ATTACHMENT DOCUMENT
FOR
COUNCIL MEETING

Tuesday 24th March 2020

Michael Urquhart
ACTING GENERAL MANAGER

AGENDA

1. *DA Assessment*
2. *SEE*

2

Development Assessment Report

DA Number:	DA2020/2	**Council:**	Walgett
Location:	21 Butterfly Avenue, Lightning Ridge		
Development Description:	Upgrade the Water Supply System		
Title Details:	Lot 8 Section 32 DP 758612		

Proposal Overview

The proposal will involve the upgrade the Lightning Ridge WSS to improve the quality of water supplied to the town of Lightning Ridge. The proposed upgrade will consist of the following:

- Construction of an aeration system, comprising a jet spray type aerator inside the two water reservoirs in Lightning Ridge;
- Construction a chlorine dosing facility;
- Modification to the pipework around the two reservoirs; and
- Associated works including temperature monitoring system on each reservoir, power supply, SCADA system and water monitoring system.

The main issues with the existing Lightning Ridge water supply have been identified as:

- Lack of chlorination due to high water temperature;
- The unpleasant quality of water due to high water temperature; and
- The unpleasant odour of water (rotten eggs odour) and associated community complaints.

Based on the concept design and Technical Specifications Report prepared by PWA in 2019, the proposed WSS upgrade would be located within the existing water reservoirs site boundaries, and would consist of the following general components:

Aeration System

- Install a jet spray type aerator inside each reservoir; and
- Modify the current inlet arrangement of each reservoir to suit the new aerators.

Modification of Pipework

- Excavate the ground to expose the pipework around the two reservoirs to clearly understand the pipework arrangement prior to the design work;
- Undertake all necessary pipework modification to receive bore water directly to 1.1 ML reservoir in addition to 5.5 ML reservoir;
- Construct a new pipeline (minimum 200mm) between the two reservoirs connecting the outlet of the large reservoir and the inlet of the small reservoir with a flow control valve and a magflow meter; and
- Install a transfer pumping system on the 200 mm pipeline between the two reservoirs.

Chlorination System

- Install an online chlorine analyser on the outlet of each reservoir;
- Install an online pH analyser with the facilities to sample the water from the outlet
- of each reservoir;
- Install a chlorine dosing facility using gas chlorine; and
- Undertake all necessary pipework modification to supply the town from individual reservoir as well as both reservoirs simultaneously while receiving the bore water to each or both reservoirs.

Other Associated Works

- Install a magflow meter on the inlet of each reservoir;
- Install a magflow meter on the common outlet to the town;
- Install temperature monitoring system on the inlet and outlet of each reservoir;
- Install a single online turbidimeter with the facilities to sample the water from the outlet of any reservoir;
- Construct a building for the new facilities;
- Install a pressure sensor type level monitoring system on each reservoir; and
- Provide a SCADA system to monitor and control the upgraded scheme and provide signals for others to connect to the ClearSCADA system.

New Building

Would consist of three rooms, including:

- A closet type room for the chlorine cylinder storage;

- A room for chlorine dosing equipment, chlorine booster pumps, chlorine control panel and any other item associated with the chlorine dosing system; and
- A room for the electrical switch board, SCADA, online analyser displays, transfer pump VSDs, electrical metering panel, and any other instruments which are not directly connected to the chlorine dosing system.

The building would be a brick construction with colorbond or similar roof. Thermal insulation would be provided for the roof as well as other building services (power outlets, lighting, smoke and fire alarms, fire extinguishers and hose reel).

Hours of Construction

Will be as follows:

- Monday to Friday: 7.30am to 6.00pm.
- Saturdays: 7.30am to 1.00pm.
- Sundays and Public Holidays: No work allowed unless special permission granted.

Construction was anticipated to commence in late February 2020 and would take up to eight weeks to complete.

Property Details/History

	Checked	Comments
File History	Yes ☒ No ☐	
Title Plan	Yes ☒ No ☐	
Check Ownership	Yes ☒ No ☐	

Application Type

Is this application an Integrated Development Application?	Yes ☐ No ☒
Is this application a Designated Development Application?	Yes ☐ No ☒
Is this application for State Significant Development?	Yes ☐ No ☒
Is this application submitted by/on behalf of a Public Authority?	Yes ☐ No ☒
Is this application a staged Development?	Yes ☐ No ☒
Is this application a section 96 amendment?	Yes ☐ No ☒

Concurrence/Referral

Section 4.13 – EP & A Act

Does this application require concurrence referral?	Yes ☐ No ☒
Does this application require courtesy comment?	Yes ☐ No ☒
Is there any other issue that requires notation?	Yes ☐ No ☒
Does this application require referral for decision by Council?	Yes ☒ No ☐

Local Environmental Plan

Section 4.15(1)(a)(i) and Section 4.15(a((ii) – EP & A Act

This land is zoned: R1 General Residential

Development as per Standard Definitions: ***water supply system*** *means any of the following—*

(a) a water reticulation system,

(b) a water storage facility,

(c) a water treatment facility,

(d) a building or place that is a combination of any of the things referred to in paragraphs (a)–(c).

List the relevant clause/clauses applicable under the LEP		
Clause	**Compliance**	**Comment**
Land Use Table	Yes ☒ No ☐	Whilst water supply systems are not specified under the R1 zoning table, development permitted with consent includes *any other development not specified in item 2 or 4*. As water supply systems are not listed under 2 or 4 of the zoning table, they are considered to be permissible with consent. This development is considered to be ancillary development to the existing water supply.
4.3 Height of Building	Yes ☐ No ☒	The maximum height of buildings in the residential zone is 10m. Currently the reservoirs are approximately 25m high and there will be increase in height.
6.1 Earthworks	Yes ☒ No ☐	The construction of the proposal works would result in ground disturbance due to excavation works required for the proposed pipeline modification works, gas chlorine pipework as well as the foundation of the new amenities building. Therefore, there is a potential for erosion and movements of excavated materials off-site, as well as sedimentation of waterways and the resulting impacts on water quality. Erosion and sediment controls would be required during construction works and stabilisation works undertaken following the completion of the construction phase.

Is there a draft LEP or draft LEP amendment which may affect this proposal? Yes ☐ No ☒

Is there any other issue that requires notation? Yes ☐ No ☒

Do 'existing use' provisions (Sections 4.65-4.70 of the EP&A Act) apply to this development? Yes ☒ No ☐

Development Control Plan

Section 4.15(1)(a)(iii) & Section 4.15(3A) – EP & A Act

Is there a DCP which applies to this land/proposal? Yes ☒ No ☐

List the relevant clause/clauses under the applicable DCP			
Chapter	**Clause**	**Compliance**	**Comment**
5 General Development Provisions	5.2.1 Parking	Yes ☒ No ☐	The proposed development would be undertaken within the boundaries of the existing water reservoirs site. The construction vehicles would park onsite (within the reservoirs site), and no interruption to services and operations of the adjacent depot or residential developments is expected. The upgrade of the proposed Lightning Ridge WSS is not anticipated to have an impact on the availability of public transport, the demand for off street parking and traffic volumes in the locality of the proposed development.
	5.2.3 Outdoor Lighting	Yes ☐ No ☒	No detail has been given in regard to outdoor lighting. A condition is required that compliance with AS4282 Control of Obtrusive Effects of Outdoor Lighting be demonstrated.
6 Environmental Controls	6.1 Environmental Effects	Yes ☒ No ☐	**Traffic** – Construction will take approximately 8 weeks and there will be traffic generation during this time. **Odour & Emission – Construction -** The main impact to air quality during construction is expected to arise from the generation of airborne localised dust associated with earthworks as well as construction traffic (vehicles emissions). However, these emissions would occur only

			intermittently, and are expected to be minor and temporary. It would be unlikely that they would contribute to a permanent detectable reduction in local air quality. **Odour & Emission –** Operation - The proposed aeration system would assist in overcoming the existing 'rotten eggs' smell emitted from the existing reservoirs, due to its effectiveness in removing H2S Therefore, the upgraded Lightning Ridge WSS (aeration and chlorination systems) is anticipated to have a positive impact on ambient air quality post construction. **Noise** – See below Clause 6.5
	6.2 Soil & Erosion	Yes ☒ No ☐	The construction of the proposal works would result in ground disturbance due to excavation works required for the proposed pipeline modification works, gas chlorine pipework as well as the foundation of the new amenities building. Therefore, there is a potential for erosion and movements of excavated materials off-site, as well as sedimentation of waterways and the resulting impacts on water quality. Erosion and sediment controls would be required during construction works and stabilisation works undertaken following the completion of the construction phase.
	6.3 Vegetation	Yes ☒ No ☐	The proposal will not include any vegetation removal. The proposal would mainly involve replacement of existing structures and installation of new equipment and facilities within a previously disturbed land.
	6.4 Waste management	Yes ☒ No ☐	**Construction** – This can be conditioned. **Operation** - The H2S would be removed continuously from the area between the roof and the water surface. The WSS would be operated to avoid chemical spills and the generation of chemical waste. The chlorine dosing system would be located within the amenities building, and the entire chlorination system will be operated under vacuum conditions to minimise the potential for chlorine leakage. An Operational Plan will specify the requirements and procedures of the removal of the H2S as well as chemical waste discharge.
	6.5 Noise	Yes ☒ No ☐	**Construction -** The proposed development is anticipated to have a minor construction noise impacts on the surrounding residents. **Operation** - A noise assessment of the proposal (See Appendix B and Section 4.4.1) has assessed that the operation of the noisy components of the proposed development (aerators) would meet the requirements of the *Noise Policy for Industry* (NPfI) 2017 for all residential receptors. A minor noise impacts on the surrounding residents, especially those located at 50 and 52 Nettleton Drive, are predicted during operation of the upgraded WSS, however these impacts are not considered to be significant

Is there a draft DCP which may affect this proposal? Yes ☐ No ☒

Is there any other issue that requires notation? Yes ☐ No ☒

Regional Environmental Plan

There is no REP applicable to this area.

State Environmental Planning Policy

Is this proposal affected by a SEPP? Yes ☐ No ☒

List all relevant SEPPs		
SEPP	**Compliance**	**Comment**
SEPP 19 — Bushland in Urban Areas	Not Applicable ☒ Applicable ☐	*The SEPP aims to protect and preserve bushland within the urban areas because of its value to the community as part of the natural heritage, its aesthetic value, and its value as a recreational, educational and scientific resource.*
SEPP 21 – Caravan Parks	Not Applicable ☒ Applicable ☐	*The SEPP ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted.*
SEPP 33 — Hazardous and Offensive Development	Not Applicable ☒ Applicable ☐	*The SEPP provides considerations for consent for hazardous & offensive development.*
SEPP 36 – Manufactured Homes Estates	Not Applicable ☒ Applicable ☐	*The SEPP helps establish well-designed and properly serviced manufactured home estates in suitable locations.*
SEPP 44 — Koala Habitat Protection	Not Applicable ☒ Applicable ☐	*This SEPP applies to land across NSW that is greater than one (1) hectare and is not a National Park or Forestry Reserve. The SEPP encourages the conservation and management of natural vegetation areas that provide habitat for koalas to ensure permanent free-living populations will be maintained over their present range.*
SEPP 47 – Moore Park Showground	Not Applicable ☒	*Applies to the land shown edged heavy black on the map marked "Moore Park Showground Amendment No 1."*
SEPP 50 Canal Development	Not Applicable ☒ Applicable ☐	*This SEPP bans new canal estates from the date of gazettal, to ensure coastal and aquatic environments are not affected by these developments.*
SEPP 55 — Remediation of Land	Not Applicable ☒ Applicable ☐	*This SEPP applies to land across NSW and states that land must not be developed if it is unsuitable for a proposed use because of contamination.*
SEPP 64 — Advertising and Signage	Not Applicable ☒ Applicable ☐	*The SEPP aims to ensure that outdoor advertising is compatible with the desired amenity and visual character of an area, provides effective communication in suitable locations and is of high-quality design and finish.*
SEPP 65 — Design Quality of Residential Flat Development	Not Applicable ☒ Applicable ☐	*The SEPP relates to residential flat development across the state through the application of a series of design principles. Provides for the establishment of Design Review Panels to provide independent expert advice to councils on the merit of residential flat development.*
SEPP 70 – Affordable Housing (Revised Schemes)	Not Applicable ☒ Applicable ☐	*This SEPP identifies that there is a need for affordable housing across the whole of the State and describes the kinds of households for which affordable housing may be provided and makes a requirement with respect to the imposition of conditions relating to the provision of affordable housing.*

Aboriginal Land 2019	Not Applicable ☒ Applicable ☐	*This SEPP provides for development delivery plans for areas of land owned by Local Aboriginal Land Councils to be considered when development applications are considered, and declares specified development carried out on land owned by Local Aboriginal Land Councils to be regionally significant development.*
Affordable Rental Housing 2009	Not Applicable ☒ Applicable ☐	*The SEPP provides for an increase in the supply and diversity of affordable rental and social housing in NSW.*
Building Sustainability Index: BASIX 2004	Not Applicable ☒ Applicable ☐	*The SEPP provides for the implementation of BASIX throughout the State.*
Coastal Management 2018	Not Applicable ☒ Applicable ☐	*This SEPP promotes an integrated and co-ordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the Coastal Management Act 2016, including the management objectives for each coastal management area.*
Concurrences 2018	Not Applicable ☒	*This SEPP allows the Planning Secretary to act as a concurrence authority.*
Educational Establishments and Child Care Facilities 2017	Not Applicable ☒ Applicable ☐	*This SEPP facilitates the effective delivery of educational establishments and early education and care facilities across the state.*
Exempt and Complying Development Codes 2008	Not Applicable ☒ Applicable ☐	*The SEPP provides exempt and complying development codes that have State-wide application, identifying, in the General Exempt Development Code, types of development that are of minimal environmental impact that may be carried out without the need for development consent; and, in the General Housing Code, types of complying development that may be carried out in accordance with a complying development certificate.*
Gosford City Centre 2018	Not Applicable ☒	*This SEPP applies to the Gosford City Centre.*
Housing for Seniors or People with a Disability 2004	Not Applicable ☒ Applicable ☐	*The SEPP aims to encourage provision of housing for seniors, including residential care facilities. The SEPP provides development standards.*
Infrastructure 2007	Not Applicable ☒ Applicable ☐	*The SEPP provides a consistent approach for infrastructure and the provision of services across NSW, and to support greater efficiency in the location of infrastructure and service facilities.*
Complies	Yes ☐ No ☐ Comment Only ☒	Under Clause 125(5) and 127 of SEPP Infrastructure 2007, development for the purpose of a water supply system or any development that is in connection with an existing water supply system may be carried out by any person without development consent only within a prescribed zone this being; RU1 Primary Production, RU2 Rural Landscape, RU4 Primary Production Small Lots, IN1 General Industrial, IN3 Heavy Industrial, SP1 Special Activities and SP2 Infrastructure. As the site for the proposed water supply works is not located within a prescribed zone, the provisions of SEPP Infrastructure 2007 do not apply to the works.
Kosciuszko National Park – Alpine Resorts 2007	Not Applicable ☒	*This SEPP applies to part of Kosciuszko national park, and to Kosciuszko Road and the Alpine Way. The part of Kosciuszko Park to which the policy applies is the land described as the ski resort area in Part 8A of Schedule 6 to the Act.*

Kurnell Peninsula 1989	Not Applicable ☒	*This SEPP applies to land within the Shire of Sutherland, known as Kurnell Peninsula, and adjacent waterways.*
Mining, Petroleum Production & Extractive Industries 2007	Not Applicable ☒ Applicable ☐	*The SEPP aims to provide proper management of mineral, petroleum and extractive material resources and ESD.*
Miscellaneous Consent Provisions 2007	Not Applicable ☒ Applicable ☐	*This SEPP provides for the erection of temporary structures and the use of places of public entertainment while protecting public safety and local amenity.*
Penrith Lakes Scheme 1989	Not Applicable ☒	*This SEPP applies to the land shown edged heavy black on the structure plan relating to Penrith Lakes.*
Primary Production and Rural Development 2019	Not Applicable ☒ Applicable ☐	*This SEPP facilitates the orderly economic use and development of lands for primary production; reduce land use conflict and sterilisation of rural land.*
State and Regional Development 2011	Not Applicable ☒ Applicable ☐	*This SEPP identifies development that is State significant development or State significant infrastructure and critical State significant infrastructure and to confer functions on joint regional planning panels to determine development applications.*
State Significant Precincts 2005	Not Applicable ☒ Applicable ☐	*This SEPP facilitates the development, redevelopment or protection of important urban, coastal and regional sites of economic, environmental or social significance to the State so as to facilitate the orderly use, development or conservation of those State significant precincts for the benefit of the State, and facilitates service delivery outcomes for a range of public services and to provide for the development of major sites for a public purpose or redevelopment of major sites no longer appropriate or suitable for public purposes.*
Sydney Drinking Water Catchment 2011	Not Applicable ☒ Applicable ☐	*This SEPP provides for healthy water catchments that will deliver high quality water while permitting compatible development.*
Sydney Region Growth Centres 2006	Not Applicable ☒	*This SEPP co-ordinates the release of land for residential, employment and other urban development in the Orth West Growth Centre, the South West Growth Centre and the Wilton Growth Area.*
Three Ports 2013	Not Applicable ☒	*This SEPP provides a consistent planning regime for the development and delivery of infrastructure on land in Port Botany, Port Kembla and the Port of Newcastle*
Urban Renewal 2010	Not Applicable ☒ Applicable ☐	*This SEPP establishes the process for assessing and identifying sites as urban renewal precincts, and facilitates the orderly and economic development and redevelopment of sites in and around urban renewal precincts,*
Vegetation in Non-Rural Areas 2017	Not Applicable ☒ Applicable ☐	*This SEPP protects the biodiversity values of trees and other vegetation in non-rural areas of the State, and to preserves the amenity of non-rural areas of the State through the preservation of trees and other vegetation.*
Western Sydney Employment Area 2009	Not Applicable ☒	*This SEPP protects and enhances the land known as the Western Sydney Employment Area for employment purposes.*
Western Sydney Parklands 2009	Not Applicable ☒	*This SEPP puts in place planning controls that will enable the Western Sydney Parklands Trust to develop the Western Parklands into a multi-use urban parkland for the region of western Sydney.*

List all relevant Draft SEPPs		
SEPP	**Compliance**	**Comment**
SEPP 44 – Koala Habitat Protection	Not Applicable ☐ Applicable ☐	*The key changes in the proposed amended SEPP relate to the definitions of koala habitat, list of tree species, list of councils, and development assessment process.*
SEPP 55 — Remediation of Land	Not Applicable ☒ Applicable ☐	*The proposed SEPP will provide a state–wide planning framework for the remediation of land; require consent authorities to consider the potential for land to be contaminated when determining development applications; clearly list the remediation works that require development consent; and introduce certification and operational requirements for remediation works that can be undertaken without development consent.*
Environmental SEPP	Not Applicable ☒ Applicable ☐	*Changes proposed include the consolidation of the following existing SEPPs:* • *SEPP 19 – Bushland in Urban areas* • *SEPP (Sydney Drinking Water) 2001* • *SEPP 50 – Canal Estate Development* • *Greater Metropolitan REP No.2 – Georges River Catchment* • *Sydney REP No. 20 – Hawkesbury – Nepean River (No.2-1997)* • *Sydney REP (Sydney Harbour Catchment) 2005* • *Willandra Lakes REP No.1 – World Heritage Property*

Is there any other issue that requires notation? Yes ☐ No ☒

Planning Agreement

Section 4.15(1)(a)(iiia) – EP & A Act

Is there a Planning Agreement in force under section 93F of the EP&A Act? Yes ☐ No ☒

Has a Planning Agreement been offered under this development? Yes ☐ No ☒

Planning Strategies/Local Policy

Is there a Planning Strategy or Local Policy that requires notation? Yes ☐ No ☒

Has the applicant submitted any supporting planning assessments? Yes ☒ No ☐

Comment: Statement of Environmental Effects, Technical Specifications and Plans

Is there any other issue that requires notation? Yes ☐ No ☒

Subdivision

Is this application for subdivision? Yes ☐ No ☒

Environmental Impacts

Section 4.15(1)(b) – EP & A Act

Does this proposal have any potential impact on:

	Impact	Comment
Social	Yes ☒ No ☐	It will lead to an improved water supply, This is a major positive impact for the water users.
Economical	Yes ☒ No ☐	There will be a positive impact during the construction of the upgrade works.
Siting & Configuration	Yes ☒ No ☐	The siting is appropriate as this is ancillary development to an existing water supply site.

