agribusiness and food processing sectors". The plan identifies that livestock products such as wool, milk and egg production contributes $99 million to gross regional product, while livestock including cattle and calves, sheep and lambs, poultry, pigs and other animals contributes $906 million to the gross regional product (p.27) and also provides on farm employment.

The draft New England North West 2041 plan was on public exhibition from 22 November 2021 to 18 February 2022. It is expected that the final plan will be released later in 2022.

4.1.5 Draft Namoi Regional Water Strategy

The Draft Namoi Regional Water Strategy (DPE, 2021f) forms part of the strategic planning framework for water management in NSW. The strategy aligns with the Regional Water Strategies Guide and sets the following objectives for managing water in the region:

- deliver and manage water for local communities by improving water security, water quality and flood management for regional towns and communities
- enable economic prosperity by improving water access reliability for regional industries
- promote affordability by supporting cost effective policy and infrastructure options
- protect and enhance the environment by improving the health and integrity of environmental systems and assets, including by improving water quality
- recognise and protect Aboriginal water rights, interests and access to water, as well as Aboriginal heritage assets.

Public feedback on the draft strategy was sought from Wednesday, 3 March until Sunday, 16 May 2021. The recommendations of this assessment have considered, and align with, the objectives of this strategy. For a broader assessment of project consistency with the outcomes and objectives of this strategy, please refer to Chapter 2 of the EIS.

4.2 Local Government Area

The project is in Tamworth Regional LGA, which constitutes the regional SIA study area. The plans and strategies supported by local government are representative of the needs of local communities and identify strategies and opportunities to further improve the liveability and resilience of these communities, which could be affected by the project.

Tamworth Regional Council provides strategic plans and statutory directions to define and deliver their vision for the future of the community. These are summarised in the LGA Planning Context in Annexure C.

4.2.1 Blueprint 100

Blueprint 100 (Tamworth Regional Council, 2022b) is the regional growth plan for the Tamworth Regional Local Government Area. The new Dungowan Dam is identified as a key project to realising the quality of life aspirations of the community and to accelerate the region's aspirations for increased productivity and exports. Further detail on this plan is provided in Annexure C.

5 Social baseline

This chapter summarises baseline information from the study and reference areas to identify key social conditions for the project's social area of influence. The baseline provides contextual information used to identify social benefits and impacts. Social impacts can include intangible issues such as access to housing, social services, health and wellbeing, employment, and economic livelihoods. They can also be experienced physically through insufficient capacity or capability of infrastructure, housing and accommodation, transport and roads, water, power and communications access or supply. These impacts are exacerbated by pre-existing social conditions and are most significantly felt by vulnerable groups of people. The social baseline provides an understanding of pre-existing social conditions and identifies vulnerable groups. Data relating to housing and accommodation and local workforce skill and capacity also informs workforce and accommodation recommendations, to maximise benefits to the local community. Unless otherwise stated, the data included in this social baseline is derived from the 2016 Census of Population and Housing (ABS, 2016a, 2016b, 2016c).

5.1 SIA Study area

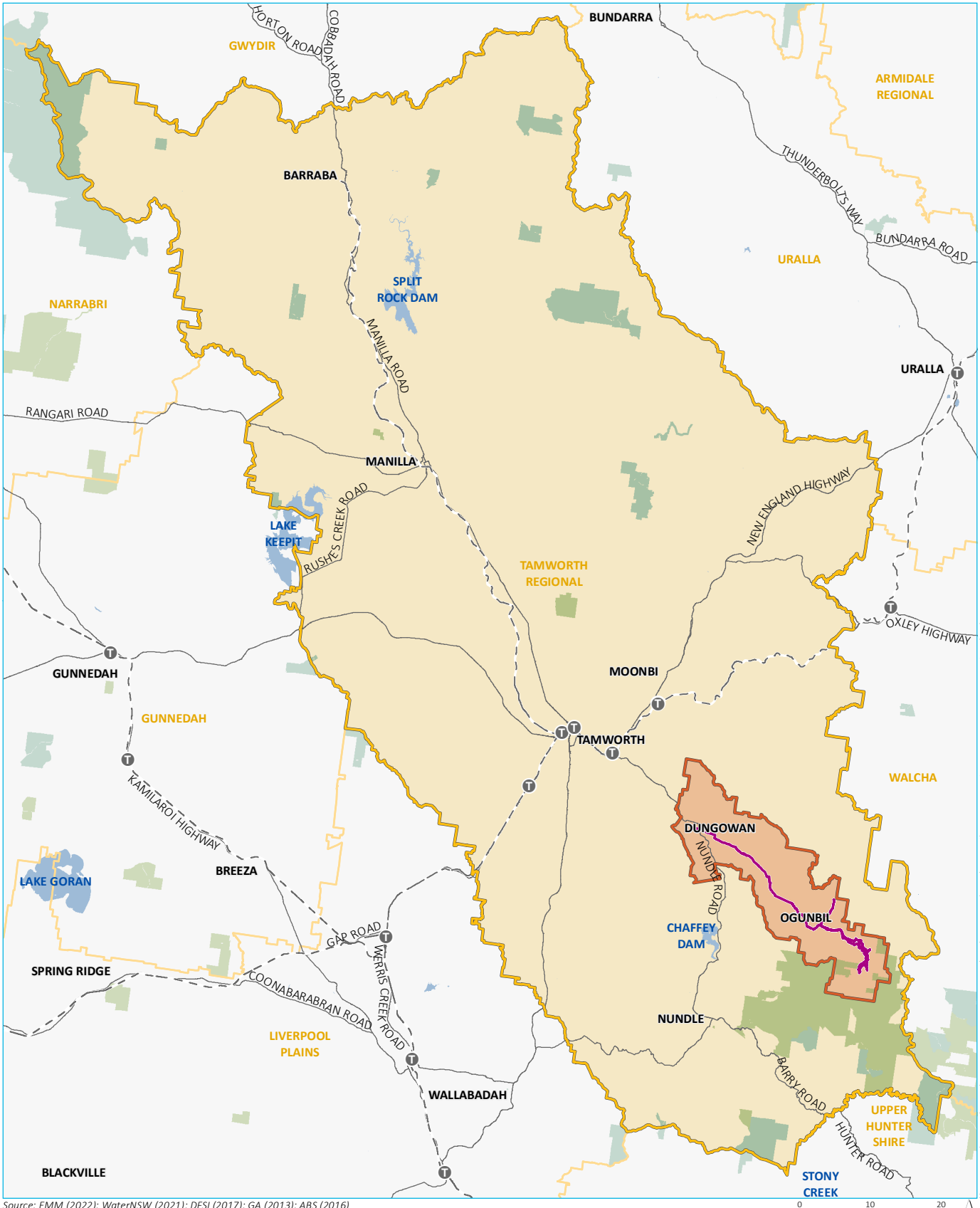
While the project footprint is localised, direct and indirect impacts may be farther reaching. Thus, the project is considered to have two key study areas: a local study area (local area) including Dungowan State Suburb Classification (SSC) and Ogunbil SSC, and a regional study area (regional area) comprised of Tamworth Regional LGA. The SIA study area also includes the area of reference, which includes the New England and North West region, and the State of NSW.

The local area consists of the communities that may experience direct social impacts from the project (ie impacts related to local social infrastructure and services, local workforce, local business and industry, local housing and accommodation, and community health and wellbeing). The regional area is the geographic areas likely to experience few direct and more indirect social impacts of the project. Indirect impacts are associated with use of infrastructure, supply chains, roads, transportation of goods, materials and equipment, the movement of workers (some of which may have drive in drive out (DIDO) arrangements) and cumulative impacts arising from other projects in the area. Accordingly, these impacts have been assessed as being within the local area. For comparative purposes, the New England and North West region has been identified as the area of reference. This area will include social trends and data for communities consistent with the local and regional areas as a meaningful point of comparison. Comparison is also made against the State of New South Wales (NSW) data.

Potentially affected communities have been mapped to the Australian Bureau of Statistics (ABS) categories used for data collection (Table 5.1) and the local area and regional area illustrated in Figure 5.1.

Table 5.1 SIA study area

SIA study area	Geographic area	ABS data category	Referred to in report as:
Local area	Dungowan suburb	Dungowan (State Suburb, SSC)	Local area
	Ogunbil suburb	Ogunbil (State Suburb, SSC)	
Regional area	Tamworth Regional Council area	Tamworth Regional LGA	Regional area
Area of reference	New England and North West region	New England and North West SA4	Area of reference
State of New South Wales	State of New South Wales	New South Wales STE	NSW



Source: EMM (2022); WaterNSW (2021); DFSI (2017); GA (2013); ABS (2016)

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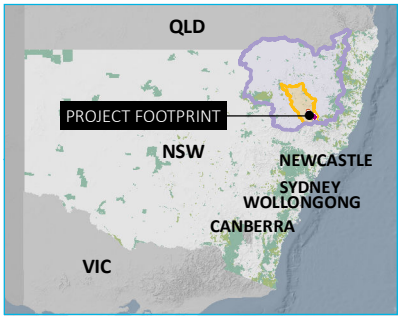


KEY

- Project footprint
- Regional area
- Local area
- Local government area
- New England and North West statistical area level 4 (see inset)
- Train station
- Rail line
- Major road
- Named waterbody
- NPWS reserve
- State forest
- SIA study area

Dungowan Dam and pipeline project
Social impact assessment
Figure 5.1

EMM
creating opportunities

5.2 Demographic profile

According to the 2016 Census of Population and Housing, the local area has a total population of 546 people. Most of these people reside in Dungowan (398) with a smaller portion residing in Ogunbil (148). The population of the local area represents <1% of the regional area population (59,663). From 2011 – 2016, the population of the local area increased by 4.2%. Overall, the population of the local area increased by a similar proportion compared to the regional area (6.0%). Although the local area and regional area increased by a smaller percentage compared to NSW (8.1%), they experienced a greater population percentage increase than the area of reference (3.0%).

Projected population data for the area is only available for Tamworth Regional LGA and is published by DPE (DPE 2019). In 2019, the projected population of the regional area was estimated to increase to 68,906 persons by 2041, representing a total increase of 13.0% and an average annual increase of 0.5%.

In 2022, DPE has predicted a further increase to the regional population by 2041, with the population expected to grow by 9,187 people to a total of 71,956 (DPE 2022a). This is based on a predicted annual increase of 0.69%, which is less than NSW's predicted annual increase of 0.95%. The current 2021 population of the regional area is a total 63,070 people (ABS 2021).

In the local area, the largest demographic age groups are 55 – 64 years (19.2%), 5-14 years (18.5) and 45 – 54 years (16.8%). There is a particularly small proportion of persons aged 15 – 35 years in the local area (17.4%) compared to NSW (26.8%), which is likely attributable to fewer education and work opportunities for young people in rural areas. Most of the population of the local area is aged 35 – 65 years (52.3%). These slightly older age distributions are reflected in the median ages across the local area and regional area: 39 years in Dungowan, 49 years in Ogunbil, compared to 38 years in NSW.

5.3 Vulnerable minority groups

There are numerous vulnerable groups within the study area community including the elderly and persons with a disability (need for assistance), socio-economically disadvantaged groups, homeless persons, and Aboriginal and/or Torres Strait Islander persons. Understanding the extent of vulnerability in communities is important to adequately gauge the baseline situation of the affected population prior to project commencement. Capturing how vulnerable groups might experience and reasonably perceive social impacts is important to inform the social assessment.

5.3.1 Disability

In the local area, 1.8% of people have a need for assistance in one or more of the three core activities of self-care, mobility and communication due to a long-term health condition (lasting 6 months or longer), a disability (lasting 6 months or longer), or old age. This is much lower than NSW (5.4%), while the population within the regional area and area of reference has a slightly greater need for assistance (5.6% and 5.6% respectively).

5.3.2 Homelessness

Homelessness can lead to health problems including poor nutrition, depression, substance abuse, poor dental health, and mental health conditions (AHRC 2021). For homeless persons, hardships with finances, transport, identification, Medicare, and difficulty with appointment maintenance/treatment plans make accessing health care services more difficult than the average person (AHRC 2021). As such, homeless persons are at greater risk of being negatively affected by potential impacts on livelihoods and health and wellbeing.

Rates of homeless are not available for the local area but are available at the LGA level. Homelessness is measured at a rate per 10,000 persons. According to the 2016 Census estimations on homelessness, rates of homelessness in the regional area and area of reference are lower than NSW rates, with a rate of 34.3 homeless people per 10,000 persons in the regional area and a rate of 42.7 homeless people per 10,000 population in the area of reference, compared to a rate of 50.4 homeless people in NSW.

5.3.3 Aboriginal and/or Torres Strait Islander Population

At the time of the 2016 Census, 1.8% of the total population within the local area and 10.1% of the regional area population identified as Aboriginal and/or Torres Strait Islander compared to 3% in NSW. The largest demographic in the Aboriginal and/or Torres Strait Islander community in the regional area is children (aged 5–14 years). Compared to the total population of the regional area and NSW, there is a much smaller proportion of persons aged 65 years and older who identify as Aboriginal and/or Torres Strait Islander. The Aboriginal population's smaller proportion of the population (both males and females) living beyond 65 years aligns with the lower life expectancy among Aboriginal Australians nationally that is particularly acute in Aboriginal males (AIHW 2020), with much of this gap is explained by the relationships between increased socioeconomic disadvantage, worsened mental health outcomes, and related health risk behaviours, including greater proportions of smoking and alcohol use (AHMAC 2017).

5.3.4 Socio-economic disadvantage

The level of disadvantage or advantage in the population is indicated in the Socio-Economic Indexes for Areas (SEIFA) which focuses on low-income earners, relatively lower education attainment, high unemployment and dwellings without motor vehicles. SEIFA categorises levels of socio-economic disadvantage through four indexes, with each index being a summary of a different subset of Census variables and focuses on a different aspect of socio-economic advantage and disadvantage.

The local area experiences higher levels of advantage compared to other suburbs in NSW as the area is ranked in the 6th or higher decile for all indices (ie are more advantaged than 60% of communities in NSW). This indicates that compared to other communities in NSW, there are fewer households with low income, more residents with qualification/more residents in higher-skill occupations, more households with high incomes and in skilled occupation, and fewer households paying low rent in the area. This could also reflect lower levels of unemployment compared to other communities in NSW.

The regional area experience slightly lower levels of advantage compared the local area as they are ranked in the 5th or lower decile for almost all indices (ie in the bottom 50% of communities in NSW in terms of advantage). However, they are not amongst the most disadvantaged communities and experience more middle levels of advantage and disadvantage compared to other communities in NSW.

5.4 Effects of the COVID-19 pandemic

This SIA was conducted during the COVID-19 pandemic. Population data and forecasts presented in this social baseline were developed prior to the onset of the pandemic and do not consider the potential impacts to assumptions stemming from COVID-19. However, they do provide an insight into the baseline condition of the regional area without this external shock. In a COVID-19 impact assessment developed for Tamworth Regional Council, id consulting (2020) outlines the following influences on population change due to the COVID-19 pandemic:

- Migration – people moving to and from an area.
- Economic resilience – availability of jobs.
- Resident vulnerabilities – unmet economic and social needs.

- Local amenity – contributes to the way of life in an area.

The Australian Government's Centre for Population (2020) estimated a net shift in migration away from capital cities in favour of regional areas from 2020. In facilitating increased migration from urban centres to more regional areas of Australia, COVID-19 has increased the number of people at risk of housing instability and homeless for persons experiencing financial hardship (Anglicare 2021). This has contributed to increased rents and lower rental availability (particularly affordable housing) in regional areas of Australia, including Tamworth regional area.

In addition, COVID-19 has increased the likelihood of housing relocation among vulnerable households due to instances of low income, unemployment or insecure work and rental/mortgage stress (id consulting 2020). These changes could impact upon household formations and migrations in a multitude of ways, such as younger people returning to live with their parents, elderly people moving to live with their children for care and the creation of larger households to share the burden of housing costs (id consulting 2020).

Evidence indicates that COVID-19 has generated similar impacts to the Global Financial Crisis in Australia, with housing prices increasing after a period of uncertainty (Verdouw et al 2021). Rising prices within the private housing market generally work to further exclude low income and vulnerable people from the property market, leading to housing stress and insecurity (Verdouw et al 2021). The impacts of COVID-19 on the labour and housing market are ongoing and as such, there is difficulty in measuring the full extent of those impacts currently in and into the future.

5.5 Local workforce skill and capacity

In 2016, the estimated labour force in the local area was 286 people (52% of the local area population) and 27,607 people (46.2% of the regional area population). At the time of the 2016 census the unemployment rate in the local area (5.2%) was lower than the unemployment rate in the regional area (5.8%), area of reference (6.4%) and NSW (6.3%). However, there is significant variation in unemployment between the suburbs in the local area. While the unemployment rate in Dungowan is only 1.5%, the unemployment rate in Ogunbil is 14.5% which is significantly greater than unemployment across the state (6.3%).

In the local area, there is no youth unemployment. This may be attributable to the low proportion of youth in the local area. The regional area (12.2%) and NSW (13.6%) demonstrate a much higher percentage of unemployed youth. Meanwhile, 52% of the local population participate in the labour force, which is a lower rate of workforce participation compared to NSW (59.2%). This may present an opportunity to offer training and apprenticeship opportunities for unemployed and/or disadvantaged youth in the local and regional area.

Educational attainment (ie the highest level of schooling completed) in the local area is similar to the regional area and the area of reference, however all three areas of interest experience lower levels of educational attainment compared to NSW. The local area (40.8%), regional area (41.2%) and area of reference (42.4%) all have a smaller proportion of persons who have completed Year 12 or equivalent compared to NSW (59.1%), with a higher percentage of their population completing Year 10 and 11 or equivalent. This pattern is apparent in communities throughout regional, rural, and remote Australia, where students have reduced access to education services and lower reports of positive school experiences (ie relating to belonging, self-confidence, purpose, and perseverance) compared to students in metropolitan areas (Mitchell Institute 2015).

A comparatively high percentage of persons in the local and regional study area have certificate level qualifications (49.6% and 41.8% respectively). This rate of certificate level qualification is significantly higher compared to NSW (29.7%). This reflects a combination of factors including limited access to further education institutions which is characteristic of rural areas and the dominant regional employment sectors in the local area. In line with the high number of certificate level qualifications, a large proportion of persons in the local and regional area are managers (23.8% and 13.1% respectively), technicians and trades workers (17.7% and 14.4% respectively) and laborers (13.0% and 14.1% respectively). As an ABS occupation category, managers are inclusive

of farmers and farm managers. The significant proportion of managers in the local area (23.8%) is indicative of the agricultural sector being the dominant industry of employment (see Section 5.9). The second highest proportion of non-school qualifications in the local and regional area are bachelor degrees (14.9% and 16.4% respectively). Management and commerce (12.3%) is the most studied field in the regional area, followed by engineering and related technologies (10.7%) indicating an certain availability of skilled workers in those fields (id consulting, 2021a).

Industries of employment that are most relevant to the project are construction and electricity, gas, water and waste services. Whilst construction is a relatively large area of employment in the local area (9.4%), the construction workforce of the regional area and area of reference is slightly lower, constituting 7.8% and 6.7% of the population respectively. Moreover, across the regional area electricity, gas, water and waste services make up only 1.1%, 1.0% and 0.9%, respectively. However, of the 5,702 registered businesses in the regional area, 17.1% were in the construction industry (17.1%) followed by rental, hiring and real estate services (7.9%).

The jobs to resident ratio for Tamworth Regional Council in 2020/21 was 1 resident to 0.96 jobs, meaning that there were less jobs than resident workers. As of 2021 in the regional area, the construction industry has a ratio of 1:0.98 and electricity, gas, water and waste services currently have a jobs to residents ratio of to 1:0.85. This means that there are slightly fewer jobs than resident workers (id consulting 2021a). This suggests that within these industries, the regional area has employment capacity. Moreover, there is some availability of relevant skilled workers in the local and regional area, predominantly technicians and trades workers (17.7% and 14.4% respectively), labourers (13.0% and 14.1% respectively), and machinery operators and drivers (6.1% and 6.9% respectively). A local workforce for highly specialised areas of construction may be difficult to source and will require the utilisation of FIFO or DIDO workers. To ensure benefits of the project are experienced by the local community, upskilling programs could be implemented to better equip local people to meet the needs of the project's workforce.

Tamworth is within a 30-40 minute commute from the project and as such could potentially provide and/or accommodate a construction workforce outside of the workers camp. The relevance of a commute within one-hour is due to health and safety considerations to manage driver fatigue and prevent fatality for those working a 12-hour shift. Variations of the one-hour commute could require a reduction of the shift hours to manage fatigue.

5.6 Social Infrastructure and services

Central to supporting the quality of life and well-being of communities, social infrastructure can be defined as the "community and individual support services and resources such as health, education, early childhood, community support, community development, culture, sport and recreation, parks and emergency services" (Australian Urban Observatory 2020). Due to the increased workforce that will be required by the project it is important to determine the capacity for service provision and social infrastructure in the study area. The following data is derived from Ask Izzy (2022), unless otherwise stated.

Access to education, community services, and health services varies across the study area. In the local area (Dungowan and Ogunbil), there is minimal access to services requiring community members to travel to Tamworth to access these services. The extensive services in Tamworth Regional LGA is attributable to Tamworth City (in the regional area) having the largest population in the regional area and being the service centre for the region. The only services in the local area include one preschool, one primary school, and two emergency services (ie rural fire brigade). To access additional services in Tamworth, people residing in the local area must travel approximately 30 – 40 minutes.

The local area is particularly lacking in health service provision however Tamworth is well provisioned, with two hospitals. Tamworth Hospital is the major trauma referral centre for the northern region of the Hunter New England LHD, offering 282 beds. It is the biggest health care facility in NSW outside of the Sydney-Wollongong-Newcastle metropolis and provides a broad range of emergency and specialist health services (Head Medical 2022). Additionally, for private health care, Tamara Private Hospital is a 53-bed medical and surgical hospital with over 90 accredited practitioners (Ramsey Health Care 2022). There are no General Practitioner (GP) services in the local area. However, approximately 19 practices are available in the regional area. The range of services offered include: general, community and Aboriginal and/or Torres Strait Islander health services. Psychology and counselling services, maternal, child and family health services, aged care services and other specialist services.

There are two rural fire service brigades in the local area however other emergency services must be sourced from the regional area. Most of the emergency services in the regional area are in Tamworth City.

Childcare services and schools are largely centralised in the suburbs around Tamworth. Services include long day care, preschool and outside of school hours care (OSHC). There is one primary school in the local area, which also offers childcare, with 20 students ranging from kindergarten to Year 6. As this school does not have the capacity to teach the significant proportion of primary and secondary school attendees in the local area, students in the local area must travel outside of the local area to attend school. In the Tamworth area, the schools range from kindergarten to Year 12, with 11 of the schools having 500 or more student enrolments. Tertiary education can be accessed regionally through the following institutions: The University of New England Tamworth campus, the University of Newcastle Department of Rural Health, Tamworth Community College, and TAFE NSW Tamworth.

Community services cannot be accessed within the local area, however Tamworth is home to several organisations and service providers, which offer a range of services to various groups and include both specific service providers and multi-service providers. The Tamworth Local Aboriginal Land Council (LALC) provides the most comprehensive Aboriginal and/or Torres Strait Islander services, which include Aboriginal services and information related to housing and accommodation, education programs, youth services, justice and representation services, and other support services. Many of the child and family services available in the proximate regional area are provided through multi-services providers such as Anglicare and Centacare New England North West. These services include education services, counselling and mediation, playgroups, and other child and family support services. Youth services are primarily offered by for the Tamworth Regional Youth Centre.

5.6.1 Arts, cultural and recreational facilities

The regional area boasts an abundance of arts and cultural facilities. There are facilities available for those interested in fine arts, theatre, literature, history, film, dance, craft, and music. Throughout the year, the regional area hosts a variety of cultural activities and events, including the Tamworth Country Music Festival – the largest music festival in the southern hemisphere – which attracts more than 55,000 visitors.

Whilst there are limited recreation services and facilities in the local area, the regional area offers many facilities for a variety of sporting activities. These include sporting grounds/fields, netball courts, tennis courts, multipurpose courts, a skate park, a BMX track, a velodrome, aquatic centres, golf clubs, and an equestrian ground. Olympic-standard facilities are available in the local area. There are numerous recreational and competition sporting clubs within the local area that use these facilities.

There are also a range of outdoor recreational activities available in the regional area. These include additional scenic walking tracks and lookouts, Warrabah National Park, Horton Falls National Park, Watsons Creek National Park rivers and natural pools suitable for water activities, and additional campsites/caravan parks/farm stays etc.

5.7 Transport

In the local area, the primary means of travel to work is by car, either as the driver or as a passenger (66.1%). According to 2016 ABS Census data, nobody in the local area travels to work using public transport. The relatively large proportion of persons who do not travel to work by car instead work at home – as is largely required of those working in the agriculture industry. Ogunbil Road is the major road running through the local area. Ogunbil Road connects the local area with the Tamworth City and NSW Route B56 (Oxley Highway).

There are very limited fixed-line public transport services available in the local area (ie city buses, trams, rapid transit, and ferries). Peel Valley Coaches provides services from Dungowan to Ogunbil and from Dungowan to Nemhinga to Tamworth. Campbell M&M and Nundle NA also provide bus services from Dungowan.

Tamworth Buslines provides fixed-schedule public bus services that runs throughout the regional area. There are two networks running throughout the regional area. The Tamworth Bus Network services the more centralised suburbs of the regional area, including Tamworth (North, South, East, and West), Oxley Vale, Taminda, and Calala. These buses operate from Monday to Saturday, excluding public holidays, with multiple services throughout the day. The Tamworth Rural Bus Network links Tamworth with more rural suburbs within the regional area, including Manilla, Bendemeer, and Quirindi. These services mainly operate Monday to Friday, with Saturday services to and from Bendemeer also available.

5.8 Housing and accommodation

Access to safe, adequate and affordable housing is a critical pillar in enabling the physical, mental and social health of communities. While housing is generally provided in the private market, a distinct lack of affordable housing options for different income brackets and diverse community members can result in more people needing housing assistance (Infrastructure Australia 2019).

5.8.1 Housing type and tenure

For the local and regional area, 96.6% and 87% of the population area living in separate houses, making it the most common housing type and structure. This is significantly higher than across NSW, with only 66.4% of its population residing in separate houses. These proportions are most likely also influenced by NSW's larger populations, though may also indicate a shortage of non-separate housing types in the area (such as flats or apartments). The number of homes owned outright in the local area (33.5%) is slightly higher than in the regional area (30.3%) and in NSW (32.2%). This corresponds with a slightly higher percentage of homes owned with a mortgage in the local area (36.2%) than in NSW (32.3%). The proportion of rented homes is notably lower, with the local area at 16.5%, and NSW at 31.8%.

5.8.2 Housing cost and stress

Rent and mortgage repayments constitute a significant proportion of household costs. In the local area median monthly mortgage repayments and weekly rent payments are the highest in Dungowan, costing households approximately $1,700 and $240 respectively. Dungowan has a higher median mortgage compared to the regional area ($1,500) however NSW is significantly greater ($1,986). However, Dungowan has a smaller weekly rent median repayment of $240 compared to the regional area ($260) and NSW ($380). This may be indicative of the smaller proportion of renters in Dungowan.

Housing prices are only available for the regional area and are limited to certain suburbs. Based on the housing price trends across the regional area, housing prices have been steadily increasing across the regional area from 2013 – 2021 (REA Group 2021). Across all suburbs, since 2020, there has been a significant upward trend in median housing prices. In the local area, median mortgage payments increased by 4.6% in the suburb of Dungowan from 2011 – 2016. Median mortgage payments in the regional area increased by a similar proportion over the 2011 – 2016 period. However, median mortgage payments increased by a much smaller proportion in the area of reference from 2011 – 2016 and decreased in NSW. In Dungowan, rent payments doubled between 2011 – 2016, with the regional area and NSW seeing a lesser, but no less significant, increase of 30.0% and 26.7% respectively over the same period.

Housing stress is considered to occur when households in the lower 40% of income distribution spend more than 30% of their income in housing costs (rents or mortgage repayments) (AHURI 2019). This can mean that local people who are not employed in higher-paying jobs may be unable to afford local rents, which can be pushed up by higher salaries. In 2021 in the regional area, only 30.6% of all sales and 28.5% of rentals were affordable to low income households (id consulting 2021b).

Analysis of rental stress in the local area shows there is a lower proportion of households in Dungowan (2.4%) and Ogunbil (0%) experiencing rental stress when compared with the regional area (11.1%) and NSW (12.9%). This could be attributable to the combination of high levels of home ownership and the lower levels of renting in the local area. However, in Dungowan and Ogunbil (10.7% and 7.7% respectively) there is a higher proportion of households with mortgage payments equal to or above 30% of their household income compared to the regional area (5.3%) and NSW (7.4%). This demonstrates that the local area may potentially be experiencing housing stress related to mortgage repayments.

i Housing availability

A snapshot of housing availability in the local area can be derived from analysis of data from the REA Group (2022). On 12 April 2022, there were no properties for sale and no properties for rent in the local area. In selected suburbs in the regional area there were 197 properties for sale and 106 properties for rent (Table 5.3). The vast majority of these available properties were located in Tamworth City.

There is an undersupply of housing options in the local area. Low housing availability reduces the affordability of housing for low to medium income households (O'Sullivan 2021). Moreover, 'lower income households in rental stress will struggle to pay for other essential household items, such as medical or educational expenses, food, transport, and energy costs' (Family and Community Services NSW 2019).

ii Tourist and visitor accommodation

Tourist and visitor accommodation refers to accommodation options that are typically provided to visitors or tenants for a short period of time; for example, motels, hotels, serviced apartments, bed and breakfast, self-contained homes, caravan and camping parks (Destination NSW 2022). The length of tenancy in these forms of accommodation can often extend to lengthy stays, depending on accommodation availability, price, and personal circumstances.

Tourist and visitor accommodation providers in the regional area service a number of different industry sectors including tourism, mining, renewable energy and agricultural industry sectors. Tourism is a strong and growing sector in the Tamworth Regional LGA (see Section 5.9.3). The region is known for having the capacity to host large regional events and accommodation for visitors (Tamworth Regional Council 2022a). There are many regional events throughout the year that place significant demand on short-term accommodation in the local and regional area. Both the number of events and patronage is increasing as evident in trends in visitor numbers to the local area.

Within the local area, tourist and visitor accommodation is exceptionally minimal (Google Travel 2021). The majority of tourist and visitor accommodation in the Tamworth Regional LGA is concentrated in Tamworth.

5.9 Local business and income

5.9.1 Income

Individual income data is one of many indicators of socio-economic status and is linked to factors such as employment status, age (eg students and pensioners often receive a lower income), qualifications and type of employment (id consulting 2021c)

There is variation in the individual and household median weekly incomes across the local area and regional area. Dungowan has a slightly higher individual medium weekly income of $717 compared to Ogunbil ($530), the regional area ($633) and NSW ($664). While Dungowan also had a higher household medium weekly income of $1286 compared to Ogunbil ($1125) and the regional area ($1180), it remains lower than NSW ($1486). Overall for the regional area, 7.3% of the population in 2016 earned a high income, and 37.1% earned a low income, compared with 8.3% and 40.0% respectively for Regional NSW (id consulting 2021c).

5.9.2 Industry of employment

Agriculture, forestry and fishing is the top industry of employment in the local area (21.3%). Other top industries of employment in the local area are construction (9.4%) and health care and social assistance (8.8%). In comparison the industry sectors with the largest employment share in the regional area in 2016 were health care and social assistance (15%) retail trade (11.1%) and education and training (9%). This reflects the more abundant health services, community services, and education resources in the regional area with Tamworth as a regional centre compared to more rural communities in the local area.

i Businesses by industry

Of the 5,702 registered businesses in the regional area, 25.8% were in the agriculture, forestry and fishing industry. The industry with the next highest percentage of registered businesses was construction (17.1%) followed by rental, hiring and real estate services (7.9%).

5.9.3 Tourism

Tourism is an important industry in the regional area. In terms of employment, tourism and hospitality employs approximately 4.6% of the regional workforce, equating to 1,672 people employed (id consulting 2021a). The average number of total visitors per year in the regional area from 2016 – 2019 was 1,251,000 visitors. Of these visitors per year, most were domestic day visitors (637,000) followed by domestic overnight visitors (510,000) and international visitors (12,000). The primary reason for visiting was for holiday purposes.

The tourism and hospitality industries are not defined by the ABS as regular industries but as a set of occupation categories working across a number of industries.

Industries of employment relating to tourism in the local and regional area include the following:

- Retail trade (employs 5.8% of the local area and 11.1% of the regional area)
- Accommodation and food services (employs 5.4% of the local area and 6.8% of the regional area)
- Transport, postal and warehousing (employs 2.5% of the local area and 4.8% of the regional area)
- Arts and recreation services (0.0% of the local area and 1.0% of the regional area).

5.10 Community health and wellbeing

The local area is located within the Hunter New England Local Heath District (LHD). The following three major physical health risk factors can be used as an indicator of population health: excessive alcohol consumption, tobacco smoking, and obesity. These three indicators are some of the "…most important preventable causes of ill health and death in Australia", with tobacco smoking being the single most (AIHW 2018). The Hunter New England LHD has a higher percentage of the population who are obese, smoke daily, and consume alcohol at high-risk levels in comparison to NSW. Asthma and smoking are indicators of respiratory health of the community and vulnerability to dust and other air impacts. Prevalence of asthma has significantly varied year on year within Hunter New England LHD between 2002 – 2019, with significant increases in 2007, 2010 and 2015 (14.0%, 13.7% and 14.7% respectively). Asthma prevalence in adults in Hunter New England LHD has generally been above the NSW average, however the data demonstrates that asthma prevalence levels are steadily declining. Smoking and asthma greatly decrease the resilience of the respiratory system against poor air quality that may result from construction activities. This suggests that a portion of residents within the study area are likely to experience increased respiratory impacts from poor air quality conditions and the presence of dust.

Primary Health Networks (PHNs) are health administrative areas, which represent primary health care organisations across Australia from July 2014. In Australia there are 31 PHN's, 10 of which are in NSW. Hunter New England and Central Coast Primary Health Network (PHN) has consistently had a higher proportion of people accessing GP mental health services compared to the rest of Australia, and the number of patients accessing GPs for mental health services has seen a general increase from 2013 through to 2021 at both scales. However, the Hunter New England and Central Coast PHN has displayed a slightly lower rate of people accessing specialist mental health care services compared to Australia. Whilst lower than Australia, Hunter New England and Central Coast PHN has had a slight increase in specialist mental health care access from 1.2% in 2013 to 1.5% in 2021. Data relating to the number of people that have been hospitalised as a result of self-harm indicates poor and/or poorly managed mental health. Intentional self-harm hospitalisations in Hunter New England LHD have consistently been above the NSW average across 2001 – 2020. Between 2010 – 2017, the number of people hospitalised due to intentional self-harm had a dramatic increase in Hunter New England LHD.