Setbacks	Yes ☐ No ☒	
Privacy	Yes ☐ No ☒	
Overshadowing	Yes ☐ No ☒	
Solar Access	Yes ☐ No ☒	
Visual	Yes ☒ No ☐	The works will be visual, but mostly the new building which will contain: • A closet type room for the chlorine cylinder storage; • A room for chlorine dosing equipment, chlorine booster pumps, chlorine control panel and any other item associated with the chlorine dosing system; and • A room for the electrical switch board, SCADA, online analyser displays, transfer pump VSDs, electrical metering panel, and any other instruments which are not directly connected to the chlorine dosing system.
Significant Views	Yes ☐ No ☒	
Amenity	Yes ☒ No ☐	As this should remove the rotten egg gas smell associated with the water, this in itself should improve the amenity.
Water	Yes ☐ No ☒	
Air	Yes ☒ No ☐	As this should remove the rotten egg gas smell associated with the water, this in itself should improve the air quality.
Noise	Yes ☒ No ☐	**Construction** - The proposed development is anticipated to have a minor construction noise impacts on the surrounding residents. **Operation** - This is a summary from the Lightning Ridge Water Supply Upgrade -Noise Impact Assessment undertaken by SMK in 2017 (see Appendix B of the SEE). Although the scope of works assessed in the 2017 noise assessment (cooling tower) is no longer valid; however, the information and assessment's results of noise impacts are still applicable for the proposed development. The upgraded Supply will be run by an automated system that will engage in response to demand and peak load requirements. As a result, the facility will operate intermittently throughout day, evening and night periods. Given the morning demand upon the Lightning Ridge water supply, the upgraded supply is anticipated to regularly be required to operate in the early morning hours, prior to 7am. The proposed aeration system is considered to be the main source of noise during the operation of the upgraded supply. The 2017 assessment concluded that the noise generated by the (previously proposed) cooling tower is expected to fall beneath the *Noise Policy for Industry* (NPfI) 2017 recommended maximum criteria at all residential receptors throughout the day and evening periods, but are likely to exceed the adopted threshold at the night periods, potentially resulting in a minor noise disturbance to the north-eastern receptors. It is noted that the currently proposed aeration system (jet spry aerator) is considered to have a much lower noise and vibration levels when compared with cooling towers. The jet spray aerators would be installed inside the reservoirs, which would act like a barrier to stop direct emissions of noise. It is noted also that the aerators will operate intermittently throughout day, evening and night periods. This level of intrusion may result in a minor disturbance to the surrounding residential amenity. It is worth noting however, that the noise generated by the aerators would be similar in character to domestic air-conditioning units, however, noise emitted by the aerators and their location inside the reservoirs is anticipated to be

		at lower levels of noise and vibration. Therefore, the impact may be less noticeable, particularly throughout the summer months. Therefore, it is concluded that the operational noise of the jet spray aerators is not anticipated to have a significant impact on the surrounding sensitive receptors.
Land Degradation	Yes ☐ No ☒	
Tree Loss	Yes ☐ No ☒	
Flora	Yes ☐ No ☒	
Fauna	Yes ☐ No ☒	

Has a Threatened Species Impact Assessment been prepared? Yes ☐ No ☒

Does the proposed development require approval under the EPBC Act Yes ☐ No ☒

Heritage	Impact	Comment
European	Yes ☐ No ☒	
Aboriginal	Yes ☐ No ☐	An Aboriginal Heritage Information Management System (AHIMS) search was carried for the land including a 50 metre buffer. No sites are recorded or places declared either on the land or within the 50 metre buffer. See Attachment.

Is this land classified as containing an item of environmental heritage? Yes ☐ No ☒

Is there an impact on and adjoining or in close vicinity to an item of environmental heritage? Yes ☐ No ☒

Is this proposal in a heritage conservation Zone? Yes ☐ No ☒

Is this proposal in an adjoining or in close vicinity to a conservation zone? Yes ☐ No ☒

Has a Heritage Impact Statement been prepared for this proposal? Yes ☐ No ☒

Has an Archaeological Survey been prepared for this proposal? Yes ☐ No ☒

Is there any other issue that requires notation? Yes ☐ No ☒

Flooding

Section 4.15(1)(b) – EP & A Act

Is this property flood affected? Yes ☐ No ☒

Bush Fire Prone Land

Section 4.15(1)(b) – EP & A Act

Is this property bush fire prone as per the Bush Fire Prone Map? Yes ☐ No ☐

Contaminated Land

Section 4.15(1)(b) – EP & A Act

Has this land been identified as being contaminated land by Council? Yes ☐ No ☒

Has a Contaminated Land Site Investigation been completed? Yes ☐ No ☒

Is it a possibility this land may be contaminated? Yes ☐ No ☒

Is this land in the close vicinity or adjoining a known contaminated site? Yes ☐ No ☒

Infrastructure

Section 4.15(1)(b) – EP & A Act

Has an engineering assessment been completed? Yes ☐ No ☒

Is an engineering assessment required? Yes ☐ No ☒

Does this proposal have any potential impact on:

	Impact	Comment
Sewer	Yes ☐ No ☒	
Water	Yes ☐ No ☒	
Drainage	Yes ☐ No ☒	
Access	Yes ☐ No ☒	
Kerb & Gutter	Yes ☐ No ☒	
Upgrade Existing Road	Yes ☐ No ☒	
Road Network	Yes ☐ No ☒	
Existing Easements	Yes ☐ No ☒	
Electricity	Yes ☐ No ☒	
Telecommunications	Yes ☐ No ☒	
Pedestrian Access	Yes ☐ No ☒	
Loading & Unloading	Yes ☐ No ☒	
Parking	Yes ☐ No ☒	
Energy Conservation	Yes ☐ No ☒	

Does the development require any new easements? Yes ☐ No ☒

Has an Erosion and Soil Control Plan been submitted? Yes ☐ No ☐

Construction Assessment

Is a Construction Certificate Required? Yes ☒ No ☐

Was a construction certificate submitted with this application? Yes ☐ No ☒

Is a construction assessment required? Yes ☐ No ☒

Is there any other issue/feature/impact that requires notation from the assessment? Yes ☐ No ☒

Is an annual Fire Safety Measures certification required? Yes ☐ No ☒

Is a public defects liability agreement required? Yes ☐ No ☒

Section 68 Assessment

Is a section 68 assessment required? Yes ☒ No ☐

Has a section 68 assessment been completed? Yes ☐ No ☒

Was a section 68 application submitted with this application? Yes ☐ No ☒

Comment: The section 68 will be for stormwater only.

Developer Contributions

Does this proposal require any Developer Contribution? Yes ☐ No ☒

Signage

Does this proposal require signage? Yes ☐ No ☒

Notification

Is this application an advertised development application?	Yes ☐ No ☐
Was this application advertised as per the provisions of? EP& A Act ☒	Yes ☒ No ☐ Not Required ☐
Is there any other issue that requires notation?	Yes ☒ No ☐

Comment: At the time of writing this assessment, the neighbour notification had not been undertaken. A separate report t Council is being prepared recommending that delegated authority be given to the GM to determine the application if no written submission with an objection are received. If a submission which is an objection is received, the application will be sent back to Council for consideration.

Section 88b Instrument

Does Council require a Section 88b instrument to be prepared?	Yes ☐ No ☒

Public Interest

Does this proposal have any construction or safety issues?	Yes ☐ No ☒
Is there any public health issues?	Yes ☐ No ☒
Are there any other public interest issues?	Yes ☐ No ☒

Site Suitability

Section 4.15(1)(c) – EP & A Act

Is this a suitable site for this development?	Yes ☒ No ☐

Assessing Officer General Comment

Comment: This proposed development will improve the quality of water supply in the Lightning Ridge township. The main issues with the existing Lightning Ridge water supply have been identified as:

- Lack of chlorination due to high water temperature;
- The unpleasant quality of water due to high water temperature; and
- The unpleasant odour of water (rotten eggs odour) and associated community complaints.

will be rectified.

The 'do -nothing' option would mean that the above-mentioned existing issues in the Lightning Ridge WSS will remain unresolved, and that the drinking water quality would not be improved.

Recommendation

This development application be approved subject to the following conditions:

RELEVANT PRESCRIBED CONDITIONS (under the Environmental Planning and Assessment Regulation 2000)

Compliance with Building Code of Australia & insurance requirements under the Home Building Act 1989

Please Note: *A reference to the Building Code of Australia is a reference to that Code as in force on the date the application is made for the relevant:*

a) development consent, in the case of a temporary structure that is an entertainment venue, or

b) construction certificate, in every other case.

1. The work must be carried out in accordance with the requirements of the Building Code of Australia.

Erection of signs

Please Note: *This does not apply in relation to:*

a) *Building work, subdivision work or demolition work that is carried out inside an existing building, which does not affect the external walls of the building development consent, in the case of a temporary structure that is an entertainment venue, or*

b) *Crown building work that is certified, in accordance with section 116G of the Act, to comply with the technical provisions of the State's building laws.*

c) *A complying development certificate issued before 1 July 2004 only if the building work, subdivision work or demolition work involved had not been commenced by that date.*

2. A sign must be erected in a prominent position on any site on which building work, subdivision work or demolition work is being carried out:

   a) showing the name, address and telephone number of the principal certifying authority for the work, and

   b) showing the name of the principal contractor (if any) for any building work and a telephone number on which that person may be contacted outside working hours, and

   c) stating that unauthorised entry to the site is prohibited.

3. Any such sign is to be maintained while the building work, subdivision work or demolition work is being carried out, but must be removed when the work has been completed.

Please Note: *Principal certifying authorities and principal contractors must also ensure that signs required by this clause are erected and maintained (see clause 227A which currently imposes a maximum penalty of $1,100).*

GENERAL CONDITIONS

4. The development shall be implemented in accordance with:

   (a) All documentation and correspondence submitted by the applicant, or their agents, in support of the Development Application,

   (b) the details set out on the plans approved and stamped by authorised officers of Council,

   except as amended by the conditions of this development consent.

   Note: Any proposal to modify the terms or conditions of this consent, whilst still maintaining substantially the same development to that approved, will require the submission of a formal application under Section 4.55 of the *Environmental Planning and Assessment Act 1979* for Council's consideration. If amendments to the design result in the development not remaining substantially the same as that approved by this consent, a new development Application will have to be submitted to Council.

5. A copy of all stamped approved plans, specifications and documents must be kept on site at all times so as to be readily available for perusal by any officer of Council or the Principal Certifying Authority.

6. A site-specific Construction Environmental Management Plan is to be prepared and will include work procedures and mitigation control measures, including but not limited to, the following:

   - Any conditions of consent and any other licence/approval conditions;
   - Emergency response plan in case of a pollution incident;

- Complaints handling procedure and a 24-hour telephone contact number;
- Erosion and Sediment Control Plan, prepared in accordance with "*Managing Urban Stormwater, Soil and Construction, 2006* (Landcom)";
- Identify appropriate procedures for handling and disposal of waste, in accordance with the *Protection of the Environment Operations Act 1997* and the *Protection of the Environment Operations (waste) Regulation 2014*;
- A Noise and Vibration Management Plan incorporating feasible and reasonable construction noise and vibration management measures.

7. A separate application is to be submitted for the new building which is to house the chlorine dosing equipment, the electrical switch board, SCADA, online analyser displays, transfer pump VSDs, electrical metering panel, and any other instruments which are not directly connected to the chlorine dosing system.. This is to include plans (site and elevation) and is to include full engineering certification.

CONDITIONS TO BE COMPLETED PRIOR TO CONSTRUCTION COMMENCING

8. A Construction Certificate must be obtained, in accordance with cl.146 of the Environmental Planning and Assessment Regulation 2000, before work commences.

9. Council is to be given written notice of the intention to commence works and the appointment of a Principal Certifying Authority (if the PCA is not Council) at least two days before the proposed date of commencement, in accordance with cl 103 and 104 of the Environmental Planning and Assessment Regulation 2000. Such notice is given using the form enclosed with this consent.

   Should Council be appointed the Principal Certifying Authority, the applicant must give at least 2 days' notice to enable inspections to be undertaken.

10. Before construction commences on the site and throughout the construction phase of the development, erosion control measures are to be installed to prevent soil erosion, water pollution or the discharge of loose sediment on surrounding land, as follows:

    - divert uncontaminated run-off around cleared or disturbed areas,
    - erect a silt fence to prevent debris escaping into drainage systems or waterways,
    - prevent tracking of sediment by vehicles onto roads,
    - stock pile topsoil, excavated material, construction and landscaping supplies and debris within the site.

Please Note: *Failure to take effective action may render the developer liable to prosecution under the NSW Protection of the Environment Operations Act 1997.*

11. A hoarding or fence must be erected between the work site and any public place if the work is likely to cause traffic (pedestrian or vehicular) in a public place to be obstructed or otherwise inconvenience. The erected hoarding is to be sufficient to prevent any substance from or in connection with the work falling into the public place. The work site must be kept lit between sunset and sunrise if it is likely to be hazardous to persons in the public place. The hoarding, fence or awning is to be removed once the work has been completed.

12. Approval to carry out work stormwater work must be obtained, in accordance with section 68 of the *Local Government Act 1993*, before works commence.

13. Compliance with *AS4282 Control of Obtrusive Effects of Outdoor Lighting* be demonstrated.

CONDITIONS TO BE COMPLETED DURING CONSTRUCTION

14. The owner of the property is to ensure that any building is constructed:
    (a) to meet the setback requirements of the approved plans,
    (b) to be located within the confines of the lot, and;
    (c) so that it does not interfere with any easements or covenants upon the land.

15. Any building work must be carried out between 7.00am and 5.00pm Monday to Friday and 8.00am to 1.00pm Saturdays, excluding Sundays and public holidays. No audible construction is to take place outside these hours, to maintain the amenity of the locality.

16. A garbage receptacle must be provided at the work site before works begin and must be maintained until works are completed. The garbage receptacle must have a tight fitting lid and be suitable for the reception of food scraps and papers.

17. Waste materials (including excavation, demolition and construction waste materials) must be managed on the site (and must not be burned on site) and then disposed of at a waste management facility, to protect the amenity of the area and avoid the potential of air pollution.

18. Effective dust control measures are to be maintained during construction to maintain public safety/amenity. Construction activities are to be undertaken so as not to inconvenience the adjoining land owners and are to be restricted solely to the subject site.

19. Any run-off and erosion control measures required must be maintained within their operating capacity until the completion of the works to prevent debris escaping from the site into drainage systems, waterways, adjoining properties and roads.

20. No material or equipment associated with the development is to be placed on public land without the written consent of the Council, and any activity located in close proximity to public areas is to be fenced to prevent damage to persons or property.

21. Any earthworks (including any structural support or other related structure for the purposes of the development):

    a) must not cause a danger to life or property or damage to any adjoining building or structure on the lot or to any building or structure on any adjoining lot, and

    b) must not redirect the flow of any surface or ground water or cause sediment to be transported onto an adjoining property, and

    c) that is fill brought to the site—must contain only virgin excavated natural material (VENM) as defined in Part 3 of Schedule 1 to the *Protection of the Environment Operations Act 1997*, and

    d) that is excavated soil to be removed from the site—must be disposed of in accordance with any requirements under the *Protection of the Environment Operations (Waste) Regulation 2005*.

    Any excavation must be carried out in accordance with *Excavation Work: Code of Practice* (ISBN 978-0-642-785442), published in July 2012 by Safe Work Australia.

22. If, during the course of any activities conducted under this consent, the Applicant becomes aware of any heritage or archaeological sites not previously identified, all work likely to affect the site shall cease immediately. The Applicant shall then consult with relevant authorities and decide on an appropriate course of action prior to recommencement of work. The relevant authorities may include NSW Environment, Climate Change & Water and the relevant local Aboriginal community. Any necessary permits or consents shall be obtained and complied with prior to recommencement of work.

CONDITIONS TO BE COMPLETED PRIOR TO OCCUPATION/USE COMMENCING

23. Occupancy of the building is not to take place until the Principal Certifying Authority (PCA) has carried out a final inspection and an Occupation Certificate issued. All required trade certifications are to be available to the PCA before the final inspection will be carried out.

Please Note: *Failure to obtain an Occupation Certificate is an offence under the legislation. Penalty advice for buildings (penalties do not apply to uses detailed in sections 109M and 109N; i.e. Crown projects, Class 1a and 10 buildings or as detailed for places of public entertainment).*

24. At the completion of the works, the work site must be left clear of waste and debris.

25. An Operation Environmental Management Plan is to be prepared or an existing plan updated to provide adequate protection to workers undertaking future maintenance activities of the upgraded Water Supply Service.

CONDITIONS RELATING TO ONGOING OPERATIONS

26. A further application is to be made for any change, enlargement or intensification of the premises or land use, including the display / erection of any new structure such as signage, partition walls or building fit-out (unless the proposed work is exempt from the need for consent under *State Environmental Planning Policy (Codes SEPP) 2008).*

COUNCIL ADVICE ONLY

27. Covenant/s: The applicant / owner has the responsibility of being aware of any covenant which may affect the proposal.

28. Dial Before You Dig: Underground assets may exist in the area that is subject to your application. In the interests of health and safety and in order to protect damage to third party assets please contact Dial Before You Dig at www.1100.com.au or telephone on 1100 before excavating or erecting structures (This is the law in NSW). If alterations are required to the configuration, size, form or design of the development upon contacting the Dial Before You Dig service, an amendment to the development consent (or a new development application) may be necessary. Individuals owe asset owners a duty of care that must be observed when working in the vicinity of plant or assets. It is the individual's responsibility to anticipate and request the nominal location of plant or assets on the relevant property via contacting the Dial Before You Dig service in advance of any construction or planning activities.

29. Telecommunications Act 1997 (Commonwealth); Telstra (and its authorized contractors) are the only companies that are permitted to conduct works on Telstra's network and assets. Any person interfering with a facility or installation owned by Telstra is committing an offence under the Criminal Code Act 1995 (Cth) and is liable for prosecution. Furthermore, damage to Telstra's infrastructure may result in interruption to the provision of essential services and significant costs. If you are aware of any works or proposed works which may affect or impact on Telstra's assets in any way, you are required to contact: Telstra's Network Integrity Team on phone number 1800 810 443.

Reasons For Conditions

1. To confirm and clarify the terms of Council's approval.
2. To comply with all relevant legislation.
3. So that the impacts of any increase in the scale or duration of operations may be assessed and appropriately controlled. Section 19 (1) (b) of the *Environmental Planning and Assessment Regulation 2000*, as amended.
4. To prevent and/or minimise the likelihood of environmental harm and public nuisance.
5. To ensure the rehabilitation of the site.
6. To minimise the potential for adverse impacts on the environment or public as a result of the development.
7. To ensure waste is disposed of in an appropriate manner.
8. To ensure that public infrastructure is maintained.
9. To minimise the potential for detrimental impacts to buildings or neighbouring properties.

Conclusion

I confirm that I am familiar with the relevant heads of consideration under the Environmental Planning & Assessment Act and Local Government Act (if applicable) and have considered them in the assessment of this application.

I certify that I have no pecuniary or non-pecuniary interest in this application.

Additional Notes Attached Yes ☒ No ☐

Signed: .....

Elizabeth Cumming, Consultant Planner

Date:17 March 2020

Signed: .....

Jessica McDonald, Director Environmental Services

Date:18 March 2020

Office of Environment & Heritage
NSW GOVERNMENT

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : LR Water Supply

Client Service ID : 491834

Elizabeth Cumming

Date: 17 March 2020

7 Vernon Street
Inverell New South Wales 2360

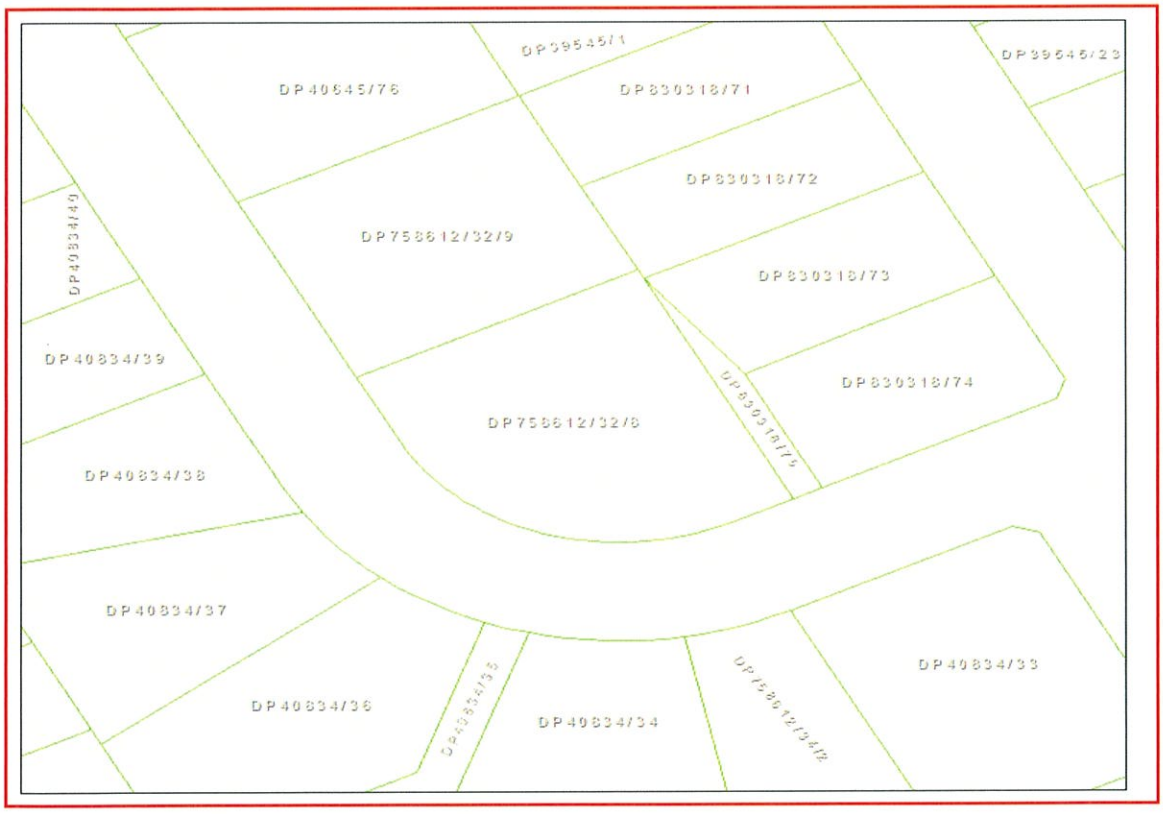
Attention: Elizabeth Cumming

Email: nenwplanningservices@outlook.com

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 8, DP:DP758612, Section : 32 with a Buffer of 50 meters, conducted by Elizabeth Cumming on 17 March 2020.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

3 Marist Place, Parramatta NSW 2150
Locked Bag 5020 Parramatta NSW 2220
Tel: (02) 9585 6380 Fax: (02) 9873 8599

ABN 30 841 387 271
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NSW GOVERNMENT | Public Works Advisory

Lightning Ridge Water Supply System Upgrade

Statement of Environmental Effects

Report Number: ISR19127

March 2020

Prepared for: Walgett Shire Council

WALGETT SHIRE COUNCIL

Report Number: ISR19127

Document control

Version	Author(s)	Reviewer	Approved for issue	
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Abbreviations

AHIP	Aboriginal Heritage Impact Permit
CEMP	Construction Environmental Management Plan
BC Act	Biodiversity Conservation Act 2016
DECCW	Department of Environment, Climate Change and Water
EP&A Act	Environmental Planning and Assessment Act 1979
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPA	Environment Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
LEP	Local Environmental Plan
LGA	Local Government Area
NPW Act	National Parks and Wildlife Act 1974
SEPP	State Environmental Planning Policy
WSC	Walgett Shire Council
WSS	Water Supply System

1. Introduction

This Statement of Environmental Effects (SEE) accompanies a Development Application (DA) lodged on behalf of the Walgett Shire Council (WSC). The proponent seeks approval from WSC to upgrade the Water Supply System (WSS) in Lightning Ridge, NSW (Lot 8 Section 32 DP758612).