5.11 Community culture, values and aspirations

The community vision as described by Tamworth Regional Council (2017a) is to "work in partnership to co-create a world-class regional centre that is a great place to live, work, study and visit". Through a commitment to principles of social justice – including equity, access, participation, and rights demonstrated in local plans and policy (Annexure C.3).

5.12 Community strengths and vulnerabilities

When identifying strengths in the regional area, it is evident that the region is well serviced with social infrastructure and services (particularly health, community, and education services in Tamworth). Additionally, the higher proportion of people in relevant occupations and high proportion of construction businesses is recognized as a strength and opportunity in relation to the project in terms of local procurement. While there is some availability of relevant skilled workers in the local and regional area, a local workforce for highly specialised areas of construction may be difficult to source and will potentially require the utilisation of workers from outside of the regional area. Strengths identified in the local community include the relatively high level of socio-economic advantage, low rates of homelessness and low rates of disability.

The key vulnerabilities within the study area as determined through the social baseline include lack of availability within the local housing market. Local health services are poor, requiring a 40 minute trip into Tamworth to access quality health facilities. However, educational attainment is lower across the local and regional area, with certificate level being the primary level of qualification.

A summary of the key strengths and vulnerabilities within the community based on the baseline social conditions is provided in Table 5.2.

Table 5.2 Community strengths and vulnerabilities

Vulnerabilities	Themes	Strengths/Opportunities
• Ageing population in local and regional area. • Small proportion of 15 – 35-year-olds, which is a large share of the working age population • Lower educational attainment • Highly specialised skills needed for the project may not be able to be sourced from the local and regional area	**Livelihood** Workforce	• Growing labour force, particularly in the construction and agricultural industries. • Encourage employment of disadvantaged youth as well as Aboriginal and/or Torres Strait Islander populations. Proximity to Tamworth, a large regional centre within 30 minutes of the local area. • Available employment capacity in the local and regional construction industry. • Provide training opportunities for workforce in the study area eg upskilling
• Cumulative accommodation demands from multiple project developments. • Low rental vacancy rates, indicating a tight rental market with an undersupply of rental housing during that time. • Reduced mortgage affordability in local area (ie increased amount of households paying above 30% of household income for mortgage compared to NSW).	**Way of Life** Housing	• Local hiring or utilisation of temporary tourist accommodation to avoid exacerbating an already tight rental market. • Diversity in tourism and visitor accommodation options in the regional area
• Declining population in smaller regional communities Eg Dungowan and Ogunbil • Small size of communities increases vulnerability to structural changes and changes in cohesion due to influx of temporary workforces associated with major projects in the region • Sizeable regional indigenous population • Aging population	**Community**	• High levels of socio-economic advantage within the local area when compared to NSW. • Local area demonstrates slightly higher levels of income.
• Limited regional public transport connections	**Way of life**	• Recreational and sporting oriented, evidence of various recreational facilities and sporting clubs. • Rural character and amenity contributes considerably to community lifestyle
• Community services predominately located in the regional area with minimal services in the local area. • To access health, education and community services, people residing in the local area must travel approximately 30 – 40 minutes.	**Accessibility** information and services	• Strong regional supply of social infrastructure and services in Tamworth. • Tamworth Hospital is the major trauma referral centre for the northern region of the Hunter New England LHD. .

Table 5.2 Community strengths and vulnerabilities

Vulnerabilities	Themes	Strengths/Opportunities
• Limited access to health services in the local area • Higher socioeconomic and health disadvantages for Aboriginal and/or Torres Strait Islander populations in the regional study area • Poorer mental health outcomes regionally (indicated by self-harm hospitalisations and access to non-hospital Medicare-subsided mental health services) than in NSW. • Poorer physical health outcomes regionally (indicated by higher levels of smoking, alcohol consumption and overweight or obese adults) than in NSW. • Over size or over mass vehicles causing safety hazards on rural road infrastructure.	**Health and Wellbeing**	• Contribute to the improvement of socioeconomic and health outcomes through direct employment supported by training and capacity development

6 Community and stakeholder engagement

This chapter summarises the findings from the community engagement activities undertaken in relation to the project:

- as part of the EIS engagement; and
- as part of the data collection for the SIA.

Consultation for this assessment includes being completed during the COVID-19 pandemic and was conducted in accordance with applicable Australian and NSW Government health agency advice.

6.1 EIS engagement

Key engagement activities conducted by Water Infrastructure NSW for the project as at 7 July 2022 have included 55 community information sessions and events, 96 stakeholder briefings, 388 landowner meetings, 332 businesses on the Local Business Register, 55,231 flyer drops, up to June 2022. Water Infrastructure NSW has also engaged with Tamworth Business Chamber, Peel Valley Water Users Association and Dungowan Valley Water User Association, community groups including State Emergency Service (SES) – Tamworth Unit, Tamworth Regional Residents and Ratepayers Association, Inland Rivers Network and Tamworth Water Security Alliance and local environmental organisations such as Tamworth Regional Landcare Association, Peel and Namoi Junction Landcare Group, Peel Wetlands Landcare Group and Upper Peel Landcare Group. The impacts identified by these groups have been considered in preparing this report. Full details of community engagement activities and outcomes are described in Chapter 5 of the EIS.

A designated project email address was established to update subscribers and for feedback, enquiries and complaints (dungowandamproject@dpie.nsw.gov.au), with 449 emails received. Enquires included:

- questions about the cost and funding of the project;
- questions about the impact of the project on the cost of water for irrigators and residents of Tamworth;
- questions about whether hydro is being considered as a part of the project; and
- local business enquiries and proposals to work on the project.

Project newsletters were issued in December, June, July and August 2020, July, August, September and December 2021, January and March 2022 and posted on the Water Infrastructure NSW website: https://water.dpie.nsw.gov.au/water-infrastructure-nsw/dam-projects/dungowan-dam/project-updates/project-newsletters

In the March 2022 project newsletter, it was announced that the project will facilitate pipeline access for landowners who have the infrastructure running through their property, with access to water subject to licencing and access agreements with Tamworth Regional Council. This was extended from the existing commitment made by Water Infrastructure NSW to ensuring any property who had a connection to the existing pipeline will maintain their access.

The Aboriginal Cultural Heritage Assessment also identifies and details ongoing consultation with 18 Registered Aboriginal Parties (RAP), 450 interactions have been undertaken with the RAPs across these opportunities.

A dedicated project website for the project was established in August 2020: https://water.dpie.nsw.gov.au/water-infrastructure-nsw/dam-projects/dungowan-dam . As of June 2022, a total of 33,280 webpage views have been recorded. The website provides project background information, project updates including upcoming engagement opportunities, media events and EIS technical report fact sheets.

6.2 SIA field study

This section outlines the engagement activities undertaken as part of the SIA field study.

6.2.1 In-depth interviews participation

In-depth interviews were conducted with 7 local service providers, 8 landowners and 15 key stakeholders between 29 to 31 October 2020, with a further round of interviews in July 2022. Each of the service provider interviews explored the capacity of their service and offered insights into the potential impacts and benefits of the project to specific areas of service in the community. The in-depth interviews with the landowners involved a discussion of the values, vulnerabilities and strengths of the local community, as well as the identification of perceived impacts and benefits as a consequence of the project. A total of 30 interviews were conducted with stakeholders in-person, via telephone and via written response with:

- Four schools and tertiary education providers;
- Twelve childcare providers;
- Three tourist and visitor accommodation providers;
- Two emergency service providers;
- One employment service provider;
- Four real estate agents;
- One Tamworth Regional Council officer, and
- Three indigenous stakeholders.

The key findings from the in-depth interviews are provided in Section 6.4.

6.3 Online community surveys

Two online community surveys were open to the public to identify issues and potential impacts relating to the project, the first released in 2020 and another in 2022. These online community surveys were distributed via survey monkey to a key distribution list. The 2020 survey was designed specifically for the purpose of the SIA and included open ended, multiple choice, and rating-style questions, which provided both qualitative and quantitative data. The 2020 survey was distributed by WaterNSW . In 2022, the rating-style question was replaced with an open answer format, allowing for more qualitative data. The 2022 survey was distributed by Water Infrastructure NSW.

Given that surveys were conducted on a voluntary basis and over varied time periods, self-selection bias may exist within the results. In this respect the results of the surveys should not be considered to represent the views of the total population, however, they do represent the views of individuals within the population.

6.3.1 Online community survey 2020

The 2020 survey was available for response for four weeks, from 28 September 2020 to 26 October 2020. There was a total of 87 responses to the online community survey, of which 67 resided in the regional area (82%), 6 resided within the area of reference (7%), and 7 resided outside of the study area (9%). Of these participants, 8 indicated that they own or operate property that may be affected by the project (9.2%). The results of the 2020 survey are provided below.

i Participation and project awareness

The project awareness of respondents varied, with 27 participants indicating they have a fair awareness of the project (31.0%), and an additional 35 indicating good or very good awareness (40.2%). The remaining 25 participants indicated having poor awareness of the project (28.7%), see Figure 6.1. Of the responses, 20 participants indicated they are had previous communications with Water Infrastructure NSW regarding the project (23.3%).

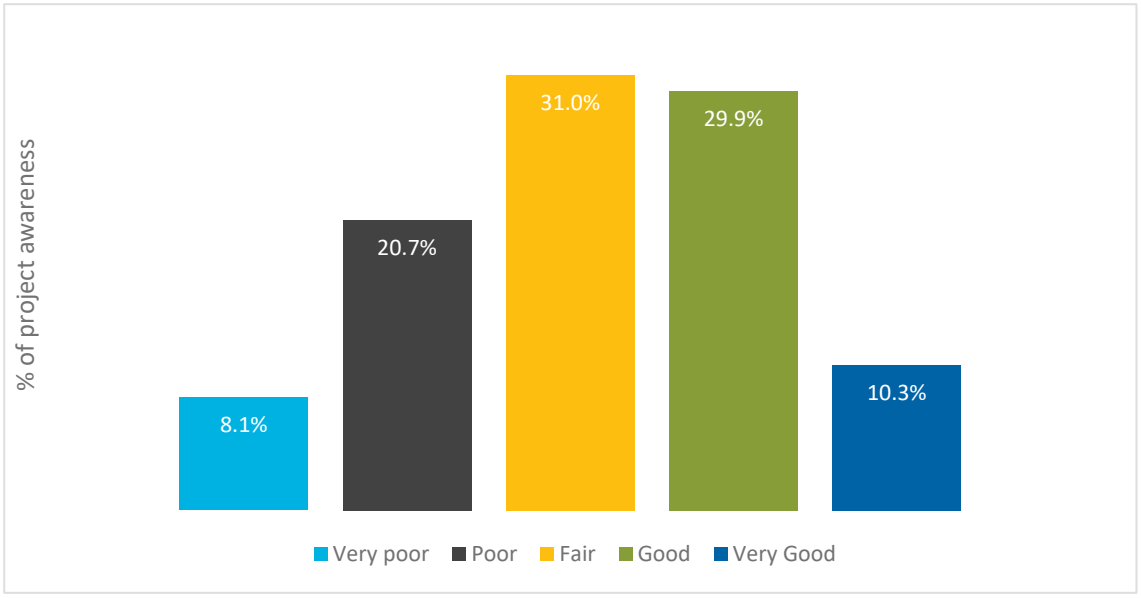


Figure 6.1 Project awareness in community survey

ii Project support

Participants were asked how they felt about the project as either strongly opposed, opposed, neutral, supportive, or strongly supportive. Project support varied across the total 87 responses, with 14 respondents indicating they have neutral feelings towards the project (16.1%), and an additional 40 participants indicating they are supportive or strongly supportive (57.5%). The remaining 26 respondents (26.4%) indicated to have opposing feelings of the project Figure 6.2.

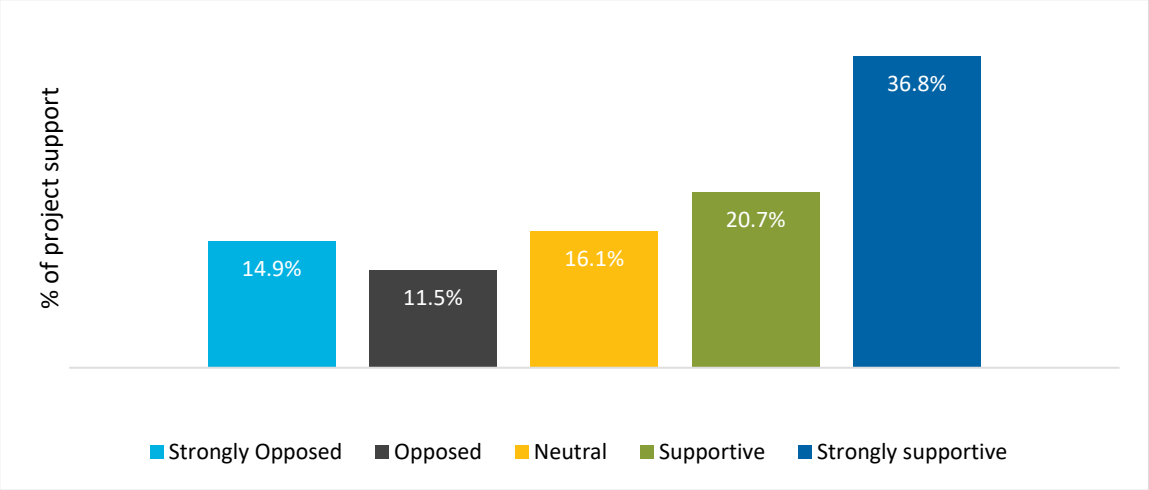


Figure 6.2 Project support in community survey

iii Perceived impacts and benefits

Participants were asked to rate a variety of potential impacts (relating to land use) associated with the project as either very negative, negative, neutral, positive or very positive. The most negative perceived potential impacts were impacts to disruption during construction (16.3%) and permanent loss of agricultural land (16.1%). The most perceived positive impact identified was control of fire risks (9.6%). Participants felt neutral towards impacts of; effect of noise on livestock (61.6%), reduced long-term productivity (57%), biosecurity (56.5%), fire risk (50.6%), permanent loss of agricultural land (50.6%). A detailed account of the perceived negative and positive impacts on land use of the project from online community survey results is shown in Figure 6.3.

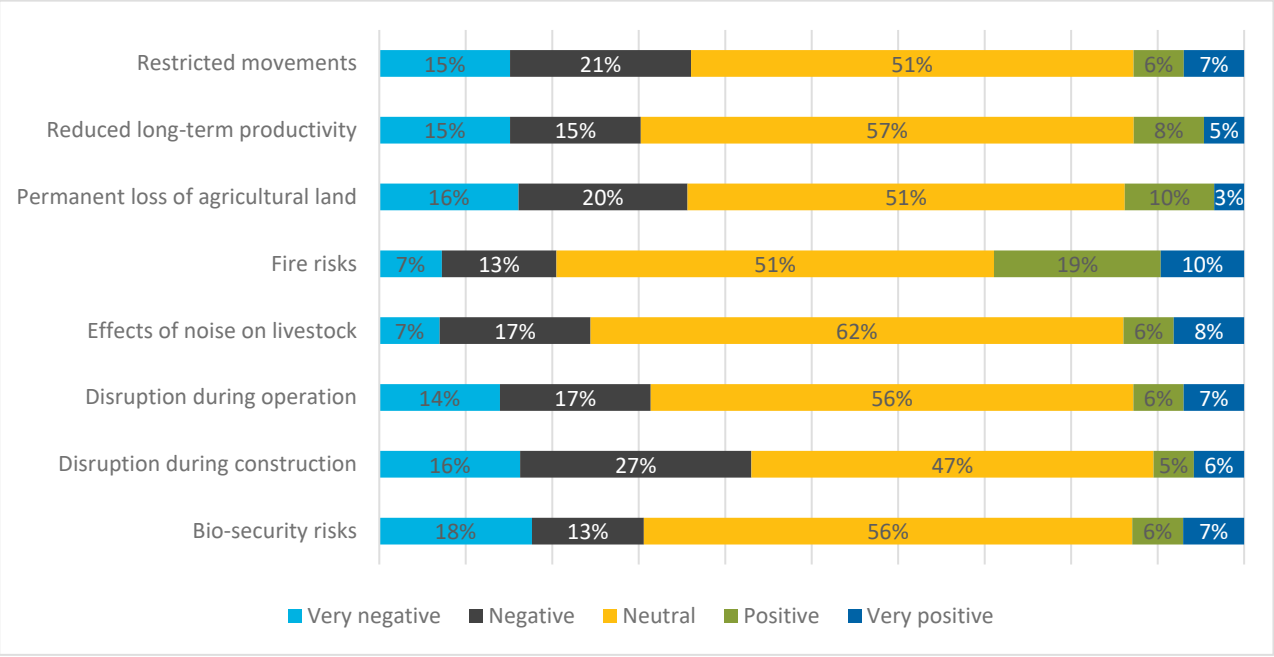


Figure 6.3 Perceived impacts on land use in community survey

Participants were asked to rate the potential impacts on the local community associated with the project as either very negative, negative, neutral, positive or very positive. The most negative potential impacts were those to surface water and flooding (14%) and groundwater (11.9%) due to surface water and groundwater interaction being disrupted as well as a reduced flow within Dungowan Creek. The most perceived positive impacts identified were employment (28.7%) and health (21.8%). Notably, the perceived positive impacts identified was also to surface water and flooding (19.8%) and small businesses (19.5%). Participants felt neutral towards impacts of; air quality (64.4%), noise (64%), traffic (62.1%), and access to social infrastructure (51%). A detailed summary of the perceived negative and positive impacts on the community of the project from online community survey results is shown in Figure 6.4.

In the space provided for open responses, participants provided additional comments about these impacts. These concerns largely pertained to the allocation of water from the project, including fears over the new Dungowan Dam's management and overall management of water not benefiting the local community (through water allocation) were frequently mentioned. Further potential impacts related to water pricing, with concerns of water costs in the local area increasing. It was also believed that the project would reduce river flows and water access that would impact farmers and users downstream. Issues regarding project construction and operation were mentioned, relating to the impacts on native flora and fauna specifically regarding the populations of Murray cod, platypuses, turtles, regent honeyeaters, koalas and Booroolong frogs. Additional concerns were raised over the impacts to recreational fishing as well as the potential impacts experienced by Indigenous communities regarding the loss of cultural artefacts, heritage, landscape and sense of place.

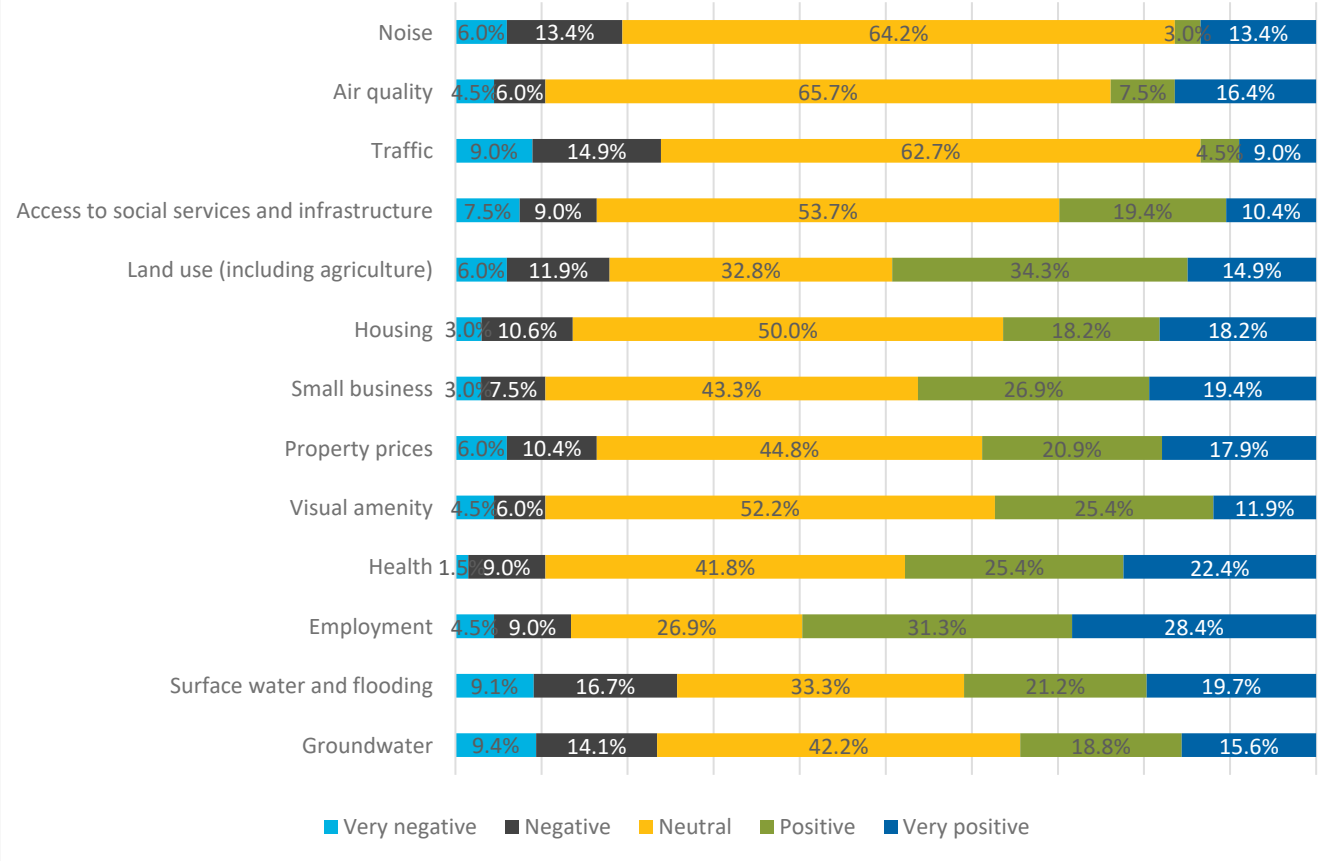


Figure 6.4 Perceived impacts on local community in community survey

6.3.2 Online community survey 2022

A second online survey was open to the public to update the community's identification of issues and potential impacts[1]. The 2022 survey was available for responses from 2 June 2022 to 10 June 2022 (nine days) and 67 responses were received. The survey was distributed to 1,122 stakeholders on the key distribution list. Of the total 66 respondents who completed question 12 of this survey, 33 (50%) of the respondents resided within the Tamworth Regional LGA, with 4 (6.1%) residing in Sydney. Twenty-seven (27) respondents (40.9%) chose to remain anonymous for this survey.

Compared with 2020, a lower proportion of responses were received on the 2022 survey, as the survey was only available to the community for a period of 9 days. Responses were received from approximately 5.9% of the total stakeholder distribution list.

i Participation and project awareness

Participants were asked to rate their project awareness as either very good, good, fair, poor and very poor. Among the 66 respondents project awareness was reported to be either very good (30.3%), good (39.4%), followed by fair 21.2%), poor (6.1%) or very poor (1.5%) (See figure2). Participants were asked if they have previously received any project newsletters, emails, fact sheet, postcards or attended an event, to which 52 participants said yes (78.8%), and 15 answered no (22.7%).

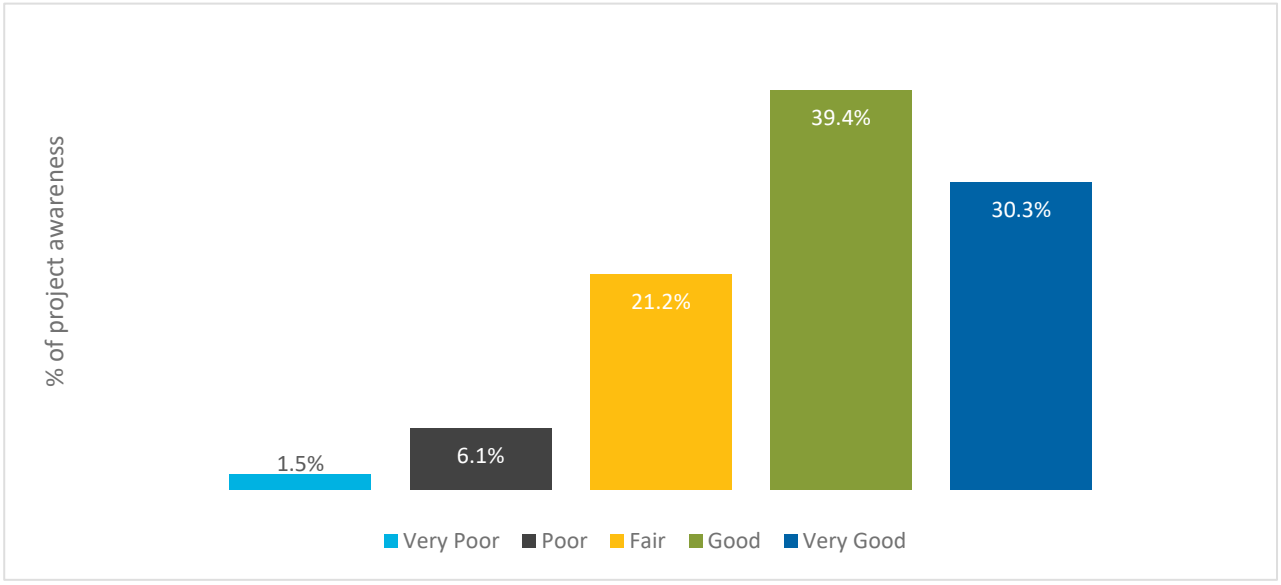


Figure 6.5 Project awareness in community survey

ii Project support

Of the 66 responses, 26 indicated they are strongly opposed the project (39.4%), with a further 11 respondents also oppose the project (16.7%). 7 participants remain neutral or are undecided (10.6%), and 23 respondents either support or strongly support the project (34.8%).

[1] The analysis is based on the SIA survey issued by the Water Infrastructure NSW Communications team. Some questions from the 2020 survey were changed or removed so a full set of data was not able to be collected.

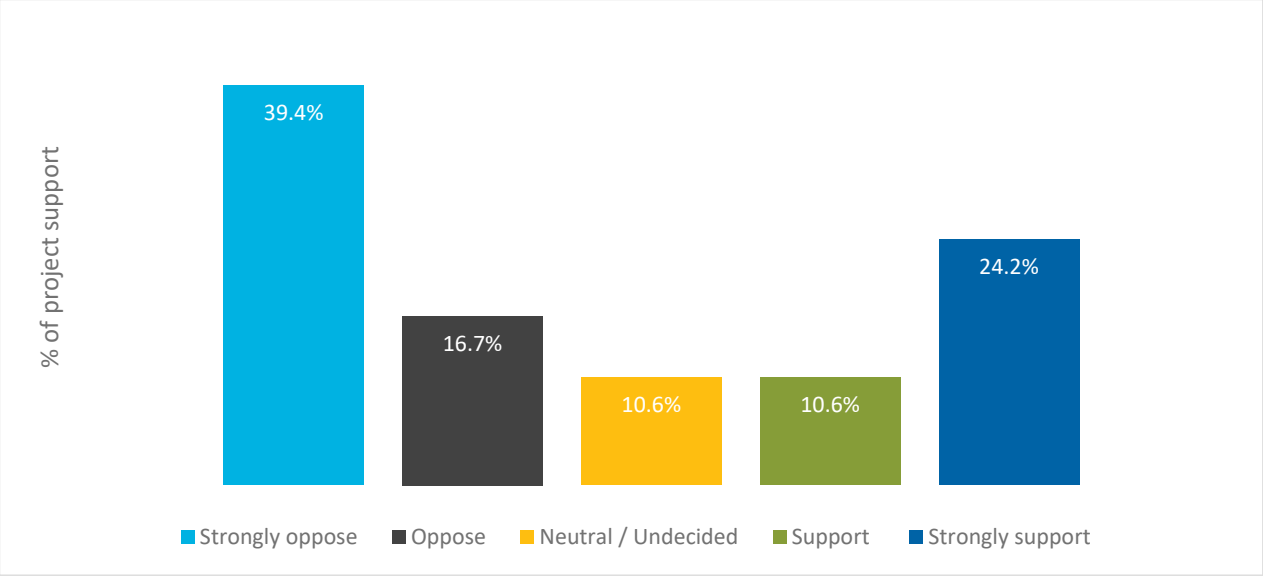


Figure 6.6 Project support in community survey

iii Perceived impacts and benefits

Participants were asked if they felt the project will have a positive, neutral or negative impact for residents and businesses. Of the 66 participants, 30 perceived the project to have a negative impact for residents and businesses (44.1%); 15 believed the project to have a neutral impact for residents and businesses (22.1%); and 20 view the project to have a positive impact for residents and businesses (29.4%)

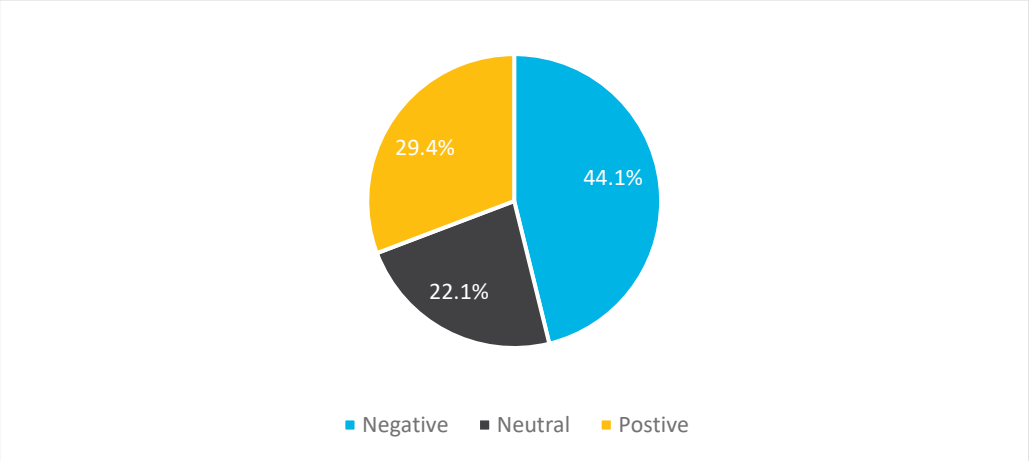


Figure 6.7 Perceived impacts in community survey

iv Key issues raised

Below is a summary of key issues that were raised when the participants were asked what they thought the key issues of the project are for residents and businesses. The top five key concerns related to: costs, water management, decision-making systems, business case, and impacts to livelihood.

a Cost

Respondents raised multiple concerns about the costs of the project, including uncertainty regarding whether costs will be passed onto the residents and farmers of Tamworth, and who will benefit economically. For instance, some worried about increased charge for water ("will my rates increase"), while other critiqued the increased cost of the project, "initial cost $450m now $1.3 billion". These comments highlighted uncertainty about the construction costs as opposed to the operational costs, but also pertained to the efficiency of the final project, as one respondent claimed "building a $1.3 billion plus dam is not going to increase the water". In general, there was a strong sentiment the costs of building the project should be used to explore alternative solutions and put towards addressing other social issues such as health, education and housing crisis.

b Water management

Water management was a frequently mentioned issue for residents and businesses. Some respondents were unconvinced of the project's outcomes, claiming that it "will not provide water security as it relies on rainfall which is increasingly unreliable". Other respondents suggested that alternative water management solutions should be explored as they believed it would "do a better job at harnessing the rain". These solutions included schemes such as the council gifting or subsidising large rain tanks to residents, requesting all buildings and businesses to collect, store rainwater and recycle, having Smart household plumbing which reuses grey water. Overall, the respondents expressed concern that the management of water is not focused on benefiting the local community.

c Decision-making systems

Issues related to decision making systems was a major concern among the participants, particularly whether the project would increase water security. Some participants raise concerns about a lack of trust in the project's decisions, including one respondent who claims, "Tamworth people do not have any faith in the information given about the proposed project." Other respondents indicated that to be able to make an informed decision, the community needs to be told the project details, explaining that "we [respondents] want transparency and accountability and to be told the truth".

d Business case

Additional concerns pertained to the business case, including one respondent who identified "The fact that only some selected extracts from the business case will be made available is not an open and transparent approach" multiple comments directly identified community concerns around project cost compared against potential benefits, and several identified the need for transparency. The above concerns are strongly related to livelihood, with regard to concerns over impacts to farmers, including impacts to the water supply and concerns about downstream flow impacts.

e Impacts to livelihood

Comments regarding livelihood mainly focused on the impacts on rural landowners, farmers, and local businesses in the local area, as one respondent claimed, "I strongly disagree with taking water from the environment and farmers who's businesses rely on water". These concerns included access to water supply during disruptions from construction, as well as the potential for a changed cost of water use.

6.3.3 Comparison of 2020 and 2022 surveys

In the 2020 survey, 28.7% of respondents indicated a poor awareness of the project, while 31.0% had a fair awareness, and 40.2% had a good or very good awareness of the project. In 2022, the awareness of the project increased, with only 7.6% of respondents expressing poor or very poor awareness, 21.2% having a fair awareness, and 69.7% claiming a good or very good awareness.

The 2020 survey revealed that 57.5% of respondents were supportive or strongly supportive of the project, while 26.4% were opposed or strongly opposed, and 16.1% remained neutral or undecided. In 2022, only 34.8% of respondents were supportive or strongly supportive of the project, with 39.4% opposing or strongly opposing the project, and 16.7% remaining neutral or undecided.

Key themes raised in the 2020 online community survey included those relating to water management and allocation, particularly including water pricing, disruption to river flows, and impacts to livelihood. These concerns were reflected by the 2022 survey, where respondents highlighted five key themes: cost, water management, decision-making systems, business case, and impacts to livelihoods. Many of the open comments from the 2020 survey also focused on land use impacts, including disruption to surface water during construction and the permanent loss of agricultural land due to flooding and/or decreased river flows. These concerns were somewhat reflected by the 2022 survey, though respondents focused mainly on water management, cost, and impacts to livelihood. In addition, the 2022 survey raised impacts relating to decision-making and business case, which were not raised in the 2020 survey, including respondent's trust in the dam's outcomes and efficiency, transparency and communication regarding the project, and desire for exploration of alternative options for improving water security other than a dam.

Given that there were fewer survey respondents in 2022, the shift in respondent perceptions of the project demonstrated above should not be considered to be representative of the views of the entire original respondent group.

6.4 Summary of findings

This section outlines the key potential social impacts identified by participants in the SIA field study through in-depth interviews and community surveys. The findings below also include consideration of the findings of community engagement activities and EIS engagement activities conducted by Water Infrastructure NSW and reported in the Stakeholder Engagement Technical Report (2022) appended to the EIS. All consultation activities of the SIA field study sought to understand how participants viewed their community (see Table 6.1) and identify how the project may impact on the community (see Table 6.2).

Values, strengths and vulnerabilities, and impacts, benefits and opportunities identified in **bold font** are **key impacts** as perceived by the community and were reflected strongly in survey and in-depth interview responses.

6.4.1 Community identified values, strengths and vulnerabilities

A summary of existing community values strengths and vulnerabilities identified by participants in the SIA field study are provided in Table 6.1.

Table 6.1 Community identified values, strengths and vulnerabilities

Values	Strengths	Vulnerabilities
Water security for farming and for the community	**Strong regional social service capacity identified by community**	**Poor telecommunication and mobile coverage**
Local and regional agricultural sector	Tamworth's role as a regional centre, providing access to health and emergency services, education and other resources and infrastructure.	Lack of customers to support local business – eg closure of the Dungowan General Store, resulting in Dungowan residents having to travel to Tamworth for goods.
Culture and cultural heritage in the local and regional area	Resilience to and through cultural challenges, changing demography, climatic challenges and COVID 19. In particular, strong adaptability to water restrictions	Safety hazards arising from ageing infrastructure
Local employment	Prominent farming and agricultural sector	**Lack of security of water supply - The regional area has had permanent water conservation measures in place since 2002.**
Communication with the local community	Growing cultural diversity in Tamworth	Youth retention and employment
Effective water management, to deliver water security	Local Aboriginal community has strong connections to the environment, and an ability to participate in bushfire and environmental management processes, as well as cultural processes.	Vulnerable people with lower socio-economic status
Recreational arts and music (ie Tamworth Country Music Festival)	Tamworth as a regional service hub, particularly for health services and education	Unskilled local workforce
Natural heritage of the region and Connection to Country	Quality tourism accommodation options in the regional area	Service providers reported lack of qualified teachers
Environmental management – clean environment and waterways		Community division over approaches to water management
Health of surrounding biodiversity and environments		**Lack of social services and infrastructure in Dungowan and Ogunbil (eg telecommunication, mobile coverage)**
Open and participatory decision-making behind allocation of tax dollars		Housing availability
Opportunities for recreation		Poor water management (ie of water licenses, access)
Support for young people, particularly young people of Aboriginal descent		Loss of connection for aboriginal people to Country and existing historical sites, including farmland and aboriginal places and materials
Health and Wellbeing		Road conditions and infrastructure
Physical (transport) and social connections to other towns and cities		Need for culturally safe places
Opportunities to own and be given recognition and respect, particularly for first nations people.		Vulnerable people with disabilities
Capacity for economic growth offered by diverse primary production sector, public service regional hub, increasing population, Tamworth's role as a regional centre and tourism income		Tamworth acts as a place of transition for people without access to employment
Access to services and infrastructure, such as education.		
Social connection and support		
Tourism		
Opportunities to walk on Country		

6.4.2 Community identified impacts, benefits and opportunities

A summary of the potential social impacts identified by participants in the SIA field study are provided in Table 6.2. Some themes have been identified as impacts, benefits and opportunities, or have been applied to multiple categorizations, depending on the alignment of the feedback received. The importance of water security was a strong recurring theme in the feedback received from surveys and in interviews, and can be seen across all categories in impacts, benefits and opportunities.

Table 6.2 Community identified impacts, benefits and opportunities

Impacts	Benefits	Opportunities
	Health and wellbeing	
• **Fears over water access, including dam and water management may induce mental health stress for the local community. Construction and operational impacts to downstream water quality** • Bushfire risk during construction and from workers poor practice	• Water security and quality improvements will reduce related health impacts.	• Opportunity for local services to increase capacity due to increased demand
	Way of Life	
• Road diversions and increased traffic will impact residents' ability to travel to work and school (eg impacting school bus timetables). • Vibrations from construction processes may impact the structural integrity of people's houses and heritage sites. • De-watering of the existing dam could bare great impact on the local community given existing drought and water restrictions. • Increase in housing demand may impact housing and rental affordability thereby increasing housing stress in the local and regional area.	• Improved water security will benefit the way of life of local and regional communities, particularly with the possibility of a reduction in current water restrictions. • Longer term water security will also increase the potential for the regional area to grow in population.	• **It was suggested for the new Dungowan Dam to be open to the public for recreational use. A recreational dam would benefit families and residents in the local and regional area.** • Potential for new users to access water infrastructure from the dam • **Possibility of improved access to telecommunication services (within local area).**

Table 6.2 Community identified impacts, benefits and opportunities

Impacts	Benefits	Opportunities
Livelihood		
• Concern over current crops being where the planned pipeline is proposed to be constructed. • **Change in water price and/or water allocations will impact the local and regional community, particularly farmers.** • **Construction of the project may impede or directly impact farm operation, including:** **- livestock movement.** **- livestock loss through misadventure, and** **- land disturbance and erosion**. • **Biosecurity concerns for weeds and invasive plant species being spread on farming land through construction machinery and worker vehicles.** • Concern over the potential loss of prime agricultural land, and thus loss of farmer's productivity. • Reduction of river flows, water access, or water quality may impact farmers use for agricultural purposes • **Concerns for property access.** • Impact to Aboriginal people's ability to gain sustenance from the land and water due to impacts to flora and fauna. • Long-lasting construction impacts on soil condition of agricultural land (erosion, compaction and subsidence).	• Increased income to and investment opportunities for the local and regional community (resulting from increased water security and fewer restrictions) • Local businesses, including tourism, supported by the increase in population. • Water security in the local and regional area will encourage youth retention in the local workforce and agricultural sector. • The agricultural sector in the local and regional area may benefit from increased water security (eg increase in farming income). • Local procurement and employment of construction workers as well as employment of external construction workforce to bolster the local economy. • Project may indirectly increase property prices or lower insurance premiums related to flooding, thus financially benefitting local property owners. • Farming land price increases due to water security • Rise in housing prices due to increased housing demand • Employment services providers are running a civil construction course in collaboration with Dungowan Dam to support the community in building a skilled workforce • Water security in the area would increase food production regionally. • Futureproofing of local water supply.	• Consult with local farmers to provide advanced warning of the pipeline location to enable re-planning of crop strategies. • Establish a telecommunication strategy such as a text system to notify farmers of construction operations. • Increased population may provide an opportunity for the local community to explore accommodation business ventures such as farm-stays and wedding venues. • Secure equal-opportunity employment outcomes for the local community, in particular for aboriginal people and youth. • Prepare access agreements to reduce the impacts to private properties (including farms) during construction of the pipeline. • Local procurement of goods and services supporting the project. • Deliver job opportunities targeted to community capacity building through collaboration with education service providers. Potential for improving local access to training and apprenticeship opportunities targeted at youth and reintegration/ rehabilitation. Consider opportunities for integrated outcomes with the point below. • Align project's local job opportunities with industries where skills will enable ongoing local employment after the project finishes.
Access		
• Impacts to access to services due to disruptions to utility services (eg electricity, waste, telecommunications etc.) • Local social infrastructure facilities and services are already taxed. May struggle to support an increased population, impacting on the ability of the local community to access services (health, education, community etc). • Transport disruptions due to work on or near roads impeding access to services, eg school bus and emergency services delays	• **Increased water security and availability benefits service providers, businesses and individuals.** • Enabling new users to access water from the dam. • Potential for delivery of increased capacity of local services and social infrastructure (due to demand).	• Enable improved local telecommunication access through delivery of permanent infrastructure. • Early engagement with local service providers (such as health) around project needs to provide an opportunity for prior resource planning – thus increasing/maintaining capacity.
Community		
• Contention over water allocations has the potential, if not well-managed, to be the source of community conflict and breakdown of social cohesion. • Impacts on community cohesion due to support or objection to the project. • Opposition to Project by some in the community due to frustrations over other water options not being explored.	• Water security in the local and regional area may encourage youth retention in the local and regional community. • Improved resilience to climate change impacts due to improved water security	• Opening the dam for public recreation would improve the levels of social cohesion in the local community. • Providing education opportunities around information gathered by the project, including aboriginal cultural heritage and biodiversity for all community members – enabling information and story sharing

Table 6.2 Community identified impacts, benefits and opportunities

Impacts	Benefits	Opportunities
	Decision-making systems	
• Poor telecommunication services impede local community's ability to receive information pertaining to the project, resulting in impacts to how the local community access decision-making systems and grievance mechanisms. • **Fears over dam management and overall management of water not benefiting the local community (through water allocation and project delivery phasing aligning with times that work for the community eg Not dewatering during drought).** • **Concern about the high cost of the project against anticipated returns (eg raised costs for users)** • **Distrust in EIS process and management systems (eg lack of communication and transparency)** • Community and aboriginal voice is not given equal weight or respect in project decision making		• Opportunity for WaterNSW to liaise with telecommunication service providers to support improved telecommunication services in the local area. • Opportunity for WaterNSW to further disclose the project economics, option studies and great transparency over decision processes with community. • Future project documents and processes to acknowledge and respect community and aboriginal input, and provide opportunities for storytelling and information sharing.
	Culture	
• Impacts experienced by Indigenous communities regarding the loss of, and/or loss of access to, cultural artefacts, heritage, landscape and sense of place. This may also result in intergenerational inequity and impede aboriginal people's ability to gain personal and cultural connection and sustenance (including spiritual) from the land and water. • Limiting community access to the project area and cultural sites identified as significant, including those of significance to Aboriginal peoples (ie conservation and protection of sites), • Recreational and cultural fishing/hunting/gathering may be obstructed or negatively impacted during project construction and operation for all, but particularly for indigenous people.	• The project has contributed to information gathering about the local area's biodiversity, history, culture, social context and geography. This information has cultural value.	• Opportunity to establish a final repository of recovered cultural materials, or a memorial in close proximity to their original location. Aboriginal people should be able to determine access to repository, but knowledge should be available for all. • Opportunity to communicate the importance of lessons that have been learnt through project work, and to articulate and provide education around the connection to place, nature, history and cultural context at local and regional levels. • Acknowledge and encourage the participation of diverse community groups in this project, from conception to monitoring to deliver outcomes aligned with and respectful of community needs • Reconsider providing access to the dam and or land around the dam for recreational and cultural purposes.
	Surroundings (including public safety)	
• Project construction and operation will impact native flora and fauna. • Alteration of landscape due to waterflow changes or flooding. • Amenity and safety impacts arising from construction noise, dust, and increased traffic. • Amenity and environmental impacts due to spread of weeds. • Poor existing road infrastructure will increase heavy vehicles and vehicle movements poses road safety risks. • Increased traffic and vehicle weight may cause road infrastructure to deteriorate • Increased heavy vehicles on a school bus route increases the risk of collision, injury and potential loss of life. • Project generation and handling of waste, and related environmental, amenity and public health impacts.	• Improvement of flood mitigation. Increased water security will mediate bushfire risk (eg firefighting capability will be improved with more access to water)	• WaterNSW should liaise with local Council to support road infrastructure improvements and upgrades, including implementing warning signs during construction phase.

7 Social impact assessment

This chapter groups and analyses the identified social impacts of the project. The aim of the SIA is to assess the proposed change to the current baseline social conditions using data collected from relevant sources to develop a layered picture of the potential social impacts of the project to the community.

To prioritise the identified social impacts, a risk-based framework outlined in Section 2.3 of the SIA Guideline Technical Supplement (2021b) has been adopted for assessment of social impacts. Findings from technical reports and stakeholder perceptions have been used to capture expert and local knowledge in the impact assessment, and to develop appropriate impact mitigation, amelioration, and enhancement strategies.

Assessment of social impacts is complex and as such requires the balancing of a range of factors and often competing interests. The impact assessment is reflective of this and has:

- assessed some aspects of the project as both negative and positive as they relate to different groups of people;
- included negative impacts on local communities while documenting the benefits to the broader region;
- considered the impacts on vulnerable groups and provided management strategies to ensure that any existing disadvantages are not exacerbated; and
- considered each communities access to critical resources, such as housing and health care, and how this affects their resilience.

The social impacts identified have been assessed on a worst-case scenario initially and then the residual effect is assessed on the basis that mitigation of negative impacts or enhancement of positive impacts are successfully implemented. The assessment uses the terms unmitigated and mitigated when referring to negative impacts and un-enhanced or enhanced when referring to positive impacts.

The following data and information have been used to identify the impacts and their associated risks:

- data collected as part of the social baseline;
- findings from community and stakeholder engagement activities (Stakeholder Engagement Technical Report appended to the EIS) and SIA field work;
- findings from technical studies;
- academic research; and
- relevant high-quality government and agency reports.

A social impact assessment was conducted with the authors, EIS project manager and EIS project director on 24 June 2022 to address impacts and apply the social risk framework outlined in Section 3.3 of this report. Using this likelihood and magnitude framework allows assessment of the level of significance of a social impact as low, moderate, high or very high. Both impacts and benefits have been assessed.

7.1 Way of life impacts

This section provides a detailed assessment, unmitigated and mitigated, of the way of life impacts and the matters that significantly impact the way of life as a result of the project.

The matters assessed include:

- traffic delays and road safety;
- impacts to the community and built environment caused by noise, vibration and dust during construction and operation;
- housing demand increase resulting in affordability impacts for the local community; and
- water security.

The benefits assessed include:

- water security.

7.1.1 Unmitigated – Way of life impacts related to traffic delays and road safety

Multiple responses received through SIA Field Study work have identified that potential traffic delays caused by increased heavy vehicle movements, road diversions, infrastructure deterioration and increased traffic during construction and operation are of concern. There is a potential for this to impact the community's ability to travel to work and school, to access services and to ensure emergency services are unimpeded.

The importance of this concern is further supported by the Our Community Plan (Tamworth Regional Council 2022b), within which the community identified "Improving local roads is the key area to change, followed by water supply, more community facilities/recreational opportunities and safety in the area".

The Social Baseline found that in the local area, the only means of travel to work is by car, either as the driver or as a passenger (66.1%). Otherwise, farmers work from their own properties. The Social Baseline has also identified that people residing in the local area must travel approximately 30 – 40 minutes outside of the local area to access community services. Ogunbil Road, which is part of the project transport route, connects the local area with Tamworth City and NSW Route B56 (Oxley Highway).

The Traffic Impact Assessment (TIA) appended to the EIS (EMM 2022) identified that:

- there will be approximately 10 light vehicles (20 movements) per day for construction workers on the pipeline, and approximately 23 light vehicle movements per day for the main works construction area;
- there will be approximately five heavy vehicles (10 movements) per day for earthmoving, refuelling and pipe deliveries from ancillary facilities along the pipeline route;
- it is anticipated that at peak construction, a daily average of 60 heavy vehicle trips would be required for the main construction area;
- the road safety audit identified that certain parts of the existing road network require update for safety reasons;
- there are no anticipated impacts to public transport, except for occasional, informal additional use by project staff, which won't negatively affect access for residents;
- school buses operate within the transport route used for the project, and may potentially be impacted by traffic works due to safety conflicts;
- a large part of the primary transport route will be affected by a reduced speed limit (from 100 to 80kmph) proposed for the majority of the construction period;
- there were no potential impacts identified to traffic flow on major roads;

- operational traffic volumes and vehicle types will remain consistent with the existing Dungowan dam's, and
- the level of service (average delay) will not be affected during construction or operation.

In alignment with the TIA (EMM 2022), this report finds that further detailed consideration of operational traffic impacts is unnecessary, as it is expected that any social impacts related to operation of the new Dungowan dam will be negligible.

There is high social importance placed on this matter by the community in the local and regional study areas, as demonstrated in community engagement, the planning context and the social baseline, though there is a low risk of delays being caused by the project. There is a high unmitigated road safety risk identified by the TIA.

Unmitigated, way of life impacts related to residents' ability to access services is assessed as **medium** with likelihood being **likely** and magnitude being **minor**.

Unmitigated, way of life impacts related to road safety is assessed as **high** with likelihood being **likely** and magnitude being **moderate**.

7.1.2 Mitigated – Way of life impacts related to traffic delays and road safety

Existing safety regulations and construction process requirements exist for managing and mitigating the impacts of construction projects on surrounding road networks. These and other mitigations are identified in detail in the TIA. The Ecologically Sustainable Development (ESD) Pathway report appended to the EIS (Edge Environment 2022b) also provides mitigations to reduce impacts from transport risks, which are fully supported by this report as they would also reduce delays and associated safety concerns.

It is recommended that the Road Condition Report recommended in the TIA (EMM 2022) include a plan for monitoring and, if necessary, repair of transport routes during the Project. Any commitments made under this plan should be proportionate to the project's contribution to total traffic volumes and in consultation with Tamworth Regional Council.

This report also proposes the following supporting actions to be incorporated in preparation of the Construction Traffic Management Plan identified by the TIA (EMM 2022) :

- A robust engagement process including reporting, monitoring and seeking community feedback throughout the project. As identified in the TIA, consultation with school bus operators is of critical importance.
- Planning project deliveries outside school bus pick up and drop off times.
- Individually checking and confirming the ongoing safety of each pick up and drop off site along the project route.
- Planning construction in school bus pick up/drop off areas to occur during school holidays.

If the mitigations proposed in the TIA and ESD Pathway report are enacted and supported with the actions recommended by this report, the mitigated impact has been determined to be low.

Mitigated, way of life impacts related to traffic residents' ability to access services is assessed as **low** with likelihood being **possible** and magnitude being **minimal**.

Mitigated, way of life impacts related to road safety is assessed as **medium** with likelihood being **possible** and magnitude being **minor**.

A summary of the assessment is provided in Table 7.1.

Table 7.1 Summary of way of life impacts related to traffic delays and road safety

Social impact	Matter	Affected parties	Duration	Extent	Unmitigated	Mitigated
Way of life	Road diversions, deterioration and increased traffic will impact residents' ability to travel to work and school and to access services (eg impacting school bus timetables, access to social services and emergency services).	Local residents, service providers	Construction	Local area (Dungowan, Ogunbil) and regional area (Tamworth Regional LGA)	Medium (negative)	Low (negative)
Way of life	Road safety will be impacted by the increased number vehicle movements during the project, including heavy vehicle movements in particular	Local residents, service providers	Construction	Local area (Dungowan, Ogunbil) and regional area (Tamworth Regional LGA)	High (negative)	Medium (negative)

7.1.3 Unmitigated – Way of life impacts related to the community and built environment caused by noise, vibration and dust during construction and operation

Multiple residents and the local Aboriginal community have raised concerns about the impacts of noise, vibration and dust on residential and workplace amenity (for farmers on local agricultural land) and overall health and vibration impacts on local heritage sites.

Project Noise

The Noise and Vibration Impact Assessment (NVIA) appended to the EIS (EMM 2022) identifies that during construction of the Dam, noise is likely to be compliant, however during pipeline construction noise is anticipated to be above the noise management levels at times during proposed pipeline construction for short periods of time if unmitigated.

The NVIA also found that operation of the new Dungowan Dam and static sites are unlikely to have significant noise impacts, and that road traffic noise impacts will be minimal during both construction and operation.

The Health Impact Assessment (HIA) (EnRiskS 2022) appended to the EIS identifies that, based on the predicted noise levels, there are no health impacts of concern for noise generated during construction from static locations or during operations.

However, during the construction of the pipeline and Dungowan Dam Road upgrade works there is the potential for elevated levels of noise that require mitigation to ensure health is protected. These measures are most important during the night-time. Changes in traffic volumes are expected to be noticeable by the community and may result in increased levels of annoyance and sleep disturbance along Tamworth-Nundle Road, Ogunbil Road, Dungowan Dam Road, Dungowan Creek Road and Back Woolomin Road. To prevent undue noise impacts, the NVIA recommends a series of mitigations supported by the HIA and this report.

Vibration

The NVIA assessment found that vibration is unlikely to affect residential dwellings but may affect the Ogunbil Shearing Sheds heritage site if unmitigated and it is unlikely that the project would cause vibration impacts at any surrounding receivers. The report concludes that it is possible that some vibratory activities would occur close to structures and therefore management of vibration levels may be required.

The HIA identifies that the potential for adverse health impacts within the off-site community associated with construction vibration or blasting noise is negligible.

Air Quality – Dust

The Air Quality and Greenhouse Gas Assessment (AQGHGA) appended to the EIS (EMM 2022) identifies that there are unlikely to be impacts resulting from dust to existing residential receivers as a result of works on the new Dungowan Dam, however work to construct the pipeline and powerline may result in low to medium impacts.

Dust has the potential to exacerbate the health and well-being of local residents with respiratory conditions and those sensitive to changes in air quality during construction and operation. The social baseline (Section 5.10) found that asthma and smoking are prevalent in the local health district, so it is anticipated that a portion of residents within the local area are likely to experience increased vulnerability to respiratory impacts from poor air quality conditions and the presence of dust if these impacts are not mitigated.

This assessment demonstrates that residential and workplace amenity impacts are important for the project to manage, and noise, vibration and dust matters will each require mitigation, with principal impacts occurring within the project footprint during construction of the pipeline.

Unmitigated, way of life impacts related to the community and built environment caused by noise, vibration and dust during construction and operation is assessed as **medium** with likelihood being **possible** and magnitude being **moderate**.

7.1.4 Mitigated – Way of life impacts related to the community and built environment caused by noise, vibration and dust during construction and operation

Noise, dust and vibration on construction projects are strictly regulated, as outlined in the AQGHGA and the NVIA. As such, construction projects are inherently required to implement mitigations to prevent potential impacts to human health.

Noise and Vibration

The NVIA identifies that the Construction Environmental Management Plan (CEMP) will include a Noise and Vibration Management Plan (NVMP) detailing noise and vibration actions, including proactive and targeted community engagement, planning work outside of sensitive times and using the least impactful method and equipment.

The HIA finds that mitigating night time road noise is of particular importance. In particular, minimising the movement of trucks during the night-time period along Tamworth-Nundle Road, Ogunbil Road, Dungowan Dam Road, Dungowan Creek Road and Back Woolomin Road would be of key importance to minimise health impacts, particularly impacts relating to sleep disturbance. A number of these existing roads are infrequently used with low background noise.

The Statement of Heritage Impact (SOHI) (EMM 2022) appended to the EIS identifies that potential construction impacts to the Ogunbil Shearing Shed heritage item should be mitigated by aligning the pipeline a suitable distance from the shed and preparation of a Construction Heritage Management Plan.

Air Quality – Dust

With the successful implementation of dust mitigation measures recommended in the AQGHGA, the risk of dust soiling or human health and ecological impacts because of powerline and pipeline works would be effectively reduced.

In summary, the relevant assessments have identified that these impacts may be effectively mitigated by sensitive construction processes and planning, which are to be addressed through detailed construction management plans and community engagement processes as the project progresses.

Mitigated, way of life impacts related to the community and built environment caused by noise, vibration and dust during construction and operation is assessed as **low** with likelihood being **possible** and magnitude being **minimal**. A summary of this assessment is provided in Table 7.2.

Table 7.2 Summary of way of life impacts related to the community and built environment caused by noise, vibration and dust during construction and operation

Social impact	Matter	Affected parties	Duration	Extent	Unmitigated	Mitigated
Way of life	Impacts to the community and built environment caused by vibration, noise and dust during construction and operation	Residents within the project footprint and around transport routes.	Construction, operation	Project Footprint	Medium (Negative)	Low (Negative)

7.1.5 Unmitigated – Way of life impacts related to housing demand affecting housing availability and affordability

The project will employ 125 workers at its peak and housing for up to 140 workers will be provided onsite.

Given the proposed capacity, the workforce can be accommodated onsite in its entirety. A portion of the workforce will be local workers. Therefore, those who potentially seek housing in the local area will be limited to any non-local workers for whom onsite accommodation is not suitable, such as those who wish to bring their families with them (this assessment assumes that on-site facilities will not be designed to support family living) Because of this, the relative proportion of those who will be looking to purchase or rent housing within the local area is anticipated to be low.

During SIA fieldwork in 2020, real estate agents indicated that there was low availability of housing in the market, and their professional opinions on whether dwellings would become less available due to demand increases potentially caused by the project varied. Most associated even a minor increase in demand with an increase in price, due to the lack of availability.

1.8% of the local population are Aboriginal people and 10.1% of the regional area's total population are Aboriginal people. Aboriginal interview respondents identified that their community includes residents who are extremely vulnerable to housing stress when affordable housing is unavailable. Respondents identified a lack of social housing and there are members of the local community who are currently homeless. There was an observation that the rental market tends to give preference to non-aboriginal renters, and so any lack of availability has the potential to directly impact housing options and affordability for aboriginal people. Observations around access to affordable housing also extended to identify vulnerabilities around access to temporary affordable housing, including that offered in caravan parks.

The SIA social baseline (Section 5.3 and 5.8) found that the number of homes owned outright in the local area (33.5%) is slightly higher than in the regional area (30.3%) and in NSW (32.2%). This corresponds with a slightly higher percentage of homes owned with a mortgage in the local area (36.2%) than in NSW (32.3%). The proportion of rented homes is notably lower, with the local area at 16.5%, and NSW at 31.8%.

Over the last three years there has been limited availability of affordable rental dwellings in the regional area, and mortgage repayments are the principal cause of housing stress in the local area.

Local households experiencing housing stress are extremely susceptible to price increases, to a point where health and wellbeing is impacted by the percentage of total income spent on housing. However, homelessness in the regional area and area of reference is lower than NSW rates.

The social baseline demonstrates the relationship between socioeconomic disadvantage and housing stress, indicating that vulnerable groups are disproportionately affected by increases in rent and mortgage rates.

Further evidence from the social baseline identifies that as of 12 April 2022, there were no properties for rent or for sale in the local area. In selected suburbs in the regional area there were 197 properties for sale and 106 properties for rent. Most these available properties were located in Tamworth City.

While the potential for these impacts to occur on a large scale is low due to the onsite accommodation to be provided through the project, it has been found that even a minor increase in demand may increase the susceptibility of vulnerable groups in the local community to housing stress and homelessness. The importance of access to affordable rental housing and temporary accommodation is extremely high to the local and regional community, who are going through a period of increased susceptibility to these impacts.

Unmitigated, way of life related to housing demand impacting housing availability and affordability is assessed as **high** with likelihood being **likely** and magnitude being **major**.

7.1.6 Mitigated – Way of life impacts related to housing demand affecting housing availability and affordability

Further supporting the need for access to housing in the regional area, the following strategies identify housing as a priority and seek to align housing and infrastructure delivery outcomes:

- A 20-Year Economic Vision for Regional NSW, 2018–2038 (Annexure C) seeks to deliver diverse and affordable housing at a regional level.
- The Staying Ahead: State Infrastructure Strategy 2022-2042 (Annexure C) specifically seeks to deliver Aboriginal housing and enabling infrastructure programs in partnership with local communities.
- Tamworth Regional Council's Blueprint 100 - Our Community Plan (Annexure C) also identifies the importance of delivery of diverse and affordable housing at a LGA level.

The above plans set priorities by identifying gaps and community concerns, then deliver strategic direction to inform local planning. Securing housing is a priority for both local and state government in the regional area.

The project proposes to provide worker accommodation and an unspecified proportion of jobs will also be offered to local workers. It is proposed that the project give preference to local residents when employing project staff and contractors. This will reduce the project's potential contribution to competition for housing and prevent impacts to vulnerable communities.

To mitigate further impacts to housing access, the project should seek to ensure onsite housing and facilities to support residential occupation are delivered prior to project commencement, to ensure that there is not a lag between commencement and provision of housing for workers. Ideally, housing would be delivered by local contractors to further mitigate impacts and provide economic benefits to local business.

Post construction, a potential social benefit to relieve housing shortages, could be the repurposing of the construction accommodation facility within the LGA. This could provide temporary social housing.

Mitigated, way of life related to housing demand impacting housing availability and affordability is assessed as **low** with likelihood being **unlikely** and magnitude being **minor**. A summary of this assessment is provided in Table 7.3.

Table 7.3 Summary of Way of life impacts related to housing demand affecting housing availability and affordability

Social impact	Matter	Affected parties	Duration	Extent	Unmitigated	Mitigated
Way of life	Increase in housing demand may impact housing and rental affordability, thereby increasing housing stress in the local and regional area.	Local and regional residents, vulnerable communities with low socio-economic backgrounds are particularly susceptible	Project construction	Local area (Dungowan, Ogunbil) and regional area (Tamworth Regional LGA)	High (negative)	Low (negative)

7.1.7 Unmitigated – Way of life impacts related to water security, quality, price and allocations

The existing Dungowan Dam holds up to 6.3 GL of water. The new Dungowan Dam will have the capacity to hold 22.5 GL of water, delivering an additional 16.2 GL of water storage capacity. Overall, the project will increase town water security.

The UN defines water security as “The capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability” (UN-Water 2013).

The project is critical to improving long-term water security for the regional area. The project will provide improved drought resilience and water security for Tamworth, while sustaining a future level of irrigation as the city grows. The importance of water security to liveability is identified in the Draft Namoi Regional Water Strategy (DPE, 2021f), which states that “Water is critical to the health of the environment, the social fabric and liveability of the Namoi region and its economic prosperity” and the following feedback from local councils “Droughts increase mental health issues in towns and can decrease their liveability”.

The strategic context for this project outlined in Chapter 4, Annexure C and EIS Chapter 2 clearly demonstrates that water security is a high priority for the Tamworth Regional LGA.

Multiple members of the community including residents, farmers, irrigators associations and indigenous participants have raised concerns through the SIA field study and community engagement activities identified in Chapter 5 of the EIS around the matters summarised below:

- Reduction of river flows, impacts to water access rights, and/or water quality changes may impact farmers use of water for agricultural purposes and this may cause community conflict and breakdown of social cohesion/relationships.
- Impacts to water availability during drought conditions, with the concern that lack of access to water during drought may generate physical and mental health impacts.

- Impacts to human health due to potential degradation of water quality.
- Change in water price.
- Concern over lack of access to water conditions, with uncertainty generating physical and mental risk.

As identified in Section 2.2.4, the current raw water pipeline from the existing Dungowan Dam supplies water to around 65 existing customers. There would be negligible disruption to the supply of raw water to existing customers during the pipeline construction and commissioning. Around three planned interruption periods are proposed that are expected to be between 24-48 hours in duration, with advanced notice provided to customers.

52 customers on the replacement pipeline alignment would also be provided with connection points as a result of the project, totalling 117 new and existing raw water connections. This benefit was announced in March 2022 in project newsletters, after the initial SIA field study survey was conducted in 2020.

The Surface Water Assessment (SWA) appended to the EIS (EMM 2022) provides the following detail on downstream water flows and quality.

In Dungowan Creek, the key risk to surface water quality is the disturbance of soil during trenching for the purpose of installing the pipeline, leading to an increase in erosion and sediment-laden runoff into watercourses. Uncontrolled sediment runoff has the potential to increase turbidity and nutrients entering the waterways, which may have ecological and water quality impacts (EMM 2022).

During operation of the new Dungowan Dam, no water quality effects are expected to Dungowan Creek after an initial 'proving period'. The first few years after commissioning may have different water quality as stumps and leaf litter in the inundation area decay. See the SWA Annexure E Limnology assessment for further discussion of the new Dungowan Dam water quality. Water quality effects during the proving period are also outlined in Table 7.1, Summary of Potential Impacts in the SWA report appended to the EIS (EMM 2022). Most of the effects identified in this table are equivalent to those experienced within the existing dam.

Findings in the SWA identified that the release of nutrients into the reservoir post commissioning from decomposing vegetation would still pose a significant impact even when mitigated. It was concluded that these effects have the potential to be detrimental to fish species in the reservoir and downstream. As discussed in Section 7.4.5 of this report, the Aquatic Ecology Assessment, appended to the EIS (Austral Ecology and Research 2022), also identifies catastrophic impacts to aquatic fauna as their access to key fish habitats (KFH) upstream of the new Dungowan Dam will be permanently lost. In response, the Aquatic Ecology Assessment identifies the proposed mitigation of offsets, which have been agreed with regulators, including the modification of four fish barriers on the Peel River to facilitate improved fish passage. Further assessment of the social impacts of this matter is provided in Section 7.4.5 of this report.

No change is expected to flows in the Dungowan Creek during the new Dungowan Dam construction (see SWA section 6.6).

While the new Dungowan Dam is filling there will be a reduced frequency of high flows in Dungowan Creek, as a result the frequency of bank-full and overbank flows (which are beneficial to environmental receptors) would be reduced. During this period, flood protection for residents and assets in the Dungowan Creek valley would be increased. Unregulated catchments downstream of the dam would still provide runoff to the creek, and so there would still be a (reduced) possibility of natural flooding within the Dungowan Creek valley even while the new Dungowan Dam is filling. (SWA Section 7.4.2). Similar effects would occur following droughts if the dam is drained for water supply and requires refilling. Section 2.2.4 identifies that in the rare situation when the dam is at FSL when a major inflow event occurs, there would be a minor increase in flooding downstream of the new Dungowan Dam as the dam would not have capacity to capture flood waters, and the new Dungowan Dam has a larger catchment area and spillway than the existing dam.

During operation of the new Dungowan Dam, on 90% of days flow would not change. On around 10% of days, flow past Dungowan may decrease, influenced by dam filling and capture of water. These reductions in flow would occur during higher flow days (SWA Section 7.4.3).

No changes to Peel River water quality are anticipated. The new Dungowan Dam will take the place of and operate similarly to the existing Dungowan dam, albeit with a larger storage.

During operation of the new Dungowan Dam the regularity of flows into the Peel River will experience minor changes, as it is anticipated that water will be supplied to Tamworth via the Dungowan pipeline rather than via releases from Chaffey Dam along the river. In the Peel River, flow released from Chaffey Dam would remain unchanged on 65% of days. On 30% of days, the flow released from Chaffey Dam would decrease. Water releases from the Chaffey Dam would continue to supply stock and domestic allocations, and security of these supplies would increase.

The new Dungowan Dam will capture portions of flood events, reducing flood peaks, and make that water available for use later. The total water available for human use will increase. The new Dungowan Dam will reduce the time in water restrictions for Tamworth (sections 4.2 and 4.3 of SWA Annexure A).

Water allocations will continue to be managed under the existing Water Sharing Plan for the Peel Regulated River Water Source (WSP) (NSW Government, current version July 2020). It is expected that irrigation allocations will not change as a result of the project. Detailed assessment of project implications for allocations in the Dungowan Creek, Peel Valley and Namoi areas is provided in the SWA (EMM 2022). While allocations are a sensitive issue for the community, as identified in the Community and Stakeholder Engagement Outcomes Report summarised in Chapter 5 of the EIS (EMM 2022), the project is unlikely to have a significant impact on community relationships or to create conflict around water allocations.

Section 6 of the Health Impact Assessment (HIA) (EnRiskS 2022) appended to the EIS found no significant risks to human health and wellbeing associated with water supply, quality, or allocations.

A Customer Bill Impacts statement (appended to the EIS, EMM 2022) has been prepared by Water Infrastructure NSW to assess the impact of the project on customer water bills as a result of the project. The statement identifies a minimum bill increase of approximately $50-$53 per annum for residential users, irrespective of whether WaterNSW or Tamworth Regional Council owned and operated the pipeline. However, ultimately water price is set by IPART and subject to a range of factors, and as such the above is only a preliminary indication. Customers, for the purposes of implementing bill changes, are all residents within the Tamworth Regional LGA connected to water and wastewater services supplied by Tamworth Regional Council, and increases will not be applied to general security allocations. The social baseline (Section 5.3.4) found that the regional area ranked in the 5th or lower decile for almost all indices of socio-economic disadvantage (ie in the bottom 50% of communities in NSW in terms of advantage).

The Climate Change Adaptation Plan (Edge Environment 2022a) appended to the EIS identified that climate impacts including drought are likely to impact the ability for the new Dungowan Dam to deliver a secure source of water for users and the environment, however, the dam will improve resilience to these impacts when compared with the existing scenario.