The Proposal

The proposal will involve the upgrade the Lightning Ridge WSS to improve the quality of water supplied to the town of Lightning Ridge. The proposed upgrade assessed in this SEE would consist of the following:

- Construction of an aeration system, comprising a jet spray type aerator inside the two water reservoirs in Lighting Ridge;
- Construction a chlorine dosing facility;
- Modification to the pipework around the two reservoirs; and
- Associated works including temperature monitoring system on each reservoir, power supply, SCADA system and water monitoring system.

The development is described in the following documentation that accompanies the DA and this SEE.

Reports

- Technical Specifications Report, Lightning Ridge Water Supply System Upgrade – prepared by PWA, dated July 2019.
- Noise Impact Assessment- Lightning Ridge Water Supply System Upgrade– prepared by SMK Consulting, dated October 2017.

This SEE describes the subject site and the surrounding area, together with the relevant planning controls and policies relating to the site and the type of development proposed.

This SEE assesses the impact of the proposed Lightning Ridge WSS upgrade, being the aeration system, the new chlorine facility, modification of pipework and other associated monitoring and electrical works. It provides an assessment of the proposed development against the heads of consideration as set out in Section 4.15 of the *Environmental Planning and Assessment Act* (EP&A Act) 1979.

It is noted that some of the proposed upgrade works of the Lightning Ridge WSS, being the new chlorine dosing facility, modification of the pipework around the two reservoirs and other associated works including temperature monitoring system, power supply, SCADA system and water monitoring system could be undertaken as exempt development, or as development permitted without development consent under *State Environmental Planning Policy (*Infrastructure) 2007 (SEPP) Infrastructure, however, these works are being assessed in this SEE to provide a comprehensive impact assessment of the proposed Lightning Ridge WSS upgrade.

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2. Section 4.15 Considerations

This SEE has been prepared to meet the requirements of Section 4.15 (1) of the Act, which require a consent authority to take into consideration a number of matters as relevant to the development.

These matters, and how they have been considered as part of this SEE, are detailed below.

As a result of the assessment it is concluded that development of the site in the manner proposed is considered to be acceptable and is worthy of the support of the Council.

Table 2-1: Section 4.15 (1) Matters for Consideration

Section 4.15 (1) Considerations	Where Addressed in the SEE
(a) the provisions of any of the following that that apply to the land to which the development application relates,	
(i) any environmental planning instrument, and	Section 5.3.1 and 5.3.2
(ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and	Section 5.3.3
(iii) any development control plan, and	Section 5.3.4
(iiia) any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4, and	No applicable current or draft planning agreements
(iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph), and	Section 5.2.2
(b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,	Section 5
(c) the suitability of the site for the development,	Section 6.3
(d) any submissions made in accordance with this Act or the regulations,	Council to consider
(e) the public interest.	Section 6.4

3. The Site and Surrounding Environment

3.1 Description of the Subject Site

Lightning Ridge is a town in north-western NSW within Walgett Shire Council (WSC) Local Government Area (LGA), near the southern border of Queensland. It is located approximately six km east of the Castlereagh Highway, and 75 km to the south of the town of Walgett.

The Lightning Ridge water supply consists of two bore pumping stations, which pump water to the two (2) water reservoirs through a water rising main. The water is supplied to the town through an outlet attached to each reservoir.

The two water reservoirs and associated infrastructure are located at 21 Butterfly Avenue in Lightning Ridge (Lot 8 Section 32 DP758612). The water reservoirs site is generally flat and is fenced. The entire lot area is approximately 22.2 ha.

Maps, aerial views and photographic views of the site and water reservoirs are provided in Figure 3-1 to Figure 3-6.

Water supply and power supply is available to the site from Butterfly Avenue.

3.2 Land Ownership

The site (Water Reservoirs) is located within Lot 8 Section 32 DP758612 and owned by WSC.

3.3 Surrounding Environment

The lot containing the water reservoirs can be accessed from Butterfly Avenue via a sealed driveway. It is located in the southern portion of the of Lightning Ridge township and surrounded by the residential settlements. The nearest residential property to the site is directly adjacent to the eastern boundary, being 50 and 52 Nettleton Drive. In addition to residential properties located across the road approximately 20 m to the west and south of the site's boundary, being (38, 40, 42, 44, 46, 48, 50 and 52 Butterfly Avenue) (see Figure 3-5).

The surrounding area is of a typical suburban environment. The main source of background noise being intermittent traffic along Butterfly Avenue.

The nearest water course to the water reservoir site is the Twelve Mile Swamp Creek, which runs approximately 6.2 km to the east. Coocoran Lake is located approximately 10 km to the north west of the site. Some natural drainage lines are located within a close proximity to the site (See Figure 3-2).

Figure 3-1: Location Map of the Proposed Works in NSW

Source: SIX Maps, August 2019

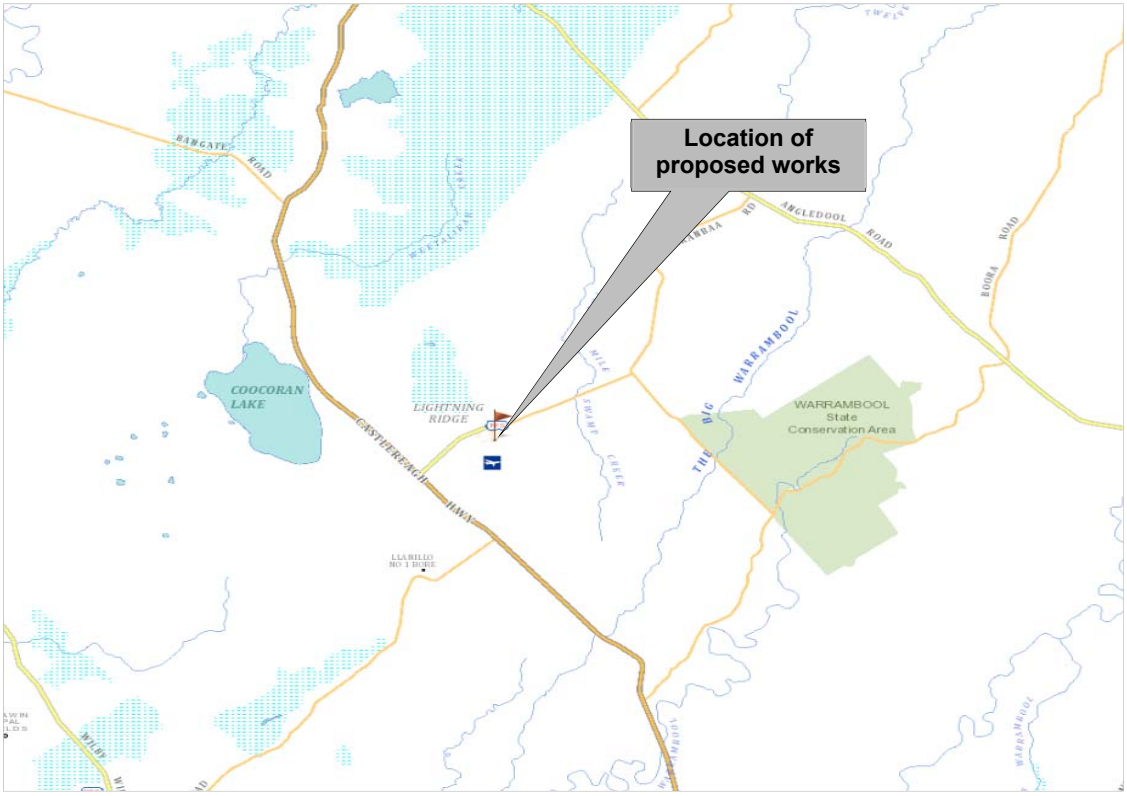


Figure 3-2: Location Map of the Proposed Works in Relation to the Surroundings Watercourses and Natural Drainage Lines

Source: SIX Maps, September 2019

Figure 3-3: Locality Map of the Site

Source: SIX Maps, August 2019

Figure 3-4: Aerial View of the Water Reservoirs Site (outlined in red)

Source: SIX Maps, August 2019

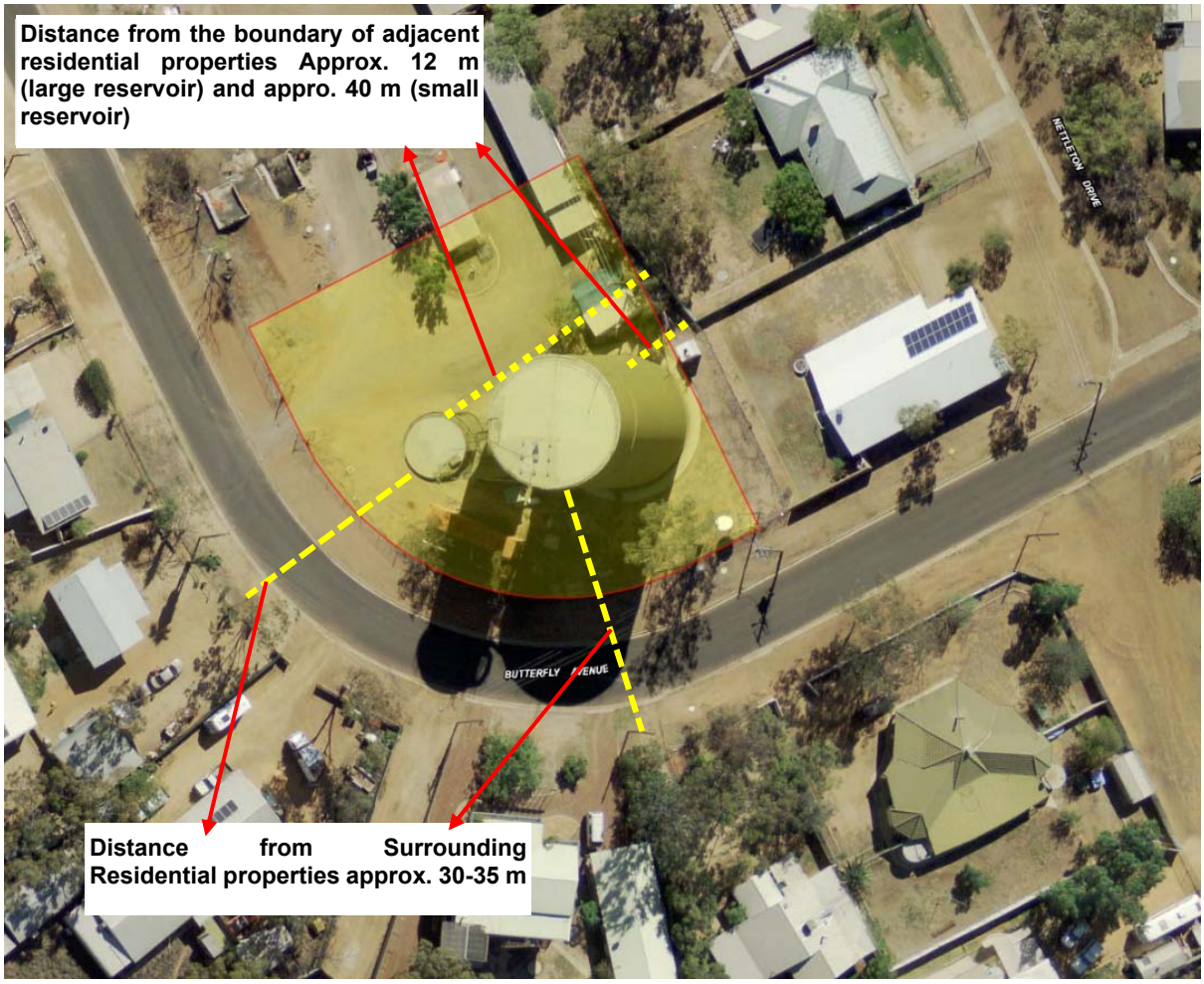


Figure 3-5: Aerial Map of the Proposed Works Site (outlined in red) and Distance from Nearest Residential Properties

Source: Six Maps, August 2019

Figure 3-6: Photographic Views of the Existing Water Reservoirs and Associated Equipment

Source: PWA, 2019

4. The Development

This section is a summary of the Technical Specification Report prepared by PWA in 2019. The full report is provided in Appendix A.

4.1 Existing Infrastructure

Lighting Ridge receives its water supply from two bores sourced from the Great Artesian Basin (GAB). The existing Lightning Ridge WSS consists of two bore pumping stations, two town reservoirs and associated pipeline arrangement around the two reservoirs.

Pumping Stations

There are two bore pumping stations, being the old bore pumping station with flow rate of 29 L/s, and the new bore pumping station with the flow rate of 30 L/s. Water is pumped to two town reservoirs and is then reticulated thought the town via gravity.

Water Reservoirs and Pipelines

The daily water demand from the two reservoirs vary during winter and summer peak times. The pipeline arrangement around the two reservoirs and their functions are shown in Figure 4-1.

The two reservoirs are located next to each other. The small reservoir is 1.1 ML and the larger one is 5.2 ML. Both reservoirs are approximately 25 m tall and made of steel and service connections to the town. Water from the bores is pumped to the two reservoirs using a common rising main.

Water extracted from the sealed bores remains at approximately 50°C all year round. Raw water is transferred to the two town reservoirs via a heat exchanger at the public swimming pool and is supplied to Lightning Ridge township without treatment. Water temperature decreases to approximately 25°C at the reservoirs. The water is not chlorinated. Sodium hypochlorite powder has been dosed from the top of the reservoir in a few occasions for disinfection.

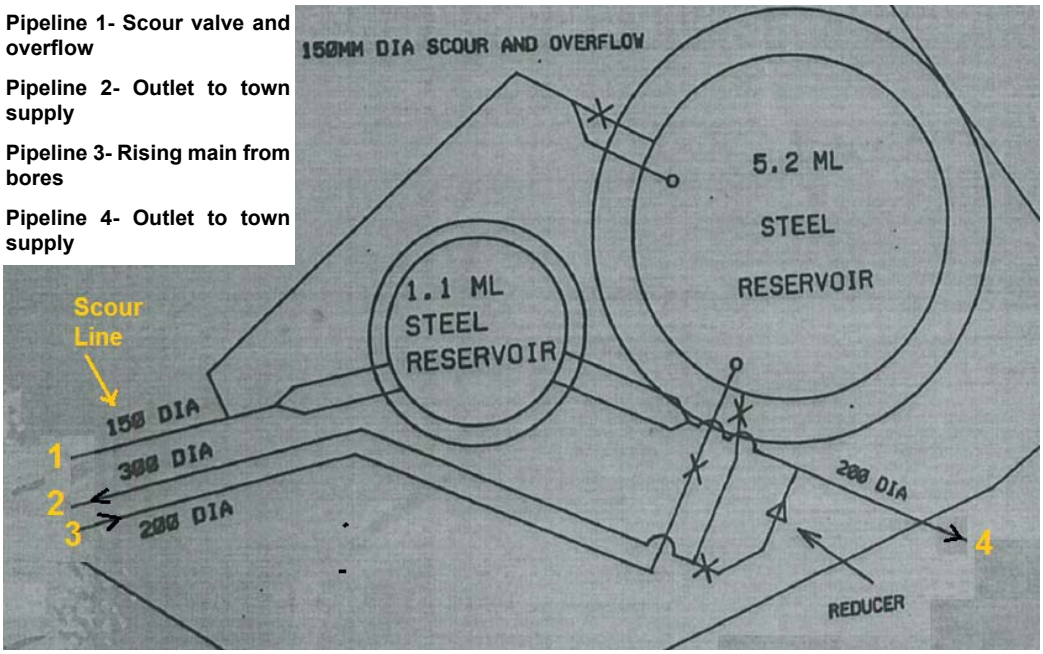


Figure 4-1: Layout of the Existing Reservoirs and Associated Pipelines

Source: PWA, August 2019

At present, the water from the bore pumping stations enters the large reservoir only (via pipeline no. 3) and the current pipeline arrangement does not allow feeding the small reservoir from the bore system. The small reservoir acts as a balance tank and is fed from the large reservoir. When the large reservoir is being fed from the bores, the town can only be fed from the small reservoir. The pipes and valve arrangement also allow sending the water to the town from the large reservoir by manually opening and closing the valves, however, this will require stopping the feed to the large reservoir from the bores.

The inlet of the large reservoir is a bottom entry and terminates approximately (3/4) of the height of the reservoir. The small reservoir is also a top entry and the arrangement of the inlet.

A magflow meter is provided on the rising main of each bore and located near the bore site. A signal from these magflow meters will be available soon on the ClearSCADA telemetry system which is currently being installed.

Each reservoir needs to maintain at least 15m water level to maintain the town pressure.

The entire WSC water supply including the bores will be available on the ClearSCADA after the current telemetry upgrade.

When the ClearSCADA system is running, the reservoir operating levels can be adjusted via SCADA.

Existing Water Quality and Associated Issues

The limited onsite water quality tests carried out by PWA indicated that:

- The Hydrogen sulphide (H_2S) levels in the raw bore water exceeds *the Australian Drinking Water Guideline* (ADWG) value of 0.05mg/L at both bores.

- Iron and Manganese values in the raw water from new bore and old bore are under ADWG values.

Additionally; on site aeration tests were carried out at the new bore and the old bore to check if aeration can remove the H_2S and oxidise or help in oxidising any manganese or iron in the water. Based on the test result (see Appendix A), the excess H_2S levels in the raw bore can be removed by aeration, the H_2S residuals of the aerated water meet the ADWG.

In summary, the bore water is generally complying with all of the ADWG except for microbiological quality, because it is not disinfected, and the H_2S levels are elevated. However, the water is soft and stabilising the water with lime to correct the pH with acid or carbon dioxide would add an immense complexity that may not be warranted.

The main issues with the existing Lighting Ridge water supply have been identified as:

- Lack of chlorination due to high water temperature;
- The unpleasant quality of water due to high water temperature; and
- The unpleasant odour of water (rotten eggs odour) and associated community complaints.

4.2 Option Evaluation and Objectives

4.2.1 'Do- Nothing' Option

The 'do -nothing' option would mean that the above-mentioned existing issues in the Lightning Ridge WSS will remain unresolved, and that the drinking water quality would not be improved.

4.2.2 Upgrade the Lightning Ridge WSS Option

WSC investigated the option of upgrading the existing Lightning Ridge WSS, to improve the quality of water supplied to the town of Lightning Ridge and overcome the issues in the existing WSS. The proposed upgrade would consist of the following works:

- Construction of an aeration system, comprising a jet spray type aerator inside the two reservoirs;
- Construction a chlorine dosing facility comprising of gas chlorine;
- Modification to the pipework around the two reservoirs (both reservoirs receive water from bores and supply the town).
- Associated works including temperature monitoring system on each reservoir, power supply, SCADA system and water monitoring system.

4.2.3 Preferred Option

The 'Do Nothing' is not considered acceptable to address the issues associated with the existing Lightning Ridge WSS, and therefore was not the preferred option. WSC preferred option was to upgrade the WSS to achieve the objectives of the project, being the improvement of the water quality supplied to Lightning Ridge township.