The Tamworth regional area is highly susceptible to drought related physical and mental health stressors. The social baseline (Section 5.10) in this report identifies residents in the region have a higher rate of access for physical and mental health services compared to other regions of NSW. Tamworth has also had water conservation measures in place since 2002 (Drought in Australia: coordinator-general for drought's advice on a strategy for drought preparedness and resilience OCG 2019, Table 6.3). During drought conditions, negative economic outcomes, which arise from restricted productivity can be a further detriment to social connections, mental health, and wellbeing of farming communities (Edwards, Gray & Hunter 2018). Edwards, Gray and Hunter (2018, p.5) found that "drought is estimated to increase mental health problems significantly. A negative impact of drought on mental health is found for farmers and farm workers". Moreover, Edwards et al. (2015) calculated that, if the population were not exposed to drought, the overall incidence of mental health problems in rural and regional areas would be 10.5% lower. However, given that the project is expected to reduce the impacts of drought on the severity and number of water restrictions, the project may be seen to have a positive overall impact on drought related mental health and wellbeing impacts.

Further observations on project governance, which have been observed as potentially causing stress for the community and associated mitigations, are provided in Section 7.2.

In summary, improvements to water security are a key intended benefit of this project. While the project is anticipated to cause temporary service disruptions to those connected directly to the Dungowan pipeline, the project will result in benefits to residents in the regional and local area through improved water security and access. It is not anticipated that there will be negative impacts to water security and allocations due to the project. Outstanding community concerns requiring mitigation are the impact of price increases on vulnerable residents, and the implementation of mitigation measures proposed in the relevant EIS technical studies to secure water quality. These considerations are addressed in Section 7.1.8.

7.1.8 Mitigated – Way of life impacts related to water security, quality, price and allocations

Detailed consultation to determine water access needs and to provide advanced notice of planned service disruptions is required, per the project description (EIS Chapter 4 and Chapter 2 of this report) to mitigate any potential impacts to pipeline customers.

The HIA (EnRiskS 2022) found that the assurance of water quality outcomes are dependent on a range of mitigation measures proposed to be implemented during construction and operation, specifically:

- mitigation measures identified to minimise the potential for algal blooms to impact on raw water quality (SWA, EMM 2022); and
- mitigation measures detailed in the Groundwater Impact Assessment (EMM 2022) appended to the EIS, particularly during pipeline construction.

The ESD Pathway report (Edge Environment 2022b, Section 7.3, appended to the EIS, EMM 2022) identifies sustainability initiatives to improve Government efficiency in use of water, energy and transport, identifying the need for:

- a strong focus on the effective management of water for construction/capital works activities (eg rainwater harvesting, reuse and recycling);
- metering on water monitoring systems for efficiency during construction phase; and
- the sites landscaping to incorporate native, climate resilient and low maintenance vegetation.

Implementation of these mitigations offers an opportunity to further align the project with the State and Local government's strategic objectives, which have been informed by the community.

Tamworth Regional Council's Drought Management Plan (2016a) describes the triggers and responses for each level of water restriction within Tamworth.

During construction of the new Dungowan Dam, a temporary bypass pipeline would be established through the construction area by way of the diversion tunnel to ensure continued supply of water to downstream consumers from the existing Dungowan Dam.

During trenching across Dungowan creek and for the purposes of mitigating any other construction impacts, construction areas would require industry standard sediment and erosion control plans, flood diversions and minimisation of the length of time that trenches are open. It is anticipated that with these in place there would be no meaningful impact to surface water quality (SWA Chapter 6). Over the period of a year $50 is not a significant increase against the estimated annual bill of $1406 for water and wastewater services (Customer Bill Impacts, appended to the EIS). The Water Utilities Database (Department of Planning and Environment – Water), identifies that across local water utilities in NSW, the average annual water bills in the 2020-2021 financial year ranged from $903 to $2,254. The average annual water bill in Tamworth was $1,405.87 (which means the average user paid roughly $27 per week). Maximum prices for WaterNSW are set by the Independent Pricing and Regulatory Tribunal of NSW.

The overall social impact of water pricing is dependant on a range of factors, including the potential for non-project related bill increases and the broader economic context. As such, the likelihood of this impact occurring is considered possible. The magnitude is assessed as moderate as the project may have a long-term impact to something people in the region value highly, and which may affect people already in a state of socio-economic disadvantage.

The Social Baseline (Section 5) identified that in the regional area, median weekly household income is $1180 and 37.1% of the population earn a low income (id consulting 2021c). However, the baseline also identified that housing stress causes economic disadvantage for vulnerable residential users in the local area. As such, any increase in water bills may cause additional mental and financial stress for vulnerable members of the community. It is proposed that the future service provider may consider offering a temporary exemption from the water price increase for people who can demonstrate that they are experiencing financial hardship. A summary of the assessment is presented in Table 7.4.

Table 7.4 Summary of way of life impacts related to water security, quality, price and allocations

Social impact	Matter	Affected parties	Duration	Extent	Unmitigated	Mitigated
Way of life	Pipeline water supply disruption	Farmers relying on pipeline for water supply for livestock and irrigation.	Construction	Farms relying on pipeline water supply	Medium (negative)	Low (negative)
Way of life	Uncertainty around water supply: connection to new pipeline.	Farmers with the pipeline passing through their property	Construction	Farms impacted by pipeline alignment	Medium (negative)	Low (negative)
Way of life	Dungowan Creek Potential reduction in water quality impacting water supply.	Farmers relying on Dungowan Creek water supply for livestock and irrigation.	Construction	Farms relying on Dungowan Creek water supply	Low (negative)	Low (negative)

Social impact	Matter	Affected parties	Duration	Extent	Unmitigated	Mitigated
Way of life	Dungowan Creek Potential reduction in water quality impacting water supply.	Farmers relying on Dungowan Creek water supply for livestock and irrigation.	Operation	Farms relying on Dungowan Creek water supply	Medium (Negative)	Low (negative)
Way of life	Dungowan Creek Potential reduction in water flows to impacting water supply.	Farmers relying on Dungowan Creek water supply for livestock and irrigation.	Construction	Farms relying on Dungowan Creek water supply	Low (negative)	Low (negative)
Way of life	Dungowan Creek Potential reduction in water flows to impacting water supply.	Farmers relying on Dungowan Creek water supply for livestock and irrigation.	Operation	Farms relying on Dungowan Creek water supply	Medium (negative)	Low (negative)
Way of life	Peel River. Potential reduction in water quality impacting water supply.	Farmers relying on Peel River water supply for livestock and irrigation.	Construction and Operation	Farms and businesses relying on Peel River water supply	Low (negative)	Low (negative) – Likely no residual impact
Way of life	Peel River. Potential reduction in water flows impacting water supply.	Farmers relying on Peel River water supply for livestock and irrigation.	Construction,	Farms and businesses relying on Peel River water supply	Low (negative)	Low (negative)
Way of life	Water Supply Potential reduction in water flows to Peel River.	Farmers relying on Peel River water supply for livestock and irrigation.	Operation	Farms and businesses relying on Peel River water supply	Medium (Negative)	Low (Negative)
Way of life	Water security during drought, with uncertainty generating physical and mental risk.	Local and regional residents an, farmers and business owners.	Lifecycle of the project	Local area (Dungowan, Ogunbil) and regional area (Tamworth Regional LGA)	Medium (Negative)	Low (Negative)
Way of life	Community conflict and breakdown in social relationships – due to water allocations	Local and regional businesses, farmers and residents	Construction and Operation	Local area (Dungowan, Ogunbil) and regional area (Tamworth Regional LGA)	Low (Negative)	Low (Negative)
Way of life	Water quality - health and wellbeing	Water users relying on Calala WTP processed water	Construction and Operation	Local and Regional Area	Low (negative)	Low (negative)

Social impact	Matter	Affected parties	Duration	Extent	Unmitigated	Mitigated
Way of life	Change in water price	Current Tamworth Regional Council water supply customers	Operation	Local area (Dungowan, Ogunbil) and regional area (Tamworth Regional LGA)	Medium (Negative)	Medium (Negative)
Way of life	Concern over lack of access to water conditions, with uncertainty generating physical and mental risk	Tamworth water supply customers	Operation	Local area (Dungowan, Ogunbil) and regional area (Tamworth Regional LGA)	Medium (Negative)	Medium (Negative)

7.1.9 Unenhanced – Way of life benefits related to water security

The community identified that the project is anticipated to have the following economic benefits, due to overall improvements to water security through reduced water restrictions:

- Businesses and service providers including increased income to and investment opportunities for the local and regional community. This may in turn encourage youth retention in the local workforce and agricultural sector.
- The agricultural sector and food production in the local and regional area (eg increase in farming income).
- New users enabled with access to raw water infrastructure from the new Dungowan Dam.
- The potential for the regional area to support population growth.

These observations align with the related strategic directions and observations made in the Draft *New England North West Regional Plan 2041* (DPE 2021e) and with the Draft Namoi Regional Water Strategy (DPE, 2021f), as well as findings detailed under Section 7.1.7. However, the benefit of impacts around population increase should be measured against the housing-related findings of Section 7.1.5 and 7.1.6.

The Draft Namoi Regional Water Strategy (DPE, 2021f) sets objectives to:

- deliver and manage water for local communities by improving water security, water quality and flood management for regional towns and communities; and to
- enable economic prosperity by improving water access reliability for regional industries.

The strategy also identifies the social importance of water to the region, as it "supports the region's population and its liveability, protects and conserves ecological assets and Aboriginal cultural heritage, and underpins key industries and local employment." The draft strategy also identifies that currently, farmers rely on on-property cultural practices, such as crop and farm infrastructure, to manage and mitigate drought impacts on their properties. It is anticipated that the project will improve these benefits for the community, and reduce (though not remove) reliance on cultural practices for drought management, given that droughts are expected to be an ongoing concern for communities across Australia.

The social baseline has determined that in the local area there is a particularly small proportion of persons aged 15 – 35 years (17.4%), compared to NSW (26.8%), which is likely attributable to fewer education and work opportunities for young people in rural areas. Most of the population of the local area are 35 – 65 years old (52.3%). In the local area there is no youth unemployment, this may be due to the low proportion of youth.

For more information on potential economic opportunities associated with the project, please refer to Sections 7.1.3 and 7.7.

The community identified that the project is anticipated to have the following social benefits, due to overall improvements to water security through reduced water restrictions:

- way of life of local and regional communities, particularly with the possibility of a reduction in current water restrictions; and
- physical and mental health improvement.

Per the UN definition of water security provided in Section 7.1.7, the SWA appended to the EIS (EMM, 2022) demonstrates that improvements delivered by the project will enable the community to sustain their "livelihoods, human well-being, and socio-economic development for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability" (UN-Water 2013).

Section 7.1.7 provides further discussion on the impacts to health and wellbeing caused by water insecurity.

The community anticipates that the project may have the following social benefits, due to overall improvements to water security through reduced water restrictions:

- Project may reduce flooding impacts on properties, thereby increasing property prices or lowering insurance premiums, thus financially benefitting local property owners.
- More water available to mediate bushfire risk during droughts.
- Improved resilience to climate change impacts due to improved water security.

The Bushfire Hazard Assessment (BlackAsh 2022) appended to the EIS, identifies that suitable water levels and infrastructure must be provide and maintained on the site for firefighting purposes. The report does not address whether water available due to the project would deliver broader local and regional benefits for firefighting, as this is an indirect implication of the overall improvements to water security enabled by the project.

Section 7.1.7 of this report summarises the ways construction and operation of the new Dungowan Dam will influence flood events, as identified by the SWA and project description. As per the assessment provided, flood mitigation is not an expected benefit of the project. The Draft *New England North West Regional Plan 2041 Strategy* (DPE, 2021b) identifies that the Dungowan Dam project would improve water security for Tamworth, particularly in the light of climate change, climate variability, and growing population. The SWA (EMM 2022) found that after population growth and climate change to 2040, in a median climate change scenario, Level 1 water restrictions may be required 43% of the time, but this could fall to 28% of the time after the new Dungowan Dam is built. Level 5 restrictions may be required 20% of the time, but this could fall to 11% of the time with the new Dungowan Dam.

Unenhanced, economic benefits of improved water security is assessed as **very high** with likelihood being **likely** and magnitude being **transformational**.

7.1.10 Enhanced – Way of life benefits related to water security

Noting that water security is and will continue to be a significant issue for the community that will rely on active management by Tamworth Regional Council and WaterNSW, the project may explore opportunities to contribute to resilience and water security planning.

One option for how this may be achieved is through development of a resilience action plan to address the community's vulnerability to shocks and stresses (such as drought and bushfire). This process is usually driven by local government and prepared through collaboration with state government, public authorities, service providers and the community, including businesses and farmers.

This project may contribute to resilience planning by:

- providing background data required for determining the community's susceptibility to risks and shocks. Information prepared through the EIS and supporting technical assessments will significantly assist with this process;
- identifying gaps in available strategies, processes, and information to inform discussions on opportunities for the resilience action plan to implement change; and
- capitalising on ongoing relationships and collaboration with Tamworth Regional Council and other key stakeholders engaged through the project.

Potential benefits of this process include:

- Providing an integrated plan for addressing climate and drought vulnerability that approaches risk from multiple governance levels using a collaborative approach
- Reducing reliance on dam water consumption and improving the predicted benefits of the dam's contribution to climate resilience in the region by identifying and capitalising on water interdependencies and other opportunities.

  The US Environmental Protection Agency (2022) identifies that: "Many critical community services and all critical infrastructure rely on water to function (eg, firefighting). Similarly, drinking water and wastewater services rely on other services to ensure consistent distribution of safe water and collection of wastewater, such as transportation for the delivery of treatment chemicals. These bi-directional relationships are called interdependencies. Understanding interdependencies enables water utility owners and operators, and their stakeholders, to determine how a water service interruption may impact and be impacted by other essential services resulting in detrimental effects on the community at large".
- Enabling the community to collaborate in decision making systems and planning for water security, along with broader climate resilience outcomes.

Enhanced, economic benefits of improved water security is assessed as **very high** with likelihood being **likely** and magnitude being **transformational**. A summary of the assessment is presented in Table 7.5.

Table 7.5 Summary of Way of life benefits related to water security

Social impact	Matter	Affected parties	Duration	Extent	Unenhanced	Enhanced
Way of life	Economic benefits of improved water security	Broader community, with a particular focus on businesses, farms and service providers	Operation	Local and Regional areas, potential national and broader flow-on effects for GDP and national food security	Very High (Beneficial)	Very High (Beneficial)
Way of life	Social benefits of improved water security	Local and Regional community	Operation	Local and Regional areas	High (Beneficial)	Very High (Beneficial)
Way of life	Environmental benefits of improved water security, as identified by the community	Local and Regional community	Operation	Local and Regional community	High (Beneficial)	High (Beneficial)

7.2 Community impacts

This section provides a detailed assessment, unmitigated and mitigated, on the community impacts and the matters that significantly impact the community as a result of the project. The community identified impacts on community cohesion due to project decision-making includes:

- Division in those who support or object to the project.

7.2.1 Unmitigated – Community impacts related to community cohesion due to project decision making

Following on from the assessment of the importance of water security to the local community (see Sections 7.1.7 and 7.1.9), both residents and service providers have noted the high stakes of this project. How water is managed and allocated remains a source of potential contestation for the local community, with distrust towards current management processes being expressed. SIA participants frequently raised their concerns over the integrity of Tamworth Regional Council's management of the current dam and pipeline, with hopes expressed that WaterNSW *"will manage water allocations and environmental flows more effectively than Tamworth Regional Council currently do".*

Under Decision-Making Systems in Section 7.8.1, there is an assessment of the inconsistencies in the strategic context of this project and it is clear that various strategies consider the new Dungowan dam project from various perspectives. There is a risk that these identified inconsistencies in governance approaches will create uncertainties and distrust within communities.

It is important that a community has social trust not only of one another but also the various authorities that partake in the functioning society, such as governments or administrative bodies. Existing research points to the importance of social trust between stakeholders and communities in debates around water management. Wheeler, Hatton MacDonald and Boxall (2017) highlight that "trust is integral to social life because it is the foundation of a vibrant community, social participation, effective governance, economic productivity and managing risk". For agricultural communities and farmers in particular, Wheeler, Hatton MacDonald and Boxall (2017) find that lack of contact with government agents may explain some of the mistrust farmers hold toward governments, with more localized networks remaining more trusted sources of information. This directly correlates with the establishment of social cohesion which refers to the degree of solidarity and connectedness

within a group or community, including "the sense of belonging of a community and the relationships among members within the community itself" (Manca 2014). Building social cohesion within a community requires the engagement of the local community and the establishment and maintenance of effective long-term partnerships (Australian Human Rights Commission 2015).

Maintaining social trust and cohesion is of high importance to the Dungowan community as well as the regional area, as demonstrated by the literature and landowner consultation above.

Unmitigated, the impact related to social cohesion is assessed as **high** with likelihood being **likely** and magnitude being **moderate**.

7.2.2 Mitigated – Community impacts related to community cohesion due to project decision making

Ensuring that community consultation is equal and even and does not prioritise only those who are located in or close to the project site may improve conflict associated with unfair stakeholder engagement perceptions. Holding regular community information sessions, meetings and providing newsletters to the local community may allow the broader community to have a say and contribute to stakeholder consultation activities, whilst also increasing awareness of the project and its anticipated impacts, and more importantly benefits of the project. Equitable and consistent community engagement will also mitigate any risks arising from the inconsistencies demonstrated in the strategic political context surrounding the project. Mitigated, the benefits related to social cohesion is assessed as **medium** with likelihood being **possible** and magnitude being **moderate**. A summary of the assessment is presented in Table 7.6.

Table 7.6 Summary of community impacts related to community cohesion due to project decision making

Social impact	Matter	Affected parties	Duration	Extent	Unmitigated	Mitigated
Community	Community cohesion due to project decision making	Community in the local and regional area	Construction and Operation	Local area (Dungowan, Ogunbil) and regional area (Tamworth Regional LGA)	High	Medium

7.3 Accessibility impacts

This section provides a detailed assessment of the unmitigated and mitigated accessibility impacts and the matters that significantly impact accessibility because of the project. The matters assessed include:

- Impacts related to access to utility services during construction, and
- Benefits related to improved access to local services.

7.3.1 Unmitigated – Accessibility impacts related to access to utility services during construction

The local community have identified concerns that landowners could experience service disruptions, including telephone, electricity and water that reduce the productivity of agricultural land. This disruption would impact users of the existing Dungowan pipeline and landowners along the Peel River and creeks relying on the creeks for agriculture as well as landowners along the new Dungowan pipeline.

Agricultural production in the Tamworth region is worth $243 million and agriculture is the largest industry of employment. In 2019, 14.8% or 1,216 people employed in the Tamworth Region were employed in agriculture, forestry and fishing. Further, in 2019, there were 1,108 agriculture businesses in the Tamworth Region. (Land Use Assessment, 2022, Section 5.5.3 and 5.5.4). Agriculture, forestry and fishing is the top industry of employment in the local area (21.3% of industries) (Section 5.9.2).

There is no internet access in the Dungowan Valley and 25.1% of residents in the regional area do not have internet access (Communications and Stakeholder Engagement Report, Section 3.1, appended to the EIS, EMM 2022). While it does not form part of the project scope, it is understood that investigations outside of the project scope are ongoing with regard to provision of mobile phone coverage.

One landholder noted:

"…mobile coverage will be available during project build, then dismantled. Shows how much NSW Government respects residents!"

The Dungowan community is also concerned that the lack of mobile reception will create safety risks during construction (Chapter 5).

There is potential for disruption to electricity provision during construction. Existing powerlines within the new Dungowan Dam inundation area currently supply the town of Niangala and would require decommissioning to enable the construction of the new Dungowan Dam. Further, there is potentially a need to upgrade a 13.2 km section of existing overhead powerline, install a new powerline and upgrade existing powerlines to maintain HV connectivity and network integrity. These works would be carried out prior to decommissioning existing powerlines and completed at the start of the project construction. (Project Description, Chapter 2).

In regard to water provision, there is expected to be three planned interruption periods between 24-48 hours in duration (Surface Water Assessment, EMM 2022).

Unmitigated, the impact from utility service disruption is assessed as **medium** with likelihood being **almost certain** and magnitude being **minor**.

A second impact on accessibility relates to the ability of local social infrastructure facilities and services to support an increased population, thereby impacting the ability of the local community to access services such as health, education, community support, emergency services and sport and recreation. While the local area has very few services, Tamworth City is the service hub for the regional area (refer to Section 5.6).

Tamworth Regional Council's (2022b) Blueprint 100 Community Plan 2023 – 2033 notes its commitment to provide high quality lifestyle, recreational and community facilities.

Service providers noted during SIA interviews that increased population would increase pressure on child care, education and employment services. These responses are based on an assumption that the families of project staff would be moving into the local area during construction. Emergency services (police, ambulance) noted there is sufficient capacity to support additional demand.

One landowner noted that:

> *"It's really hard to find a GP in town, so it would be good to see more country doctors come along."*

If it is assumed that 10% of the peak construction workforce would live locally outside of the onsite worker camp, that is 12 possible households, who are more likely to be on site for the project duration (up to 6 years), potentially adding to the community. It is unlikely these residents would seek to move to the local area given the lack of housing availability and services, so it's anticipated that they would be more likely to move to Tamworth City. As such, it's unlikely that this addition would place significant further strain on services, given the existing population of Tamworth was 77,029 in 2016.

Unmitigated, the impact during construction from the access to utility services to support an increased population is assessed as **Medium** with likelihood being **possible** and magnitude being **minor**.

7.3.2 Mitigated – Accessibility impacts related to access to utility services during construction

A new power connection would be established before any decommissioning to ensure power supply to the Niangala area is maintained throughout construction and operation of the project (Project Description, Chapter 2).

If short duration service disruption is unavoidable, the impact would be mitigated through negotiation of Access Agreements with landowners. Potentially affected landowners would be consulted during the planning process prior to the decommissioning works.

To support energy supply and the reduced risk of blackouts, the project could apply the Energy recommendations (under recommendation 7.3) outlined in the ESD Pathway report (Edge Environment 2022b), appended to the EIS.

During construction of the new Dungowan Dam, a temporary bypass water pipeline would be established through the construction area by way of the diversion tunnel to ensure continued supply of water to downstream consumers from the existing Dungowan Dam

There would be negligible disruption to the supply of raw water to existing customers during the pipeline construction and commissioning (Surface Water Assessment, EMM 2022). Advanced notice would be provided to customers ahead of approximately three planned interruption periods that are expected to be between 24-48 hours in duration.

The project would also supply raw water to customers that have connections to the existing pipeline and to additional new customers along the route of the replacement pipeline, provide water via run of the river discharges to any stock and domestic water licence holders along Dungowan Creek, and provide environmental flows through translucency releases and a new Environmental Contingency Allowance (ECA).

Mitigated, the impact from utility service disruption is assessed as **low** with likelihood of social impact being **unlikely** and magnitude being **minor**.

Consultation with service providers and advanced notice regarding the type and quantum of likely increase in service demand may mitigate the ability of local services to support the significant population increase during construction.

Giving preference to local residents when employing project staff and contractors may mitigate the introduction of significant additional demand on key services and prevent impacts to vulnerable communities.

Mitigated, the impact from the ability of services to support an increased population is assessed as **low** with likelihood being un**likely** and magnitude being **minor**. A summary of the assessment is presented in Table 7.7.

Table 7.7 Summary of accessibility impacts related to access to utility services during construction

Social impact	Matter	Affected parties	Duration	Extent	Unmitigated	Mitigated
Accessibility	Impacts related to access to utility services	Community in the local and regional area connected to public utility services	Construction	Local area (Dungowan, Ogunbil) and regional area (Tamworth Regional LGA)	Medium	Low
Accessibility	Impacts related to increased demand for services	Community in the local and regional area connected to public utility services	Construction	Local area (Dungowan, Ogunbil) and regional area (Tamworth Regional LGA)	Medium	Low

7.3.3 Unenhanced – Accessibility benefits related to improved access to local services

The community identified the delivery of increased capacity of local services and social infrastructure due to demand and project deliverables as a potential benefit of the project. Opportunity to enable improved access to telecommunications services for local landholders through delivering additional infrastructure to support the project was also identified.

Landowners identified the potential for improved local services, such as:

> *"I think that all of the schools, hospitals could cater if more people come here. The school needs more students which might come if more young people start coming back. "*
>
> *"Potentially the Dungowan General Store would be able to reopen if there was enough business to make it profitable, which would be beneficial as we wouldn't have to go to Woolomin or Tamworth for bread and milk."*
>
> *"The local businesses would all handle and benefit from an increase in tourism."*
>
> *"Potential for mobile coverage to extend to Dungowan if this forms a part of the Dam warning system - currently there is nothing in place, so a text system would seem like best option, but we'd need mobile coverage for this."*

These benefits are of high importance to the community in the local area and may extend to the regional area, as demonstrated by the landowner consultation above.

Unenhanced, the benefits related to improved access to local services is assessed as **medium** with likelihood being **possible** and magnitude being **moderate**.

7.3.4 Enhanced – Accessibility benefits related to improved access to local services

Consultation with businesses and service providers and advanced notice regarding the type and quantum of likely increase in service demand may enhance access to increased local service provision and generate confidence to start new or reopen local businesses. The project should use its Local Business Register to consult with the local business community and work closely with the Tamworth Regional Council.

Giving preference to local residents when employing project staff and contractors may also enhance this benefit through more local service demand being generated.

Investigations outside of the project scope are ongoing with regard to provision of mobile phone coverage. If future investigations consider the installation of temporary telecommunications infrastructure for project use during construction, consideration should also be given to provision of permanent mobile phone coverage and internet access to the Dungowan Valley and other areas near the dam that currently do not have access.

Enhanced, the benefits related to improved access to local services is assessed as **high** with likelihood being **likely** and magnitude being **moderate**. A summary of the assessment is presented in Table 7.8.

Table 7.8 Summary of accessibility benefits related to improved access to local services

Social impact	Matter	Affected parties	Duration	Extent	Unenhanced	Enhanced
Accessibility	Impacts related to access to utility services	Community in the local and regional area connected to public utility services	Construction	Local area (Dungowan, Ogunbil) and regional area (Tamworth Regional LGA)	Medium	High

7.4 Culture impacts

This section provides a detailed assessment, unmitigated and mitigated, on the culture impacts and the matters that significantly impact culture as a result of the project. The matters assessed include impacts experienced by Indigenous communities regarding:

- Loss of, and/or loss of access to, material culture including cultural artefacts, heritage, landscape and sense of place resulting in cumulative loss to material culture and intergenerational inequity;
- The ability of Aboriginal people to gain personal and cultural connection and sustenance (including spiritual) from the land and water. Changes to downstream flows affecting ongoing use of the area for cultural and way of life purposes may also impact this ability
- Limiting community access to the project area and cultural sites identified as significant, including those of significance to Aboriginal peoples (ie conservation and protection of sites)
- cultural (indigenous and non-indigenous) connections to declining fish populations and impacts on cultural and recreational fishing

As they relate to shared beliefs, customs, values and stories, and connection to land, places and buildings.

7.4.1 Unmitigated – Culture impacts related to intergenerational loss of material culture and opportunity and cumulative loss to material culture

Impacts experienced by indigenous communities regarding the loss of, and/or loss of access to material culture including cultural artefacts, heritage, landscape and sense of place. This may result in intergenerational inequity and cumulative loss to material culture. Lack of access to physical environment may impact availability of opportunities for future education, tourism and research if poorly managed.

These impacts are identified as significant to Aboriginal peoples.

Indigenous groups interviewed noted various impacts on Aboriginal sites, landscape and knowledge and the potential for loss of material culture, knowledge and access to sites for future opportunities:

> *"Farmers have already either prevented access to certain sites or removed relics on their properties."*
>
> *"Access and knowledge for future generations – always access to knowledge regardless of infrastructure – eg If a scar tree is knocked down, it doesn't change what the tree represented. Knowledge doesn't change, it's only if the opportunity to speak isn't given, anything from the area if it's not passed down, no one will know it. "*
>
> *"[We]… need to keep them close – artefacts. [We] would like them to be left on or near Country. Artefacts should go back as close to country as possible – …what comes off country goes back to Country. I would like to see them used for educational purposes for indigenous and non-indigenous people. "*
>
> *"It is important to … ensure a deep response to understanding and communicating the importance of cultural sites and materials. It is important to … demonstrate pride in historical connections between places, trade, intermarriage, knowledge sharing. Local areas [are] …cared for by local nations, but we shouldn't be reduced to this."*

In regards to cumulative loss, Aboriginal SIA survey participants noted that:

"200 years ago, white settlement was a major impact. Totally changed the ways things are done – places and practices. Agricultural clearing of paddocks full of trees and wildlife. Food resources. Happened everywhere."

"For this project, an issue to be addressed is distrust between mob and farmers. The mob have issues with some farmers. If a cultural site is on land, we can't take the land away. Cultural sites should be fenced off and protected."

Section 9.2 of the Aboriginal Cultural Heritage Assessment (ACHA) appended to the EIS (EMM, 2022) notes twelve objects or sites with valid site status. Three have been assessed as having high cultural significance, two as moderate and seven as low cultural significance. Eight objects or sites of tentative status have been assessed as having moderate or high cultural significance. The objects and sites include cultural sites including for ceremonial activities, possible burial sites, social history places, artefact scatter and a potential culturally modified tree near Terrible Billy Creek.

Of the 17 discrete Aboriginal sites and places sites within, or near the project footprint, between 4 and 6 would be subject to direct impacts resulting in their complete or partial loss; five would be unaffected, including several of high cultural value; and six would be inundated by the eventual reservoir created. In addition, the project would directly impact some 2.2 ha of identified areas of high artefact densities and ~42 ha where such cultural material is more likely to be present based on predictive models; and inundate a further ~96 ha of these deposits. Academic studies demonstrate that submerged soil profiles within dams experience limited modification, and as such these sites and cultural deposits can be considered largely unaffected by the project. A low-density stone artefact background scatter is considered present across the entire project footprint and would also be adversely affected (ACHA, Section 10.1).

Unmitigated, culture impacts related to intergenerational loss of material culture and opportunity is assessed as **high** with likelihood being **almost certain** and magnitude being **moderate**.

Unmitigated, cumulative loss to material culture is assessed as **high** with likelihood being **very likely** and magnitude being **major**.

7.4.2 Unmitigated – Culture impacts related to cultural connection and sustenance and changes to downstream flows

Culture impacts related to Aboriginal people's ability to gain personal and cultural connection and sustenance including spiritual sustenance from the land and water. Changes to downstream flows affecting ongoing use of the area for cultural and way of life purposes may also impact this ability.

SIA indigenous interviewees explained:

"Murray cod and other fish in the broader river system and a specific type of yabby are found in Terrible Billy Creek. "

"No water, no fish. This is the effect on the environment. There is a cultural aspect – not getting the same fish anymore."

"Can't walk on country, dam there."

"In my eyes, seems like we're getting pushed out, less and less area to walk on Country, [it's a] spiritual thing."

The ACHA (EMM, 2022) outlines concerns for fish life in regard to changes to the way of life for aboriginal people who are concerned about downstream impacts on fish populations.

Habitat that will be lost because of the construction of the new Dungowan Dam varies, as certain areas may be affected by unintended impacts that don't form part of the project scope. This could include potential accidental release of fuel in uncontrolled areas (via a collision on the construction corridor for example) (Section 8.1.1 Aquatic Ecology Assessment (AEA) (Austral Ecology and Research, 2022) appended to the EIS (EMM 2022).

The construction of the new Dungowan dam will result in a loss of fish habitat via two pathways:

- The construction of the new dam will be located 6,190 metres downstream from the location of the existing Dungowan Dam, resulting in a loss of access to 6,190 metres of Dungowan Creek that was previously accessible to fish moving upstream, but only as far as the existing Dungowan Dam.

- The inundation of fish habitat upstream of the new Dungowan Dam as a result of flooding will impact on key fish habitat (KFH) in a number of tributaries including Jones Oaky Creek, Paradise Creek, Terrible Billy Creek and two unnamed waterways.

The Surface Water Assessment (SWA) appended to the EIS (EMM 2022) shows that in a dry climate, creek flows in Dungowan Creek would become less frequent, and the Peel River between Chaffey Dam and Tamworth would become ephemeral, with cease-to-flow occurring approximately 5-8% of the time (p112). Within the Peel River, the project has negligible effects on the flow duration curve. Within Dungowan Creek, the project has negligible effects on the flow duration curve with wet climate conditions; and a positive effect during dry conditions, with fewer cease-to-flow days in the proposed infrastructure scenario.

The AEA (Austral Ecology and Research, 2022) notes that no mitigation measures are proposed or can be implemented to limit the impact of the loss of KFH in Dungowan Creek as a result of the project. Impacts attributed to this loss in KFH will be addressed via aquatic offsets, which are discussed in more detail as a mitigation in Section 7.4.6.

Unmitigated, the ability to gain personal and cultural connection and sustenance (including spiritual) from the land and water is assessed as **medium** with likelihood being **likely** and magnitude being **minor.**

Changes to downstream flows affecting ongoing use of the area for cultural and way of life purposes is assessed as **low** with likelihood being **unlikely** and magnitude **minor**.

Further assessment related to social impacts of declining fish populations is provided in Sections 7.4 and 7.6.

7.4.3 Unmitigated – Culture impacts related to loss of access to land and cultural sites

Culture impacts related to limiting community access to the project area and cultural sites is identified as significant, including those of significance to Aboriginal peoples (ie conservation and protection of sites).

Indigenous SIA survey participants noted the cultural significance of the project area such as;

> *"Land is still used/ viewed when going on Country."*
>
> *"If a dam is built there, it will be hard to go on [Country] again."*
>
> *"We currently have access to the original homestead which will be lost as a result of the project."*
>
> *"Let it be known we are against the dam. It is direct ancestral land."*
>
> *"We have come across unknown sites [which is] good for knowledge building. [They may be] lost to us, men's site. [It is] possible burial sites. My family has lived in the area since the 1860s. We are full blood."*
>
> *"One of the social impacts is that artefacts coming from there have been taken off country. We need a place to put them back, a lot of artefacts."*

Further, Section 3.2 of the ESD Pathway report (Edge Environment 2022b), appended to the EIS identified that the materiality impacts to Aboriginal cultural heritage are extremely important and require active address throughout the project lifecycle.

The ACHA (EMM 2022) identifies that the *Native Title Act 1993* applies to considerations around intergenerational equity, and assesses, and defines the intentions of the Act and it's relationship to cultural heritage sites. It also identifies that the Gomeroi People native title applicants are RAP's providing feedback on the ACHA.

Unmitigated, loss of access to land and cultural sites is assessed as **high** with likelihood **very likely** and magnitude being **major**.

7.4.4 Mitigated – Culture impacts related to intergenerational loss of material culture, cultural connection and sustenance, cumulative loss to material culture and access to land

Recommendations and mitigations as noted in Section 11 of the ACHA report should be implemented. Further, the effectiveness of these mitigations will be dependent upon thorough ongoing engagement with the local and broader indigenous community. A comprehensive stakeholder engagement strategy would be developed and implemented, and formal monitoring, evaluation and corrective action is undertaken. (ESD Pathway report, Annexure H). Requirements include:

- the community believe their concerns have been considered and addressed;
- monitoring of heritage is undertaken at appropriate intervals during construction and operation; and
- monitoring and modelling demonstrates maintenance of heritage values.

In relation to intergenerational equity, the ESD Pathway report (Edge Environment 2022b) recommends that the present generation should ensure that the health, diversity, and productivity of the environment are maintained or enhanced for the benefit of future generations. It is recommended that the project achieve this through efficient use of resources in construction, waste minimisation, net zero habitat loss, use of low embodied carbon materials, sustainable procurement, effective stakeholder engagement and cultural heritage protection (Section 7.2.2).

In addition, the Tamworth Local Aboriginal Land Council (LALC) provides the most comprehensive Aboriginal and/or Torres Strait Islander services, which include Aboriginal services and information related to housing and accommodation, education programs, youth services, employment and training services, and other support services. As a key indigenous service provider, the project should work with the Tamworth LALC and other indigenous service providers to support indigenous businesses take advantage of opportunities relating to future education, tourism and research (TLALC 2022).

Mitigated, culture impacts related to intergenerational loss of material culture and opportunity and cumulative loss to material culture is assessed as **high** with likelihood being **likely** and magnitude being **moderate**.

Mitigated, the ability to gain personal and cultural connection and sustenance (including spiritual) from the land and water is assessed as **medium** with likelihood being **likely** and magnitude being **minor.**

Mitigated, changes to downstream flows affecting ongoing use of the area for cultural and way of life purposes is assessed as **low** with likelihood being **unlikely** and magnitude **minor**.

Mitigated, loss of access to land and cultural sites is assessed as **high** with likelihood **very likely** and magnitude being **major**. A summary of the assessment is presented in Table 7.9.

Table 7.9 Summary of culture related to intergenerational loss of material culture, loss of cultural connection and sustenance, and access to cultural sites and land

Social impact	Matter	Affected parties	Duration	Extent	Unmitigated	Mitigated
Culture	Intergenerational loss of material culture and opportunity and cumulative loss to material culture	Local Aboriginal groups	Operation	Project area and regional area	High	High
Culture	Ability to gain cultural sustenance/ changes to downstream flows	Local Aboriginal groups	Construction and Operation	Area around dam, peel river and Dungowan Creek	Medium/Low	Medium/Low
Culture	Loss of access to land and cultural sites	Local Aboriginal groups	Operation	Project area	High	High

7.4.5 Unmitigated – Culture impacts related to cultural (indigenous and non-indigenous) connections to declining fish populations and impacts on cultural and recreational fishing

Lost river connectivity through water resource developments is a key cause of decline in fish populations, disrupting both fish migrations and species productivity (Harries et al 2017). Across both the 2020 and 2022 community surveys conducted as a part of the SIA field study, participants raised concerns regarding the risk to the reduction of biodiversity and threats to habitats. Impacts to native fish habitats was raised as a concern as well as the access of recreational fishers to fish populations in the area. Recreational fishing was identified as a highly valued activity in the cultural and social way of life for residents.

Fish life was a key concern arising out of Aboriginal engagement, especially around changes to way of life for Aboriginal people who place cultural importance on certain fish populations and habitats. Participants in the broader community survey also acknowledged the potential impact of the project on local Aboriginal peoples' connection to waterways and cultural heritage.

A representative from a Registered Aboriginal Party (RAP) identified the Murray cod and very rare species of spiny crayfish as of cultural value to local Aboriginal people's connection to Country. This Indigenous representative also noted how their family would fish, hunt and gather along the creeks in the area. Cultural importance was specifically placed on Terrible Billy Creek and the Aboriginal RAP reported that it is where the rare spiny crayfish can be found.

The Draft Namoi Regional Water Strategy (DPE, 2021f) is founded around the objectives to "protect and enhance the environment by improving the health and integrity of environmental systems and assets, including by improving water quality" and "recognise and protect Aboriginal water rights, interests and access to water, as well as Aboriginal heritage assets." As aquatic life is a key impact for aboriginal people, and is highly contextualised by connection to place, this is a key social concern for the project.

The Aboriginal Cultural Heritage Assessment (ACHA), appended to the EIS (EMM 2022), reported that during consultation there was frequent mention of fishing and hunting along Dungowan Creek and Peel River, suggesting that these water systems play an important role in the culture of the local community. The ACHA also identified Terrible Billy Creek as having high cultural importance due to ceremonial activities in the upper reaches of the creek. The ACHA also identified the desire of the local Aboriginal community to maintain connection with a number of cultural and social history places around the project area following construction.

Findings in the Surface Water Assessment (Surface Water) report, appended to the EIS (EMM 2022) identified that the release of nutrients into the reservoir post commission from decomposing vegetation would still pose a significant impact even when mitigated. It was concluded that these effects have the potential to be detrimental to fish species in the reservoir and downstream. The magnitude of this impact of nutrient loading caused by vegetation decomposition could not be accurately predicted however it is anticipated that this matter will cause higher nutrient levels in the reservoir in the first few years of operation than will occur in later years.

Whilst the existing Dungowan Dam is a barrier to fish movement, no fish passage infrastructure is included in the design of the new Dungowan Dam and, as such, the new Dungowan Dam will also pose a barrier to fish passage. The Aquatic Ecology Assessment, appended to the EIS (Austral Ecology and Research, 2022), identifies catastrophic impacts to aquatic fauna access to key fish habitats (KFH) as access to KFH is permanently lost. This will result in a loss of connectivity to waterways upstream of the new Dungowan Dam. A total 34.2km of waterways will lose connectivity, inclusive of a loss of 26.4km that is determined to be Type 1 highly sensitive key fish habitats, 6.19 km of Dungowan Creek and 16.9km of lost connectivity along Terrible Billy Creek, which has been determined as a place of cultural value in the ACHA. Offset strategies proposed to address the ecological impacts to fish passage are addressed in further detail in Section 7.4.6 of this report.

The community places high environmental value on native fish populations and biodiversity within the region, with many expressing concerns for fish species well-being and the impact upon recreational fishing.

Cultural fishing is recognised by the Fisheries Management Act 1994 as of spiritual, social and customary significance to Aboriginal persons and is defined as:

> *"fishing activities and practices carried out by Aboriginal persons for the purpose of satisfying their personal, domestic or communal needs, or for educational or ceremonial purposes or other traditional purposes, and which do not have a commercial purpose".*

Engagement with RAP representatives points to the assumption that Aboriginal people in this area gain personal and cultural connection and sustenance (including spiritual) from these waterways, inclusive of its fish population. In discussing the project and its impacts on water systems in the area, the Aboriginal RAP representative during the SIA field study noted:

> *" there's a cultural aspect where you can't get the same fish any more"*

In the ACHA, the Freshwater Catfish was identified as associated with Creation Ancestors in the project footprint, with the Murray Cod also being mentioned in the report. Both the Freshwater Catfish and Murray Cod were identified in the Aquatic Ecology Assessment as threatened species having the potential to occur in waterways associated with the Namoi catchment. Risks to these species were identified, with risk assessments ranging from Low to Medium (for more information on the risk assessment for operational impacts see Table 9.4 in Aquatic Ecology Assessment appended to the EIS). The spiny crayfish was also highlighted through RAP engagement as having cultural importance however the Aquatic Ecology Assessment did not identify the spiny crayfish as at risk to be impacted by the project.

Unmitigated, cultural (indigenous and non-indigenous) connections to declining fish populations and impacts on cultural and recreational fishing is assessed as **very high** with likelihood being **almost certain** and magnitude being **major**.

7.4.6 Mitigated – Culture impacts related to cultural (indigenous and non-indigenous) connections to declining fish populations and impacts on cultural and recreational fishing

Water quality management measures proposed for the new Dungowan dam are outlined in the Surface Water Assessment, which include the construction and operation of a multi-level offtake within the design of the dam. A Fauna and Flora Management Plan (FFMP) and a Construction Environment Management Plan (CEMP) will be prepared and mitigation recommendations from the Aquatic Ecology Assessment will be incorporated.

The Aquatic Ecology Assessment (Austral Ecology and Research, 2022) specifies that no mitigation measures are proposed or can be implemented to limit the impact of the loss of key fish habitats in Dungowan Creek as a result of the project. The approach to offsetting these fish passage impacts have been agreed with DPI Fisheries to remove existing downstream fish barriers as well as direct offset payment into the Fish Conservation Trust Fund. The proposed mitigations facilitate clear fish passage to an additional 94.7 km of waterway within the Peel River and Dungowan Creek, that would otherwise not be provided. These offsetting measures are proposed in the Aquatic Ecology Assessment, however they do not relieve the social impact of loss of access to certain fish and aquatic fauna populations within upstream water bodies of cultural importance. To mitigate social impacts arising from these ecological impacts to fish passage, it is recommended that Aboriginal values, particularly social and economic values, are considered within mitigation and management strategies. Ongoing engagement with Aboriginal community representatives should be maintained to monitor the cultural and social impact of the lost connectivity facing fish populations in the catchment. As discussed in Section 7.4.1, multiple opportunities were raised by Aboriginal SIA participants surrounding the sharing of knowledge and education surrounding Aboriginal objects, sites and places that may be impacted. An additional mitigation to be included within this consideration is directing funding towards education on current cultural practices in the catchment, particularly the traditional practice of cultural fishing.

It is also recommended in the ESD Pathway report (Edge Environment 2022b), appended to the EIS, that Ecologically Sustainable Development principles to be incorporated into the design, construction and operation phases of the project, most prudently the conservation of biological diversity and ecological integrity should be a primary consideration. The precautionary principle outlined in the ESD Pathway report cites that if there are threats of serious damage to the environment, the project should incorporate adaptability and resilience into the project design through the implementation of environmental management and infrastructure maintainability.

In response to the above, this report recommends that Water Infrastructure NSW should complete additional social impact assessment and consultation with the local community, and particularly Aboriginal persons, to identify whether the proposed offsets effectively mitigate the cultural impacts of the project, and to understand the cultural impacts and benefits of the proposed aquatic offsets.

Research in mitigating the effects of barriers to freshwater fish migration has identified that a management group should be established to enhance knowledge sharing among stakeholders, managers, researchers, engineers and the community (Harries et al 2017). To enhance fishway designs and improve barrier management, Water Infrastructure NSW should consider liaising with relevant fisheries funds and professional, water resources, conservation and angling bodies to support the establishment of such a group to help mitigate the effects of barriers to fish passage at a catchment level.

The ACHA (EMM 2022) also recommends the preparation of a Cultural Flows Management Plan to address this impact. If implemented effectively, the risk of affectation is lowered, but not completely resolved, particularly during drought periods.

Mitigated, this risk of this impact would be assessed as **high** with likelihood being **possible** and magnitude being **major**. A summary of the assessment is presented in Table 7.10.

Table 7.10 Summary of cultural impacts related to cultural (indigenous and non-indigenous) connections to declining fish populations and impacts on cultural and recreational fishing

Social impact	Matter	Affected parties	Duration	Extent	Unmitigated	Mitigated
Culture	Cultural (indigenous and non-indigenous) connections to declining fish populations and impacts on cultural and recreational fishing	Aboriginal people, local community	Construction and operation	Namoi catchment	Very High	High

7.4.7 Unenhanced – Culture benefits related to information gathering and long term preservation of cultural material

The community identified that the project has contributed to information gathering about the local area's biodiversity, history, culture, social context and geography. Long-term preservation of substantive inundated cultural material and artifacts excavated during the EIS process could be a benefit and that this information has cultural value.

SIA participants explained that:

> *"Current stories, artefacts and history recorded through EIS process, could improve overall knowledge in the region if shared."*
>
> *"Opportunity to project to help with conversations – educations – if they understand better, might give opportunity to see and protect sites."*
>
> *"[We]… need to keep them close – artefacts. [We] would like them to be left on or near Country. Artefacts should go back as close to country as possible – …what comes off country goes back to Country. I would like to see them used for educational purposes for indigenous and non-indigenous people. "*

If few Aboriginal objects and places remain in a region due to development impacts, there are fewer opportunities for future generations of Aboriginal people and the broader community to enjoy the cultural benefits. Information about the integrity, rarity and representativeness of the Aboriginal objects, sites and places that may be impacted, and how they inform the past visitation and occupation of land by Aboriginal people, are relevant to the consideration of intergenerational equity and the understanding of the cumulative impacts of a project (ACHA, Section 10.4)

The process of completing the ACHA assessment can be considered to have benefits for the local aboriginal community. In the first instance, the investigations of the project footprint have significantly improved our archaeological and scientific understanding of a previously poorly understood region. Information on the past peopling and their activities within the footprint have now come to light, as well as an improved understanding of contemporary sites and values. Such information will only be added to and further refined through future stages of the project (ACHA, Section 11).

Unenhanced, information gathering and long term preservation of cultural material is assessed as **low** with likelihood of **unlikely** and magnitude of **minimal**.

7.4.8 Enhanced – Culture benefits related to information gathering and long term preservation of cultural material

While the project would result in some intergenerational/cumulative loss to material culture, it is considered that there would be numerous cultural heritage benefits. These include the long-term preservation of substantive inundated cultural material that would be inaccessible from future harm, a greater understanding of the past and contemporary values in the region, new 'created' Aboriginal spaces and opportunities for heritage interpretation and public outreach (ACHA, Section 10.1).

The project also provides the Aboriginal community with opportunities to undertake heritage interpretation, development of narratives and visual representation of Aboriginal values, stories and places for the project footprint – something that is currently lacking from the Dungowan and Tamworth region. This would improve understanding and public outreach of cultural heritage to the broader community into the future (ACHA, Section 10.1).

The project should support the RAPs to focus any relocated material culture from the project footprint to a specific locale (the former school site, DDCS5, has been identified in the ACHA as a potential long term location), and thereby provide a specific locale for future use by Aboriginal participants and the general community. If implemented, the relationship of this 'created' Aboriginal place to the new Dungowan Dam would be in place for many decades to come, and this site too would form an important continuation and re-imagining of cultural heritage of the region for future generations (ACHA, Section 10.4).

Enhanced, information gathering and long term preservation of cultural material is assessed as **medium** with the likelihood being **possible** and magnitude **minor**. A summary of the assessment is presented in Table 7.11.

Table 7.11 Summary of culture benefits related to information gathering and long term preservation of cultural material

Social impact	Matter	Affected parties	Duration	Extent	Unenhanced	Enhanced
Culture	Information gathering and long term preservation of cultural material	Local Aboriginal groups	Operation	Project area and regional area	Low	Medium

7.5 Health and wellbeing impacts

This section provides a detailed assessment, unmitigated and mitigated, on the health and well-being impacts and the matters that significantly impact the health and well-being as a result of the project. The matters assessed include:

- physical health; and
- mental health.

7.5.1 Unmitigated – Health and wellbeing impacts related to (and from) workers living and working on site

The project will provide overnight accommodation for about 140 workers in an accommodation camp adjacent to the new Dungowan Dam construction compound. The number of workers represents 22.9% of the local area population but only 2.09% of the regional area population (59,663). The local workforce will temporarily be reliant on access to local services, including health services and will interact with the local community, as such, addressing impact to their health and wellbeing is critical for understanding potential flow-on effects to the community, as well as for the workforce as temporary community members.

The camp would be operational throughout the project construction and would provide facilities for the overnight accommodation of workers including single storey units, central facilities, stormwater detention/quality treatment, maintenance areas, bus and car parking.

Health and wellbeing impacts of construction workers may arise including from dust and emissions, noise, vermin and pest infestations, bush fire risk, service disruption, travel to and from the site, isolation and distance from services.

The Waste Management Assessment (Waste) appended to EIS (EMM 2022) notes that key waste generating activities include food waste at the accommodation camp and ancillary facilities. If stored incorrectly or dumped, food waste could result in pests and vermin at each construction area. This presents a hazard to human and environmental health.

Bushfire risk for and from workers as a result of smoking amongst workers in the construction and operational workforce may increase the risk of grass fire, posing a threat to neighbouring farming businesses. A community member consulted noted that:

> *"if workers were allowed to smoke on site that there would be a risk of grass fires, .. I would prefer that workers did not smoke on site at all."*

Disruption to services such as internet and water, and lack of suitable dwellings, transport, cooking facilities, bathroom and laundry facilities for workers at the accommodation camp are a community concern.

The majority of workers would either be housed in the proposed accommodation camp or transported by bus from existing accommodation in Tamworth. Workers staying onsite will experience distance to services. Dungowan and Ogunbil, closest to the project site, have minimal access to services. The only services in the local area include one preschool, one primary school, and two emergency services (ie rural fire brigade). To access additional services in Tamworth, people residing in the local area must travel approximately 30 – 40 minutes (see Section 5.6 Social Infrastructure and services). This may have indirect impacts on local services due to increased demand from workers such as the Dungowan hotel as well as fuel and food availability.

Landowners consulted were concerned about the driving behaviour of pre-construction workers:

> *"We have noted that workers coming to and from the property aren't driving safely, this is a concern for us, especially if we're crossing cattle."*

Being located at an accommodation camp and away from family and friends may also cause feelings of isolation by the workers potentially resulting in effects on mental health. This may result in alcohol and drug issues, traffic issues and assaults (interview, Tamworth police).

The HIA (EnRiskS 2022) appended to EIS (EMM 2022) found that construction noise and vibration will be present, but does not address noise or vibration with relation to construction workers, as workplace health and safety is expected to be managed separately through application of the NSW *Work Health and Safety Act 2011* and associated Work, Health and Safety (WHS) regulations. Construction exposures are expected to be monitored and managed in accordance with standard WHS regulations and guidance. However, the report does find that using a conservative approach, there are some risks from dust on air quality that may be problematic for workers if left

unmitigated, though workers in the construction compound will be adults who are generally healthy, thus reducing risk associated with onsite exposure to air quality impacts.

The AQGHGA, appended to the EIS (EMM 2022), notes the highest predicted increment from emissions occurs at the accommodation camp. When background concentrations are added to the modelled increment, there are no additional exceedances of the 24-hour average impact assessment criteria for PM_{10}[2] and $PM_{2.5}$[3] at any receptor outside of the inundation zone, including the accommodation camp. Similarly, there are no exceedances of the annual average impact assessment criteria for PM_{10}, Total Suspended Particulate matter (TSP) and dust deposition.

The Contamination Preliminary Site Investigation (PSI) appended to the EIS (EMM 2022) provide consideration of relevant safety aspects for the construction workforce, finding potential risks associated with waste and chemicals.

Unmitigated, health and wellbeing impacts related to (and from) workers living and working on site is assessed as **high** (bushfire), dust and emissions, service disruption, travel, isolation and distance from services (**medium**), and noise and vermin and pest infestations (**low**).

7.5.2 Mitigated – Health and wellbeing impacts related to (and from) workers living and working on site

All mitigation measures as detailed in the AQGHGA are required to be implemented. This include the development and implementation of an Air Quality Management Plan (AQMP) to be prepared and implemented as part of the Construction Environment Management Plan (CEMP) for the project. The AQMP will provide detail on the methods to be used to minimise the generation of dust during all works, and from exposed materials. The CEMP will include management plans that outline measures to be implemented to mitigate the project's various impacts including air quality, noise and vibration, traffic management, waste management and emergency management.

The AQGHGA included identification of the following dust mitigation measures, which would be implemented during the project:

- Watering of gravel haul roads.
- Use of water sprays on drilling, screening/sizing and crushing activities.

The HIA (EnRiskS 2022) found that there are no health impacts of concern in relation to emissions to air of PM2.5 as a result of the construction works, where proposed dust mitigation measures are implemented.

The project could also apply the waste management and transport recommendations made in the Ecologically Sustainable Development Pathway (Edge Environment 2022b) appended to the EIS which include:

- Procurement for civil works and construction to include preference for locally sourced recycled content where possible;
- Waste management plan which identifies waste quantities and types, and measures to minimise waste during construction and operation to be in place;
- Monitoring and reporting of waste to be considered to encourage improved recycling practice and waste reduction target; and

[2] particulate matter less than 10 micrometres (µm) in aerodynamic diameter

[3] particulate matter less than 2.5 µm in aerodynamic diameter

- The demolition and construction waste are reused or diverted to recycling rather than landfill.

The construction phase of the project will require large numbers of workers to be in a relatively remote area that is susceptible to bushfire. Detailed emergency management planning will be completed as part of the CEMP prior to construction to ensure the safety of workers.

Diesel generators would only be used infrequently and temporarily where construction areas are not yet connected to the main construction power supply. At the peak of construction, the project would consume about 347,000 L diesel per month and in total about 10.9 ML would be required throughout the project (Project Description, Section 7.8.4 Materials and handling, iii).

Construction vehicle fuel should be sourced from a wholesaler to avoid disruption of fuel availability locally.

This assessment demonstrates that health and wellbeing impacts on and from workers living and working on site are of importance to the local community. Noise, vibration, dust, emissions, pests, bush fire, service disruption, work travel and isolation will each require mitigation, with principal impacts occurring during construction of the new Dungowan Dam.

Mitigated, health and wellbeing impacts related to (and from) workers living and working on site are assessed as **high** (bushfire). Mitigated, dust and emissions, noise and vermin and pest infestations are assessed as **low**. A summary of the assessment is presented in Table 7.12.

Table 7.12 Summary of health and wellbeing impacts related to (and from) workers living and working on site

Social impact	Matter	Affected parties	Duration	Extent	Unmitigated	Mitigated
Health and wellbeing	Health and wellbeing relating to (and from) workers living and working on site	Construction workers and the community	Six year construction period	Project site (accommodation camp) and the local area	Bushfire (high) Dust, emissions, service disruption, travel, isolation, distance from services (medium) Noise (low) Pest infestation (low)	Bushfire (high) Dust, emissions (low) Service disruption, travel, isolation, distance from services (low) Noise (low) Pest infestation (low)

7.6 Surroundings impacts

This section provides a detailed assessment, unmitigated and mitigated, on the surroundings impacts and the matters that significantly impact the surroundings as a result of the project. The matters assessed include:

- changes to the landscape;
- Impact of invasive species on ecological communities and farming; and
- Project generation and handling of waste and related environmental, amenity and public health impacts.

7.6.1 Unmitigated – Surroundings impacts related to changes to the landscape

Changes in the landscape bring out strong emotions in people who have an attachment to the landscape and can affect how people experience their rural surroundings. Changes to the local landscape is anticipated to impact upon residents' sense of place which Kiandra, Sorice & Thomas (2020) define as "the wide range of connections between people and places that develops based on the place meaning and attachment a person has for a particular setting".

Throughout consultation, the community placed high environmental value on natural water systems in the area as well as the wildlife that rely on these systems, with one 2020 survey respondent noting the importance of:

> *"the health and wellbeing of Dungowan Creek and all the animals that rely on a healthy creek for their existence. What happens to them when the flow ceases?"*

As discussed in Section 7.1.7 of this report, multiple members of the community, including residents, farmers and Indigenous participants, expressed concern regarding reductions in river flows. One 2020 survey participant raised their fear over seeing a 'parched landscape'. Whilst changes in water flows was determined to be a low-level impact when mitigated (Table 7.13), environmental changes can impact on how people value their natural landscape. Visual impacts, which concern changes to the local landscape, influence the subjective concerns and sentimental values associated with regional landscapes (Botterill & Cockfield 2014). In particular, water systems are not only important for sustaining communities' quality of life through providing services such as food, water and recreation but also through less tangible aspects such as aesthetic, spiritual and other values attached to natural surroundings (Verbrugge et al 2019). Water landscapes can take on a multitude of meanings, including being an expression of ecological values, representing attachments to home as well as being scenic or tranquil landscapes (Verbrugge et al 2019).

Research suggests that visual changes to a landscape can have increased cultural and social significance for regional communities due a strong agricultural values and agricultural production presence (Botterill & Cockfield 2014). Therefore, the strong presence of the agriculture industry within the local area, as discussed in Section 7.4, may influence the concerns over visual amenity raised in the community consultations.

Species loss and wildlife displacement was a key area of concern for Indigenous participants, landholders, and survey participants. The community places high environmental value on native fish populations and biodiversity within the region, with many expressing concerns for fish species well-being and the impact upon recreational fishing.

These local environmental values are reflected regionally within the New England North West Regional Plan articulating clear goals to ensure a healthy environment with pristine waterways with strategic directions to protect areas of potential high environmental value (see Annexure C, Section C.2i).

The World Health Organisation (2015) makes note that "biodiversity loss can have significant direct human health impacts if ecosystem services are no longer adequate to meet social needs. Indirectly, changes in ecosystem services affect livelihoods, income, local migration and, on occasion, may even cause or exacerbate political conflict."

According to the Biodiversity Development Assessment Report (BDAR), appended to the EIS (EMM 2022), a direct impact of the project is that a total of approximately 185 ha of native vegetation would be lost during the clearing and inundation of land. The project is expected to result in significant impacts on Box Gum Woodland, which is determined as a threatened ecological community, as well as the Koala and Spotted-tail Quoll, which were identified as threatened species. These ecological communities and species were raised in the SIA community surveys as a point of concern.

The SWA (EMM 2022) identified that soil disturbance during the construction of the replacement Dungowan pipeline will be a key risk to surface water quality as it may lead to an increase in erosion and sediment-laden runoff into the natural watercourse. As discussed earlier in Section 7.1.7 of this report, with sediment and erosion control plans in place within construction areas, there would be no meaningful impact to surface water quality. However, with the value placed on natural water flows by the community, it is important to note how the visual appearance of water quality influences an individual's experience and aesthetic evaluation of a landscape (Lee and Lee 2015).

The Landscape and Visual Impact Assessment (LVIA), appended to the EIS (EMM 2022), concluded that the primary visual impacts of the project will be associated with temporary construction activities for pipeline infrastructure and road upgrades. While the introduction of the new Dungowan Dam infrastructure, including the dam wall and spillway, will contrast strongly with the otherwise rural and low-development character of the study area, the visual impacts of the 270m long and a height of 58 m dam wall and infrastructure will not dominate the landscape, as the larger and more dominant feature is the reservoir behind the dam wall. Terrible Billy Fire Trail has been assessed to have the highest level of visibility for the general public to view the proposed body of stored water and the new Dungowan Dam wall and is the closest point, approximately 1 km from the inundated area (refer to LVIA appended to EIS Section 7.1.8). While the water in the reservoir has a high visual effect and is assessed as having a **high-moderate** overall visual impact, the anticipated number of individuals impacted is extremely low due to the geographic isolation of the new Dungowan Dam, hence the high level of visibility is not seen as a significant visual impact.

Whilst assessed as **low-moderate**, the construction and permanent installation of the powerlines will have more lasting impacts on the views from three rural residents and minor roads. Moreover, according to the LVIA, the new Dungowan Dam infrastructure and reservoir will not be visible from any nearby residences and the main (transient) views will be from minor roads and forestry land.

The Dark Sky Planning Guideline (2016) informs the assessment of significant development within a 200 km radius of the Siding Spring Observatory (SSO). Section 8 of the LVIA (EMM, 2022) notes that the project will create linear infrastructure including approximately 33 km of pipeline, running generally in a north-westerly direction from the new Dungowan Dam to Dungowan Showground. The north-western extent of the Dungowan pipeline is 192 km from Siding Spring Observatory (SSO). There is therefore up to approximately 11 km of the 33 km pipeline within the area subject to the Dark Sky Planning Guideline. The new Dungowan Dam, being approximately 216 km from SSO, is not within the Dark Sky Planning Guideline area.

The SOHI (EMM 2022), identified that the cultural landscape inside and surrounding the project footprint is of local significance and will be subject to minimal heritage impacts. The report concluded that there would be loss of local significance in the existing cultural landscape and concluded that the majority of the impact will be through inundation, which will obscure the landscape rather than destroy it.

Unmitigated, the impact of loss and changes to the cultural and natural landscape affecting sense of place is assessed as **medium** with likelihood being **possible** and magnitude being **moderate.**

Unmitigated, project construction and operation impacting upon native flora and fauna (through inundation or changes to water flows) is assessed as **high** with likelihood being **almost certain** and magnitude being **moderate.**

Unmitigated, changes to views and vistas due to introduction and removal of old infrastructure (existing Dungowan dam, powerlines) and associated construction and demolition works is assessed as **low** with likelihood being **likely** and magnitude being **minimal.**

Unmitigated, changes to views and vistas due to inundation of new Dungowan Dam is assessed as **medium** with likelihood being **almost certain** and magnitude being **minor.**

Unmitigated, visual impacts to the Siding Spring Observatory from project construction and operation is assessed as **low** as the likelihood of the impact is **unlikely** and the magnitude is **minor**. The observatory is 200km away from the project site.

Unmitigated, the risk of erosion and sedimentation impacting on surroundings, especially on aesthetic natural value and visual appearance of water bodies is assessed as **medium** with likelihood being **likely** and magnitude being **minor.**

7.6.2 Mitigated – Surroundings impacts related to changes to the landscape

To best mitigate surroundings impacts relating to changes in the landscape, it is recommended that Water Infrastructure NSW implement the mitigation and management measures recommended by the LVIA (EMM 2022) with particular focus on ensuring that the final alignment of the proposed electricity powerline is selected to avoid or minimise vegetation clearance.

Increasing acceptance of the project over time will diminish the perceived severity of the visual impact as people adapt to their new surroundings. Additionally, the maintenance of a community grievance mechanism that provides an opportunity for residents to raise any concerns about visual impacts during the construction and operation of the project should be strongly considered.

The BDAR (EMM 2022) specifies that impacts on ecological communities and species will be compensated through the implementation of the biodiversity offset strategy. It should be noted that the offset strategies do not address social experiences of biodiversity loss and threats to valued species. However, the BDAR report does specify that an objective of the biodiversity offset strategy is to 'Identify offsets that have additional social, economic and/or environmental co-benefits'.

Should Water Infrastructure NSW identify that social co-benefits are desirable outcome of the biodiversity offset strategy, a social needs analysis should be undertaken by a suitably qualified person (in alignment with the SIA Guideline definition (DPE 2021A)) to understand and determine adequate opportunities for social co-benefits for the community in the local and regional area, who are affected by the impacts of the loss of biodiversity. The local community's cultural, spiritual and recreational values need to be acknowledged throughout decision-making processes related to biodiversity offsetting. Community consultation is recommended to inform the proposed biodiversity offset strategy.

Key avoidance by design and impact minimisation measures outlined in the detailed project description appended to the EIS (EMM 2022) and further detailed in the BDAR report includes the selection of pipeline and powerline routes that maximise the use of existing cleared areas and minimise disturbance to intact native vegetation, particularly Box Gum Woodland. In addition, during decommissioning of the existing Dungowan Dam, revegetation works are proposed within the former inundation area including topsoiling and seeding about 59 ha of land with the aim of restoring native woodland and forest.

The TIA, appended to EIS (EMM 2022) found where construction hours occur in darker evening or night-time periods, there will be a need for task lighting. The lighting direction will be towards the ground below the horizontal plane. This will mitigate upward light spill, which can contribute to artificial skyglow. The lighting associated with the construction of the pipeline would be absorbed in the glow of normal urban lighting emanating from towns such as Tamworth. During operation, minimal to negligible lighting is expected as the majority of the pipeline infrastructure is buried and at or above ground infrastructure is not expected to require lighting except for safety lighting during maintenance activities.

Recreational dam access was a benefit opportunity identified by the community:

> *"We would like this Dam to be a recreational dam and would like to have access to it, we are into kayaking and would like to take advantage of having a body of water accessible for recreational use."*
>
> *"There would be a benefit to us if this were to be a recreational dam because our family would enjoy being able to access water for aqua activities."*

This assessment acknowledges that recreational access for the public is not currently within the scope of the project, and that there is no public access to the existing Dungowan Dam. For WaterNSW operational purposes including safety and security, as well as due to stringent requirements placed by NSW Health on water supply, it will be difficult to provide public and/or recreational access to the new Dungowan Dam.

However due to recreational access being identified by the community as a beneficial opportunity and the SEARs requirement to "Assesses the existing recreational opportunities associated with the site, how these will be impacted by the project, and any proposed design measures to improve the recreational amenity of the site", this assessment supports a recommendation that recreational access to the land around the new Dungowan Dam should be reconsidered within the scope and benefits of the project, though it is understood that access to water-based recreation won't be feasible due to the need to maintain water quality.

There is a potential tourism opportunity that will likely exist after the new Dungowan Dam is operational around bushwalking and viewing areas. Given that tourism is highly significant to the region (Section 7.7.3), this may be an opportunity to offer additional social and economic benefits for the community with limited cost to the project, though future operation and management of any recreational facilities offerings is a key consideration.

Providing recreational access to views of the new Dungowan Dam, or to the land around the dam may also mitigate resident's negative experiences of changes in the landscape and natural environment by providing new place to establish connectedness. Recreational access may also enhance public perceptions surrounding the project and its impacts to residents' sense of place.

If it is determined that recreational opportunities may be provided on site, it is recommended that a further targeted social needs analysis be completed in collaboration with Tamworth Regional Council and WaterNSW with the intent of understanding:

- The scope of what opportunities the site may offer, including opportunities for transition of facilities and materials.
- Community needs for recreational opportunities in the local and regional area, based on engagement and strategic direction.
- Comparative analysis of recreational opportunities previously provided at other dams, and their usage, benefits and risks.
- Options feasibility analysis, including potential economic and social benefits for the local area and region.

It is also recommended that onsite amenities provided for workers, such as bathrooms and potentially exercise equipment or barbecue areas, be planned as permanent infrastructure to be repurposed for recreational use should this land use be adopted.

The SOHI (EMM 2022) outlines that an archival record in the form of digital photography will be prepared to capture the pre-inundation and pre-construction state of the landscape. This assessment supports these recommendations to mitigate the impacts to the community regarding changes to landscape and surroundings.

As outlined in the SWA (EMM 2022), a Soil and Water Management Plan (SWMP) will be developed for the project prior to the commencement of construction as well as Erosion and Sediment Control Plans (ESCPs) to mitigate impacts to disturbed areas. This assessment supports the implementation of these management plans, which will also serve to mitigate potential impacts to the visual appearance of water bodies.

It is also proposed that, even though the project design life is 100 years, the direct impacts of decommissioning should be considered, and where possible, mitigations for future impacts should be built into the project scope. This should be considered with respect to materials used and deconstruction processes, and should be well informed given the planned decommissioning of the existing Dungowan Dam.

Mitigated, the impact of loss and changes to the cultural and natural landscape affecting sense of place is assessed as **low** with likelihood being **possible** and magnitude being **minimal.**

Mitigated, project construction and operation impacting upon native flora and fauna (through inundation or changes to water flows) is assessed as **high** with likelihood being **likely** and magnitude being **moderate.**

Mitigated, changes to views and vistas due to introduction and removal of old infrastructure (dam, powerlines) and associated construction and demolition works is assessed as **low** with likelihood being **likely** and magnitude being **minimal.**

Mitigated, changes to views and vistas due to inundation of new dam is assessed as **medium** with likelihood being **almost certain** and magnitude being **minor.**

Mitigated, visual impacts to the Siding Spring Observatory from project construction and operation is assessed as **low** as the likelihood of the impact is **unlikely** and the magnitude is **minor**.