4.3 Description of the Proposed Development

Based on the concept design and Technical Specifications Report prepared by PWA in 2019, the proposed WSS upgrade would be located within the existing water reservoirs site boundaries, and would consist of the following general components:

Aeration System

- Install a jet spray type aerator inside each reservoir; and
- Modify the current inlet arrangement of each reservoir to suit the new aerators.

Modification of Pipework

- Excavate the ground to expose the pipework around the two reservoirs to clearly understand the pipework arrangement prior to the design work;
- Undertake all necessary pipework modification to receive bore water directly to 1.1 ML reservoir in addition to 5.5 ML reservoir;
- Construct a new pipeline (minimum 200mm) between the two reservoirs connecting the outlet of the large reservoir and the inlet of the small reservoir with a flow control valve and a magflow meter; and
- Install a transfer pumping system on the 200 mm pipeline between the two reservoirs.

Chlorination System

- Install an online chlorine analyser on the outlet of each reservoir;
- Install an online pH analyser with the facilities to sample the water from the outlet of each reservoir;
- Install a chlorine dosing facility using gas chlorine; and
- Undertake all necessary pipework modification to supply the town from individual reservoir as well as both reservoirs simultaneously while receiving the bore water to each or both reservoirs.

Other Associated Works

- Install a magflow meter on the inlet of each reservoir;
- Install a magflow meter on the common outlet to the town;
- Install temperature monitoring system on the inlet and outlet of each reservoir;
- Install a single online turbidimeter with the facilities to sample the water from the outlet of any reservoir;
- Construct a building for the new facilities;
- Install a pressure sensor type level monitoring system on each reservoir; and
- Provide a SCADA system to monitor and control the upgraded scheme and provide signals for others to connect to the ClearSCADA system.

The following is a summary of the main upgrade components. The detailed description of the proposed WSS upgrade is provided in Appendix A.

4.3.1 Jet Spray Aerator

The proposed works involves the installation of the of a jet nozzle type spray aerator inside the two water reservoirs in Lightning Ridge.

The aerators would be installed close to the roof to maximise the distance between the aerator and the top water level which will maximise the contact time of the sprayed water with the air inside the reservoir. It is proposed to install the aerators at a level not deeper than 300m from the reservoir roof level. As the inlet of each reservoir currently terminates a few meters below the reservoir top level, this will require extending the inlet of each reservoir.

All components of the aerator unit would be '316' stainless steel. Other light weight material might be used provided that the selected material has excellent strength and corrosion resistant properties.

Each aerator would achieve a minimum of 3˚C temperature drop during the summer periods and would effective in removing H_2S.

The aerators would not direct the water jets towards the walls. Jets would be directed slightly upward to maximise the falling depth but would not touch the roof.

The H_2S would be removed continuously from the area between the roof and the water surface.

4.3.2 Pipework Modification

The contractor would be required to produce the conceptual drawings of the proposed pipework modifications post excavation, to clearly identify and confirm the current pipework arrangements and functionality of the pipes around the two reservoirs. The concept design of the pipework modification would be submitted and approved by WSC prior to the commencement of works.

The proposed pipework modification would be undertaken to the achieve the following functional requirements:

- Transfer water from any bore (or both bores) simultaneously to any reservoir;
- Transfer water from any reservoir (or both reservoirs) simultaneously to the town;
- Transfer water from the large reservoir to the small reservoir; and
- Raise the inlet pipe termination point from the current level to a level sufficient to install the aerators (at a level about 300mm below the roof level).

The new pipework would be '316' stainless steel or DICL and suit the existing pipes.

The pipework modification would also provide automatic flow isolation valve on the inlet of each reservoir, and a flow control valve on the pipeline between the two reservoirs. All these valves would be connected to the SCADA system.

A pressure gauge on the inlet of each reservoir, and an online temperature analyser on the inlet and outlet of each reservoir would also be installed as part of the proposed pipework modification works.

The works would involve the installation of a manual sampling points on the inlet and outlet of each reservoir, as well as on the pipeline between the two reservoirs.

4.3.3 Transfer Pump Unit

Install a VSD operated transfer pump unit with two pumps (Duty and 100% standby) on the pipeline between the two reservoirs. This pump would be used to transfer the water from the large reservoir to small reservoir. During operation of the pump, the bore supply to the small reservoir will be stopped by closing the relevant valves.

4.3.4 Chlorination System

The proposed works would involve the provision of a complete vacuum-controlled chlorination system to dose chlorine to the water with the flow pacing facilities.

The chlorination system would be capable of dosing up to 6 mg/L of chlorine into the water.

The system would generate alarms when there is a failure of chlorine gas (no-flow alarm for gas) as well as chlorine solution failure (no-flow alarm for solution).

The gas chlorine system would have two duty and two standby cylinders with automatic changeover.

All gas chlorine system associated pipework would be installed underground or run on pipe trays if aboveground. All above ground pipes would be UV resistant or painted with UV resistant paint.

Chlorine Dosing Operation

The chlorine dosing system would be designed to use 70 kg cylinders. It would have two duty and two standby cylinders with automatic changeover. Sufficient space would be provided in the room for two spare uninstalled cylinders.

The system would have two separate chlorine dosing points, one to dose chlorine into the 5.2 ML reservoir and the second one to dose into the 1.1 ML reservoir.

The dosing system would be capable of dosing 1 mg/L to 6 mg/L of chlorine to each dosing point for a water flowrate between 12 L/s and 30 L/s to each reservoir. The total water flowrate to both reservoirs would not exceed 30 L/s at anytime.

Due to the risk of losing chlorine during evaporation operation, chlorine would not be dosed into the inlet pipe of any reservoir.

A new hole may be drilled on each reservoir for the installation of the dosing points. This would be using a flange connection. The dosing quill would be able to be removed for cleaning purposes. Provide non-return valves and isolation valves as required at the dosing point.

4.3.5 Amenities Building

The new amenities building would be designed and installed under the construction contract. The building would be located within the site boundaries (most probably on

the vacant area to the north-west of the existing water reservoirs) and would consist of three rooms, including:

- A closet type room for the chlorine cylinder storage;
- A room for chlorine dosing equipment, chlorine booster pumps, chlorine control panel and any other item associated with the chlorine dosing system; and
- A room for the electrical switch board, SCADA, online analyser displays, transfer pump VSDs, electrical metering panel, and any other instruments which are not directly connected to the chlorine dosing system.

The building would be a brick construction with colorbond or similar roof. Thermal insulation would be provided for the roof as well as other building services (power outlets, lighting, smoke and fire alarms, fire extinguishers and hose reel).

4.4 Operation of the Aeration System

4.4.1 Operational Noise

This section is a summary from the Lightning Ridge Water Supply Upgrade -Noise Impact Assessment undertaken by SMK in 2017 (see Appendix B). Although the scope of works assessed in the 2017 noise assessment (cooling tower) is no longer valid; however, the information and assessment's results of noise impacts are still applicable for the proposed development.

The upgraded Lightning Ridge WSS will be run by an automated system that will engage in response to demand and peak load requirements. As a result, the facility will operate intermittently throughout day, evening and night periods. Given the morning demand upon the Lightning Ridge water supply, the upgraded WSS is anticipated to regularly be required to operate in the early morning hours, prior to 7am. The proposed aeration system is considered to be the main source of noise during the operation of the upgraded WSS.

The 2017 assessment concluded that the noise generated by the (previously proposed) cooling tower is expected to fall beneath the *Noise Policy for Industry* (NPfI) 2017 recommended maximum criteria at all residential receptors throughout the day and evening periods, but are likely to exceed the adopted threshold at the night periods, potentially resulting in a minor noise disturbance to the north-eastern receptors.

It is noted that the currently proposed aeration system (jet spry aerator) is considered to have a much lower noise and vibration levels when compared with cooling towers. The jet spray aerators would be installed inside the reservoirs, which would act like a barrier to stop direct emissions of noise. It is noted also that the aerators will operate intermittently throughout day, evening and night periods.

This level of intrusion may result in a minor disturbance to the surrounding residential amenity. It is worth noting however, that the noise generated by the aerators would be similar in character to domestic air-conditioning units, however, noise emitted by the aerators and their location inside the reservoirs is anticipated to be at lower levels of noise and vibration. Therefore, the impact may be less noticeable, particularly throughout the summer months.

Therefore, it is concluded that the operational noise of the jet spray aerators is not anticipated to have a significant impact on the surrounding sensitive receptors.

4.5 Construction Considerations and Methodology

The proposed Lightning Ridge WSS upgrade would be undertaken by the successful contractor as part of a design and construct contract. The contractor would be required to ensure that all equipment used and the manner of the installation of the WSS system is in accordance with the final agreed design, and in compliance with the relevant Australian Standards.

Site security and temporary fencing would be placed on the construction zone perimeter to prevent unauthorised access into the work site.

The proposed development is likely to include the following general activities by the contractor(s):

- Preparation of a Construction Environmental Management Plan (CEMP);
- Provide all necessary provisions for site signage, safe access, security, safe storage of hazardous materials, amenities, etc. to meet SafeWork NSW WHS requirements and current Australian Standards;
- Establishment of site preliminaries such as entry/exit points, erosion and sediment controls, stormwater management controls, temporary protection fencing,
- Loading/unloading, transportation and placement of construction equipment and materials;
- Identification of services on the site which may be impacted by the works;
- Excavate the ground to expose the pipework around the two reservoirs to clearly understand the pipework arrangement prior to the design work;
- Contractor to produce the concept design for the proposed pipework modification and submit to WSC to gain approval;
- Undertake necessary pipework modification in accordance with the approved design drawings;
- Install the jet spray aerator, transfer pumping station, chlorine dosing facilities, amenities building as well as all other associated works and equipment;
- Make good/repair any damage caused to Council assets during the construction process; and
- Clean-up site and remove all materials and equipment from the site.

There is sufficient area to allow for a construction compound within the site boundaries.

4.5.1 Construction Equipment

Construction equipment will include the following or similar equipment as required:

- Light commercial and passenger vehicles, which may include a light truck for delivery and removal of materials, utility vehicle and trailer;
- Electric hand tools;
- Backhoe;
- Small to medium crane; and

- Mobile scaffolding.

4.5.2 Construction Timeframe

Hours of construction will be as follows:

- Monday to Friday: 7.30am to 6.00pm.
- Saturdays: 7.30am to 1.00pm.
- Sundays and Public Holidays: No work allowed unless special permission granted.

Construction is anticipated to commence in late February 2020 and would take up to eight weeks to complete.

4.5.3 Construction Noise and Vibration

Noise would be generated during construction of the proposed Lightning Ridge WSS, which has the potential to have an impact on the surrounding and adjoining residences.

Therefore, the following construction noise mitigation measures have been recommended to aid in reducing construction noise impacts, to ensure efficient noise attenuation performance is achieved:

- Undertake community notification with adjacent properties (50 and 52 Nettleton Drive, 38, 40, 42, 46, 48, 50 and 52 Butterfly Avenue) when it is planned to carry out construction of the development and where it is likely to cause vibration or offensive noise and impact nearby residents.
- Works of a noisy nature or those works which could impact neighbouring properties should follow EPA guidelines for construction works, including the *Interim Construction Noise Guideline (DECCW, 2009).*
- For works of a noisy nature or those works which could impact neighbouring properties, implement any practical and reasonable control measures to minimise noise and vibration impacts. Site and project specific measures to control noise would be determined by the construction contractor based on the construction methodology and included in the CEMP, which is required to be submitted to WSC for review prior to commencement of construction works. The *Interim Construction Noise Guideline* (DECCW, 2009) should be referred to when considering appropriate measures, and may include:
  - Optimum siting of work areas, vehicle and plant parking areas, materials stockpiles and equipment storage areas in locations where potential acoustical impacts would be minimised; and
  - Identify activities where noise is most intrusive and develop strategies to reduce impacts for these activities.

4.5.4 Construction Environmental Management

The construction contractor will be required to prepare and implement a site-specific CEMP. The CEMP will include work procedures and mitigation control measures, including but not limited to, the following:

- Any conditions of consent and any other licence/approval conditions;

- Emergency response plan in case of a pollution incident;
- Complaints handling procedure and a 24-hour telephone contact number;
- Erosion and Sediment Control Plan, prepared in accordance with "*Managing Urban Stormwater, Soil and Construction, 2006* (Landcom)";
- Identify appropriate procedures for handling and disposal of waste, in accordance with the *Protection of the Environment Operations Act 1997* and the *Protection of the Environment Operations (waste) Regulation 2014*;
- A Noise and Vibration Management Plan incorporating feasible and reasonable construction noise and vibration management measures.

4.6 Operation

Following construction, WSC would prepare an Operation Environmental Management Plan (OEMP) or incorporate procedures into an existing OEMP to provide adequate protection to workers undertaking future maintenance activities of the upgraded Lightning Ridge WSS.

4.7 Ecologically Sustainable Development Principle

The encouragement of ecologically sustainable development (ESD) is one of the objects of the EP&A Act. The proposed development is considered to be consistent with these principles, with the development designed to protect, where possible, the environmental values of the site. Safeguards have been proposed to be implemented during construction works to prevent long term and irreversible environmental degradation in accordance with the precautionary principle and inter-generational equity. The works are considered to be consistent with these principles. Environmental safeguards would be implemented during construction works to prevent long term and irreversible environmental degradation in accordance with the precautionary principle and inter-generational integrity. The proposed works would not impact on biological diversity and ecological integrity as the works would be within previously disturbed areas and would mainly replace existing structures.

5. Statutory Framework and Development Controls

5.1 Consultation

As the consent authority is WSC (the proponent), many previous correspondence and consultation with Council's town planners were undertaken. Due to the small -scale of the development as well as the lack of specific planning controls for this kind of developments. No pre-DA meeting was conducted. It was determined that the DA to be lodged accompanied with the technical specifications as well as associated plans.

5.2 Legislation

The following Acts are relevant to the Proposal.

5.2.1 Environmental Planning and Assessment Act 1979 (NSW)

As the proposed works will require development consent, Walgett Shire Council will be the consent authority and the proposal will be assessed as Crown development under Division 4, Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Section 4.15: Evaluation

Section 4.15 of the EP&A Act requires that the consent authority to take into account the likely impacts of the development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality.

This SEE has been prepared to meet the requirements of Section 4.15 of the Act as listed in Table 2-1 of this SEE. As a result of the assessment it is concluded that development of the site in the manner proposed is considered to be acceptable and is worthy of the support of the Council.

5.2.2 Environmental Planning and Assessment Regulation 2000 (NSW)

Section 92 of the *Environmental Planning and Assessment Regulation 2000* prescribes a number of matters that must be taken into consideration by a consent authority in determining a development application, for the purposes of Section 4.15 of the EP&A Act. A review of these matters indicates that none are relevant to the proposed development.

5.2.3 Protection of the Environment Operations Act 1997 (NSW)

Construction and operation of the proposed development will not involve any scheduled activities listed in Schedule 1 of the *Protection of the Environment Operations Act 1997* (POEO Act). It is not anticipated that the development will result in pollution of the environment (including noise, dust and water pollution), and therefore an Environment Protection Licence is not considered to be required.

5.2.4 Biodiversity Conservation Act 2016 (NSW)

The *Biodiversity Conservation Act 2016* (BC Act) has repealed the *Threatened Species Conservation Act 1995*, the *Nature Conservation Trust Act 2001* and the animal and plant provisions of the *National Parks and Wildlife Act 1974*.

The Act specifies the requirements for biodiversity assessment, including for development applications under Part 4 of the EP&A Act. For Part 4 assessment, the proponent of a

development that is likely to significantly affect threatened species will have to prepare a Biodiversity Development Assessment Report (BDAR).

The site is highly disturbed due to the development of the existing water reservoirs. The proposal includes an upgrade of the existing Lightning Ridge WSS, including the installation of an aeration system within an existing water reservoirs, modification of existing pipework, new chlorine dosing facility as well as other associated works. Although minor ground disturbance is required to accommodate some of the proposed (pipework modification), however, the site has been disturbed and cleared to accommodate existing infrastructure, and no vegetation would require removal to accommodate the proposed WSS upgrade works. Therefore, it is concluded that the proposal would not impact on any previously recorded threatened flora and fauna species, their habitat or endangered ecological communities listed under the BC Act. No further assessment under the BC Act is required.

5.2.5 National Parks and Wildlife Act 1974 (NSW)

The *National Parks and Wildlife Act 1974* (NPW Act) provides for the statutory protection of Aboriginal cultural heritage places, objects and features. One of the objects of the NPW Act is the conservation of places, objects and features of significance to Aboriginal people (Section 2A).

Aboriginal Objects and Aboriginal Places are protected under Part 6 of the NPW Act and there are legislative penalties if a person harms or desecrates an Aboriginal Place or Object (s. 86). Harm to an Aboriginal Place or Object includes any act or omission that destroys, defaces or damages the object or place, or, in relation to an Aboriginal object, moves the object from the land on which it had been situated. It is a defence against prosecution for unintentionally harming Aboriginal Objects if due diligence had been exercised to determine that no Aboriginal object will be harmed, or the harm or desecration was authorised by an Aboriginal Heritage Impact Permit (AHIP).

The site has been largely cleared and disturbed. The proposal involves an installation of the aeration system within existing water reservoirs, modification of existing pipework, new chlorine dosing facility as well as other associated works. therefore, it is concluded that the proposal would not impact on any potential Aboriginal objects, and that the proposal can proceed with caution without an AHIP.

5.2.6 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)

A number of Matters of National Environmental Significance are protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The EPBC Act establishes a process for assessing the environmental impact of activities and developments where “Matters of National Environmental Significance" (MNES) may be affected. Under the Act, any action which “has, will have, or is likely to have a significant impact on a matter of NES” is defined as a “controlled action”, and requires approval from the Commonwealth Department of the Environment and Energy which is responsible for administering the EPBC Act.

It is not anticipated that any matters of national environmental significance as listed under the EPBC Act would be significantly impacted by the proposal.

5.3 Environmental Planning Instruments

The following environmental planning instruments are relevant to the Proposal.

5.3.1 State Environmental Planning Policy – (Infrastructure) 2007 (ISEPP)

State Environmental Planning Policy (SEPP) (Infrastructure) 2007 aims to assist in the effective delivery of public infrastructure by improving certainty and regulatory efficiency. It provides a clear definition of environmental assessment and approval process for public infrastructure and services facilities.

Under Clause 125(5) and 127 of SEPP Infrastructure 2007, development for the purpose of a water supply system or any development that is in connection with an existing water supply system may be carried out by any person without development consent only within a prescribed zone this being; RU1 Primary Production, RU2 Rural Landscape, RU4 Primary Production Small Lots, IN1 General Industrial, IN3 Heavy Industrial, SP1 Special Activities and SP2 Infrastructure. As the site for the proposed water supply works is not located within a prescribed zone, the provisions of SEPP Infrastructure 2007 do not apply to the works.

5.3.2 Walgett Local Environmental Plan 2013

Zoning

Under the *Walgett Local Environmental Plan 2013* (WLEP), the site is zoned R1 General Residential (refer to Figure 5-1). The objectives of the R1 zone are:

- *To provide for the housing needs of the community.*
- *To provide for a variety of housing types and densities.*
- *To enable other land uses that provide facilities or services to meet the day to day needs of residents.*
- *To enable development that is compatible with the surrounding residential environment and that is unlikely to adversely affect the amenity of residential development on land in the zone.*

The aeration system and associated works are considered to meet the definition of a water supply system which is defined under the LEP to mean any of the following:

(a) a water reticulation system,

(b) a water storage facility,

(c) a water treatment facility,

(d) a building or place that is a combination of any of the things referred to in paragraphs (a)–(c).

Whilst water supply systems are not specified under the R1 zoning table, development permitted with consent includes *any other development not specified in item 2 or 4*. As water supply systems are not listed under 2 or 4 of the zoning table, they are considered to be permissible with consent.

The proposed works at the water reservoir site are considered to be consistent with the objectives of the R1 General Residential land zone, as it provides facilities and services (water supply) that meets the day to day needs of the residents.

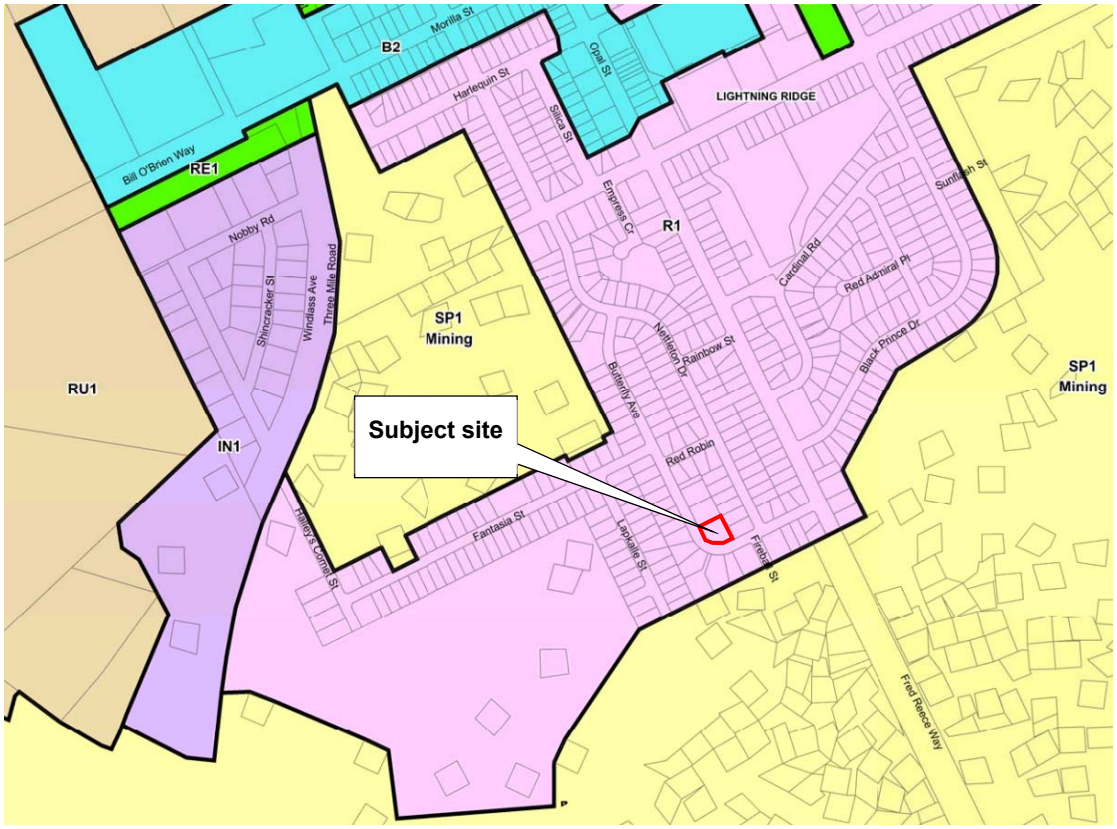


Figure 5-1: LEP Zoning Map Extract (site outlined in red)

Source: Walgett LEP 2013 (Zoning map tile map 004AA), accessed August 2019

5.3.3 Draft Environmental Planning Instruments

There are no draft Environmental Planning Instruments relevant the proposed development.

5.3.4 Walgett Development Control Plan 2016

Walgett Development Control Plan (DCP) 2016 applies to all categories of development within Walgett LGA and includes the site. The purpose of this plan is to provide clear and concise development guidelines and provide certainty of development outcomes within Walgett LGA, for the developers and the community.

Table 5-1 below addresses the relevant provisions of Walgett DCP 2016. The specific chapters of the DCP relevant to the proposal include:

- General Development Specifications; and
- Environmental Controls.

Table 5-1: Compliance with Walgett DCP 2016 Requirements

Chapter 5 General Development Specifications	
5.2 Other Development Types	
5.2.1 Parking	
Controls/Requirements	**Compliance/ How to be Addressed**
Parking and traffic requirements will be based on consideration of: • likely peak usage times; • the availability of public transport; • likely demand for off street parking generated by the development; • existing traffic volumes on the surrounding street network; and • efficiency of existing parking provision in the location. ***Other controls do not apply to the proposed development.***	**Complies** The proposed development would be undertaken within the boundaries of the existing water reservoirs site. The construction vehicles would park onsite (within the reservoirs site), and no interruption to services and operations of the adjacent depo or residential developments is expected. The upgrade of the proposed Lightning Ridge WSS is not anticipated to have an impact on the availability of public transport, the demand for off street parking and traffic volumes in the locality of the proposed development.

Chapter 6 Environmental Controls	
6.1 Environmental Effects	
Traffic	
Controls/Requirements	**Compliance/ How to be Addressed**
No specific controls available under the Walgett DCP 2016	Construction vehicles would access the site through the main entrance on Butterfly Avenue. The number and frequency of construction vehicles is unknown at this stage but it is considered to be minor given the small scale of the proposed development and short construction timeframe (eight weeks). The CEMP will include the relevant traffic mitigation measures to reduce traffic impacts associated with the development.
Air Quality (Odour and Emissions)	
Controls/Requirements	**Compliance/ How to be Addressed**
No specific controls available under the Walgett DCP 2016	**Construction** The main impact to air quality during construction is expected to arise from the generation of airborne localised dust associated with earthworks as well as construction traffic (vehicles emissions). However, these emissions would occur only intermittently, and are expected to be minor and temporary. It would be unlikely that they would contribute to a permanent detectable reduction in local air quality.

	The CEMP will include specific mitigation measures to reduce potential air quality impacts during construction. **Operation** The proposed aeration system would assist in overcoming the existing 'rotten eggs' smell emitted from the existing reservoirs, due to its effectiveness in removing H_2S (see Appendix A). Therefore, the upgraded Lightning Ridge WSS (aeration and chlorination systems) is anticipated to have a positive impact on ambient air quality post construction.
Water Quality	
Controls/Requirements	**Compliance/ How to be Addressed**
No specific controls available under the Walgett DCP 2016	**Construction** The construction of the proposal works would result in ground disturbance due to excavation works required for the proposed pipeline modification works, gas chlorine pipework as well as the foundation of the new amenities building. Therefore, there is a potential for erosion and movements of excavated materials off-site, as well as sedimentation of waterways and the resulting impacts on water quality. Erosion and sediment controls would be required during construction works and stabilisation works undertaken following the completion of the construction phase. Other potential impact on water quality may arise from construction waste entering adjacent drainage lines or watercourses.

	The CEMP will include mitigation measures to ensure pollutants (sediments and construction waste) do not enter nearby drains or waterways (see Section 4.5 and 4.5.4.) **Operation** No impact on local water quality is anticipated post construction.
6.2 Soil and Erosion	
Controls/Requirements	**Compliance/ How to be Addressed**
Generally, erosion and sediment control measures are not required on land with a gradient less than 1:50 (11º). On sites with gradients higher than 1:50 or where there is evidence of existing erosion applicants should consider: • The need to manage runoff to prevent any land degradation including offsite sedimentation; • Cut and fill will be minimised and the site stabilised during and after construction; and • Arrangements in place to prompt revegetation of earthworks to minimise erosion.	As mentioned above, the CEMP will include mitigation measures (runoff management controls) to prevent offsite sedimentation.
6.3 Vegetation	
Controls/Requirements	**Compliance/ How to be Addressed**
Development design shall accommodate the retention of any significant trees and vegetation.	**Complies** The proposal will not include any vegetation removal. The proposal would mainly involve replacement of existing structures and installation of new equipment and facilities within a previously disturbed land.

	The s.10.7 Planning Certificate obtained from WSC for the proposed works site indicated that the site is not identified as containing native vegetation of a conservation status. The existing landscaping trees existing within the boundary of the site would not be affected by the proposal.
6.4 Waste Management	
Controls/Requirements	**Compliance/ How to be Addressed**
General waste storage and collection arrangements shall be specified.	**Complies** **Construction** The CEMP will include the relevant general waste mitigation measures, as relevant to the development. **Operation** The H_2S would be removed continuously from the area between the roof and the water surface. The WSS would be operated to avoid chemical spills and the generation of chemical waste. The chlorine dosing system would be located within the amenties building, and the entire chlorination system will be operated under vacuum conditions to minimise the potential for chlorine leakage. An OEMP would be prepared by WSC for the upgraded Lightning Ridge WSS. The OEMP will specify the requirements and procedures of the removal of the H_2S as well as chemical waste discharge.

6.5 Noise	
Controls/Requirements	**Compliance/ How to be Addressed**
Where relevant, applications are to contain information about likely noise generation and the method of mitigation.	**Complies** **Construction** The proposed development is anticipated to have a minor construction noise impacts on the surrounding residents. The CEMP will include mitigation measures to reduce the noise impacts associated with construction of the proposed development (See Section 4.5.3) **Operation** A noise assessment of the proposal (See Appendix B and Section 4.4.1) has assessed that the operation of the noisy components of the proposed development (aerators) would meet the requirements of the *Noise Policy for Industry* (NPfI) 2017 for all residential receptors. A minor noise impacts on the surrounding residents, especially those located at 50 and 52 Nettleton Drive, are predicted during operation of the upgraded WSS, however these impacts are not considered to be significant (see Section 4.4.1).

6. Conclusion

6.1 Environmental Planning Instruments – Section 4.15(a)

The provisions of relevant environmental planning instruments relating to the proposed development are provided in this SEE and have been satisfactorily addressed.

6.2 Impacts of the Development – Section 4.15(b)

An assessment of key issues relating to the proposed development is provided in this SEE. It is considered that the likely impacts of the development, including impacts to traffic, noise and amenity have been satisfactorily addressed and that the proposed development has social and environmental benefits through the provision of drinking water which meets the ADWG requirements and through improved ambient air quality (removal of odours).

6.3 Suitability of the Site – Section 4.15(c)

The development involves the minor augmentation of existing water supply infrastructure located wholly within the site boundary.

The subject site is identified as being zoned R1 General Residential pursuant to the WLEP 2013. Development for the purposes of a water supply system or in connection with an existing water supply system can be carried out with development consent within the R1 General Residential Zone under the WLEP 2013 and SEPP (Infrastructure) 2007.

The site context is described in this SEE. It is not anticipated that adverse/detrimental traffic, noise and amenity impacts from the new development. The proposed development is consistent with the existing use of the site for water supply and is unlikely to have a noticeable impact to the visual amenity, due to the works being located entirely within the boundaries of the existing reservoirs site.

Overall, the subject development is considered satisfactory in terms of the likely impacts of the development and, as such, the subject site is considered suitable for the proposed development.

6.4 The Public Interest – Section 4.15(e)

The proposed Lightning Ridge WSS upgrade will have a minor short- term positive economic impact in the locality, due to the potential to generate employment opportunities for the local community. The development would result in a positive long- term health benefit to the residents of Lightning Ridge through the provision of water which would consistently meet the ADWG .

7. References

NSW Department of Planning and Environment. (2019), NSW Planning Portal, https://www.planningportal.nsw.gov.au/find-a-property

Appendix A Technical Specifications – Lightning Ridge Water Supply System Upgrade

Technical Clauses

Contents

Table of Figures, Tables and Sketches

Technical

1 General

1.1 Lighting Ridge, NSW

Coordinates	29°26′0″S 147°58′0″E
Population	2,284 (2016 census)
Postcode	2834
Elevation	170 m
Location	74 km N of Walgett
LGA(s)	Walgett Shire

Lighting Ridge is a town in north-western New South Wales, in the Walgett Shire, near the southern border of Queensland and is about six kilometres east of the Castlereagh Highway. Lighting Ridge is served in commercial activities by the town of Walgett, some 75 km to the south. Temperatures in summer can reach into the high 40s Celsius, but below ground the temperature remains continually at much lower levels.

2 Existing Lighting Ridge Water Supply Overview

2.1 Overview

Photos and drawings of the existing facilities are provided in Appendices 1 and 2.

Lighting Ridge bore water is sourced from the Great Artesian Bore (GAB). There are two bore pumping stations: old bore pumping station with flow rate of 29 L/s, and the new bore pumping station with the flow rate of 30 L/s. Water is pumped to two town reservoirs and is then reticulated thought the town via gravity.

The daily water demand from the two reservoirs vary between 1.4 ML/d in the winter to 1.8ML/d during the peak days in the summer.

The pipeline arrangement around the two reservoirs and their functions are shown on

Layout 2-1.

The two reservoirs are located next to each other. The small reservoir is 1.1 ML and the larger one is 5.2 ML. Both reservoirs are approximately 25m tall and made of steel. Both reservoirs are connected to service connections to the town.

The water from the bores is sent to the two reservoirs using a common rising main.

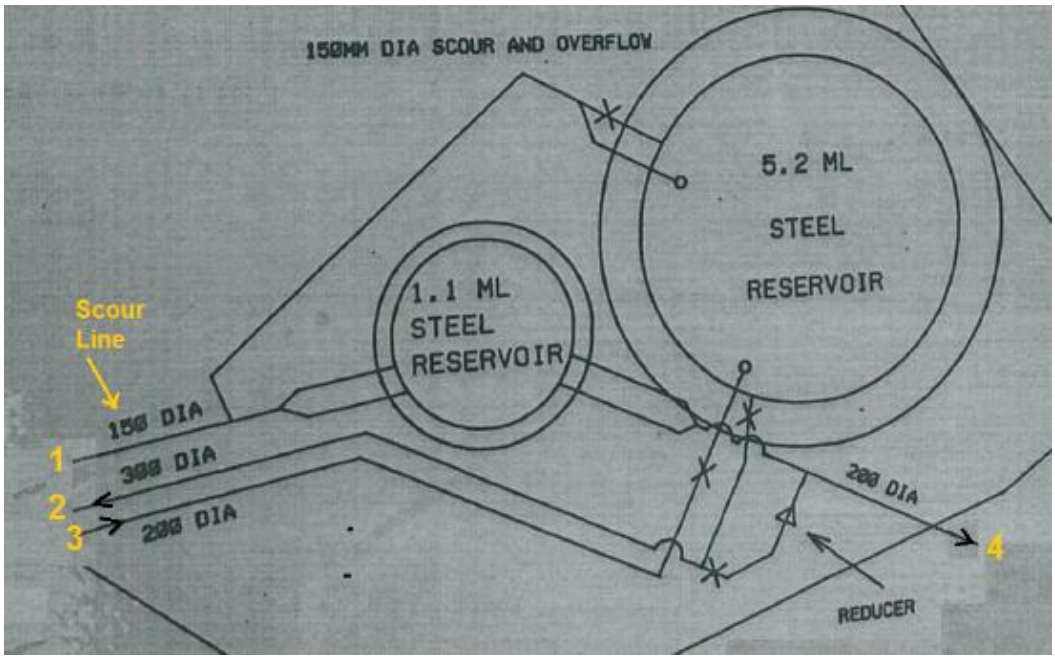
Bore pumps are provided with VSD driven motors and the flowrate can be adjusted remotely via SCADA.

Water extracted from the sealed bores remains at approximately 50°C all year round. Raw water is transferred to the two town reservoirs via a heat exchanger at the public swimming pool and is supplied to Lighting Ridge Township without treatment. Water temperature decreases to approximately 38 degrees at the inlet of the reservoir.

According to Lighting Ridge operational staff the water gets quite cold in winter, During winter, the reservoir acts as a cooling tower because the turnover of the reservoir water is quite low and it has time to cool down. In summer, the water demand is high and the water in the reservoir turns over very quickly and hence doesn't have time to cool down.

The water is not chlorinated. The water from the bores is in a completely sealed system, including the reservoirs. There has been E-coli counts in the past, so chlorine dosing should be made available when required.

Sodium hypochlorite powder has been dosed from the top of the reservoir in a few occasions for disinfection.



Layout 2-1: Pipeline around two reservoirs

- Pipeline 1: Scour valve and overflow
- Pipeline 2: Outlet to town supply
- Pipeline 3: Rising main from bores
- Pipeline 4: Outlet to town supply

At present, the water from the bores enters the large reservoir only (via Pipeline 3) and the current pipeline arrangement does not allow feeding the small reservoir from the bore system. The small reservoir acts as a balance tank and is fed from the large reservoir. The pipes and valve arrangement also allow sending the water to the town from the large reservoir by manually opening and closing the valves, however, this will require stopping the feed to the large reservoir from the bores.

The inlet of the large reservoir is a bottom entry and terminates approximately 3/4th of the height of the reservoir. The small reservoir is a top entry and the arrangement of the inlet is shown on the drawings in Appendix B.

A magflow meter is provided on the rising main of each bore and located near the bore site. A signal from these magflow meters will be available soon on the ClearSCADA telemetry system which is currently being installed.

Each reservoir needs to maintain at least 15m water level to achieve the desired town pressure.

The entire shire water supply including the bores will be available on the ClearSCADA after the current telemetry upgrade.

When the ClearSCADA system is running, the reservoir operating levels can be adjusted via SCADA.

Onsite Testing on Water Quality:

The limited onsite water quality tests carried out by Public Works Advisory (PWA) have revealed that:

- Hydrogen sulphide (H_2S) levels in the raw bore water exceeds the Australian Drinking Water Guideline (ADWG) value of 0.05mg/L at both bores.
- Iron and Manganese values in the raw water from new bore and old bore are under ADWG values.

The site test results are shown in the Table 1

Table 2-1: Lighting Ridge Water Quality Test Result

Parameter	New Bore - Raw		Old Bore - Raw
	Test 1	Test 2	Test 1
CO_2	5mg/L		3.75 mg/L
H2S	0.3mg/L	0.14mg/L	0.2 mg/L
pH	8.31	8.25	8.14
Appearance	Clear	clear	clear
Odour	Slightly rotten egg smell	Slightly rotten egg smell	Slightly rotten egg smell
Temperature	48.9oC	48.9oC	49oC
Turbidity	0.3 NTU	0.3 NTU	0.85 NTU
Total Fe	0.05 mg/L	0.05 mg/L	0.04 mg/L
Total Mn	0.011 mg/L	0.011 mg/L	0.004 mg/L
Aerated water H_2S*	0.02 mg/L	0.02 mg/L	0.02 mg/L

*Onsite Aeration Test.

On site aeration tests were carried out at the new bore and the old bore to check if aeration can remove the H_2S and oxidise or help in oxidising any manganese or iron in the water.

Based on the test result shown in Table -1, the excess H_2S levels in the raw bore can be removed by aeration and the H_2S residuals of the aerated water meet the ADWG.

The bore water is generally complying with all of the Australian Drinking Water Guidelines except for its microbiological quality, because the water is not disinfected, and elevated H_2S. However, the water is soft, and it is thought that trying to stabilise the water with lime and consequently correct the pH with acid or carbon dioxide will add an immense complexity that may not be warranted.

Additional water quality results are attached at the end of this document.

2.2 Existing facilities

Few drawings and photographs of the two reservoirs are provided at the end of this specification.

Three phase power supply is available next to the reservoirs. Refer to Appendix A for the exact location of the transformer. Essential Energy has confirmed approximately 30 kW of spare power is available in this transformer.

3 Proposed Improvement for the Lighting Ridge Water Supply

3.1 Overview

The main issues of the Lighting Ridge Water Supply are:

- Due to very high-water temperature, chlorination is not carried out,
- High temperature gives an unpleasant aesthetic quality to the water; and
- The Community has numerous complaints about rotten egg smell.

The Walgett Shire Council is planning to improve the quality of the water supply at Lighting Ridge. As the main issues relate to the water's high temperature, H_2S and microbiology, it is proposed to construct an aeration system and a chlorine dosing facility to address those issues. This specification has been prepared to engage a suitable contractor under Design & Construct Contract for the upgrade.

The conceptual arrangement of the preferred upgrade and the operating philosophy of the upgraded system is discussed below. The selected tenderer will be required to assess the situation and current facilities in detail and design a suitable system to address the issues.

3.2 Contractor's scope of work

The key items included in the scope of work of the contractor (called Lighting Ridge Water Supply Upgrade Contractor) includes the following. This includes supply all labour, tools, materials, and equipment necessary to complete the installation works including field/site testing, demonstration and commissioning.

a) Excavate the ground to expose the pipework around the two reservoirs to clearly understand the pipework arrangement prior to the design work.

b) Install a jet spray type aerator inside each reservoir

c) Install a single common online turbidimeter with the facilities to sample the water from the outlet of any reservoir

d) Install an online chlorine analyser on the outlet of each reservoir

e) Install an online pH analyser with the facilities to sample the water from the outlet of each reservoir

f) Install a magflow meter on the inlet of each reservoir

g) Install a magflow meter on the common outlet to the town

h) Install temperature monitoring system on the inlet and outlet of each reservoir

i) Install a chlorine dosing facility using gas chlorine

j) Construct a building for the new facilities

k) Modify the current inlet arrangement of each reservoir to suit the new aerators

l) Undertake all necessary pipework modification to receive bore water directly to 1.1 ML reservoir in addition to 5.5 ML reservoir

m) Undertake all necessary pipework modification to supply the town from individual reservoir as well as both reservoirs simultaneously while receiving the bore water to each or both reservoirs

n) Construct a new pipeline (minimum 200mm) between the two reservoirs connecting the outlet of the large reservoir and the inlet of the small reservoir with a flow control valve and a magflow meter

o) Install a transfer pumping system on the above pipeline between the two reservoirs

p) Install a pressure sensor type level monitoring system on each reservoir

q) Provide all electrical works including power supply, Electrical Switchboard, Instrumentation, cabling, and automatic control and motoring.

r) Provide all Telemetry works including new Telemetry Panel and updating Telemetry HMI/SCADA to integrate new/additional signals.

s) Provide effective communication system between the Reservoir site and the Council's Central Monitoring Facility (CMF).

t) Provide a SCADA system to monitor and control the upgraded scheme and provide signals for others to connect to the ClearSCADA system

u) Connect the new facilities with other components of the water supply by joining up at the Limits of Contract where applicable, including supply of all the necessary gaskets, seals etc.

v) Install an Intruder/burglar alarm system ~~and CCTV camera system~~ in the new building.

The following shall also be provided under this contract:

(a) Personnel safety gear as required.

(b) Provide all signage as required by SafeWork NSW, Australian Dangerous Goods Code and any of the Act and Regulation at the entrance to the site and on the building.

(c) 12 months Performance Run for all process design, process performance and

equipment supplied under this contract.

(d) Conduct design meetings and submit design reports.

(e) Conduct (Construction Hazard Assessment Implication Review (CHAIR) and Hazard and Operability Study (HAZOP) workshops including facilitation.