Mitigated, the risk of erosion and sedimentation impacting on surroundings, especially on aesthetic natural value and visual appearance of water bodies is assessed as **low** with likelihood being **likely** and magnitude being **minimal.**

A summary of the assessment of surroundings impacts is presented in Table 7.13.

Table 7.13 Summary of surroundings impacts related to changes to the landscape

Social impact	Matter	Affected parties	Duration	Extent	Unmitigated	Mitigated
Surroundings	Loss of and changes to existing cultural and natural landscape may impact on sense of place.	Local residents, local community, Aboriginal people	Construction and operation	Local and regional area	Medium	Low
Surroundings	Project construction and operation may impact native flora and fauna. (through inundation or changes to water flows)		Construction and operation	Project area, local area and regional area	High	High
Surroundings	Changes to views and vistas due to introduction and removal of old infrastructure (dam, powerlines) and associated construction and demolition works	Local community and Aboriginal people, Regional visitors.	Construction and operation	Local area	Low	Low

Table 7.13 Summary of surroundings impacts related to changes to the landscape

Social impact	Matter	Affected parties	Duration	Extent	Unmitigated	Mitigated
Surroundings	Changes to views and vistas due to inundation of new dam	Local community and Aboriginal people, regional visitors.	Operation	Local area	Medium	Medium
Surroundings	Impact on sky visibility for the Siding Spring Observatory (Dark Sky Planning Guideline).	Visitors to the Siding Spring Observatory	Construction and operation	Regional area	Low	Low
Surroundings	Risk of erosion and sedimentation impacting on changes to surroundings, especially on aesthetic natural value and visual appearance of water bodies.	Land owners, local community, Dam operator and water services provider. Regional visitors.	Construction and operation	Project area	Medium	Low

7.6.3 Unmitigated – Surroundings impacts related to the effect of invasive species on ecological communities and farming

Weeds and invasive species can cause serious economic, environmental and social problems. They can impact native ecosystems and adversely affect native flora and fauna. During consultation a number of participants expressed biosecurity concerns around the potential impact of invasive species on ecological and farming communities, including landholders along the pipeline, around the new Dungowan Dam and in the local area. Concerns were raised by a few landholders about the biosecurity risks and the impact invasive weeds potentially brought in via construction machinery and worker vehicles may pose on their land. Some concerns were raised about how the introduction of weeds or invasive species during construction could impact the integrity of their crops and disrupt their agricultural activities. Others raised questions about the potential amenity and environmental impacts due to the spread of weeds and the impacts to native flora and fauna. There is a potential for invasive species to impact ecological and farming communities.

Impacts weeds may impose include physical barriers due to mass, thorns or prickles, disruption or competition to crops and harvesting, introduction of poisonous or indigestible materials for livestock and native animals, competition for native flora, and the ability to host and transfer pests and diseases to crops and native plants.

The EIS has assessed the biosecurity concerns due to the vegetation removal and disposal on the natural environment. The biodiversity values of the study area are described in the BDAR (EMM 2022). Management of the invasive species impacts is described in Chapter 7of the EIS.

The significance of this concern is further supported by the strategic directions and recommendations outlined in the State Infrastructure Strategy 2022–2042 to protect our natural endowments and implement a strategic and practical approach to managing biodiversity (Infrastructure NSW 2022). Additionally, the Tamworth Regional Blueprint 100, with the strategic focus of protecting the natural environment and ensure the planning and operational processes for Tamworth, considers the impacts to biosecurity and the natural environment (Tamworth Regional Council 2022b)

The BDAR (EMM 2022) identified that an indirect impact of the project may include edge effects whereby environmental conditions along the edges of habitat fragments can promote the growth of different plant species (including weeds), supress the growth of other plant species, promote invasion by animals (native and introduced) that specialise in edge habitats, or change the behaviour of resident animals. The BDAR concluded that:

As habitat in these areas is already significantly influenced by existing edge effects and the impacts of grazing activities, the project is unlikely to significantly increase edge effects on vegetation and habitats remaining in these areas post construction.

Some parts of the dam construction and inundation areas would however impact on habitat that is not currently subject to substantial edge effects. In these areas, construction of the project has the potential to disperse weeds species into areas where they do not currently occur.

The most likely causes of weed dispersal associated with the activity would include earthworks, movement of soil and attachment of seed (and other propagules) to vehicles and machinery.

These changes, and the presence of adjacent disturbed land, may result in minor degradation of native vegetation through weed invasion, changes to native plant species composition and diversity and habitat suitability for animal species.

The Land Use and Property Assessment, appended to the EIS (Tremain Ivey 2022) identified biosecurity risks during the construction and operation phase. The potential biosecurity risks during construction include:

- weeds that could be introduced or spread at the pipeline construction footprint and the powerline easement. A biosecurity breach of this nature is likely to increase costs and decrease income of agricultural properties in the vicinity of the project. Depending on the biosecurity matter, impacts on both costs and income could be short term to longer term (more than five years);
- potential carriers of weed seeds and plant material include vehicles, machinery and personnel (clothing and footwear). Biosecurity matter could also be spread by soil and water movements directly associated with construction works;
- potential impacts of a biosecurity incident on agricultural businesses include increased costs associated with monitoring pests, weeds or diseases and implementing control measures; and reduced income caused by reduced livestock, crop or pasture production and lower produce quality,
- weeds such as parthenium weed, fireweed, some cactuses, spiny burr grass, khaki weed, giant Parramatta grass and Bathurst burr are readily spread by vehicle, machinery and human activity, and
- the risk of diseases or pests being introduced or spread during the construction phase of the project is very low for the major land uses in the area (grazing and cropping).

The Waste Management Assessment (Waste) (EMM 2022) identified the need for disposal of weed infested vegetation. Based on the project vegetation mapping it is estimated that approximately 1,100 tonnes of weed infested vegetation would require treatment.

The TIA (EMM 2022), identifies that where the pipeline route traverses private property, there will be a range of potential rural property access impacts to be considered including increased ground disturbance and potential spreading of weeds by contractor vehicles moving along the Dungowan pipeline route.

Matters dealt with in other sections of this report that were considered in assessing impacts related to the effect of invasive species on ecological communities and farming include:

- Biosecurity concerns for weeds and invasive plant species being spread on farming land through construction machinery and worker vehicles. (See Livelihood 7.71)
- Amenity and environmental impacts due to spread of weeds and impacts to native flora and fauna, only as they result from introduction of invasive species (See Surroundings 7.6.1)

There are several potential impacts to amenity and environmental impacts due to spread of weeds. However, the magnitude of the impact is constrained due to the relatively small amount of land temporarily and permanently removed from productive land use, the limited duration of pipeline and powerline construction activities on individual paddocks, lack of current commercial land use near the new Dungowan Dam and low pest and disease biosecurity risks associated with the project and is therefore assessed to be **medium** risk.

Without any social mitigation measures, amenity and environmental impacts due to spread of weeds and impacts to native flora and fauna as they concern farming and ecological communities is assessed as **medium** with likelihood being **possible** and magnitude being **moderate.**

Unmitigated, biosecurity risks of weeds and invasive plant species being spread on farming land through construction machinery and worker vehicles is assessed as **high** with likelihood being **likely** and magnitude being **moderate.**

7.6.4 Mitigated – Surroundings impacted related to the effect of invasive species on ecological communities and farming

As part of the CEMP for the project, a Biosecurity Management Plan (BMP), a Contaminated Land Management Plan (CLMP), a Construction Soil and Water Management Plan (CSWMP) and Operational Environmental Management Plan (OEMP) have been recommended to manage contamination during the construction and operation of the project. The CEMP will document the measures to avoid and minimise direct and indirect impacts to ecological and farming communities and reduce the risk of off-site transport or spread of disease, pests or weeds. (Land Use and Property Assessment, Section 9, EMM 2022). Landowners will also play an important role in preventing weeds from spreading and will be consulted regarding farm biosecurity requirements in relation to all plant and equipment that will enter their property.

The BDAR (EMM 2022) in Section 7.7.5 outlines multiple controls to be implemented to prevent the introduction and/or spread of weeds, or plant pathogens. The BDAR report specifies that:

- a weed control protocol would be developed as part of the Biodiversity Management Plan. This would aim to stop the spread of environmental weeds, particularly those listed as High Threat Weeds;
- undertaking of weed control in key areas prior to construction works, with active and intensive weed control being undertaken within 50 m of the disturbance footprint and in areas where significant weeds are known to occur;
- vehicles, machinery and equipment must be clear of soil and plant debris when they arrive on site and prior to movement between sites;
- wash-down stations will be constructed;
- a weed and pathogen monitoring program will be implemented; and
- revegetation of cleared areas will occur as quickly as possible following construction works in an area.

As outlined in the ESD Pathway report (Edge Consulting 2022b) appended to the EIS, the ESD principles should be incorporated into the design, construction, and operation phases of the project. Applying the precautionary principle and sustainability initiatives to improve Government efficiency in use of water, energy and transport is also recommended as part of the project mitigation measure. Moreover, the Tamworth Regional Council's Community Plan (2022b) identified a key priority area in minimising and mitigating impacts on biosecurity and on the natural environment.

The TIA (EMM 2022) appended to the EIS proposes access agreements; which are to be negotiated with rural property landowners impacted by the Dungowan pipeline construction activity; will detail any restrictions to access (ie along tracks, across paddocks etc) and the details of these agreements will be included in the Construction Traffic Management Plan (CTMP) and further management plan documentation.

Mitigated, amenity and environmental impacts due to spread of weeds and impacts to native flora and fauna as they concern farming and ecological communities is assessed as **low** with likelihood being **possible** and magnitude being **minor.**

Mitigated, biosecurity risks of weeds and invasive plant species being spread on farming land through construction machinery and worker vehicles is assessed as **low** with likelihood being **unlikely** and magnitude being **minor.** A summary of the assessment is presented in Table 7.14.

Table 7.14 Summary of surroundings impacts related to the effect of invasive species on ecological communities and farming

Social impact	Matter	Affected parties	Duration	Extent	Unmitigated	Mitigated
Surroundings	Amenity and environmental impacts due to spread of weeds. Impacts to Native Flora and Fauna	Local landholders along the pipeline and around the dam site local and regional area	Construction only as they result from introduction of invasive species	Within the project footprint Broader regional community	Medium	Low
Livehood	Biosecurity concerns for weeds and invasive plant species being spread on agricultural land through construction machinery and worker vehicle	Local landholders along the pipeline and around the dam site local and regional area	Construction and Operation	Within the project footprint Broader regional community	High	Low

7.6.5 Unmitigated – Surroundings impacts related to project generation and handling of waste and related environmental, amenity and public health impacts.

There is the potential for rubbish and waste to impact the amenity of the project footprint, particularly in the form of visual and olfactory amenity impacts. In particular, visual and odour impacts could be generated due to waste generation from the construction workforce through the use of portable toilets and food waste. Solid waste from construction and excavations works and demolition of the old dam will be generated.

The Waste Management Assessment (Waste), appended to the EIS (EMM 2022), identifies the following key waste generating activities:

- spoil from excavations at the spillway, embankment, decommissioning the existing dam, site establishment and road upgrades;
- wastewater from concrete and grouting works, greywater and sewage at construction ancillary facilities;
- concrete and other solid waste from dam decommissioning; vegetation clearance within the reservoir area and for site establishment; and
- food waste at the accommodation camp and ancillary facilities.

The Waste report identifies that should waste be improperly managed, risks include possible contamination of construction areas or surrounding areas, which may include landholder property. Uncontrolled storage or disposal of excavated spoil may also contaminate soil and water runoff, ultimately impacting on the water quality of Dungowan Creek. Though the report identified this as unlikely as the project is already required to demonstrate legislative compliance and to implement mitigations to prevent this.

Food waste would be generated by the construction workforce working at most of the construction areas, including along the alignment of the pipeline and new and existing roads to be upgraded. The Waste report noted that if incorrectly stored or dumped, unmanaged food waste could result in pests and vermin at each construction area. This would not only present hazards to human and environmental health but also create negative amenity impacts to surrounding residents, landholders and farmers.

Sewage and black water waste will need to be managed as per local regulations from Tamworth Regional Council.

Unmitigated, the risk of poor management of garbage and sewage waste onsite and its potential to impact the landscape and local environment is assessed having a **medium** impact, with a **possible** likelihood level and a magnitude as **moderate**.

Unmitigated, health impacts due to potential vermin and pest infestations arising from incorrect waste disposal are assessed as **Low,** with the impact having **possible** likelihood yet a **minor** magnitude rating.

7.6.6 Mitigated – Surroundings impacts related to project generation and handling of waste and related environmental, amenity and public health impacts.

A Construction Waste Management Plan (CWMP) will be prepared in accordance with the relevant regulations, which will aim to prevent, avoid and recycle waste. The CWMP will outline how the project would address the volume and type of waste streams to be generated and the correct classification method, storage and treatment facilities at each construction area. To mitigate negative community perceptions and to ensure community concerns are addressed, the CWMP should be clearly communicated to the community to inform them of the exact onsite waste management plans and the grievance mechanisms they can access should they encounter any concerns. Construction soils, demolition materials (concrete, steel) etc will be segregated into recyclables and reusable products and the rest sent to registered landfill.

The CWMP aligns with the ESD Pathway report (Edge Environment 2022b) recommendations, appended to the EIS, for sustainable initiatives for improving Government efficiency in waste. This plan will both ensure that waste is correctly disposed of and managed to avoid pollution and increase community awareness about the waste management practices of the project. Adherence to the waste management plan would also contribute to positive community perception of the project.

Mitigated, the risk of poor management of garbage and sewage waste onsite and its potential to impact the landscape and local environment this impact is assessed as **Low**, with the impact deemed to be **unlikely** and of **minimal** consequence.

Mitigated, with surrounding mitigation measures are implemented the potential vermin and pest infestations arising from incorrect waste disposal remained assessed as **Low**, with a likelihood reduction of unlikely with **minor** consequences. It is **unlikely** that impacts from ineffective waste management will occur as these will be included in the project's conditions of approval. A summary of the assessment is presented in Table 7.15.

Table 7.15 Summary of surroundings impacts related to project generation and handling of waste and related environmental, amenity and public health impacts

Social impact	Matter	Affected parties	Duration	Extent	Unmitigated	Mitigated
Surroundings	Risk of poor management of garbage and sewage waste onsite and its potential to impact the landscape and local environment.	Local residents and landholders. Regional visitors	Construction	Project area and local area	Medium	Low
Surroundings	Health impacts due to potential vermin and pest infestations arising from incorrect waste disposal	Local residents and landholders. Regional visitors	Construction	Project area and local area	Low	Low

7.7 Livelihood impacts

This section provides a detailed assessment, unmitigated/mitigated and unenhanced/enhanced, of the livelihood impacts and the matters that significantly impact livelihood as a consequence of the project. The matters assessed are:

- livelihood impacts related to construction and operation impacts on agricultural activity and productivity;
- livelihood benefits related to growth and economic development, and
- livelihood benefits related to local employment opportunities.

7.7.1 Unmitigated – Livelihood impacts related to construction and operation impacts on agricultural activity and productivity

Construction of the project may impede or directly impact farm operation, including property access, livestock movement, livestock loss through misadventure, biosecurity and the ability to use land over the buried pipeline. Construction of the pipeline may also cause short term disruption to grazing, crop and pasture damage, impact crop planning, land disturbance and soil compaction and/or subsidence and erosion, as well as there is a potential loss of prime agricultural land, and thus loss of productivity.

Landowners consulted were concerned over potential loss of prime agricultural land and productivity, disturbance of land impacting the integrity of crops and the loss of crops if not given advance warning to re-plant. Participants of the 2020 community survey rated disruption during construction (43%), permanent loss of agricultural land (36%), biosecurity risks (31%) and reduced long term productivity (30%) as very negative or negative impacts of the project.

During the Dungowan pipeline construction, a 20 m wide construction corridor for the pipeline will be temporarily taken out of production. Potential impacts include reduced soil stability and increased susceptibility to erosion, loss or degradation of topsoil, risk of exposing buried contaminants and introduction of contaminants into soil material.

Research shows that buried pipeline installation can impact on soil structure and crop root decomposition (Ebrahimi et al 2022). Soil disturbance on agricultural land through such activity contributes to the degradation of soil quality and crop yield loss (Ebrahimi et al 2022). This primarily occurs through increased vehicle traffic intensity and pipeline trenching, which results in soil compaction and the mixing of topsoil with subsoil (Ebrahimi et al 2022). In addition, Shaheb et al (2021, p.417) found that "high gross weight vehicles/machinery traffic damages soil structure and soil environment that are critical for sustainable crop production".

The Land Use Assessment (LUA) (Tremain Ivey 2022), appended to the EIS (EMM 2022) found that livestock grazing and cropping together comprise about 87% of the pipeline footprint with the majority being used for grazing livestock. The operational footprint of the new Dungowan Dam has been purchased by Tamworth Regional Council and is not currently used for agriculture or any other commercial activity. Approximately 63 per cent of the operational footprint was previously used for agriculture.

The LUA also found the average period of temporary loss across the pipeline construction footprint is estimated at three months. Areas along the pipeline subject to intensive soil disturbance will take longer to recover than peripheral areas, as these will generally need to be rehabilitated to reinstate pastures or crops to former productivity. Depending on the time of year and seasonal conditions this may take up to 12 months or more.

Construction activities may result in an increased risk of livestock misadventure due to hazards such as open excavations causing injuries, livestock escaping from gates being left open and greater traffic along public roads increasing the risk of collisions (TIA, EMM 2022, p.47). Impacts of weeds and invasive plant species being spread on farming land through construction machinery and worker vehicles is addressed in Section 7.6.3.

During operation, the permanent loss of land for agricultural use is 158.02 hectares (ha), of which 145 ha would be inundated by the reservoir. The remainder will be the land used for pipeline infrastructure and ancillary works. The land which encompasses the remaining operational footprint is not currently used for agriculture or any other commercial activity. Biosecurity risks during operation are similar to those during construction, however the magnitude of risk will be much lower (LUA, EMM 2022, p.54). Restricted movement, disruption to grazing and soil disturbance during operation will be negligible (LUA ,EMM 2022, p.55), especially as the pipeline will be buried.

The total area of the operational footprint is 158.02 ha, of which the 145 ha inundation area represents 0.025 per cent of the total area of agricultural holdings in the Tamworth region. The Land, Soils and Erosion (LSE) report appended to the EIS (EMM 2022) found there will be no agricultural land productivity impacts upstream of the dam embankment, due to the lack of existing farmland in this area. The LSE also found that the land and soil capability of agricultural lands along the pipeline and powerline easement are unlikely to change from their current capability, provided appropriate management and mitigation measures are implemented.

The estimated total gross annual value of agricultural production for the Tamworth Region in 2015-16 averaged at $391 per hectare across the total area of agricultural holdings but varied for different enterprises from grazing production (approximately $369 per hectare) to hay and silage production (approximately $1,530 per hectare) (LUA, Tremain Ivey, 2022). On this basis, average gross annual value across the different land uses on the operational footprint is estimated at approximately $175 per hectare per year. Therefore, the potential permanent loss of gross loss of production value due to the loss of crop and pasture land is estimated at approximately $27,654 per annum (158.02 hectares x $175 per hectare per annum). This represents only 0.01 per cent of the gross value of agricultural production for the Tamworth Region.

Unmitigated, impacts to agricultural activity and productivity from project construction is assessed as **high** as the likelihood of the impact **is likely** and there is the potential for **moderate** consequences. During operation, impacts to agricultural activity and productivity is assessed as **medium**.

Unmitigated, the impact from the disruption to the ability to use land over the buried pipeline is assessed as medium with the likelihood being **likely** and the magnitude **of risk being minor**.

This impact has been assessed at a regional and local level for the potential loss of prime agricultural land, and thus loss of productivity is assessed as **medium** however, mitigation measures are proposed below to deal with this on a property by property basis with the likelihood being **likely** and the magnitude of the risk being **minor.**

7.7.2 Mitigated – Livelihood impacts related to construction and operation impacts on agricultural activity and productivity

The Land Use Assessment (LUA) (Tremain Ivey 2022) appended to the EIS (EMM 2022) recommends the following mitigations including frequent communication with affected landowners is necessary to prepare landowners for the potential impacts of pipeline construction. Landowners will be consulted when temporary, short-term changes to access to their property will occur. This will include advanced notification of relevant project schedules. A Land Use Management Plan will be implemented to support future project activities, and areas of key concern for farmers addressed by suitable preventative access procedures.

The LUA anticipates that when mitigated, the potential impacts of the project on land use will be relatively low, as:

- the proportion of land temporarily and permanently removed from productive land use is relativity small;
- the duration of pipeline and powerline construction activities on individual paddocks is short;
- there is a lack of current commercial land use near the new Dungowan Dam wall and in the inundation area; and
- mitigation measures that would be implemented to reduce the impacts of the project on land use would be effective.

Access agreements are to be negotiated with rural property landowners impacted by the pipeline construction. These agreements will detail any restrictions to access. It is imperative that gate and property access procedures are adhered to, to reduce the potential for unplanned migration of livestock. Fencing should be checked and repaired regularly.

The Land, Soils and Erosion Assessment (LSE) appended to the EIS (EMM, 2022) identified biosecurity management plans should be developed and controls implemented during construction to minimise biosecurity risks. A rehabilitation plan would be prepared to enable disturbed areas to be stabilised and appropriately rehabilitated as soon as feasible and reasonable following the completion of construction activities. This will be carried out in consultation with the relevant landholders.

Erosion and Sediment Control Plans (ESCPs) will be developed for all disturbed areas. A Construction Soil and Water Management Plan (CSWMP) will be prepared and implemented as part of the Construction Environmental Management Plan (CEMP). Research demonstrates that prevention of soil compaction is far better than correcting compaction problem after it occurs (Shaheb, et al 2021, p.430). Mitigation such as reducing tire inflation pressure has shown a positive effect on maintaining soil porosity and increased crop growth and yield (Shaheb, et al 2021, p.430), as well as reducing the weight of machinery/axle/wheel load (Shaheb, et al 2021, p.432).

The pipeline trench would typically be 1.35 m wide and up to 2.2 m deep. Where the pipeline is placed in a shallow depth, the land cannot be used for cropping. With prior agreement with the landowner, the option to bury the pipeline deeper where it crosses land used for cropping will impact the pipeline in some locations. A further mitigation is negotiation of compensation through Access Agreements (proportional to loss).

Mitigated impacts over the potential loss of prime agricultural land, and thus loss of productivity is assessed as **low** as agricultural productivity at a regional scale will be small due to the above factors with the likelihood being **unlikely** and the magnitude of the risk being **minimal**.

Mitigated, the impact from the disruption to the ability to use land over the buried pipeline is assessed as **medium** with the likelihood being **likely** and the magnitude of risk being **minor.**

Mitigated, impacts to agricultural activity and productivity from project construction is assessed **as low** as the likelihood of the impacts is **unlikely** and there is the potential for **minor** consequences. During operation, impacts to agricultural activity and productivity is assessed as l**ow**. A summary of the assessment is presented in Table 7.16.

Table 7.16 Summary of livelihood impacts related to construction and operation impacts on agricultural activity and productivity

Social impact	Matter	Affected parties	Duration	Extent	Unmitigated	Mitigated
Livelihood	Impacts on agricultural activity and productivity	Landowners along the pipeline	Construction and operation	Study area	High	Low
Livelihood	Impact from the disruption to the ability to use land over the buried pipeline	Landowners along the pipeline	Construction and operation	Study area	Medium	Medium
Livelihood	Concern over the potential loss of prime agricultural land, and thus loss of productivity	Landowners along the pipeline	Construction and operation	Study area	Medium	Low

7.7.3 Unenhanced – Livelihood benefits related to growth and economic development

Construction of the project is estimated to take up to six years to complete. The community identified that the project is anticipated to have the following growth and economic development benefits:

- Opportunities for business in the local area and regional area such as procurement of local goods and services.
- Support the local tourism industry.
- An increased population suggests the potential for an increased demand for local business and services and the flow on affects could include the creation of more jobs and opportunities.

The construction phase of the project will generate demand for a range of goods and services within and outside of the regional area, increasing opportunities for local businesses and therefore have a positive impact on businesses and livelihoods. The operational phase will generate demand for a range of maintenance related services.

During in-depth interviews with landholders and businesses and service providers they highlighted the opportunities for local businesses and tourism operators for the local area and regional area. SIA participants identified potential indirect flow on benefits such as;

The employment of external construction workforce is seen as positive by the local community as this will bolster the local economy as an increased population means the creation of more jobs and opportunities for the community bringing more wealth to town.

The loss of the country music festival was a massive hit, so seeing construction workforce come in would really benefit local businesses.

We plan to open a new business and we would benefit from additional income for tourism.

The flow on benefit to the local and regional area, means more employment opportunities, and people bring new families into the Tamworth and thus more demand for their service.

Increased population means the creation of more jobs and opportunities for the community bringing more wealth to town.

Consultation with the local Indigenous stakeholders illustrated that flow on effects may also bring tourism opportunities to the regional area. It is anticipated the project will bring increased support to local business and services.

Ongoing local employment creates a variety of local benefits, including continued provision of income for local workers, recirculation of a greater share per dollar into the local economy due to local supply chains and investment in local employees (Civic Economics 2012, 2013), and improved community well-being and resilience (Adams 2018). The Local Effects Analysis (LEA) (Marsden Jacobs 2022) appended to the EIS found the project is expected to increase employment opportunities in the region and is estimated to make up to the following annual contributions to the regional economy over the approximately six year construction period:

- $263 million in annual direct and indirect regional output or business turnover;
- $94 million in annual direct and indirect regional value-added; and
- 922 direct and indirect local jobs.

Economic benefits arising from the project include economic growth for the regional and NSW economy, with results indicating that over 80% of the project benefits will be through job creation of direct and indirect local employment and value added will be delivered to the Tamworth economy (Marsden Jacobs 2022).

As identified in Section 5.9, there are 5,702 registered businesses in the regional area, of those 975 (17.1%) are in the construction industry. This suggests there is potential for the project to create local benefits by engaging local contractors and suppliers to service the project. However, the potential for the realisation of this benefit, both directly to local businesses and services and from flow-on economic benefits and provision of additional jobs, is reduced if contractors and suppliers do not possess the capability and capacity to service the project. Additionally, without adequate provision of information and resources to allow interested local businesses to engage in the project, local businesses will not be able to capitalise on the potential socioeconomic benefits of the project.

Tourism is an important industry to the local and regional area and generates significant local visitors and economic activity to the region. Tamworth Regional Council's Blueprint 100 - Our Community Plan (Tamworth Regional Council, 2022b) outlines tourism as one of the nine key focus areas to support businesses and jobs across our existing industries, provide a sound economic base for business to grow and attract new businesses to the region that add value and complement our existing businesses (Tamworth Regional Council 2022b). Tamworth is currently recognized as a strong regional tourism destination, attracting significant numbers of visitors each year. The range of arts and cultural events within the SIA study area (see Section 6.1and Section 5.9.3) is likely reflective of the tourism industry in Tamworth and regional recreation opportunities may be a social benefit for the project construction workforce. Water security may have flow-on effects for enabling more resilience to drought, and as such, support events and tourism.

Unenhanced, the benefit related to growth and economic development from engaging local goods and services to service the project and the flow on effects is assessed as **high** with likelihood being **almost certain** as Water Infrastructure NSW (the proponent) has committed to engage with local contractors, local business and local suppliers to help with development of the new Dungowan Dam and also engage local businesses and services. As such, without enhancement measures in place, the positive consequence is anticipated to be **moderate.**

7.7.4 Enhanced – Livelihood benefits related to growth and economic development

Water Infrastructure NSW (the proponent) has genuine intention to establish positive, long-term connections with the local community, which has been demonstrated in commitments outlined throughout the EIS and community engagement undertaken to date, which will continue throughout the subsequent stages of the project.

There are also many opportunities for local businesses and service providers to engage with the project providing goods and services to those major contractors such as project materials, equipment hire, accommodation, cleaning, catering, waste management and office supplies. To enhance the local and regional benefits, the proponent has committed to engage with local businesses and suppliers to develop and deliver the proposed project (DPE 2022b). Currently local contractors, local businesses and suppliers are encouraged to register their expression of interest registration through the DPE website (DPE 2022b). It is anticipated that the local business register will be provided to the construction contractor(s). This list of local businesses and suppliers aims to maximise local business and employment opportunities as part of the tender process

The proponent has also created a partnership with Tamworth Business Chamber to enhance and identify opportunities for local businesses and provide regular updates and information sessions for members. Implementation of these enhancement measures increases opportunities for suppliers to gain economic benefits from the project.

To enhance livelihood benefits it is recommended WINSW continue to hold business and supplier information sessions in the local and region area to further increase information and awareness about subcontracting to the project to show how local businesses can register. Consideration should be given to how best to reach business owners outside of standard communication processes, as interviews have identified business owners in Tamworth, in particular, come from a diverse range of linguistic and cultural backgrounds.

Providing additional opportunities for businesses who may not have been aware of the registration of interest for the project would enhance the opportunities for suppliers to gain economic benefits from the project. This would have a multiplier effect for economic activity as local businesses contracting or servicing the demand generated by the project will themselves require secondary and support services for their own operation.

It is recommended that the proponent develop a Local Participation Plan. The plan aims to;

- commit to targets for the procurement of local goods and services by WINSW and its contracting partners;
- include an assessment of local contractor capabilities and a detailed analysis of existing local enterprise and the skills/education base of local residents. Where possible project supply and workforce requirements will be matched with existing capabilities in the local community; and
- develop a strategy to enhance identification and implementation of shared value opportunities within the local area.

As the approval of the project is the enhancement measure, the enhanced livelihood benefit is economic development from engaging local goods and service providers to service the project and the flow on effects is assessed as **very high**. Under the assumption WINSW prioritises procurement of local goods and services will increase economic growth and development; the likelihood remains **almost certain** and the magnitude being **major.** A summary of the assessment is presented in Table 7.17.

Table 7.17 Summary of livelihood related to use of goods and services

Social impact	Matter	Affected parties	Duration	Extent	Unenhanced	Enhanced
Livelihood	Related to growth and economic development	Local business Local contractors Local suppliers	Construction and operation	SIA study area	High	Very High

7.7.5 Unenhanced – Livelihood benefits related to increased local employment opportunities

Employment lies at the heart of socioeconomic opportunity. It provides direct economic benefit to individuals and families, including financial security, increased social mobility and access to higher standards of living. Beyond this, it is well established that working is associated with benefits to physical and mental health, social inclusion and improved developmental outcomes for the children of employed persons (Biddle 2013; Gray et al. 2014; WHO 2012).

Construction of the project would take up to six years to complete and will require a workforce of up to 922 direct and indirect fulltime employees (FTE) over the duration of the construction phase. At peak construction, the project will employ an estimated 125 FTE workers. The new Dungowan Dam zoned earthen and rock embankment, structural concrete elements (eg spillway, intake tower, diversion tunnel, outlet works and valve house) and pipeline would have a design life of 100 years whilst other project elements (eg roads, valves, electrical, lighting, communications, etc) would have a design life of approximately 50 years. The operational phase of the project, excluding larger maintenance projects, will employ one to two new full time workers, plus part time work for the existing WaterNSW operations team. The community identified that the project is anticipated to create employment and training opportunities for the local and regional areas.

The recurring theme of local employment and training opportunities is presented strongly across the SIA field study findings. Stakeholders identified that the creation of direct local employment during construction phase means local people will not have to leave the area to find employment elsewhere. The project will enhance livelihood benefits related to access to skill development and increased opportunities for apprenticeship and traineeship prospects, opportunities to improve youth retention, and provide the flow on economic effects in proving more indirect employment opportunities for the local and regional area.

Consultation with a local employment provider in the regional area noted the unemployed labour pool predominantly consisted of unskilled or lower skilled people and indicated they are '*anticipating future employment opportunities that will arise from the project'* and currently planning to *'upskill local people and secure local jobs'* by running a civil construction course in collaboration with the project to start building a skilled workforce for the project. This is supported by data collection in the social baseline (see Section 5.3 and Section 5.4). Youth unemployment is high in the regional area (12.2%) and this may present an opportunity for the project to offer training and apprenticeship opportunities for the unemployed and/or disadvantaged youth in the local and regional areas.

During in-depth interviews, participants consistently identified employment arising from the project as a potential benefit. A number of participants expressed hope that the project would improve youth retention and help to slow the trend of population decline across some communities in the local area ie There is a particularly small proportion of persons aged 15 – 35 years in the local area (17.4%) compared to NSW (26.8%), which is likely attributable to fewer education and work opportunities for young people in rural areas.

Consultation identified strong support for placement of Aboriginal and Torres Strait Islander People in labouring and civil and construction roles, traineeships, and apprenticeships in the region and to secure equal-opportunity employment outcomes for the local and regional community, in particular for Aboriginal people and youth. The project could improve youth unemployment in the local area by providing employment pathways for skilled careers as well as offer additional career pathway opportunities. Studies show that ongoing local employment creates a multitude of local benefits, including continued provision of income for local workers, recirculation of a greater share per dollar into the local economy due to local supply chains and investment in local employees (Civic Economics 2012, 2013), and improved community well-being and resilience (Adams 2018).

The Local Effects Analysis (Marsden Jacob 2022) appended to the EIS (EMM 2022) demonstrates the project will provide increased **employment opportunities** creating 922 direct and indirect jobs, both through the employment of local workers and employment of external construction workforce to bolster the local economy

Given the characteristics of the local and regional labour pool, opportunities for local workforce recruitment may include trade workers, construction labourers, ground maintenance, road maintenance, and road safety personnel. It is anticipated sourcing workers locally will likely have a significant economic and social benefit for the local community and across the region both directly and indirectly. Potential construction contractors have made a commitment to the NSW Government to employ local businesses and create jobs for local people including Aboriginal communities. (DPE 2022b).

Unenhanced, the benefit from increased local employment opportunities arising during the construction and operation of the project is assessed at **medium**. The likelihood of livelihood benefits related to increased local employment opportunities is **possible**, with anticipated **minimal** positive consequences as benefits will be realised in the medium to long term and are anticipated to result in benefits to the local economy

7.7.6 Enhanced – Livelihood benefits related to increased local employment opportunities

To maximise enhancement, Water Infrastructure NSW (the proponent) should develop a Construction Workforce Management Plan that commits to best practice in employment and investment in job readiness by Water infrastructure NSW and its contracting partners. The Construction Workforce Management Plan would;

- address the cumulative impacts of other projects in the area including competition for local workforce and contractors, opportunities to transition and or share existing skills local workforce and any barries to collaboration by liaising with Tamworth regional council and other project authorities;
- provide a details strategy for the hiring of local and regional workers in the area, followed by hiring outside of these areas;
- Consult with local employment, apprenticeship and education and training agencies to enhance the potential of hiring of local and regional workers;
- plan upskilling programs to better equip local people to meet the needs of the project's workforce while ensuring the local community experiences lasting benefit from the project; and
- identify potential sources of funding for more skills-based courses in the local area to maximise potential benefits in up-skilling the local workforce and providing targeted employment opportunities for youth.