(f) Supply of O&M manuals, standard operating procedures, functional description and train the operators.

(g) Prepare and submit Work-as-Executed drawings including the pipe layout of the existing and new pipes around the two reservoirs.

Power supply to new facilities

Tenderers shall inspect the existing switchboard on the site and confirm that it has sufficient capacity to feed the new switchboard.

3.3 Contractor's responsibility

All the equipment used and the manner of the installation shall be in accordance with the final agreed design and shall be suitable for the function for which they have been provided. The workmanship throughout shall be neat and carried out by competent tradesmen. Only qualified and experience contractors who have undertaken similar work shall submit the offers for this project.

All materials shall be new and the best of their respective kinds. Equipment and components used throughout this installation shall be of well-known brands from reputable manufacturers and suppliers. Standardise on the use of equipment and components in order to minimise spares holdings. Spares and replacements shall generally be available within 48 hours.

4 Compliance

4.1 Chlorinator

The chlorination plant shall be designed and installed to comply with:

- The current version of the Australian Standard for the Storage and Handling of Liquefied Chlorine Gas AS 2927.
- NSW Work Health Safety Act 2011
- NSW Work health and Safety Regulation 2017
- The Australian Code for the Transport of Goods by Road and Rail.
- Dangerous Goods Act
- All other applicable Australian Standards
- BCA

4.2 General compliance

Supply and installations of all equipment and system including process, mechanical, electrical components shall meet the requirements of:

- This specification.
- Public Works Advisory standard – MEW E101 (March 2017). A copy (PDF) of the document can be obtained by contacting the Principal's Authorised Person.
- All relevant Australian Standards, such as: -
  - AS/NZS 3000: 2018 – SAA Wiring Rules (2018 issue)
  - AS/NZS 3008.1.1:2017– Electrical Installation and Selection of Cables
  - AS/NZS IEC 60947.1 to 60947.7:2015 – Low Voltage Switchgear and Control gear Components.

- AS/NZS 61439.1:2016 – Low Voltage Switchgear and Control gear Assemblies – General Rules
- AS 60529-2004 (R2018) – Degree of Protection provided by Enclosures for Electrical Equipment.
- AS/NZS 1768-2007– Lighting Protection
- AS/NZS 1158 Set:2010 – Lighting for roads and public spaces set
- AS IEC 61131-2004 (R2015)– Programmable Controllers
- AS 3011.2:2019 – Electrical Installations – Secondary Batteries Installed in Buildings Sealed cells
- AS/NZS 2053.1:2001 (R2016) – Conduits and fittings for electrical installations
- AS/NZS 2648.1:1995 – Underground marking tapes
- AS/NZS 4024.1201:2014 – Safety of machinery - General principles for design - Risk assessment and risk reduction.
- AS/NZS 4024.1303:2014 – Safety of machinery - Risk assessment - Practical guidance and examples of methods.
- AS/NZS 4024.1604:2019 – Safety of machinery - Design of controls, interlocks and guarding - Emergency stop - Principles for design.

- Other statutory requirements, such as: -
  - Supply Authority Regulations;
  - Safework NSW;
  - NSW Work Health and Safety Act 2011.
  - Services and Installation Rules of New South Wales

4.3 Contractor's responsibility and Qualifications

Only the contractors who are conversant with and have detailed knowledge of the current Australian Standard of AS 2927:2019 shall submit offers for this job. The contractor shall have satisfactory knowledge and experience in designing and installing the gas chlorine systems in Australia. This includes the chlorine room. The offers submitted by the tenderers who cannot demonstrate the above requirement will not be considered.

All the equipment used and the manner of the installation shall be in accordance with this Specification and shall be suitable for the function for which they have been provided. The workmanship throughout shall be neat and carried out by competent tradesmen.

All materials shall be new and the best of their respective kinds. Equipment and components used throughout this installation shall be of well-known brands from reputable manufacturers and suppliers. Standardise on the use of equipment and components in order to minimise spares holdings. Spares and replacements shall generally be available to site within 48 hours.

Council relies upon the skill and knowledge of the Contractor in providing the services. If the Contractor considers that information, documents and other particulars made available in this specification are inadequate or contain errors or ambiguities, the contractor must give written notice as soon as practicable to the Council detailing the errors or ambiguities.

This specification provides the conceptual arrangement of the new system. Irrespective of the information in this specification, the Contractor is responsible for the design and installation of the new system to comply with all required current standards and regulations in Australia.

5 Work by Others

The following work has been planned to be carried out by others under different contract/s:

a) Installation of a shire wide telemetry system covering Lighting ridge water supply.

a) Preparation of an environmental assessment report.

b) Prepare and submit development application if required.

6 Conceptual Design

6.1 Overview

The conceptual design for the Lighting Ridge water supply upgrade is discussed below. Tenderers shall develop this concept design to achieve the specified performance requirements.

Tenders shall feel free to make modifications to this conceptual design. Council will favourably consider the designs which can achieve the following:

a) The new system has the flexibility to change the operating mode to suit the town demand and seasonal weather changes.

b) Upgraded system is simple to operate and robust.

c) Provide effective and efficient performance in terms of cooling and chlorine disinfection.

d) Access to the equipment is safe and easy.

e) Provide all necessary instrumentation to alarm system malfunctions (any additional instruments may be included under optional items)

Tenderers are encouraged to submit alternative designs with separate price in the *Schedule of Alternative Design* in Tender Schedules.

6.2 Functional and performance description

Council's minimum requirement of the upgraded system is described below. The tenderers shall take this into account when designing the new work.

Under normal operation, bore water will be sent to the large reservoir and then transferred to the small reservoir.

The design shall have facilities to operate the reservoirs in any of the following three modes:

Mode 1: When the town demand is low, bore water can be sent directly to the small reservoir. Town will be fed from the small reservoir.

Mode 2: When the town demand is high, bore water can be sent to both reservoirs the town can be supplied from both reservoirs.

Mode 3: When one reservoir is taken off for maintenance, the remaining reservoir can receive and feed the town.

Each reservoir shall be able to receive up to 30 L/s and feed the town. When both reservoirs are receiving and supplying the water to the town, the total capacity shall still be 30 L/s.

Water shall be able to be transferred from the large reservoir to small reservoir. For this purpose, a new pipeline connection shall be constructed between the outlet of the larger reservoir and the inlet of the small reservoir. When the level in the large reservoir is low, this operation may require a pump between the two reservoirs. (Note: the level of each reservoir shall always be maintained above 15 m). A transfer pump shall be installed with a capacity not less than 30 L/s when the larger reservoir is at the lowest level and the level in the small reservoir is high.

A magflow meter on the inlet of each reservoir shall be provided for monitoring the flowrate to each reservoir. A magflow meter on the pipeline between the two reservoirs shall provide the flowrate between the two reservoirs.

Incoming water to each reservoir shall be released via a spray aerator installed on the top of each reservoir. Each aerator shall provide a minimum of 3-degree Celsius temperature drop. This aeration process shall also remove the dissolved gas in the water effectively.

Chlorine shall be dosed into each reservoir and shall be flow paced to the water inflow rate to each reservoir. Chlorine shall not be dosed to the inlet pipe of the reservoir due to the risk of losing chlorine during aeration. The operator shall be able to manually set the dosage via SCADA. When the large reservoir is not feeding the town, facilities shall be available to stop chlorine dosing into the large reservoir even if this reservoir is receiving the water from the bores.

A baffle system shall be installed in each reservoir to minimise the short circuiting of the chlorine being dosed to the outlet of the reservoir. The baffle system shall be designed to

provide minimum of 0.3 baffle factor. An alternative price shall be provided for a reservoir mixing system instead of baffles.

To minimise the heat built up in the reservoir during the warm and sunny days, an effective ventilation system shall be installed for continuous air change in the space between the roof and the water surface in each reservoir. Sufficient number of whirly birds shall be provided. In addition to that, an air inlet (vent) shall also be provided to supply fresh air to this space. This pipe shall be large enough to make sure sufficient air flowrate is achieved. As this air circulation may not be required during the winter times, a manual isolation valve shall be provided on this pipeline to close the air inlet. This will help to maintain the chlorine level, by minimising chlorine dissipation due to air circulation, especially when the water is stored for a long time during the winter. The valve shall be able to be operated from the ground level or provide an electrically operated valve with control facilities from the ground level.

An online analyser on each reservoir shall indicate the free chlorine residual level. Sampling water for this analyser shall be taken from a location close to the outlet of the reservoir.

The temperature analysers shall show the temperature of the inlet and outlet of each reservoir and the reading available on a local HMI (Touch Screen).

A flow control valve shall be provided on the pipeline between the two reservoirs with flowrate can be adjustable via a local HMI (Touch Screen).

The local HMI (Touch Screen) shall also provide facilities such as: selection of the overall system operating mode, selection of bores, adjusting the set points of reservoir operating level, chlorine dosage, selection of the transfer pump between the two reservoirs and the flowrate etc.

Irrespective of the operator set points, supply to each reservoir shall be automatically turned off when the water level hits the reservoir high-high level which shall be set at 300mm below the top level of each reservoir. This will be achieved by the digital signals from a level probe on each reservoir backed by a second signal from the pressure type level monitor.

Chlorine dosing system shall be capable of dosing chlorine to one or both reservoirs simultaneously.

6.3 Spray aerator

Install jet nozzle type spray aerator inside each reservoir.

Aerators shall be installed close to the roof to maximise the distance between the aerator and the top water level which will maximise the contact time of the sprayed water with the air inside the reservoir. It is proposed to install the aerators as close as 300mm to the reservoir roof level. As the inlet of each reservoir currently terminates a few meters below the reservoir top level, this will require extending the inlet of each reservoir.

All components of the aerator unit shall be 316 stainless steel. Other lightweight materials are accepted provided that the selected material has excellent strength and corrosion resistant properties for this application.

Each aeration system shall achieve a minimum of 3^0C temperature drop during the summer periods and effective in removing H_2S.

The aerators shall not direct the water jets towards the walls. Jets shall be directed slightly upward to maximise the falling depth but shall not touch the roof.

The design shall allow the H_2S removed from water to be removed continuously from the area between the roof and the water surface. This may be achieved by providing an effective ventilation system discussed above.

6.4 Pipework Modification

All necessary pipework modifications shall be carried out under this contact to achieve the operational strategy discussed in this specification.

The actual pipework arrangement can be different to the arrangement on Layout 2-1. The contractor will be required to clearly identify and confirm the current arrangement of the pipes around the two reservoirs and their functionality. For that, the ground shall be excavated and prepare a drawing showing the current arrangement and submit to Council prior to the detailed design.

The contractor shall then produce his conceptual drawings to suit the actual pipework arrangement and submit to Council at the commencement of the project work.

Carry out any additional pipe work to achieve the following functional requirements:

- send the water from any bore, or both bores simultaneously, to any reservoir
- send water from any reservoir and both reservoirs simultaneously to the town
- transfer water from large reservoir to small reservoir
- raise the inlet pipe termination point from the current level to a level sufficient to install the aerators at a level about 300mm below the roof level

The new pipework shall be 316 stainless steel or DICL and suit the existing pipes.

Provide automatic flow isolation valve on the inlet of each reservoir and a flow control valve on the pipeline between the two reservoirs. All these valves shall be connected to the PLC/RTU/HMI system.

Install the following additional instruments:

- Pressure gauge on the inlet of each reservoir
- Online temperature analyser on the inlet and outlet of each reservoir (A signal from the analyser shall be wired to the PLC/RTU/HMI to show the temperature readings)

Necessary weather protection shall be provided to all the analysers.

Provide manual sampling points on the inlet and outlet of each reservoir as well as on the pipeline between the two reservoirs.

6.5 Transfer Pump Unit

Install a VSD operated transfer pump unit with two pumps (Duty and 100% standby) on the pipeline between the two reservoirs. This pump will be used to transfer the water from the large reservoir to small reservoir. When this pump is in operation, the bore supply to the small reservoir will be stopped by closing the relevant valves.

The minimum requirements of the system is shown on Sketch 6-1.

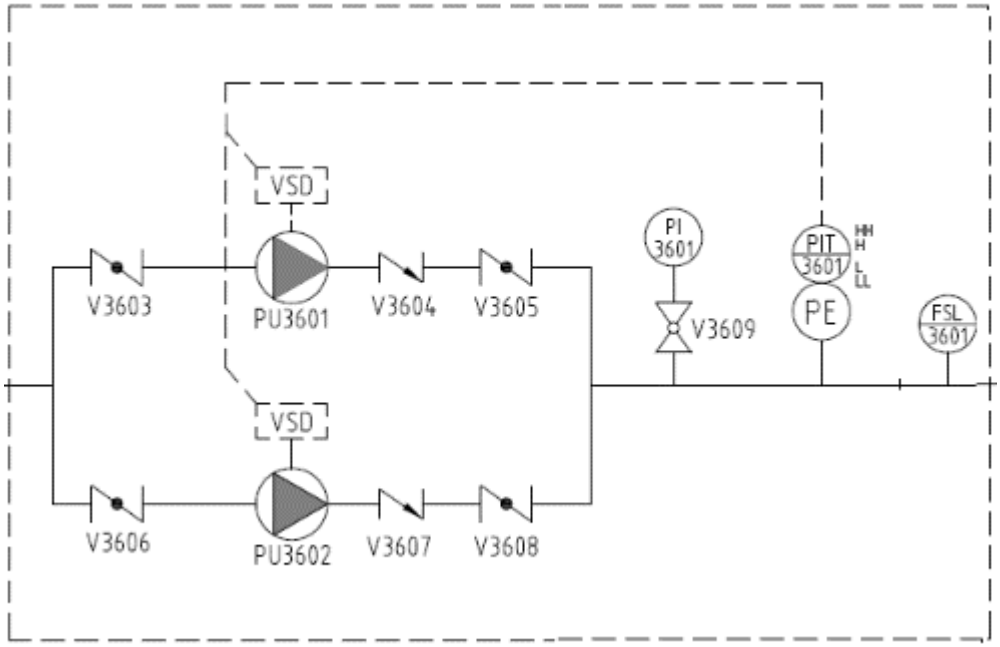
The operator shall be able to pre-set the pump flowrate. Once set, pump shall continuously transfer a fixed rate. This shall be achieved by having a control loop between the magflow meter on the same pipeline and the pump speed control.

Each pump shall be capable of pumping up to 30 L/s when the level in the large reservoir is as low as 13m and the level in the small reservoir is close to its top operating level.

Motor shall be provided with variable speed drive motor to change the flowrate between 8 L/s and 30 L/s. The operator shall be able to change the set point via the local HMI.

The VSDs of the pumps shall be installed in the building.

A manufacturer-pre-assembles pumping system assembly including the inbuilt switchboard that is suitable for external installation is acceptable. The overall pumping system shall be provided with necessary IP rating to install externally.



Sketch 6-1: Minimum requirements: Transfer pump unit

6.6 Chlorine Dosing operation

The chlorine dosing system shall be designed to use 70 kg cylinders. It shall have two duty and two standby cylinders with automatic changeover. Space shall be provided in the room for two spare uninstalled cylinders.

The system shall have two separate chlorine dosing points: one to dose chlorine into the 5.2 ML reservoir and the second one to dose into the 1.1 ML reservoir.

The dosing system shall be capable of dosing 1 mg/L to 6 mg/L of chlorine to each dosing point for a water flowrate between 12 L/s and 30 L/s to each reservoir. It shall be noted that the total water flowrate to both reservoirs will not exceed 30 L/s at any time.

Due to the risk of losing chlorine during aeration operation, chlorine shall not be dosed into the inlet pipe of any reservoir.

A new hole may be drilled on each reservoir for the installation of the dosing points. This shall be using a flange connection. The dosing quill shall be able to be removed for cleaning purposes. Provide non-return valves and isolation valves as required at the dosing point.

An effective baffle arrangement shall be provided to prevent the freshly dosed chlorine solution from short-circuiting to the outlet. The height of the baffle shall be not less than 10m. Submit an alternative price to supply and install a reservoir mixing system instead of baffles.

The operator will select the chlorine dosage. The dosing operation shall be paced to the water inflow to the given reservoir.

In case both reservoirs need chlorination, it shall be possible to dose a pre-set flowrate of chlorine solution (generated at the chlorine eductor) to each reservoir. When chlorine is being dosed to both reservoirs, flow pacing for the dosing will not be required.

When the both reservoirs are supplied by bores, the system shall automatically select the dosing operation to be controlled by the flow meters on the inlet of each reservoir.

When the large reservoir is supplied by the bores and the small reservoir is supplied from the large reservoir, then the dosing operation shall select the Mode 2. In this mode, chlorine dosing operation is controlled by the magflow meter on the inlet of large reservoir and the magflow meter on the pipeline between the two reservoirs.

Detailed design requirements of the chlorine dosing system are provided later in this specification.

6.7 Building

Refer to the clauses later in this specification for the specific re-equipment of the building

6.8 Manual Sampling Points

The contractor shall provide sampling cocks for manual drawing of water samples from various points throughout the process, including at a minimum the locations nominated below:

(a) Inlet of each reservoir

(b) Outlet of each reservoir

(c) Pipeline between the two reservoirs

7 Gas Chlorination System

7.1 General

Provide a complete vacuum-controlled chlorination system to dose chlorine to the water with the flow pacing facilities.

The chlorination system shall be capable of dosing up to 6 mg/L of chlorine into the water.

The overall process and critical individual safety units such as leak detectors, automatic cylinder shut off system etc., shall be fail-safe such that any interruption to the internal circuit of the unit, or if any consumable in test equipment runs out, or if a chlorine leak and power failure occur simultaneously, the flashing light located on the external wall outside the chlorine room shall be activated for at least four hours, and raise an alarm.

The system shall generate alarms when there is a failure of chlorine gas (no-flow alarm for gas) as well as chlorine solution failure (no-flow alarm for solution).

7.2 Number of Chlorine Cylinders

System shall have two duty and two standby cylinders with automatic changeover. Space shall be provided in the room for two spare uninstalled cylinders.

7.3 Description of Operation

The magnetic flow meter on the pipeline shall start and stop the chlorine dosing as well as pacing the chlorine flowrate to the water flowrate.

Chlorine cylinders shall be connected to the chlorination system to operate in a duty and standby mode using a changeover unit. Each chlorine bottle connected to the system shall have a cylinder mounted vacuum regulator unit with a rotameter which shall have a minimum 10:1 automatic turndown with additional manual turndown.

A chlorine relief pipe shall rise from each chlorinator and shall terminate outside the room and the terminal point of the relief shall be at least three metres from any opening into the room, at least one metre above the head level, shall be weatherproof and be covered with an insect screen.

The automatic vacuum operated change over unit shall automatically change the chlorine duty cylinder when it is empty to the standby cylinder, with visual indication of which cylinder is on line.

Manual cylinder change over facility shall also be available.

For accurate dosing of chlorine to each dosing point, two separate rate-valves and two rotameters shall be supplied.

The chlorine ejector shall ensure that water or water vapour is not allowed to enter the gas lines. The ejector shall be mounted in the chlorine closet.

From the ejector, the chlorine solution shall be transferred to the dosing point. A withdrawable diffuser shall be incorporated at the dosing point.

The Contractor shall make sure that no back-siphoning occurs in the ejector piping to the dosing point.

7.4 Chlorine Solution Pipework

Provide suitable chlorine solution pipework, which shall run underground between the chlorine room and the injection point. Provide pipe markers above ground for pipe identification purpose.

7.5 Chlorine Gas Pipework

Water or water vapour shall be prevented from flowing into the chlorine cylinders and/or those parts of the plant not designed for contact with water.

Provide a filter, to remove suspended matter in the chlorine gas leaving the chlorine cylinders before it reaches any part of the chlorination plant control system.

All metals in contact with moist chlorine shall be pure platinum; silver or other approved noble metal. All pipes carrying chlorine solution of any strength shall be made of corrosion-proof material.

Provide sufficient chlorine gas tubing to connect two 70 kg chlorine cylinder systems, one on each side of the automatic changeover vacuum regulator or panel.

Provide connectors and connector gaskets for each cylinder valve, chlorine gas tubing, vents with necessary fastenings, tools for maintenance, ammonia for testing for chlorine leakage and any other items necessary to comply with this Specification, and for the satisfactory and safe system operation.

All chlorine cylinders shall be secured to the wall by chains.

No leakage of chlorine from any part of the plant shall occur under any circumstances.

Provide pipe markers above ground level for pipe identification.

7.6 Pipework General

All pipework shall be underground or run on pipe trays if aboveground.

All above ground pipes shall be UV resistant or painted with UV resistant paint. Council may request the supplier's certificate of the pipes or the paint.

The contractor must notice the extreme climate conditions at Murrumbateman and take necessary precautions to protect the instruments and other hazards such as freezing the external pipe etc.

7.7 Chlorine Cylinder Weighing system

Supply and install a 70 kg cylinder weighing systems which shall provide an accurate, high readable indication of the weight on each duty and installed standby chlorine cylinders.

The weight of each cylinder shall be transmitted to a sealed strain gauge load cell. The scale shall be furnished with a dual channel indicator / transmitter which shall provide two large, independent LED displays and two (2) to 40 mA DC output signals, one for each weighing platform. House the indicator in an IP 65 fibreglass enclosure.

Supply and install cylinder support brackets and safety chains designed for mounting all cylinders to the wall of the chlorine closet.

7.8 Injection Quill

The injection quill shall be able to be withdrawn from the pipeline for cleaning and maintenance without the necessity of stopping the water flow in the pipeline. Provide a suitable safety precaution to prevent the quill shooting out under pressure during the removal for maintenance.

A non-return valve and a shut-off ball valve shall be included. The shut-off valve shall be able to isolate the chlorination plant from the water system when required.

The injection quill shall be designed to ensure even distribution and complete mixing of chlorine in the dosed water.

A new flow switch shall be installed on the dosing pipeline as an additional signal to indicate the chlorine solution flow and shall be indicated on the display.

7.9 Room Ambient Chlorine Level

Provide a digital display at the entrance of the chlorine room to show the chlorine level in the room. Provide appropriate whether protection for the display.

System Display

The chlorinator system shall be provided with a display for control and monitoring of the chlorine dosing operation. The display shall have facilities for all essential functions required to monitor, control, change set points and calibration etc. Alarms shall also be included. Facilities shall be available for data logging.

Some of the specific facilities available on the local display shall be:

a) Status of the system
b) Display of process variables and all operating parameters
c) Adjust operational set points using a keypad (eg. Change chlorine dosing rate, displayed in mg/L)
d) Indication of chlorine dosage in mg/L
e) Chlorine dosing rate in kg/hr
f) Chlorine leak, alarm level 1 (10 mg/m^3)
g) Chlorine leak, alarm level 2 (15 mg/m^3)
h) Room ambient chlorine level (On a digital display outside the room)
i) RUN for ejector booster pump
j) FAULT for ejector booster pump
k) Chlorine weight in each installed cylinder.

7.10 Control Signals

As a minimum, provide

a) Start Chlorination
b) Stop Chlorination
c) Chlorination level adjustment (4-20mA signal).

7.11 Alarm Signals

Some of the specific alarms available on the local display shall be:

a) Chlorine gas no-flow alarm
b) Chlorine solution no-flow alarm
c) Chlorinator Low Vacuum
d) Chlorinator High Vacuum
e) RUN for ejector booster pump
f) FAULT for ejector booster pump
g) Ejector low pressure
h) Safety shower no-flow alarm
i) Chlorine leak
j) Room ambient chlorine level high
k) Power failure
l) Common fault alarm.

Provide signals so that all above status and alarms can be connected to the telemetry system for monitoring via Telemetry.

7.12 Chlorine Ejector (Injector)

Supply and install a water operated ejector to mix chlorine gas with water to make the chlorine solution.

The ejector shall be designed to operate using a minimal booster water pressure but to create a strong vacuum.

The ejector shall be adjustable throat type so that there are provisions to make necessary adjustment to maintain optimum performance when the booster water pressure has changed with time.

Pressure gauges shall be provided to indicate the supply vacuum and ejector vacuum.

7.13 Chlorine Gas Leak Detector

The chlorine gas detector unit shall be of the electro-chemical sensing cell type requiring minimum maintenance and sensitive to the presence of chlorine gas only.

Install the sensor in the chlorine room at 300 mm above floor level.

The leak detector shall immediately activate the following devices if a chlorine leak is detected:

a) a flashing light and an audible alarm located on the external wall above the door outside the chlorine cylinder storage compartment

b) a signal for the alarm to be connected to the telemetry system.

A panel mounted LED display shall be provided outside of the chlorine room to indicate the chlorine level in the room. The display shall be larger than 80 mm and the indication shall be in ppm. Protect the display from weather.

Minimum of two-level alarm settings for “Warning” and “Danger” gas levels shall be provided with indications on the display. Readings shall be available in both ppm and mg/L for the operator to select. The alarm level shall be adjustable.

The unit shall be "fail-safe" such that any interruption to the internal circuit of the unit, or if a chlorine leak and power failure occur simultaneously, the flashing light and the audible alarm shall be activated for at least four hours.

A suitably sized UPS (Uninterrupted Power Supply) shall be provided for the leak detector.

Upon restoration of power, the detector shall automatically reset to alarm-ready state.

The leak detector shall be incorporated with a suitable self-test arrangement for automatic testing of the unit for verification of reliable sensor operation.

Password protection shall be included for all parameter settings.

Provide an emergency chlorine leak repair kit suitable for 70 kg cylinders.

7.14 Emergency Shut Off System

Provide automatic shut-off system on each installed cylinder. Each device shall automatically actuate the cylinder valve stem and shut off the chlorine gas supply during a leak from the operating (duty), or standby (installed or uninstalled spare) chlorine cylinders.

The overall system shall be designed in accordance with the requirements of the Australian/New Zealand Standard AS/NZS 2927:2019.

Preference will be given to a system utilising an electrically actuated shut off device with battery backup facility. If this is not possible, a pneumatically actuated system using a compressed air cylinder or any other suitable inert gas may also be acceptable. The compressed air cylinder shall be supplied under this contract.

Each system shall be capable of operating during a power failure of up to 4 hours’ duration by means of a 12-volt battery pack.

The system shall have two alarm levels, a warning level at 7 mg/m^3 and a shutdown level at 15 mg/m^3 of chlorine in air respectively. Both alarm levels shall be adjustable. The sensor shall also be provided with an alarm that is activated whenever a sensor fault is detected.

The overall system shall be failsafe design, fast acting with alarms to shut off the entire system in case of a:

a) chlorine leak is sensed

b) sensor faulty

c) low battery life is sensed

d) low air pressure is sensed in the actuation system or

e) manually initiated.

During a power failure, the system shall also shut the chlorine container valves automatically before the battery backup power supply is fully exhausted to make sure that the system is in failsafe mode in the case of both the mains supply and the backup battery supply being unavailable.

The control panel of the shut off system shall have the following as a minimum:

a) system healthy
b) manual test button
c) system reset button
d) power ON
e) power fault
f) low air pressure
g) leak detected, with level of chlorine in the atmosphere
h) test button
i) remote shut down activated
j) low air pressure is sensed in the actuation system.

7.15 Safety Equipment

Provide the following safety equipment:

a) one (1) lagged stainless steel deluge shower with eye / face wash basin;
b) one (1) first aid kit and first aid instructions, including Material Safety Data Sheets (MSDS) for chlorine;
c) all the required safety signs on the door and walls of the plant building;
d) fire extinguisher;
e) a small plastic squeeze bottle of diluted ammonium solution for testing chlorine gas leak at gas pipe joints;
f) a wind sock, mounted to ensure visibility for approaching vehicles;
g) a plastic wall mounted cabinet for storing spares;
h) Two labels printed with “EMPTY” and two labels printed with “FULL” on a steel plate to be used to identify the empty and full spare cylinders in the room. These labels shall be supplied with chains to hang up on the cylinders. The lettering shall be at least 50mm height.

   The contractor shall select the right location to install the windsock.

7.16 Self-Contained Breathing Apparatus

Provide and install a self-contained breathing apparatus (SCBA) designed in accordance with the requirements in the current AS 2927. Locate the SCBA in a secure IP68 cabinet external to the chlorination room. It can be attached to the reservoir and located in a weather proof cabinet, uphill of the gas bottles.

The SCBA shall be attached to a reservoir uphill of the gas bottles.

7.17 Booster Pump

Supply and install a centrifugal booster pump system with duty and standby pumps to supply sufficient flow and pressure to the injector of the chlorinator system.

Pressure gauges complete with gauge cocks shall be installed both upstream and downstream of the pressure booster system.

A pressure switch shall be installed in the pressure tank. This switch shall be connected to the plant alarm system and shall initiate a plant shut down if the pressure in the services water system falls to a level which is not sufficient to run the ejector.

There shall be isolating valves and non-return valves on the suction and discharge of each pump arranged in a manner which will allow for the removal of either pump whilst the other pump remans in service.

Leave space next to the booster pump to install a third pump in the future. Install a blank tee on the suction side for the future pump.

7.18 Cylinder Trolley

Provide one (1) cylinder trolley for use by the plant operator to carry one 70 kg chlorine cylinder at a time into or out of the chlorine plant building.

7.19 Safety Shower/Eye wash

Provide a readily accessible safety shower and eye-wash facilities designed and installed as per ANSI Z358.1.

Service water for the safety shower/eyewash shall be obtained from the reservoir. Provide non-return valves and RPZs to make sure that there is no risk of contamination to the supply to the safety shower/eyewash from other services.

Protect the safety shower from sun heating or provide a first flush system to discard the warm water to prevent from accidental use of warm water.

Protect the safety shower from freezing with lagging.

7.20 Lighting

Provide lighting of sufficient luminance as to enable the plant operators to easily read the markings on the gas cylinders, signs and instruments. All interior lighting shall be of at least the luminance specified in AS 1680.1:2006.

7.21 Electrical Work

General Requirements

The scope of works shall include, but not limited to, the following: -

1. Supply of power to all new work including the building services.
2. Preparation of detailed design drawings; and submission for review by the Authorised Person.
3. Providing all necessary instruments.
4. Providing Earthing System – (Multiple Earthed Neutral) MEN type (as per AS/NZS 3000) for the entire installation.
5. Providing all necessary cables – power, control, instruments and data.
6. Providing all necessary cable supports – including stainless-steel trays/baskets, trench and conduits for power, instrument, control and data cabling.
7. Providing all other necessary equipment and accessories to complete the installation work; and ensuring satisfactory operation of the chlorination system.

All fittings, luminaries, switches, power outlets etc. shall be of a quality suitable for the chlorine environment.

Requirements for the Switchboard / Control Panel/s

The control panel / switchboard shall include but not necessarily be limited to the following:

- A circuit breaker for incoming mains power supply
- A surge protection device for protection against power surge.
- A power / phase failure and reversal relay
- An (Human Machine Interface) HMI for local operation and monitoring.
- Power distribution board for supply to lights, power outlets, fan heater, ventilation, etc.
- A three position MANUAL/OFF/AUTO selector switch for each ejector booster pump;
- Motor starter for each pump
- All necessary circuit breakers, contactors, thermal overloads, relays, etc.
- Indicating lights and pump start/stop switches;

- Provision for testing of indication lights;
- Fault reset button; and
- All other accessories, as required, to complete the installation works.

The following shall be part of the indications provided:

- Chlorinator Low Vacuum
- Chlorinator High Vacuum
- Chlorine cylinder weight (for each installed)
- Booster pump failure (each)
- Chlorine leak
- RUN for ejector booster pump
- FAULT for ejector booster pump
- Chlorine Residual Level High
- Chlorine Residual Level Low
- RUN for sampling water pump (if pump is needed)
- FAULT for sampling water pump (if pump is needed).

7.22 Emergency Plan

Prepare and provide an Emergency Plan and procedures that is to be followed in emergencies that could occur due to chlorine emergencies. The plan shall set out the procedures that the plant operators must follow in an emergency.

Include a site layout for evacuation point during emergency leak of chlorine

7.23 Manifest

Provide a manifest in accordance with NSW Work Health and Safety Act 2011 and all other SafeWork NSW requirement.

7.24 Placarding of Stores

The chlorine plant closet shall placard in accordance with the Occupational Health and Safety (Dangerous Goods) Regulation 2004, or a later version of NSW Work Health and Safety requirements, whichever the current enforcement, and the AS 2927.

The following additional signs shall be displayed at the entrance to the site, within the vicinity of the installation. Suggested wording is given below:

a) Presence of chlorine within the site

b) Emergency contact details

c) a warning sign to prohibit smoking and to exclude other sources of ignition, e.g.:

DANGER: NO SMOKING

d) A warning sign to restrict entry, e.g.:

WARNING: RESTRICTED AREA, AUTHORISED PERSONNEL ONLY

e) All signage on the site entrance on the availability of chlorine one the site as per the Australian Dangerous Goods Code.

f) Any other notice or warnings that are required by the relevant regulatory authorities.

The additional signs shall:

- conform to AS 1319-1994;

- have lettering that contrasts with the background; and
- be clearly legible from any access point.

Unless otherwise required, the height of the letters shall be not less than 50 mm.

7.25 Safety Information Board

A safety information board, bearing information intended principally for the emergency services, shall be displayed at locations that satisfy the requirements of the emergency services. The following information should be provided:

a) location of the emergency plan;

b) location of the manifest;

c) location of personal protective equipment; and

d) locations of essential services and of the controls for their distribution.

8 Lab Equipment

The Contractor shall supply the following bench top instruments:

(a) A Hydrogen sulphide test kit. Shall be a Hach Hydrogen Sulphide Colour Disc Test Kit, Model HS-WR with any reagents and buffer solution sufficient for 12 months.

(b) A spectrophotometer (Hach DR 3900 or similar) with reagents to measure a minimum of:

- Chlorine residual: (0.1-4.0 mg/L)
- Iron: (total 0-2 mg/L and dissolved 0-0.1 mg/L) with 100 reagent sachets for each total and dissolved Fe testing
- Manganese: (total 0-1 mg/L and dissolved 0-0.1 mg/L) with 100 reagent sachets each for dissolved and total Mn testing
- Hardness
- Alkalinity
- pH
- Turbidity

9 Water Quality Monitoring Equipment

9.1 On-Line Chlorine Analyser

Supply and install one (1) on-line chlorine analyser to monitor the free residual chlorine of the re-chlorinated water.

The tenderers shall select the appropriate location for the online chlorine analyser during the pre-tender site meeting. This shall mainly be based on:

- allowing sufficient chlorine contact time and mixing time after chlorine dosing
- the length of the sampling lines posing the risk of sample water lag time
- availability of power etc.

Analyser may or may not be located next to the sampling point.

A suitable whether protection such as small cabinet shall be provided if the analyser is externally located.

The chlorinator shall be a well-known brand and widely used in the Australian drinking water industry with satisfactory after-sales service from the local agent in Australia.

The analyser shall automatically compensate for pH and temperature variations in the water.

The accuracy shall be 0.5% from the measurement range. Both temperature and pH compensation shall be incorporated.

Chlorine control setting to be adjustable between 0.1 and 6 mg/L (ppm).

The chlorine analyser shall not require any buffer solution or conditioning of sample water.

The analyser shall have a backlit LCD graphic display with all menu information for operation, setup and calibration. Operation shall be user friendly, easy-to-use menus, displayed in plain text in English and are selectable using softkeys. Readings on pH, temperature and free chlorine shall be available. Install the display at a suitable location on the internal wall of the larger room.

A minimum of two (2) alarm relays shall be provided to alarm high and low free chlorine levels.

The chlorine analyser shall be designed for fail-safe operation with all alarms to indicate any malfunction or run out of sampling water, power failure or input signal failure.

Installation shall be carried out strictly to the manufacturers' requirement.

Provide manual sampling point/s for grab samples.

9.2 On-Line Turbidimeter

Turbidimeters shall be a well-known brand and widely used in the Australian drinking water industry with satisfactory after-sales service from the local agent in Australia.

The measurement principle of turbidimeter shall be true nephelometric, based on the scattering of a beam of light by particulate matter in the liquid sample. Both scattered and transmitted light is to be measured, allowing compensation for light source output variation.

A minimum of two (2) alarm relays shall be provided to alarm HIGH and HIGH-HIGH turbidity levels.

Flow-through and immersion sensors complete with an auto-cleaning function shall be provided. The system shall be designed for simple maintenance with dry standard calibration method.

Continuous flow monitoring shall be arranged with calibration without interrupting sample flow.

The light source shall operate below rated voltage to prolong life and be supplied by a regulated source to minimise effects of power supply variations.

The meter shall include an integral turbidity indicator.

Provide a permanent turbidity reference standard to assist in calibration ("dry" type standard).

Provide a "de-bubbling" device to effectively remove air bubbles prior to the turbidimeter.

Turbidimeter shall be designed for fail-safe operation with all alarms to indicate any malfunction or run out of sampling water, power failure or input signal failure.

Provide turbidimeter reading to be transmitted via telemetry.

9.3 On-Line Analysers General

Waste sampling water shall be discharged to the natural storm water path. As specified elsewhere in this specification, an optional price shall be submitted to collect and pump the sample water back to the reservoir.

Sampling lines shall run in trenches and be protected from cold temperatures.

The minimum ingress protection for all equipment shall be:

- indoor installation shall be IP54
- outdoor installations shall be IP66.

Each analyser system shall provide menu-driven configuration of measurement and control functions via front-panel mounted touch-sensitive switches. Menus and measurement results shall be viewable on a display. Measurement shall be reportable via 0 / 4 to 20 mA outputs.

Required sample water flow shall be minimum, with an optimal sample flow rate of 200 to 350 mL/min but not higher than 600 mL/minute.

9.4 Manual Water Sampling Arrangement

The contractor shall nominate the appropriate location on a sketch for others to install manual sampling point for the chlorine test.

9.5 Instruments General

Instruments shall be supplied complete with suitable mounting brackets and preferably be fabricated from 316 stainless steel.

All instruments shall include provisions for conduit entry for electrical connections, and all entries shall be sealed with a gasket.

The contractor shall determine the specific requirements for each instrument loop.

Instrument shall be suitable for operation within the following range of environmental conditions: -

- Ambient Temperature: from – 5 degC to + 55 degC.
- Relative Humidity: from 5% to 95% non-condensing.

All instrumentation loops e.g. 4-20mA loops shall have transient surge protection at each end of the loop suitable for the instrument being protected. They shall provide both common and differential mode protection with primary clamping and low-pass series impedance filter. The protector shall have a clamp voltage of 36 Volts.

Level robes are currently available on the two reservoirs. These probes shall be changed to overflow probes with a signal connected to the SCADA with an alarm.

10 Building

10.1 General Requirements

The building shall be designed and installed under this contract.

Three rooms shall be provided in the building for (Refer to the conceptual sketch below):

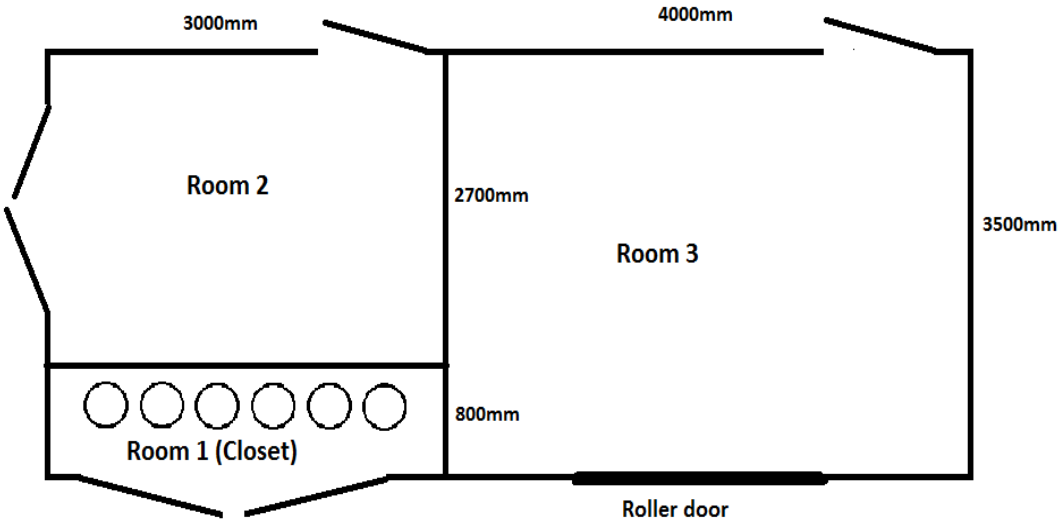


Figure 10-1: Conceptual sketch of the plan of the room

Room 1: A closet type room for the chlorine cylinder storage.

Room 2: Chlorine dosing equipment, chlorine booster pumps, chlorine control panel and any other item associated with the chlorine dosing system.

Room 3: Electrical switch board, PLC/RTU/HMI, online analyser displays, transfer pump VSDs, and any other instruments which are nor directly connected to the chlorine dosing system. Minimum size 4000mmX5000mm.

The building shall be a brick construction with Colorbond or similar roof. Thermal insulation shall be provided for the roof.

Provide a sealed glass (laminated type safety glass) window with a minimum size of 600mmX400mm on the common wall between Room 1 and 2 which shall also be a brick construction.

The building shall be complete with, as a minimum, the following facilities:

a) Building services including power outlets, lighting, smoke and fire alarm and intruder alarm (in each room).

b) Laboratory type double deep bowl stainless steel sink (Clark or similar) with a gooseneck type tap with all necessary pipework (in the large room)

c) Firefighting equipment including fire extinguishers and a fire hose reel.

Reversed cycle air conditioning shall be provided for the room where the PLC/RTU/HMI and other instruments are located. Note: The temperature at Lighting Ridge during summer can reach 50 degrees Celsius during the day. An enclosed room will get even hotter and the equipment will get damaged at high temperatures.

Provide a concrete floor for all rooms.

Provide the following facilities in the Room #3:

- A Laboratory type double deep bowl stainless steel sink (Clark or similar) with a gooseneck type tap with all necessary pipework
- A benchtop and cupboard suitable for storing chemical reagents, documents and conducting tests such as chlorine measurements. The benchtop shall be not less than 2000mmX600mm
- 2 X double GPO next to the benchtop
- 2 X double GPO on the opposite wall (Location to be confirmed during the detailed design stage)

Room 1 shall be provided with one spare double GPO and Room 2 with two double GPOs.