These commitments to local hiring would also assist to address compounding underlying social factors associated with vulnerabilities within the local area related to a lack of rental housing. SIA field study participants noted that the region has seen a great increase in demand for rental and market properties in the past year, largely as a consequence of the COVID-19 pandemic with an increasing number of people choosing to relocate to less-urban locations. If local rental accommodation was inundated with the additional need to service demand from an increased workforce that was from outside of the region, this would likely increase housing scarcity and further decrease rental affordability. In turn, this would most likely impact residents who are already vulnerable and may

not have the flexibility and resources to find alternative housing (Section 5.4). The project will provide overnight accommodation for about 140 workers in an accommodation camp adjacent to the new Dungowan Dam. The camp would be operational throughout the project construction and would provide facilities for the overnight accommodation of workers.

During stakeholder consultation, a representative advised that there would be benefits associated with establishing partnerships and building through collaboration with education service providers to ensure employment opportunities are guaranteed for the local and regional community and to potentially improve local access to training and apprenticeship opportunities. To enhance benefits arising from education and employment opportunities, Water Infrastructure NSW and/or its construction contractor(s) is encouraged to work with local employment, apprenticeship and education and training agencies to enhance the potential of hiring of local and regional workers.

To further increase the increased local benefits incorporating ESD principles in the design, construction and operation phases of the project via the inter-generational equity. The project team would demonstrate a strong commitment to the provision of community benefit in the form of increased local employment and skills. Companies can create enhanced benefits which contribute to both competitive advantage and strengthened communities through corporate social responsibility (Fordham and Robinson 2018) and 'shared value actions' (Porter and Kramer 2011). Creating shared value overlaps with corporate social responsibility by aligning the ethical and philanthropic nature of corporate social responsibility with an agreed business case (Fordham and Robinson 2018). Creating shared value is an approach to business that emphasises the mutual dependency of the competitiveness of a company and the health of surrounding communities (Shared Value Project 2022). Through the shared value approach, social challenges are solved through business activities themselves.

Enhanced, the benefits related to local employment opportunities remains as **high u**nder the assumption that Water Infrastructure NSW prioritises employment of workers with relevant skills residing within the local area, the likelihood of benefit increases to **likely**. **Minor** positive consequences will arise with the enhanced measures as livelihood benefits in the form of employment may or may not be permanent, with anticipated benefits to both the local and regional economy. A summary of the assessment is provided in Table 7.18.

Table 7.18 Summary of livelihood related to Local workforce and employment opportunities

Social impact	Matter	Affected parties	Duration	Extent	Unmitigated	Mitigated
Livelihood	Local workforce and employment opportunities	Aboriginal and Torres strait Islander People Local and regional people	Construction and Operation over 10 years	Regional area	High - Medium	High

7.8 Decision-making system impacts

7.8.1 Unmitigated – Decision-making systems impacts related to transparency and open communication

This section provides a detailed assessment of the unmitigated/mitigated decision-making impacts and matters that significantly impact decision-making systems as a consequence of the project. The matters assessed are:

- Distrust and lack of faith in the EIS process due to lack of communication with and involvement from local community and not having franchise within decision making systems for the project.

- The following community concerns relating to the cost efficiency of the project, who will pay, whether alternatives have been explored and how decisions about the project will be made, and what interests are being prioritised in decision-making processes:

  "How much will the thing cost? And how is that going to be depreciated (ie: cost of water to cover both supply + depreciation) and how much will that add to water bills? Will the traditional 80:20 split for costing apply - 80% passed on to agriculture and 20% passed on to residential? In general - everything about the economics of this project are unknown to the end users, including Council."

  "The cost has been stated as 1.3 billion dollars. The people of Tamworth don't know who will pay for this. We also don't know who will pay for any cost overruns."

  "I feel that the dam is not cost efficient. The money should be used to upgrade other amenities"

  "Tax payers money spent on a project that is not cost efficient nor an effective way to manage water at the expense of other more worthy"

  "The cost for infrastructure outweighs the small quantity of water Tamworth Regional Council (LGA) expect to receive. This water can be secured in other ways."

  "A key issue is that there are much less expensive ways to secure water, in particular water recycling. We know that water is essential to human life (and not for feed lots and irrigating crops that aren't suitable in our area)."

  "The fact that only some selected extracts from the business case will be made available is not an open and transparent approach"

  "The political context determines where money goes."

  "Perception that the project will go ahead regardless of detailed considerations, because of political impetus."

  "The interests of farmers shouldn't be prioritised above others."

- There is a need for clear direction and transparency around these matters due to the reputational risk for the project and governance.

- De-watering of the existing Dungowan Dam could bare great impact on the local community should the area be in drought and still facing water restrictions.

Extensive community consultation has been undertaken over an extended period, as outlined by the Communications and Stakeholder Engagement Technical Report appended to the EIS (DPE 2022c). However, the community have expressed a desire for more information and transparency on key aspects of the project. The 2022 online community survey demonstrates that individuals within the community expressed concern around project transparency:

"There is a lack of transparency regarding the project."

"We can't throw our full support behind the project until we know the extent of the impacts… we feel that we haven't been fully informed on… [the details]. "

"The fact that only some selected extracts from the business case will be made available is not an open and transparent approach."

A service provider interviewed for the project stated:

> *"The project is not cost efficient nor an effective way to manage water at the expense of other more worthy options. The cost"* of the project *"outweighs the small quantity of water"* the Local Government Area *"expects to receive, and taxpayer funds should be used to upgrade other amenities."* The service provider explained that *"there are much less expensive ways to secure water, in particular, water recycling."*

Indigenous interview participants explained:

> *"Information hasn't permeated to the whole community, including Aboriginal people and people with linguistic barriers. They… need to ensure information is more readily available, such as publishing information in places the community regularly uses."*

Another indigenous participant felt that the project process has been *"Disheartening," as* Indigenous participants are *"treated as underdogs. The project area is my people's Country and we need the freedom to visit and move about without being told how to do that or this."* The perceived lack of transparency has resulted in some community concern around water allocation and lack of certainty regarding how the existing Dungowan Dam will be de-watered. If the water is not redirected to the new pipeline this could bare great impact on the local community should the area be in drought and still facing water restrictions.

The policy and planning context for this project is outlined in Section 4 of this report (and Annexure C). In assessing the policy and planning context, it is clear that the strategies consider the project from various perspectives. The *Staying Ahead, State Infrastructure Strategy 2022- 2042* identifies the project as a risk, *A 20-Year Economic Vision for Regional NSW, 2018–2038* specifies that the project is an investment priority and the *Draft New England North West Regional Plan 2041* identifies the project as an opportunity.

The Draft Namoi Regional Water Strategy (DPE, 2021f) addresses the project as an option and identifies the new Dungowan Dam as an option for maintaining and diversifying the water supply, and notes:

There was mixed views on this option, with some stakeholders supporting it as a way to secure water for towns and economic growth and others objecting. Those who supported this option noted:

- *The potential economic and environmental costs of the project needed to be assessed*
- *More study was required to determine the costs of water for residents and businesses, and to determine whether licensing would be impacted*
- *This is a key component in securing Tamworth and Kootingal's water supply into the future*

Objectors noted:

- *The lack of community consultation and a business case for the project*
- *The substantial expense of the project and the likelihood it would not be cost-effective or financially viable*
- *The dam's potential to negatively impact the environment and First Nations / Aboriginal cultural sites.*

Strategic inconsistency means that while the project acknowledges and seeks to deliver outcomes, which align with all of the above plans, there is a risk that inconsistencies in governance approach will provide an unclear pathway for and desired outcome from the project, adding further risk of detriment to community faith in governance processes.

Unmitigated, impacts relating to lack of transparency and open communication is assessed as **High** as the likelihood is **Almost Certain** and there is potential for **Moderate** consequences relating to community distrust.

7.8.2 Mitigated – Decision-making systems impacts related to transparency and open communication

Residents noted that the distrust could be minimised with greater transparency, open constant and timely communication of plans, transparency from Water Infrastructure NSW (and previously WaterNSW) and clear information being distributed in the community regarding plans and water allocations etc. By increasing trust and engagement there is potential to reduce the community's hesitancy towards engaging meaningfully with decision-making systems. In regard to cost effectiveness, a list of potential options, which may fulfil the goals of the strategy are included in the 20-Year Economic Vision for Regional NSW 2018–2038 (NSW Government, updated 2021) includes the Dungowan Dam project, stating that the project would improve water security for Tamworth, particularly in the light of climate change, climate variability, and growing population.

In regards to dewatering and water allocation, Tamworth Regional Council's Drought Management Plan (2016a) describes the triggers and responses for each level of water restriction within Tamworth. During construction of the new Dungowan Dam, a temporary bypass pipeline would be established through the construction area by way of the diversion tunnel to ensure continued supply of water to downstream consumers from the existing Dungowan Dam until it is decommissioned and transferred to the new pipeline. Furthermore, the water from the existing dam would be captured by the new dam once constructed, so would not be lost and therefore would not exacerbate any impacts during a drought.

Mitigated, decision-making systems related to transparency and open communication is assessed as **medium** with likelihood being **likely** and magnitude being **minor**.

A summary of the assessment is provided in Table 7.19.

Table 7.19 Summary of decision-making system impacts related to transparency and open communication

Social impact	Matter	Affected parties	Duration	Extent	Unmitigated	Mitigated
Decision making systems	Lack of transparency	Residents of the local and regional area	Construction and operation – life of the project	Study area	High (negative)	Medium (negative)

7.9 Cumulative impacts

7.9.1 Recent development in the local and regional area

Water Infrastructure NSW are currently completing work on replacement of the existing 70 year old pipeline between Dungowan Showground and Calala Water Treatment Plant. The New Dungowan Dam and Pipeline Project update newsletter (Water Infrastructure NSW, July 2022) provides information on this separate project, and identifies that the first pipe for this project was laid in March, and that street works in Calala were almost finished at the time of publication. The newsletter also identifies the concurrent projects' impacts on short term traffic delays in Calala and identifies project engagement with landholders, collaboration with local education service providers, landholders and construction contractors. Overall, this approved project provides good examples of existing approaches to achieving improved social outcomes, and demonstrate that the proponent's project impact mitigations in the regional area align with mitigations proposed by this report and the EIS for this project.

In 2020 in response to extreme drought conditions in Tamworth, a new pipeline was constructed from the existing Chaffey Dam to a connection point with the existing Dungowan Dam pipeline at Back Woolomin Road in Dungowan. This pipeline enabled water to be delivered from Chaffey Dam directly to the Calala WTP, via the existing Dungowan Dam pipeline and only operated when water levels in Chaffey Dam were less than 20 percent. The emergency authorisation for the operation of the pipeline has expired and an EIS is currently being prepared by WaterNSW to facilitate future operation during drought conditions. The Chaffey Dam Pipeline Project is the only project which will occur within the local area.

7.9.2 Reasonably Foreseeable Development in the local area and regional area

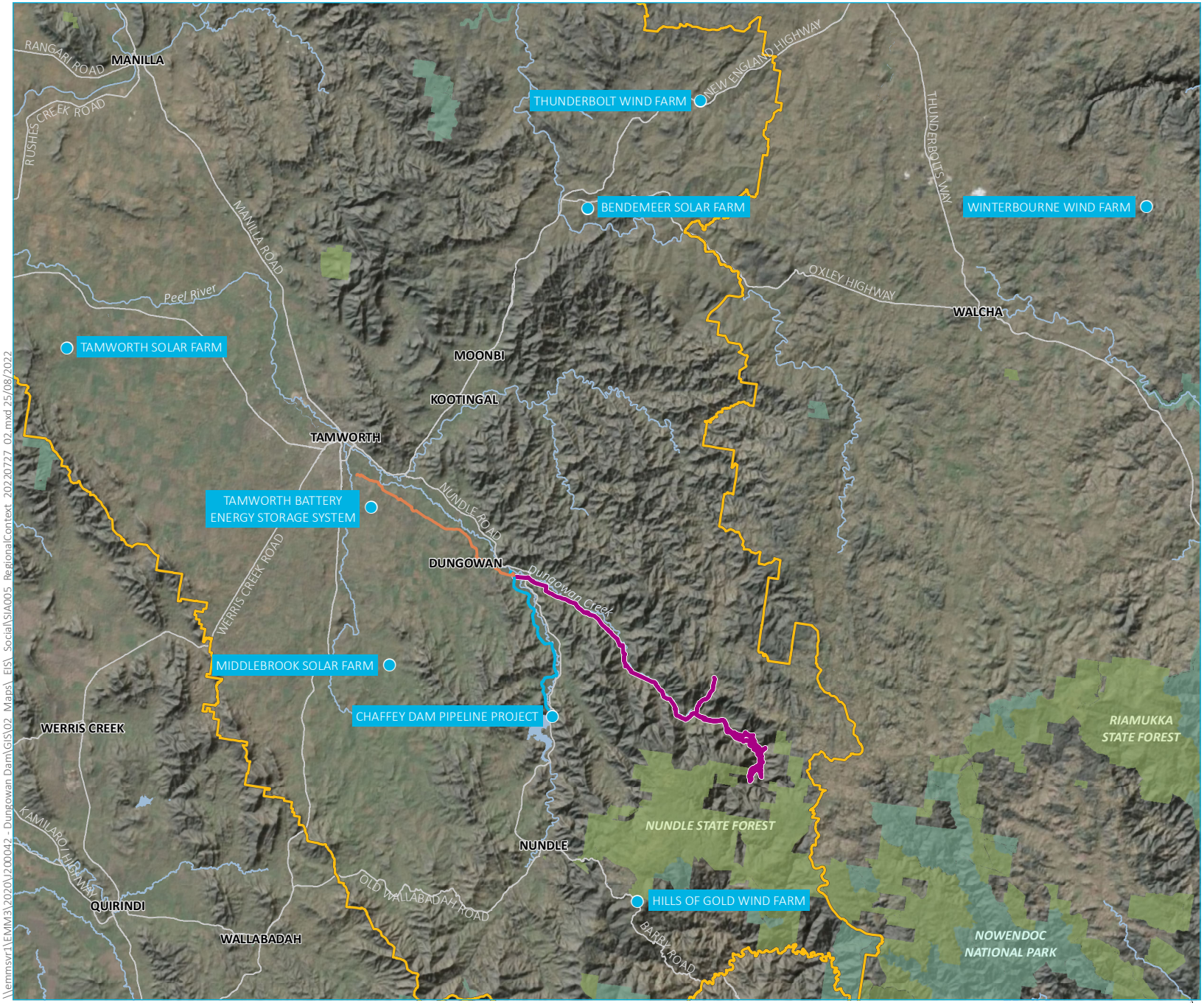
The assessment of cumulative impacts requires consideration of all Reasonably Foreseeable Development (RFD) not yet approved in the study area, the existing social conditions, and the project. RFDs are defined as projects and activities that are currently entered into the regulatory project approval pathway, have been publicly disclosed by other proponents; or may be result from the development of the project.

RFDs must have the potential to affect the nature and scale of impacts predicted for the project and must occur within the area of social influence of the project. There are a total of eight projects (operational and proposed/approved) identified with the potential to impact the regional area. None of these projects are within the local area. These developments and their identified impacts have the potential to contribute to the cumulative impacts of the project in the regional area. A radius using the boundary of Tamworth Regional LGA has been identified as the potential for consideration of cumulative impacts. Most of the projects consist of proposed and approved electricity generation developments (solar and wind). Of the eight State Significant Development (SSD) projects nearby:

- seven are within the Tamworth Regional LGA. Six of these are in various stages of the SSD approval process and one (Tamworth Solar Farm) has been approved; and
- one project (Winterbourne Wind Farm) sits outside of the Tamworth Regional LGA and is still progressing through the SSD approvals process, however has been included in this cumulative assessment as the project will probably access Tamworth as it is the closest regional centre.

Of these RFDs the following have construction programs with potential to overlap with the project: Hills of Gold Wind Farm, Middlebrook Solar Farm, Bendemeer Solar Farm, Tamworth Battery Energy Storage System, Thunderbolt Wind Farm, and Winterbourne Wind Farm. Construction of this project is expected to take six years. As such, depending on approval timeframes, it is likely that delivery of the project will overlap with at least some of these projects.

Table D.1 in Annexure D documents the RFDs and was informed through a review of the DPE Major Projects Register, social baseline study (Chapter 5) and the SIA field study program. Workforce numbers in squared brackets in Table D.1 are not expected to further contribute concurrently to the project and are not included in the cumulative population impacts below. These projects have either already concluded their construction phase or entered their operations phase and have reached their peak operational workforce. As such, an in-migration of the associated construction and operational workforces will have already occurred. Cumulative impacts are considered further in Chapter 21 of the EIS. An outline of the nearby projects is provided in Figure 7.1.



\\emmsvr1\EMM3\2020\P00042 - Dungowan Dam\GIS\02 Maps\ EIS\ Social\SIA005 RegionalContext 20220727 02.mxd 25/08/2022

Source: EMM (2022); WaterNSW (2021); DFSI (2017); GA (2013)

Nearby projects

Dungowan Dam and pipeline project
Social impact assessment
Figure 7.1

EMM
creating opportunities

7.9.3 Population change

The construction phase of the project will generate approximately 125 direct jobs on site at peak construction. The TIA has assumed that 10% of the total workforce will be travelling into the site from offsite dwellings.

If it assumed that 90% of the workforce throughout the construction process is comprised of workers from outside of the regional area, a temporary increase of 112 people is expected at peak construction. The known construction workforce associated with expected concurrent projects is 1,936 full-time employees over the total duration of concurrent projects (see Annexure D, Table D.1). Whilst it is unlikely that all of these employees will be sourced externally, the total has been used as we are not able to predict the level of in-migration resulting from other projects. The sum of assumed non-local construction workers for the project and the known potential maximum construction workforce of concurrent projects is 2,048 [112+1,936].

This figure is a worst-case scenario based on the following assumptions and considerations: the projects identified as RFD in the regional area are likely to commence construction at the same time as the project (ie Hills of Gold Wind Farm, Middlebrook Solar Farm, Bendemeer Solar Farm, Tamworth Battery Energy Storage System and Thunderbolt Wind Farm). The potential temporary cumulative population increase, as a result of the project and RFDs could be up to around 2,048 people. This represents a 3.2 % increase in total population of the Tamworth Regional LGA based on the 2021 population figure of 63,070 (ABS 2021), which would be experienced over project durations of between 1 and 6 years, with most occurring over 2 years (Table D.1, Annexure D). The project's overall contribution to the total population increase is minimal, however given that the annual increase predicted for the total regional population is only 0.69% (DPE 2019), the cumulative contribution of regional construction projects to the area's total population far exceeds existing scenarios for predicted demand used to determine service delivery planning. As identified in Section 7.7.2 of this report, the Construction Workforce Management Plan should address cumulative project impacts. This plan should also be prepared in consultation with other major regional projects and Tamworth Regional Council.

7.9.4 Other cumulative impacts:

i Traffic and transport

Traffic was raised as a key issue during the SIA field study in relation to concurrent projects and developments in the local and regional area. The TIA appended to the EIS (EMM 2022) has assessed the cumulative traffic impacts of the project considering the future traffic generation of existing and approved projects and developments. The TIA recommends that the CTMP will include consideration of other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic and will monitor and provide for amendment mechanisms accordingly. The CTMP will ensure all stakeholders are considered during all stages of the project. Cumulative transport and traffic impacts are considered to be relatively low or negligible.

ii Water flows and quality

The SWA (EMM 2022) recommends the surface water monitoring program to be implemented over the duration of the construction and operational phase of the project, which would monitor weather, stream flows, process water quantity and quality, stormwater quality and receiving water quality. The surface water monitoring program framework recommends measuring all process water uses, sources and controlled discharge volumes with cumulative flow meters to be installed at all monitoring locations. Meter readings are recommended to be recorded weekly.

The SWA (EMM 2022) assessed the cumulative impacts of the project assuming the operation of the Chaffey pipeline would occur when the new Dungowan Dam is operational. As the Chaffey pipeline operation would deliver water from Chaffey Dam to Calala through a pipeline instead of via run of river transfers, Dungowan Creek would not be affected by cumulative impacts and was not assessed. The cumulative impacts are therefore focussed on changes to hydrology in the Peel River. The Aquatic Ecology Assessment (Austral Ecology and Research 2022) reported that there are no meaningful changes to Peel River hydrology as a result of the Chaffey pipeline and therefore cumulative impacts to aquatic values such as fish passages, cumulative impacts to reproductive and survival success of native fish species (ie Murray Cod) resulting from the operation of the project and the Chaffey pipeline are not expected to be significant and considered negligible. Cumulative impacts, including from the operation of the Chaffey pipeline, are further detailed in the EIS.

iii Housing

The project will employ 125 workers at its peak and housing for up to 140 workers will be provided at the accommodation camp in the project footprint.

Given the capacity available, the non-local workforce can be accommodated onsite in its entirety. It is expected that the remainder of the workforce will be made up of existing local workers. A key issue raised during the SIA field study was the housing demand and the project may impact housing availability and affordability

The rental vacancy rate in the local and regional area in April 2022 was consistently below the 3.0% benchmark, indicating a tight rental market with an undersupply of rental housing during that time. There were no properties to rent or buy in the local area. In the regional area there were 197 properties for sale and 106 properties for rent. Most these available properties were located in Tamworth City.

Increased demand for skilled workforce and trades skills more generally, may arise with the construction and operation of concurrent SSD projects. This may cause potential impacts on the availability of skilled workforce in the local and regional area, requiring additional project workforce to be sourced from outside the local and regional areas, which may increase demand on rental housing within the local and regional areas (further discussed in Section 5.4 band Section 5.8).

iv Employment

Multiple concurrent projects occurring in the regional area could exacerbate existing skill shortages impacting both the construction sector and other industry sectors.

Employment and longevity of local industry associated with the project was considered a major benefit by local service providers during in-depth interviews. A local employment agency discussed the importance of maintaining employment opportunities through prioritising a local workforce. Renewable developments in the local area were identified as a primary source of local employment during in-depth interviews. As such, some service providers recognised significant employment benefits associated with a large number of ongoing projects and developments.

The multiple SSDs in the area also may have the potential to benefit in local procurement of goods and services, resulting in increased opportunities for revenue for local business and therefore having a positive impact on livelihoods. During in-depth interviews, stakeholders identified potential indirect flow-on benefits arising from use of local goods and services by employees and contractors, such as spending in local cafes, accommodation, and retail shops and use of local services (public and private).

The potential peak employment demands for the above future projects including; Hills of Gold Wind Farm, Middlebrook Solar Farm and Bendemeer Solar Farm and projected demand is 2,063 [125+1936+2] full-time employees. This may cause potential impacts on the availability of skilled workforce in the regional area, should construction periods overlap substantially. This may require additional workers to be sourced from outside the local and regional areas with flow-on impacts to accommodation and other industry sectors, as previously discussed.

v Biodiversity

Multiple concurrent projects occurring in the regional area could exacerbate impacts to flora and fauna communities, and have flow-on effects for people relying on these communities and to future intergenerational equity.

The Aquatic Ecology report (Section 10) appended to the EIS (EMM 2022) identifies the following cumulative risks associated with operation of the Chaffey pipeline as being over a "medium" risk level:

- Lower flows in Peel River reduce Peel River Alluvial recharge. No impacts expected downstream of Tamworth is **high**, however, the report explains that the cumulative impact of possible impacts to the stygofauna community in the Peel River is impossible to quantify. Risk has been retained as for the operational impacts as a precautionary measure.
- Cumulative impacts of altered flows on fish passage are **medium.**
- Operation of Chaffey pipeline under drought conditions results in lower delivery of water via run of river flows resulting in reduction in flows in Peel River between Chaffey Dam and Tamworth is considered **medium.**
- Risk to Lower Darling Endangered Ecological Community (EEC) as a result of the project changes to river hydrology and impacts on values (species) of the Lower Darling EEC is **medium**.

It is anticipated that when the aquatic offset strategy is implemented by the project, downstream outcomes for fish passage are likely to improve, however further assessment of the social impacts of the offset strategy would be subject to further works, as identified in Section 7.4.6.

Further analysis of cumulative biodiversity impacts from projects identified in the region was determined to be unnecessary for the project, as it is not expected that there will be significant cumulative impacts. If risks are identified, the potential for social risk associated with any risks to fish populations or loss of endangered communities is **medium - high**, particularly for issues related to livelihood and surroundings, as identified earlier in Sections 7.6.1 and 7.6.2 of this report. Similar proposed mitigations apply, however the proposed mitigations should be prepared in conjunction with not only the relevant State authorities, but also in consultation with the contact planners provided on the DPE Major Projects Register.

vi Aboriginal people's connection to land

Further to information provided in Section 7.4.1, field study respondents also identified that there is a community need for:

> *"Children and the next generation to know culture and walk on Country, need to own respect and be given respect."*

It is important to acknowledge that due to the context surrounding connection to Country for aboriginal people, cumulative impacts cannot simply be rounded into other projects in the area that will occur in a similar timeframe. While these are important, it is necessary for Aboriginal people to be meaningfully involved in the decision making processes, which affect indigenous cultures, way of life, livelihood and intergenerational equity. It is important that this process is respectful, monitored and ongoing and that participation is enabled and supported. Directions to be considered for project planning are provided in the Government Architect Office's Draft Connecting with Country framework (2020).

As identified in the ACHA, it is proposed that prior to ground disturbance, an Aboriginal Cultural Heritage Management Plan (ACHMP) be developed and reviewed periodically in consultation with the Registered Aboriginal Parties (RAPs) for the project and the consent authority to provide the post-approval framework for managing Aboriginal heritage within the project area. The project should demonstrate how ongoing decision making is consistent with guidance provided under the draft Connecting with Country framework.

vii Land Use

The Land Use Assessment (Tremain Ivey 2022) identifies that for the Chaffey Dam Pipeline and the Pipeline from Dungowan Village to Calala WTP projects, "the cumulative impacts on land use of the project and the two related pipeline projects described above would be small and cover a small fraction of the productive land in the Tamworth region. Impacts would be mostly restricted to a limited period of construction for each project, with minimal ongoing impacts during operations. Therefore, the cumulative impacts of the projects on existing land uses would be minimal."

8 Mitigation and management

This section provides a summary of the identified social impacts along with the risk rankings and mitigated technical risk rankings. In addition, key potential delivery partners have been identified to participate in the monitoring and management of impacts, along with a range of proposed social impact mitigation and management strategies.

Not all of the potential impacts will be the responsibility of the proponent to mitigate or manage, their role may be to cooperate or inform the mitigation, provide data and information, through to direct responsibility for mitigation and management of the identified potential social impacts and the opportunity for partnerships. A summary is provided in Table 8.1.

This section also provides a monitoring and management framework for social impacts of the project.

Table 8.1 Summary of mitigation and management strategies

Social impact	Matter	Unmitigated	Mitigated	Responsibility	Potential partners	Proposed mitigation and management
Way of Life	Road diversions, deterioration and increased traffic will impact residents' ability to travel to work and school and to access services (eg impacting school bus timetables, access to social services and emergency services).	Medium (negative)	Low (negative)	Water Infrastructure NSW and Contractor		It is recommended that the Road Condition Report recommended in the TIA (EMM 2022) include a plan for monitoring and, if necessary, repair of transport routes during construction of the project. Any commitments made under this plan should be proportionate to the project's contribution to total traffic volumes and types, and in consultation with Tamworth Regional Council. This report also proposes the following supporting actions to be incorporated in preparation of the Construction Traffic Management Plan: • A robust engagement process including reporting and monitoring and seeking community feedback throughout the project. As identified in the TIA, consultation with school bus operators is of critical importance. • Planning project deliveries outside school bus pick up and drop off times. • Individually checking and confirming the ongoing safety of each pick up and drop off site along the project route. • Planning construction in school bus pick up/drop off areas to occur during school holidays.

Table 8.1 Summary of mitigation and management strategies

Social impact	Matter	Unmitigated	Mitigated	Responsibility	Potential partners	Proposed mitigation and management
Way of Life	Increase in housing demand may impact housing and rental affordability, thereby increasing housing stress in the local and regional area	High	Low	Water Infrastructure NSW	Construction contractor	The project proposes to provide worker accommodation and an unspecified proportion of jobs will also be offered to local workers. The project should give preference to local residents when employing project staff and contractors to avoid the introduction of additional competition to the housing market and to prevent impacts to vulnerable communities. This approach also offers the potential to decrease social and economic disadvantage, if employment opportunities are targeted and offer appropriate education. The project should seek to ensure onsite housing and facilities to support residential occupation are delivered prior to project commencement, to ensure that there is not a lag between commencement and provision of housing for workers. Ideally, housing would be delivered by local contractors to further mitigate impacts. Post construction, a potential social benefit to relieve housing shortages, could be the repurposing of the construction accommodation facility within the Tamworth Regional LGA. This could provide temporary social housing.
Way of Life	Water security, quality, price and allocations	Medium/Low	Low	Water Infrastructure NSW	Tamworth Regional Council	Detailed consultation to determine water access needs and to provide advanced notice of planned service disruptions is required to mitigate any potential impacts to pipeline customers. Implementation of sustainability initiatives to improve Government efficiency in use of water, energy and transport (ESD Pathway report, Section 7.3) For socioeconomically disadvantaged households, it is proposed that the future service provider may offer temporary exemptions from the water price increases for people who can demonstrate that they are experiencing financial hardship.

Table 8.1 Summary of mitigation and management strategies

Social impact	Matter	Unmitigated	Mitigated	Responsibility	Potential partners	Proposed mitigation and management
Community	Community cohesion due to project decision making	High	Medium	Water Infrastructure NSW	The proponent's community engagement, local businesses, local community organisations	Ensure that community consultation is equal and even and does not prioritise only those who are located in or close to the project site may improve conflict associated with unfair stakeholder engagement perceptions. Holding regular community information sessions, meetings and providing newsletters to the local community may allow the broader community to have a say and contribute to stakeholder consultation activities, whilst also increasing awareness of the project and its anticipated impacts, and more importantly benefits of the project.
Accessibility	Access to utility services during construction	Medium/High	Medium	Water Infrastructure NSW	The proponent's community engagement	A new connection would be established before any decommissioning to ensure power supply to the Niangala area is maintained throughout construction and operation of the project. If service disruption is unavoidable, the impact would be mitigated through negotiation of compensation proportional to loss through Access Agreements with landowners. Potentially affected landowners would be consulted during the planning process prior to the decommissioning works. Consultation with service providers and advanced notice regarding the type and quantum of likely increase in service demand may mitigate the ability of local services to support a significant population increase. Giving preference to local residents when employing project staff and contractors may mitigate the introduction of significant additional demand on key services and prevent impacts to vulnerable communities.

Table 8.1 Summary of mitigation and management strategies

Social impact	Matter	Unmitigated	Mitigated	Responsibility	Potential partners	Proposed mitigation and management
Culture	Intergenerational loss of material culture and opportunity and cumulative loss to material culture Loss of access to land and cultural sites	High	High	Water Infrastructure NSW	Indigenous service providers	Recommendations and mitigations as noted in the ACHA report Section 11 should be implemented. Further, the effectiveness of these mitigations will be dependent upon thorough ongoing engagement with the local and broader indigenous community. Further, a comprehensive stakeholder engagement strategy should be developed and implemented, and formal monitoring, evaluation and corrective action is undertaken. (ESD Pathway report, Annexure H). Requirements include: • The community believe their concerns have been considered and addressed, • Monitoring of heritage is undertaken at appropriate intervals during construction and operation, and • Monitoring and modelling demonstrates maintenance of heritage values. In relation to intergenerational equity, the Ecologically Sustainable Development Pathway report recommends efficient use of resources in construction, waste minimisation, net zero habitat loss, use of low embodied carbon materials, sustainable procurement, effective stakeholder engagement and cultural heritage protection. The project should work with the Tamworth LALC and other indigenous service providers to support indigenous businesses to take advantage of opportunities relating to future education, tourism and research.
Culture	Cultural connection and sustenance and changes to downstream flows	Medium/Low	Medium/Low	Water Infrastructure NSW	Indigenous service providers	

Table 8.1 Summary of mitigation and management strategies

Social impact	Matter	Unmitigated	Mitigated	Responsibility	Potential partners	Proposed mitigation and management
Culture	Cultural (indigenous and non-indigenous) connections to declining fish populations and impacts on cultural and recreational fishing	Very High	High	Water Infrastructure NSW	Indigenous community, relevant fisheries funds and professional, water resources, conservation and angling bodies	In response to the above, this report recommends that Water Infrastructure NSW should complete additional social impact assessment and consultation with the local community, and particularly Aboriginal persons, to identify whether the proposed offsets effectively mitigate the cultural impacts of the project, and to understand the cultural impacts and benefits of the proposed aquatic offsets. Research in mitigating the effects of barriers to freshwater fish migrations has made recommendations identified that a management group should be established to enhance knowledge sharing among stakeholders, managers, researchers, engineers and the community (Harries et al 2017). To enhance fishway designs and improve barrier management, Water Infrastructure NSW should consider liaising with relevant fisheries funds and professional, water resources, conservation and angling bodies to support the establishment of such a group to help mitigate the effects of barriers to fish passage at a catchment level.
Health and wellbeing	Health and wellbeing related to (and from) workers living and working on site	Bushfire (high) Dust, emissions, service disruption, travel, isolation, distance from services (medium) Noise (low) Pest infestation (low)	Bushfire (high) Other impacts (low)	Water Infrastructure NSW	Construction subcontractor, emergency services	Regarding bushfire, detailed emergency management planning should be completed prior to construction to ensure the safety of workers. Regarding noise and vibration, workplace health and safety is expected to be managed separately through application of the NSW *Work Health and Safety Act 2011* associated regulations. Construction exposures are expected to be monitored and managed in accordance with WHS regulations and guidance. Regarding fuel availability, the project should source fuel from a wholesaler to avoid disruption of fuel availability locally. Regarding waste management and transport, procurement for civil works and construction to include preference for locally sourced recycled content where possible. Waste management plan which identifies waste quantities and types, and measures to minimise waste during construction and operation to be in place.

Table 8.1 Summary of mitigation and management strategies

Social impact	Matter	Unmitigated	Mitigated	Responsibility	Potential partners	Proposed mitigation and management
						Monitoring and reporting of waste to be considered to encourage improved recycling practice and waste reduction target, and The demolition and construction waste are reused or diverted to recycling rather than landfill.
Surroundings	Changes to existing cultural and natural landscape, visual impacts, recreational access Loss of and changes to existing cultural and natural landscape may impact on sense of place.	Medium	Low	Water Infrastructure NSW	Tamworth Regional Council and WaterNSW, engaging with community and sport and recreation providers	This assessment acknowledges that recreational access for the public is not currently within the scope of the project, and that WaterNSW has advised that there is no public access to the existing Dungowan Dam. However, this assessment recommends recreational access to the land around the new Dungowan Dam should be reconsidered within the scope and benefits of the project, though it is understood that access to water-based recreation won't be feasible due to the need to maintain water quality. If it is determined that recreational opportunities may be provided on site, it is recommended that a further targeted social needs analysis be completed in collaboration with Tamworth Regional Council and WaterNSW with the intent of understanding: • The scope of what opportunities the site may offer, including opportunities for transition of facilities and materials. • Community needs for recreational opportunities in the local and regional area, based on engagement and strategic direction. • Comparative analysis of recreational opportunities previously provided at other dams, and their usage, benefits and risks. • Options feasibility analysis, including potential economic and social benefits for the local area and region. It is also recommended that onsite amenities provided for workers, such as bathrooms and potentially exercise equipment or barbecue areas, be planned as permanent infrastructure to be repurposed for recreational use should this land use be adopted.

Table 8.1 Summary of mitigation and management strategies

Social impact	Matter	Unmitigated	Mitigated	Responsibility	Potential partners	Proposed mitigation and management
Surroundings	Loss of and changes to existing cultural and natural landscape may impact on sense of place.	Medium	Low	Water Infrastructure NSW	Tamworth Regional Council and WaterNSW	It is proposed that, even though the project design life is 100 years, the direct impacts of decommissioning should be considered, and where possible, mitigations for future impacts should be built into the project scope. This should be considered with respect to materials used and deconstruction processes, and should be well informed given the planned decommissioning of the existing Dungowan Dam.
Surroundings	Project construction and operation may impact native flora and fauna. (through inundation or changes to water flows)	High	High	Water Infrastructure NSW	Water Infrastructure NSW community engagement and SIA-trained suitably qualified person	Should Water Infrastructure NSW identify that social co-benefits are desirable outcome of the proposed biodiversity offset strategy for the project, a social needs analysis should be undertaken by a suitably qualified person (in alignment with the SIA Guideline definition (DPE 2021A) to understand and determine adequate opportunities for social co-benefits. The local community's cultural, spiritual and recreational values need to be acknowledged throughout decision-making processes related to biodiversity offsetting. Community consultation is recommended to inform the proposed biodiversity offset strategy.

Table 8.1 Summary of mitigation and management strategies

Social impact	Matter	Unmitigated	Mitigated	Responsibility	Potential partners	Proposed mitigation and management
Livelihood	Construction and operation impacts on agricultural activity and productivity, disruption to the ability to use land over the buried pipeline	High Disruption to land over buried pipeline (Medium)	Low Disruption to land over buried pipeline (Medium)	Water Infrastructure NSW	Construction contractor, Water Infrastructure NSW community engagement,	Frequent communication with affected landowners is necessary to prepare landowners for pipeline construction. Landowners will be consulted when temporary, short-term changes to access to their property will occur. This will include advanced notification of relevant project schedules. A Land Use Management Plan will be implemented to support future project activities, and areas of key concern for farmers addressed by suitable preventative access procedures. Access agreements are to be negotiated with rural property landowners impacted by the pipeline construction. These agreements will detail any restrictions to access. It is imperative that gate and property access procedures are adhered to reduce the potential for unplanned migration of livestock. Fencing should be checked and repaired regularly. With landowner prior agreement, the option to bury the pipeline deeper where it crosses land used for cropping will impact the pipeline in some locations. A further mitigation is negotiation of compensation through Access Agreements (proportional to loss).

Table 8.1 Summary of mitigation and management strategies

Social impact	Matter	Unmitigated	Mitigated	Responsibility	Potential partners	Proposed mitigation and management
Livelihood	Local workforce and employment opportunities	High	Medium	Water Infrastructure NSW	Construction contractors. In consultation with Tamworth Regional Council and other nearby concurrent projects	To maximise enhancement, Water Infrastructure NSW will develop a Construction Workforce Management Plan that commits to best practice in employment and investment in job readiness by Water Infrastructure NSW and its contracting partners. This plan will; • provide a details strategy for the hiring of local and regional workers in the area, followed by hiring outside of these areas, • Consult with local employment, apprenticeship and education and training agencies to enhance the potential of hiring of local and regional workers, • plan upskilling programs to better equip local people to meet the needs of the project's workforce, and • identify potential sources of funding for more skills-based courses in the local area to maximise potential benefits in up-skilling the local workforce and providing targeted employment opportunities for youth
Decision-making systems	Decision-making systems related to transparency and open communication, community concerns regarding cost of the project	High	Medium	Water Infrastructure NSW	Water Infrastructure NSW community engagement, Tamworth Regional Council	Greater transparency, open constant and timely communication of plans, transparency from Water Infrastructure NSW and clear information being distributed in the community regarding plans and water allocations. By increasing trust and engagement there is potential to reduce the community's hesitancy towards engaging meaningfully with decision-making systems. In regard to project cost, a list of options which may fulfil the goals of the strategy are included in the Chapter 2 of the EIS.

8.1 Monitoring and management framework

It is proposed that a monitoring and management framework be developed to ensure that the identified positive and negative impacts are monitored over time to measure the effectiveness or otherwise of the proposed management measures, including the changing conditions and trends in the Tamworth Regional LGA over the project duration.

It is proposed that the monitoring and management framework identifies the following key aspects:

- providing regular project updates to the broader community and targeted notifications and project updates to affected parties;
- ongoing community engagement as impact mitigation through participation in and reporting on regular local stakeholder briefings and meetings with:
  - Landowners and adjoining neighbours;
  - Tamworth Regional Council;
  - Registered Aboriginal Parties; and
  - DPE Water, DPI Fisheries, DPE Environment and Heritage, NSW EPA, TfNSW and NSW SES.
- track progress of mitigation and management strategies;
- assess actual project impacts against predicted impacts;
- identify how information will be captured for reporting to impacted stakeholders including landholders, communities and government on progress and achievements;
- key performance indicators, targets and outcomes;
- effective, monitored and reported complaints handling processes
- clear deliverables for responsible parties; and
- Project wide mechanisms for ongoing adaption of management measures when and if required.

To ensure the effectiveness of the management measures for the identified positive and negative impacts, it is recommended that a continuous improvement approach be adopted allowing for the review and adaption of impacts, management measure and outcomes within the CEMP and OEMP for the project.

9 Glossary

Table 9.1 Glossary

Acronym	
ABS	Australian Bureau of Statistics
ACARA	Australian Curriculum Assessment and Reporting Authority
ACECQA	Australian Children's Education and Care Quality Authority
AHMAC	Australian Health Ministers' Advisory Council
AHRC	Australian Human Rights Commission
AHURI	Australian Housing and Urban Research Institute
AIHW	Australian Institute of Health and Welfare
AQGHGA	Air Quality and Greenhouse Gas Assessment
AQGA	Air Quality and Greenhouse Assessment
BOCSAR	Bureau of Crime Statistics and Research
Cr	Councillors
CSSI	Critical state significant infrastructure
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DPE	Department of Planning and Environment
ECA	Environmental Contingency Allowance
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EMM	EMM Consulting Pty Ltd
EP&A Act	Environmental Planning and Assessment Act 1979
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPA	Environment Protection Authority
ESD	Ecologically Sustainable Development
FSL	Full supply level
HIA	Health Impact Assessment
IAIA	International Association for Impact Assessment
IEO	Index of Education and Occupation
IER	Index of Economic Resources
IFC	International Finance Corporation
IRSAD	Index of Relative Socio-Economic Advantage and Disadvantage
IRSD	Index of Relative Socio-Economic Disadvantage

Table 9.1 Glossary

Acronym	
LALC	Local Aboriginal Land Council
LGA	Local Government Area
LHD	Local Health District
LSE	Land, Soils and Erosion Assessment
LU	Land use
NSW	New South Wales
NVIA	Noise and Vibration Impact Assessment
PHN	Primary Health Network
PMF	probable maximum flood
RAP	Registered Aboriginal Party
SEARs	Secretary's Environmental Assessment Requirements
SEIFA	Socio-Economic Indexes for Areas
SES	State Emergency Service
SIA	Social impact assessment
SIA Guideline 2021	Social Impact Assessment Guideline for State Significant Projects
SIA Technical Supplement 2021	Technical Supplement: Social Impact Assessment Guideline for State significant Projects
SoHI	Statement of Heritage Impacts
SSC	state suburb classification
SSD	State significant development
SSI	State significant infrastructure
the project	Dungowan dam, pipeline and associated works
TIA	Traffic Impact Assessment
TRC	Tamworth Regional Council
The proponent	Water Infrastructure NSW
WTP	water treatment plant

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Annexure A

SIA Guideline response

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The SIA review questions as outlined in the SIA Guideline 2021 (DPE 2021a) and corresponding responses are presented in Table A.1.

Table A.1 Responses to SIA Guideline review questions

Reference number	SIA Guideline review question	Response
General		
1	Does the lead author of the SIA Report meet the qualification and experience requirements?	Yes – see Section 1.4.1 and Annexure B
2	Has the lead author of the SIA Report provided a signed declaration certifying that the assessment does not contain false or misleading information?	Yes – see Section 1.4.1
3	Would a reasonable person judge the SIA Report to be impartial, rigorous, and transparent?	Yes.
Project's social locality and social baseline		
4	Does the SIA Report identify and describe all the different social groups that may be affected by the project?	Yes – see Chapters 3,5, 6,
5	Does the SIA Report identify and describe all the built or natural features that have value or importance for people, and explain why people value those features?	Yes – see Chapters 5, 6, 7
6	Does the SIA Report identify and describe historical, current, and expected social trends or social changes for people in the locality, including their experiences with this project and other major development projects?	Yes – see Chapters 3, 4, 5, 6, 7
7	Does the social baseline study include appropriate justification for each element, and provide evidence that the elements reflect both relevant literature and the full diversity of views and potential experiences?	Yes – see Chapters 3, 4 , 5, 6, 7
8	Does the social baseline study demonstrate social-science research methods and explain any significant methodological or data limitations?	Yes – see Chapters 3, 5
Identification and description of social impacts		
9	Does the SIA Report adequately describe potential social impacts (whether negative, positive, tangible, intangible, perceived, and/or cumulative) from the perspectives of how people may experience them, and explain the research used to identify them? Where the assessment is partially complete, and expected to be completed in Phase 2 SIA, has this been explained?	Yes – see Chapters 6, 7, and 8
10	Does the SIA Report apply the precautionary principle to social impacts, and consider how they may be experienced differently by different people and groups (ie distributive equity)?	Yes – see Chapters 3.4, 5, and 7
11	Does the SIA Report describe how the preliminary analysis influenced both the project design and EIS Engagement Strategy?	Yes – see Chapters 7 and 8
Community engagement		
12	Were the extent and nature of engagement activities appropriate and sufficient to canvass all relevant views, including those of vulnerable or marginalised groups?	Yes – see Chapters 3, 5, and 6
13	How have the views, concerns, and insights of affected and interested people influenced both the project design and each element of the SIA Report (eg the social baseline, predicting impacts, and mitigation/enhancement measures)?	Yes – see Chapters 4, 5, 6, 7 and 8

Table A.1 Responses to SIA Guideline review questions

Reference number	SIA Guideline review question	Response
Predicting and analysing social impacts		
14	Does the SIA Report impartially focus on the most material social impacts at all stages of the project life cycle, without any omissions or misrepresentations?	Yes – see Chapters 7, 8
15	Does the SIA Report identify the matters to which the precautionary principle could or should be reasonably applied?	Yes – see Chapter 7
16	Does the SIA Report analyse the distribution of both positive and negative social impacts, and the equity of this distribution?	Yes – see Chapter 7
17	Does the SIA Report identify its assumptions, and include sensitivity analysis and alternative scenarios (including 'worst-case' and 'no project' scenarios where relevant)?	Yes – see Chapters 3.4, 5, 6, 7 and 8
Evaluating significance		
18	Do the evaluations of significance of social impacts impartially represent how people in each identified social group can expect to experience the project, including any cumulative effects?	Yes – see Chapters 6, 7, 8
19	Are the evaluations of significance disaggregated to consider the potentially different experiences for different people or groups, especially vulnerable groups?	Yes – see Chapters 5, 5.3, 6
Responses, monitoring and management		
20	Does the SIA Report propose responses (ie mitigations and enhancements) that are tangible, deliverable by the proponent, likely to be durably effective, and directly related to the respective impact(s)?	Yes – see Chapters 7 and 8
21	How can people be confident that social impacts will be monitored and reported in ways that are reliable, effective, and trustworthy?	See Chapter 8
22	How will the proponent adaptively manage social impacts and respond to unanticipated events, breaches, grievances, and non-compliance?	See Chapters 8

Annexure B

Authors Curriculum Vitae

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EMM Consulting Pty Limited

Professional Overview

Caroline is a Social Scientist with over 20 years' experience designing, planning, implementing and evaluating major social programs in challenging operating contexts.

She brings a strong knowledge and demonstrated application of development strategies and processes and social science methodologies. Her skill set includes social research, community and stakeholder engagement, project management, evaluation, risk management, strategic planning and reporting. Caroline has also successfully managed and mentored local teams to meet project objectives.

She has worked on projects in Australia, Indonesia, Timor Leste, Vietnam, South Africa and Zimbabwe across the education, water, social services, agriculture and clean energy sectors. Caroline is a critical thinker with highly developed problem solving skills.

Qualifications and licences

Master of Social Science (International Development), RMIT University, 2005

Bachelor of Arts/Bachelor of Commerce, Deakin University, 1998

Graduate Certificate of Evaluation, University of Melbourne, ongoing

CPA Associate, CPA Australia

Member, Australian Evaluation Society

Member, Social Impact Measurement Network Australia

Specialisation

Social Impact Assessment

Social Evaluation

Representative experience

Social impact assessment/evaluation

- Oven Mountain Pumped Hydro Storage Project, Social Impact Assessment Lead, (OMPS Pty Ltd)
- Ok Tedi Mining Limited, technical assistance for Annual Report, (Ok Tedi Mining Limited)
- Wellington Battery Energy Storage System (BESS), Social Impact Assessment (AMPYR Australia)
- Sutton Forest Sand Quarry, response to submissions report and amendment report, social impact lead, (Hi-Quality Group)
- Dungowan Dam and pipeline, Social Impact Assessment Lead (Water Infrastructure NSW)
- Muswellbrook Solar Farm, Social Impact Assessment Lead (ESCO Pacific Holdings Pty Ltd)
- Boorolong Wind Farm, Social Impact Assessment Lead (CWP Renewables)
- Integra Underground Mine Closure, Social Impact Assessment Lead, (Glencore)
- Wimmera mineral sands mine, Social Impact Assessment lead (Iluka Resources Limited)

Project management evaluation

- Innovation Resource Facility, Senior Program and Grants Manager, DT Global Australia, Department of Foreign Affairs and Trade (DFAT)
- INOVASI Education Program, Operations Advisor, The Palladium Group, Indonesia (DFAT)
- KOMPAK Governance Program, Operations Manager, Abt Associates, Indonesia (DFAT)
- MAMPU Women's Empowerment Program, Grant Manager, Indonesia (DFAT)
- Zimbabwe Extension Support and Training Project, Research and Evaluation Manager, Sustainable Agriculture Technology, Zimbabwe (EU)

Breannan Dent

Senior Social Planner

EMM Consulting Pty Limited

Professional Overview

Breannan is a Senior Social Planner with 8 years' experience in urban planning and community engagement.

With a track record of robust research and a comprehensive understanding of planning policy, Breannan can distil complex information into simple and approachable documents and conversations.

Breannan has managed and delivered planning proposals, new local planning controls and community engagement strategies.

Breannan taps into existing expertise and opportunities by fostering collaborative relationships through genuine interest and integrity.

Breannan's outstanding customer focus, intrapersonal skills, problem solving skills and work ethic have allowed her to support her colleagues in delivering future-focused projects with excellent design, sustainability and resilience outcomes for the community.

Qualifications and licences

Masters of Urban Management and Planning, University of Western Sydney, 2014

Bachelor of Social Science, University of Western Sydney, 2013

Major in Urban Geography, University of Western Sydney, 2013

Sub-Major in Peace and Development Studies, University of Western Sydney, 2013

Specialisation

Social Impact Assessment

Community and Stakeholder Engagement

Statutory Planning

Representative experience

Senior Planner Penrith City Council

- Employment Zones Reform, reviewing and reconciling proposed changes to Commercial Centre and Heavy Industrial zones from the existing Penrith Local Environment Plan (LEP) 2010 controls to the proposed changes under the Standard Instrument (Local Environmental Plans) Order 2006.

Acting Senior Planner Penrith City Council

- 61–79 Henry Street, Penrith Planning Proposal to amend Penrith LEP 2010, assessment of a planning proposal which involved extensive negotiations with the proponent and reporting to the Local Planning Panel and Councillor Briefings.
- DCP Controls for Urban Heat, revised and refined considerations previously posted as part of the proposed future sustainability controls in Development Control Plan Review 2022 which involved working on project deliverables, leading internal and industry engagement and reporting the project to Council for endorsement.

Planner Penrith City Council

- DCP Review 2022, Stage 1, reviewing and amending controls for Stage 1 of Penrith's Development Control Plan Review, developing controls for sustainability and industrial land, amending and developing controls for business and commercial land, manor houses and the Erskine Park precinct. Involved reviewing strategies, studies, demographic information and community engagement responses to determine the community's needs.
- Rodgers Street Planning Proposal to amend Penrith LEP 2010, managing the Gateway process, Local Planning Panel referral, public exhibition, heading and traffic, flood evacuation and property history matters; managing the engagement of consultants and demonstrating transparency and superior stakeholder management.
- Four Sites in Penrith and St Marys Planning Proposal to amend Penrith LEP 2010, planning proposal for a gateway determination with DPIE, engagement and reporting within prescribed timeframes and planning legislation and processes.
- Penrith DCP 2014 amendment to Site Planning and Design, Vegetation Management, Notification and Advertising, Boarding Houses and Outdoor Dining and Trading chapters. Involved managing a series of amendments to improve consistency with local and state policies, address contentious boarding house development matters, coordinate internal contributions, address community needs and ensure legal consistency.
- Seven sites at Reynolds Road and The Driftway, Londonderry Planning Proposal to amend Penrith LEP 2010, managing initial stages of the planning proposal including communication and developing proponent relations.
- Community Engagement Strategy and Community Participation Plan (CPP), development and participation in specialised engagement processes for the CPP; prepared, exhibited, reported and finalised housekeeping amendments to the CPP.
- Australian Arms Hotel Planning Proposal to amend Penrith LEP 2010, project managed the planning proposal from commencement to conclusion in accordance with the procedure for preparing a Local Environmental Plan.
- 176–202 Victoria St, Werrington Planning Proposal to amend Penrith LEP 2010, assessment of a planning proposal seeking reclassification and rezoning of Council owned land involving key considerations of rezoning and traffic management.
- 11–13 Chesham St, St Marys Planning Proposal to amend Penrith LEP 2010, managing the public exhibition, public hearing and reporting processes for the project within tight deadlines.
- Boarding Houses and Multi Dwelling Housing DCP 2014 amendment, amendment of DR Residential Development and chapters of the DCP 2014, included addressing priority issues with boarding houses and multi-dwelling housing

developments, identifying outcomes through community submissions, application assessments and management plans.

Community and Stakeholder Relations Office RPS

- Garden Island Wharf Extension Proposal, proposal to extend the Garden Island wharf, involving communicating elements of the proposal to the public and developing communication strategies and materials to ensure the project complied with conditions of consent (Department of Defence).
- Green Square Stormwater Drain Project, community and stakeholder relations office responsible for internal communications and liaising with the community and stakeholders (City of Sydney Council and Sydney Water Corporation).
- Sydney Water Delivery Management team, assessed the community impact of new infrastructure and renewal projects, delivered communication strategies for work on multiple assets across the Sydney Water network (Sydney Water Corporation).
- Balmain Pumping Station renewal, delivered effective communication to the community for the high profile project, assisting to complete both project work and manage existing community issues (Sydney Water Corporation).

Graduate Community Relations Officer

- Priority Sewerage Program, community relations officer. Communicating the complex infrastructure project program, liaising with government officials, stakeholders and project leaders, communicating with and representing community members and producing communications materials including newsletters and web content. Breannan offered expert advice on the projects history during project planning for an investigation of customer connections into the PSP systems (Priority Sewerage Program Alliance and Sydney Water Corporation).
- Lime Kiln Bay Overflow, graduate consultant for the project involving collating community responses and producing reports outlining community feedback on the proposed site (Sydney Water Corporation).
- Northern Beaches Hospital Project, worked to establish first contact with residents regarding contentious infrastructure plans, provided community relations services including stakeholder engagement and collating community feedback (Roads and Maritime Services).
- Lord Howe Island LEP Review, developed community surveys to capture community views on the plans and identify opportunities for project improvement which involved data management, reporting and research, events management and project launch management (Lord Howe Island Board).

Annexure C
Planning context

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C.1 Annexure Heading

This section provides a summary of the relevant plans and strategies across the project that inform the social risk assessment and mitigation and management strategies.

C.2 Federal

At a federal level, the project is located within the federal electorate of New England.

There are no specific federal legislative or regulatory instruments that directly impact on the social impact assessment for the project, however, the Keep it in the regions report (Parliament of Australia 2018) in November 2018 is relevant. The report recommends several measures aimed at increasing the potential for local communities to benefit economically from resourcing projects located near their community.

C.3 State

The New South Wales Parliament consists of a Legislative Assembly (lower house) and Legislative Council (upper house).

At a state level, the proposed Dungowan Dam and pipeline project sits within the New South Wales state electorate of Tamworth. There are no specific state regulatory instruments, which set directions for the social impact assessment of the project, other than those, which direct the EIS process listed in Chapters 2 and 3 of the EIS (EMM 2022), and requirements, which affect the technical studies supporting the EIS process. These are listed in the EIS and its appendices.

C.2.1 State strategies

i A 20-Year Economic Vision for Regional NSW, 2018–2038

A 20-Year Economic Vision for Regional NSW 2018–2038 (NSW Government 2018) presents a strategy for Regional NSW that encourages its role as a vibrant and growing part of the NSW economy, and fosters decisions to live in the regions. The vision is organised into five sections that form a pathway to a prosperous Regional NSW. This provides:

- a snapshot of Regional NSW today that presents the current economic and demographic environment, with reference to the thriving agricultural, energy and resources industries, and strong manufacturing, tourism, and services sectors;
- a description of the global forces shaping regional economies, and the implications of these trends;
- means to rise to economic challenges, such as investing in infrastructure, skills, advocacy and promotion, and the business environment;
- a presentation of a bright future for Regional NSW that highlights growth in key sectors, increased regional populations, and supporting infrastructure and services; and
- the current priorities for the NSW Government.

Table C.1 Relevant priorities, principles, and actions outlined in the 20-Year Economic Vision for Regional NSW 2018–2038

Relevant priorities	Relevant principles	Relevant actions
Priority 1: Infrastructure	Principle 1: Affordable, reliable and fast mobile and internet connectivity to support people and businesses	NA
	Principle 4: Reliable accessible water and energy	• Investigate research and development investment in energy and water security and resilience, particularly for engine industries. • Investigate climate-resilient water infrastructure options. • Investigate ongoing infrastructure to provide safe and secure water to regional communities.
Priority 2: Skills	Principle 5: A skilled labour force for current and future needs of the regions	• Investigate targeted skills and work experience approaches for groups that are underrepresented in regional economic participation, including Aboriginal people
Priority 5: Economic strength and diversity	Principle 8: Sustainable economies and communities are better able to recover from shocks	• Improving natural disaster preparedness through accelerating public safety mobile broadband to support a rapid response from emergency services, improve safety for emergency personnel and reduce the impact of emergencies such as bushfires and foods • Better support for regional communities through drought and other economic shocks by investigating climate-resilient water infrastructure options • Better support for regional communities through drought and other economic shocks by helping farmers, businesses and their communities to better prepare for, withstand and recover quickly from drought • Creating new opportunities in regional economies and supporting access to markets by integrating Aboriginal economic participation, education and skills development into government priorities focused on regional NSW, to increase Aboriginal employment and enterprise development

Source: NSW Government 2018

ii Staying Ahead: State Infrastructure Strategy 2022 – 2042

The *State Infrastructure Strategy 2022–2042* (Infrastructure NSW 2022) sets out Infrastructure NSW's independent advice on the current state of NSW infrastructure, and the infrastructure needs and priorities over the next 20 years. It looks beyond current projects and identifies policies and strategies needed to provide infrastructure to meet the needs of a growing population and economy.

The strategy looks beyond the current projects and outlines the importance of the following key themes:

- diversifying the infrastructure investment pipeline;
- maintaining service reliability in the existing asset base;
- embedding resilience;
- harnessing digital technology; and
- growing partnerships with the private sector.

The strategy provides:

- 9 long-term objectives, each with a dedicated chapter; and
- 57 recommendations (102 including sub-recommendations) to the NSW Government aimed at improving outcomes and living standards for the people of NSW.

The current State Infrastructure Strategy identifies water security is a major long-term challenge for NSW Strategic objectives are inclusive of infrastructure that supports additional water security projects, particularly water storage and increased use of safe, recycled, potable water to ensure its continued economic viability.

Table C.2 Relevant objectives, strategic directions and recommendations outlined in the State Infrastructure Strategy 2022–2042

Relevant objectives	Relevant strategic directions	Relevant recommendations
Service growing communities	NA	Recommendation 10 – Fund and deliver enabling infrastructure to support approved or pending housing supply Recommendation 13 – Deliver Aboriginal housing and enabling infrastructure programs in partnership with local communities
Embed reliability and resilience	Deliver assets that reduce the risk and impact of major natural hazards and shocks	NA
Enhance long-term water security	NA	Recommendation 30 – Improve water security and quality in regional NSW Recommendation 31 – Investigate and propose alternatives to the delivery of major dam projects in the Peel, Lachlan and Border Rivers catchments
Protect our natural endowments	Foster sustainable use of natural resources and construction materials through reuse and recycling. Implement a strategic and practical approach to managing biodiversity. Capitalise on blue-green infrastructure opportunities.	Recommendation 33 – Improve sustainability throughout the infrastructure lifecycle Recommendation 35 – Promote the development of a blue-green infrastructure network across NSW
Harness the power of data and digital technology	Prioritise the application and use of data and digital technology across all aspects of service delivery and throughout the infrastructure asset lifecycle	Recommendation 38 – Adopt the use of digital technology in infrastructure planning, delivery and operation
Integrate infrastructure, land use and service planning	Coordinate infrastructure, land use and service planning to meet housing, employment, industry and community needs.	Recommendation 47 – Actively reflect history, culture and heritage in places and infrastructure
Design the investment program to endure	Reconsider megaprojects and invest in existing infrastructure through augmentation, digitisation and maintenance. Diversify funding sources to deliver future investments. Ensure the construction market has the capacity, capability and productivity to meet increasing demands.	Recommendation 48 – Reconsider the timing and sequence of future megaprojects to diversify the State's investment program and mitigate delivery risks. Recommendation 57 – Develop new skills and capabilities required for infrastructure projects, and widen opportunities for communities to participate through targeted actions in training and employment initiatives

Source: Infrastructure NSW 2022

iii New England North West Regional Plan, 2016 – 2036

The *New England North West Regional Plan* outlines strategies for the region guided by the NSW Government's vision of "nationally valued landscapes and strong, successful communities from the Great Dividing Range to the rich black soil plains". In acknowledging the opportunities provided by natural resources and strong communities, the Plan presents four regionally focused goals, which are:

- a strong and dynamic regional economy;
- a healthy environment with pristine waterways;
- strong infrastructure and transport networks for a connected future; and
- attractive and thriving communities.

Some key elements of this plan include:

- build agricultural productivity and protect and enhance productive agricultural lands, ensuring ready access to water (irrigation), high-quality soils and suitable climate;
- sustainably manage and conserve water resources, and adapt to natural hazards and climate change;
- enhance transport and infrastructure networks;
- strengthen community resilience and provide great places to live; and
- collaborate with Aboriginal communities to respect and protect Aboriginal culture and heritage.

The *New England North West Regional Plan* (DPE 2016) identifies growing New England North West into the renewable energy hub of NSW as a key direction for its goal of assuring 'a strong and dynamic regional economy'. The plan points to the region as a potential leader in renewable energy and puts forward that a strategic approach to renewable energy projects will engender new opportunities as well as help to meet the NSW Government's goal of a carbon-neutral NSW by 2050.

Table C.3 Relevant goals and strategic directions outlined in New England North West Regional Plan

Relevant goals	Relevant strategic directions
Goal 1: A strong and dynamic regional economy	Direction 3: Protect and enhance productive agricultural lands Direction 7: Build strong economic centres Direction 8: Expand tourism and visitor opportunities Direction 9: Coordinate growth in the cities of Armidale and Tamworth
Goal 2: A healthy environment with pristine waterways	Direction 10: Sustainably manage and conserve water resources Direction 11: Protect areas of potential high environmental value Direction 12: Adapt to natural hazards and climate change
Goal 3: Strong infrastructure and transport networks for a connected future	Direction 16: Coordinate infrastructure delivery

Table C.3 Relevant goals and strategic directions outlined in New England North West Regional Plan

Relevant goals	Relevant strategic directions
Goal 4: Attractive and thriving communities	Direction 17: Strengthen community resilience Direction 18: Provide great places to live Direction 19: Support healthy, safe, socially engaged and well-connected communities Direction 20: Deliver greater housing diversity to suit changing needs Direction 21: Deliver well planned rural residential housing Direction 22: Increase the economic self-determination of Aboriginal communities Direction 23: Collaborate with Aboriginal communities to respect and protect Aboriginal culture and heritage Direction 24: Protect the region's historic heritage assets

Source: NSW Government 2016

iv Draft Namoi Regional Water Strategy

In addition to the objectives addressed in Section 4.1.5 of this report, the draft strategy (DPE, 2021f) also provides a summary of community responses to the project, referred to as "the option", including:

There was mixed views on this option, with some stakeholders supporting it as a way to secure water for towns and economic growth and others objecting. Those who supported this option noted:

- *The potential economic and environmental costs of the project needed to be assessed*
- *More study was required to determine the costs of water for residents and businesses, and to determine whether licensing would be impacted*
- *This is a key component in securing Tamworth and Kootingal's water supply into the future*

Objectors noted:

- *The lack of community consultation and a business case for the project*
- *The substantial expense of the project and the likelihood it would not be cost-effective or financially viable*
- *The dam's potential to negatively impact the environment and First Nations / Aboriginal cultural sites*.

C.4 Local

The project is located in Tamworth Regional LGA, which has the highest proportion of directly impacted stakeholders.

Tamworth Regional Council has regional and strategic plans that articulate their vision for the future of their community. These are summarised in Table C.4.

Table C.4 Local Government Area Planning Context

Plan/Strategy	Summary	Responsibility	Timeframe
Blueprint 100 - Our Community Plan (CP)	The Tamworth Regional Council CP is the major strategic document guiding local delivery of services and facilities and to outline the goals of the elected Council. The CSP has a vision for Tamworth as a 'Our region will be thriving, modern and prosperous, with compassion for our people, reverence for our culture, and respect for nature'. The focus areas relevant to this project are outlined below: • Water security • A liveable built environment • Prosperity and innovation • Resilient and diverse communities • Connect our region and its citizens • Working with and protecting our environment Working with and protecting our environment	Developed by Tamworth Regional Council (2022b), based on feedback from the community.	2023-2033
Long-term Financial Plan	This plan forecasts the financial capacity of Tamworth Regional Council to meet the objectives adopted in the CSP over the next 10 years. It develops and applies different financial scenarios in order for Council and the community to understand the implications of different scenarios over the longer-term.	Tamworth Regional Council (2017b)	2017 – 2027
Blueprint 100: Annual Operational Plan	• This Operational Plan maps the way the Council will action strategic objectives outlined in the CSP and details the funding required for the Council's services and functions for the 2021-2022 financial year. The Operational Plan provides a detailed breakdown of Tamworth Council's finances to give context to the planned projects and activities.	Tamworth Regional Council (2021)	2021/2022
Asset Management Strategy	• Tamworth Regional Council's Asset Management Strategy assists the Council in improving the way it delivers services from infrastructure including buildings, pools and other venues, horticulture and recreation, stormwater, transport, airport, depots, plant and fleet, waste, waste water and water.	Tamworth Regional Council (2017c)	2017 – 2027

Table C.4 Local Government Area Planning Context

Plan/Strategy	Summary	Responsibility	Timeframe
Demand Management Plan	This Demand Management Plan outlines the various water conservation measures that are to be employed by Council in order to ensure that town water demand levels are both efficient and sustainable. The objective of this Plan is to encourage efficient water use through the adoption of various demand management measures. This Plan was developed in association with a Drought Management Plan which focuses on both the demand and supply side measures that should be employed during drought periods. The Plan systematically outlines the following: • a brief review of historical demands and considers the key influences on demands; • a summary of current situation with water demands, including a breakdown of demands, benchmark data for residential consumption, water loss estimates and an overview of current demand management initiatives; • 30-year demand forecasts for Tamworth; • a summary of the Demand Management Program along with further details for each demand management measure; and an outline of the steps for implementing and monitoring the Demand Management Program.	Tamworth Regional Council (2016b)	Adopted 2016
Drought Management Plan	This Drought Management Plan outlines the various demand and supply drought response actions for various stages of an extended drought period in the Tamworth Region. The Plan also outlines Tamworth Regional Council's water restriction policy and various backup supply sources and emergency supply options. The objective of this Plan is to minimise the risk of the community running out of water and to ensure there is always sufficient water to satisfy the basic needs of the community. The Plan systematically outlines the following: • a description of the water supply systems, including drought experience; • an overview of the plans operating environment, including climatic conditions, water resources and potential downstream impacts; • a discussion on pre-drought planning measures, including demand management, operating rules, data collection and long term supply strategies; • the Drought Management Action Plans, which set out the actions to be taken during each drought response level, including water restrictions; and the post-drought actions, including regular review and updating of the Plan.	Tamworth Regional Council (2016a)	Adopted 2016
Tamworth Regional Local Environment Plan 2010	Consistency of project outcomes with the Tamworth Regional LEP 2010 is addressed in Chapter 3 of the EIS (EMM 2022).	Tamworth Regional Council	2011 EPI 27

Annexure D

Concurrent development projects

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Table D.1 Concurrent development projects

LGA	Project name	Anticipated timeframe/ project life	Development type	Status	Construction workforce	Operational workforce
Tamworth Regional	Tamworth Solar Farm	12 – month construction period / 30 years – with extension up to 60 years	Electricity Generation - Solar	Approved in 30 November 2020	[200]	2
Tamworth Regional, Liverpool Plains Shire, Upper Hunter Shire	Hills of Gold Wind Farm	24 – month construction period / 25 – 35 years	Electricity Generation - Wind	Assessment phase 2022	646	84
Tamworth Regional	Middlebrook Solar Farm	12 – 24-month construction period / 30 years	Electricity Generation - Solar	Preparing the EIS	400	12
Tamworth Regional	Bendemeer Solar Farm	12 – 18-month construction period / 30 years	Electricity Generation - Solar	Preparing the EIS	250	10
Tamworth Regional	Tamworth Battery Energy Storage System	12 – month construction phase / Battery infrastructure 20 years	Electricity Generation - Other	Preparing the EIS	150	1
Tamworth Regional, Uralla Shire	Thunderbolt Wind Farm	18 – 24 construction period 25 – 30 years	Electricity Generation - Wind	Response to Submissions	190	9
Tamworth Regional	Chaffey Dam Pipeline Project	Not identified	Water supply & management	Prepare SEARs	None identified	0
Walcha, Uralla Shire	Winterbourne Wind Farm	24 – month construction period	Electricity Generation - Wind	Prepare EIS	300	16
					1,936	134

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