Chlorine leak alarms shall be provided in both Room 1 & 2.

The chlorine rooms shall be designed, set its orientation and the roof arrangement etc so that the chlorine storage is kept under cool, dry, well ventilated, clean of trash and protected from heat from the sun. All these requirements shall be investigated during the pre-tender meeting.

An effective whirly bird system shall be provided for the two rooms for ventilation.

The fan intake in the chlorine room shall be located near the floor and exhaust fan must be sufficient to ventilate the whole area. All fan switches shall be outside the storage area. As far as possible, the entire building shall be entirely of non-combustible construction.

The conceptual arrangement of the room is provided in drawings attached.

Refer to the following section for specific civil and electrical work associated with the building.

11 Building - Civil

11.1 General

The design and construction of the chlorine building shall comply with AS 2927, the storage and handling of liquefied chlorine gas.

Refer also to

AS 1170, AS1170.1 & AS 1170.2 - Loads

AS 1668.2:2012 – Mechanical ventilation for acceptable indoor air quality

AS 1366.3-1992 (R2018) – Thermal Insulation

AS 3959:2018 – Fire Protection

NCC – National Construction Code (Formerly BCA Australia)

11.2 Groundworks

Grade external areas to give falls away from buildings of 1:100 minimum.

Termite treatment shall be carried in accordance with AS 3660.1:2014

Underfloor vapour barrier shall be in accordance with AS 2870:2011.

11.3 Design Wind Loading

A basic permissible wind velocity (Vp) shall be in accordance with AS/NZS 1170.2:2011 (R2016).

11.4 Building Layout and Access

The building shall consist of two (2) rooms with the foot-print not less than:

- 3m x 2.5m Chlorine room (for chlorine storage and dosing equipment).
- 4m x 3m Water quality monitoring and testing room

Provide Individual external access to each room as shown on the drawings. Do not provide internal access.

Provide a suitable ramp for the chlorine room access to facilitate the movement of cylinder trolley.

Internal moving access shall be in accordance with AS 2927 for the pedestrian movements with self-contained breathing apparatus equipment.

The flooring shall not include pits, ducts or sumps.

A sack truck with a cylinder cradle and safety chains or clamps shall be provided to minimise the manual handling requirement of chlorine cylinders.

11.5 Pre-Fabricated FRP Building

Design

Design the structure to the requirements of the standards and codes specified in Clause 1 General of this Section.

Materials

Fibreglass Reinforced Plastic (FRP) building shall be non-combustible, UV resistant and suitable for installation in a wet, humid and corrosive environment.

Submit a material listing report complying with standards and codes specified in Clause 1 General of this Section

Submit manufacturer's certificate that complies with Australian standards for insulation and thermal resistance. The core shall be either EPS Expanded Polystyrene or PIR Polyisocyanurate or similar. Make sure these materials are non-combustible type. The insulation core shall be flame retardant and shall comply to AS 1366.3

Resin, UV stabilisers	:	Vinylester resin with UV inhibitor, UV stabilisers are required to meet the requirements of AWWA F101:2013 and be consistent with the environmental conditions and structural requirements of the application
Stainless steel products	:	Grade 316 comply to AS 1449 with the exception that where stainless-steel bolts and washers are used, nuts shall be Grade 304 to avoid seizing. Stainless steel shall be passivated after all fabrication is completed, before installation, with "Sandvik" pickling paste or equivalent.

Supporting structural members and covers shall have the following minimum physical properties:

Property	Minimum Value
Tensile Strength	300 MPa
Flexural Strength	300 MPa

Loading

Design loadings shall be in accordance with AS1170.1 &AS1170.2 Refer to AS1170.0 for load factors and for combinations of actions.

Roof panels shall be designed for 2.5 kPa.

Floor panels shall be designed for 4 kPa.

Deflection

Allowable maximum deflection shall be L/240 where L is the span of the member.

Documents by the Contractor

Submit the following documents:

- Design documents
- Shop drawings
- Work As Executed drawings

Design documents

Design documents shall include the following:

- Applicable codes and standards
- Design assumptions
- Design life
- Design actions & loads
- Design strength of materials
- Safety considerations
- Approved Manufacturer's certificate of compliance

Shop Drawings

Prior to fabrication, provide complete shop, erection, installation and assembly drawings for the Work, including anchor bolt setting plan, components and accessories.

Warranty

Warranty period shall be minimum of 20 years.

Thermal Resistance

Provide R-value of 3.5 m^2K/W for roof and 2.0 m^2K/W for walls.

Installation

Provide anchorage devices and fasteners where necessary for the installation of the building to the Principal designed concrete platform.

Set the building accurately in location, alignment and elevation, with edges and surfaces level, plumb.

All field cut and drilled edges, holes and abrasions shall be sealed with a catalysed resin compatible with the original resin as recommended by the manufacturer.

11.1 Roofing

Performance Criteria

As a minimum, the installed roofing system and associated work shall:

- remain intact and waterproof under the local or regional ambient conditions of permissible wind loading of 41 m/s and live loading to AS 1170.1 and AS1170.2 respectively, and rainfall intensity to AS 2180;

- provide adequate means of dealing with vapour pressure, condensation, corrosion and thermal movement;

- support the specified imposed loads and types of roof access without impairment of performance;

- satisfy any other performance requirements specified.
- Roof shall be monoslope.

Roof Plumbing

Rainwater Goods

Generally	:	Provide the flashings, cappings, gutters, outlets, downpipes, and the like necessary to complete the roof system.
Metal rainwater goods	:	To AS 2179 and AS 2180.
Supports	:	Provide the necessary supports and fixings for gutters, downpipes and the like.
Colour	:	To match roof.

Gutters

Generally	:	Prefabricate gutters to the required shape where possible. Form stop ends, bends and returns. Turn down into outlets. Provide overflows to prevent back flooding. Provide expansion joints in gutters longer than 30 m.
Material	:	Colorbond Zincalume or similar
Colour	:	To match roof

Downpipes

Generally	:	prefabricate downpipes to the required section and shape where possible. Connect heads to gutter and roof outlets. Where applicable, connect feet to rainwater drains and provide removable access covers.
Material	:	to match gutters
Colour	:	To match roof
Fixing	:	provide a minimum of two purpose made circular brackets to each downpipe.

11.6 Doors

General

Provide a double door1.8m wide x 2.0m high to chlorine room and shall open outwards and be fitted with means of securing in the open position and shall be constructed of fire proof material.

Door location and distances between equipment shall ensure that operators when wearing self-contained breathing apparatus can move freely and safely. Refer to AS 2927.

Provide a roller shutter door 2.4m wide x 2.0 m high to the larger room.

Details

Installation	:	Install hardware to manufacturer's recommendations. On completion leave hardware clean, undamaged, in working order, and lubricated where appropriate with the correct lubrication. Hardware specified to suit doors thicknesses, with mortice locks installed in the centre of the door thickness. Adjust hinge size, strike plates, cylinders, turns, spindles and fixing screws where installation or door thickness various from the above.
Fixings	:	Install hardware with fixings appropriate to the item and of adequate gauge and length to provide firm fixing. Match exposed finishes to the material fixed.
Protection	:	During the work under the Contract protect hardware as necessary to prevent damage including staining, corrosion, scratching or other defacement.

Finishes : Stainless steel to AS 1449, Grade 302 with exposed edges finished to remove sharp edges and burrs.

Double Door

Type : Standard 40 mm thick solid core doors.

Provide steel latches to secure doors to external walls.

Roller Door

Door shall be fitted with plastic or alloy runners to reduce corrosion and rubber seals on the bottom of the door to minimise air movement.

Keying

General : Prior to purchasing barrels and keys for locks, obtain written advice from the Authorised Person of the keying system.

Type : Fit deadlocks to all external doors.

Keyed alike : Key alike external locks, including door locks and window locks, of each individual room.

Delivery : **Master keys**

Arrange for manufacturer or supplier to deliver direct to the Authorised Person a full set of keys.

All other keys

Deliver 2 additional sets to the Authorised Person upon Practical Completion.

Identification : **Stamping**

Code stamp keys. Code stamp lock cylinders in an approved location.

Labelling

Supply each key with a purpose-made plastic key label legibly marked to identify the key, attached to the key by a metal ring.

Key material : Pin tumbler locks

Nickel alloy not brass.

Construction keying : Supply all locks and padlocks initially fitted with temporary construction keyed cylinders. When, remove construction keying and replace with master keyed cylinders.

Key control : The Authorised Person may provide written approval for use of specified keys, under the master key system after installation of the master keyed system.

Where such approval is received, establish a key control register for recording the coding of keys issued, person accountable, date issued and date returned.

Return all keys to the Authorised Person when directed.

No keys of the master key system are to be duplicated or replaced without the appropriate written authority from the Authorised Person.

Re-key cylinders for any keys not returned and completely re-key all locks for any master key not returned. Ensure that the complete master key system still operates as originally specified including number of keys.

11.7 Viewing Window

Provide a viewing window 1500x300 on the dividing wall between the chlorine room and control room to allow the operator to read all scales without entering the chlorine room.

11.2 Room Isolation

The chlorine room shall be sealed from the outer environment as well as the adjacent room. Under any circumstance, air or water shall not leak between the two rooms.

12 Power Supply

12.1 Background

Note: Some of the work described under this section may not be required if the existing site switchboard has sufficinet power to feed the new switchboard.

Three phase power supply is available on the site. The power meter and the main switchboard is located approximately 75 m from the proposed chlorinator. Up to about 30 kW spare power is available in the current supply.

The contractor shall obtain the power from this location. Below is a photo of the transformer currently serving the Lighting Ridge depot and reservoirs.

The photos below show the transformer pole number serving the Lighting Ridge depot and reservoirs.

Figure 12-1: Existing transformer serving the Lighting Ridge depot and reservoirs

Figure 12-2: Existing transformer and pole number

12.2 Scope of Work

The scope of work shall include, but not limited to, the following:

- Liaise and co-ordinate with the Power Supply Authority with regards to all work associated with power supply connection, notification, inspections, metering, testing, etc. Pay all fees associated with power supply connection, notification, switching, inspections, metering, etc.
- Provide written evidence of the liaison and coordination with Supply Authority to demonstrate that the Contractor's work complies with the Supply Authority's requirements.
- Engage a Level 2 ASP for all work associated with service mains and consumer's mains cabling and metering.
- Provide (design supply and install) a new service main cabling from the existing "point of attachment" (i.e. Power Pole) to the Meter Box. Install the service main in conduit along the power pole.
- De-commission and remove the redundant service' main between the Power Pole and the existing Meter Box after commissioning of new cabling.
- Provide (design supply and install) a new consumers' main cabling from the Meter Box to the new Electrical Switchboard. Install the new Consumers main cable in conduits.
- Provide power supply to existing on-site equipment.
- De-commission and remove the redundant consumers' main cabling.
- All other works as required by Power Supply Authority for power supply to the new main electrical switchboard. Pay all fees and charge, as required.

12.3 Service and Consumer's Main Cabling

The current carrying capacity of the Service and Consumer's mains (3-phase+Neutral) shall be suitable for the maximum demand plus a minimum of 30% spare capacity. At this design load the voltage drop at the busbars of the new Main Switchboard shall not exceed 1.5% of the voltage at the Point of Attachment.

Supply and installation of the Consumer's Main shall comply with the requirements of the Supply Authority and MEW E101 (Part 1: Installation).

Ensure that all associated work and testing which are required by the Supply Authority have been carried out.

Notify and obtain necessary approval from the Supply Authority before connection of the Consumer's Mains to the power supply network.

12.4 Supply Authority Metering Panel/Enclosure

There is existing Meter Box on site. The scope of work shall include, but not limited to, the following:

- Engage and manage Accredited Service Providers (Level 2) to liaise with the Supply Authority for all works associated with metering.
- Relocate, if required, the existing Box from its present location; and install on the external wall of the new building.

Ensure all Forms including the Certificate of Compliance form have been submitted and approved by the Supply Authority.

Attach a completed Certificate of Compliance form to the metering panel. Submit the Customer Copy of the Certificate of Compliance form to the Principal.

12.5 Earthing

Provide new earthing for the new Electrical Switchboard in accordance with the requirements of the Supply Authority, MEW E101, AS/NZS 3000:2018 and AS/NZS 3439.1:2002.

Earthing arrangement shall be MEN (Multiple Earthed Neutral) type as per AS/NZS 3000.

An equipotential earth bond shall be installed from the main earth stake. The bond conductor shall be not less 16 mm^2 and shall be a continuous uncut cable looped to the water service.

Provide earthing electrodes as per MEW E101. Providing Earthing Pit is required.

Measure the final earthing resistance; and record the result. Submit to the Principal the earthing resistance testing certificate; and include in the Operations and Maintenance Manual a copy of the certification of the final resistance value.

13 Summary of Electrical Works

The extent of works includes, but not limited to, the following: -

- Site investigation, design, supply, installation, testing, demonstration and commissioning of all electrical works.
- Liaise and arrange with the Principal's Authorised Person for all works associated with the existing Electrical Switchboard and Telemetry Panel/Equipment. Obtain necessary permission prior to carrying out any work.
- Carry out site investigation; and gather detailed information for sites including existing power supply, electrical switchboard and telemetry network/system.
- Prepare detailed design drawings; and submit to the Principal's Authorised Person for review. All comments/instructions made by the Principal's Authorised Person shall be addressed and incorporated into the design drawings, as applicable, prior to manufacturing and/or construction.
- Provide a new Electrical Switchboard; and install inside the new Switchroom-building.
- Provide power supply to existing on-site equipment.
- Provide new earthing system.
- Provide new instrumentation and associated cabling.
- Provide a new Telemetry Panel.
- Provide all building services including lighting, power outlets, air-conditioning and ventilation and alarms.
- Prepare Inspection and Test Plans (ITP) for inspection, testing and commissioning activities. Submit all ITPs to the Principal's Authorised Person for review.
- Carry out Factory Acceptance Testing (FAT) of the electrical switchboard.
- Carry out comprehensive testing, demonstration and commissioning of all electrical equipment and system.
- Provide an Operations and Maintenance Manual (O&M) including work as executed (WAE) drawings.
- Provide Operator and Maintenance training session.

Supply all labour, tools, materials, and equipment necessary to complete the installation works including testing, demonstration and commissioning. Point to Point Tests are to be conducted and recorded as part of acceptance and pre-commissioning (i.e. site testing prior to demonstration).

All the equipment used, and the manner of the installation shall be in accordance with this Specification and shall be suitable for the function for which they have been provided. The workmanship throughout shall be neat and carried out by competent tradesmen.

Supply and install all supports, brackets, plates etc. for the mounting and positioning of all electrical equipment. Equipment shall be mounted on fixed structures. Where no fixed structure exists, the Contractor shall supply and install an approved structure for the mounting of the equipment.

All external materials shall be corrosion resistant and shall not be subject to U.V. degradation. Unless specifically stated otherwise, all brackets and fixings shall be 316 stainless steel.

In all instances, provide separation of dissimilar metals (e.g. between stainless steel and galvanised components) by supply and installation of suitable insulation pads, washers, flanged bushes, retaining rings, etc.

All materials shall be new and the best of their respective kinds. Equipment and components used throughout this installation shall be of well-known brands from reputable manufacturers and suppliers. Standardise on the use of equipment and components to minimise spares holdings. Spares and replacements shall be available within 24 hours.

14 Electrical Switchboard

14.1 General

The switchboard manufacturer shall have obtained Quality Assurance Certification to ISO 9001 and/or ISO 9002.

All work performed, and equipment selected shall conform in design, material, construction, workmanship and performance to MEW E101, AS/NZS 3000 and other relevant Australian Standards and shall meet the requirements of the Supply Authority.

Switchboard design shall consider risks associated with manual handling during transportation and installation on site. Provide all necessary measures to lower/minimise manual handling risks.

Prepare Switchboard drawings and equipment schedule as per MEW E101; and submit to the Principal for review. Provide Switchboard Operation and Maintenance Manuals as per MEW E101.

14.2 Technical Requirements

Provide an indoor type Electrical Switchboard – Switchgear and Controlgear Assembly (SCA). The SCA shall be indoor type, vermin proof, Form1, IP54 trated steel enclosure. The SCA shall contain all necessary equipment and systems for the operation, control, monitoring and protection including the following: -

- Main Switch for mains power supply – the main switch shall be 125A rated MCCB with adjustable thermal and magnetic over-current protections.
- Main Switch for back-up (from portable Diesel Generator) power supply – the main switch shall be 125A rated MCCB with adjustable thermal and magnetic over-current protections.
- Manual source change-over switch for power source – “Mains” and “Generator”. This switch shall have 3-positions – “Mains”, “OFF” and “Generator”; and shall include electrical and electrical interlocking to allow only one power supply source at any given time.
- Provision for potable diesel generator connection.
- Surge diverters (Critec-Erico Main Shunt Power Surge Diverters or approved equivalent) for incoming power supply
- Phase Failure Alarm Circuitry with voltage free contacts wired out to PLC/RTU.

- Multi-function Digital Power Meter for monitoring of voltage, current, kW, energy (kWh) and power factor.
- Pump motor starters – Electronic Soft-starter type. Provide separate motor starter for each motor. Control voltage for motor starters shall be 24V DC.
- Provision for operation and control in automatic and manual modes.
- Provision for 3-phase power supply to the Chlorination system.
- RCD protected Circuit breakers for general power. Provide 2-off industrial type, single-phase,16A rated Switched Socket Outlet (GPO) inside the Switchboard, mounted on inner door.
- One spare 3-phase, 16A rated circuit breaker.
- One spare 2-phase, 16A rated, RCD protected circuit breaker.
- Thermostat controlled anti-condensation heaters.
- All other necessary devices and circuitry including terminals, relays, transducers, surge suppressors, etc.

14.3 Features

The SCA shall have following features:

- Shall include two doors – external and internal. All indicating lights, mode selector switches and Digital Power Meter shall be mounted on the inner door. Access to operating handles/knobs of all circuit breakers and source change-over switch shall be available on the inner door (i.e. without any need to open the inner door).
- All access to the switchboard shall be only from the front via doors/panels. All busbars and busbar joints shall also be accessible from the front of the switchboard.
- Earthing System shall be MEN as per AS/NZS 3000.
- Handle unit for all circuit breaker shall be mounted on inner door; and shall be fitted with mechanism for locking in the 'OFF' position using a standard padlock.
- Cable entry into the cabling zone shall be from bottom only. Gland plates shall be minimum 5mm thick marine grade aluminium.
- Cable Zone shall include din-rails with suitably rated terminals for cabling, and suitable cable supports, e.g. cable tray.
- All cables entering or leaving the switchboard shall do so via suitable terminals. Tag terminals with the number of the wire connected to them on each side. Terminals shall be grouped, and suitable trifoliate labels shall be provided.
- The Switchboard shall be mounted on hot dipped galvanised channel iron plinths, minimum 80mm high.

14.4 Compartments

The SCA shall contain the following separate compartments with individual access door:

- Compartment for Mains and Generator Power supply; and source change-over switch.
- Compartment for power reticulation, motor starters and associated equipment.
- Auto-Control Compartment for automatic control and monitoring system.

14.5 Fault Current Withstand Capability

The SCA shall be designed and manufactured to withstand the prospective fault current, or 10kA, whichever is higher, for 3 second. The value of the prospective fault current shall be obtained from the Supply Authority, and/or calculated by the Contractor.

The Contractor shall confirm to the Principal that the Switchboard and all equipment used are suitable for the prospective fault current.

14.6 Short Circuit Coordination

The contractor shall supply data from the switchgear supplier confirming Type "2" short circuit coordination to the IEC standard 947.4.2 between contactors, motor protection relays and corresponding circuit breakers.

14.7 Motor Starters

Motor starting shall comply with the requirements of the Supply Authority and the Service and Installation Rules of New South Wales. The motor starters shall be VSD type, suitable for the motor rating.

Motor starter control circuit voltage shall be 24 V DC. A separate 24V DC power supply unit (240V/24V DC, minimum 80VA) shall be provided for each motor starter.

Each motor starter shall include hard-wired protection(s) and/or interlocking(s) for both "Manual" and "Automatic" modes of operations. These hard-wired protection(s) and/or interlocking(s) shall include TOL (Thermal Over-Load), Over-temperature, No-flow and Safety Protections, as applicable. A fail-safe alarm philosophy shall be employed. Where the alarm input connects to a relay, the relay should be energised under normal conditions and a normally open contact used so that failure of the relay or the relay power supply shall generate an alarm.

Motor Starters shall comply with the requirements of MEW E101. In addition to the requirements of MEW E101, each starter shall include the following:

- Three-phase Circuit Breaker for motor power isolation and protection for each pump motor. This Circuit Breaker shall include thermal and magnetic over-current protections; and shall include provision/facility for pad-locking in the "open" / "off" position. Circuit Breaker's operating (On/Off) mechanism (handle/knob) and pad-locking facility shall be accessible without opening the inner compartment door, i.e. shall be mounted on the inner compartment door.
- Single-phase Circuit Breaker for isolation and over-current protection of the motor starter control circuit for each motor starter. The circuit breaker shall be supplied from the load side of the drive circuit breaker.
- MANUAL-OFF-AUTO rotary Mode Selector Switch to perform following operation/control functions:
  - In the MANUAL mode/position the drive/pump motor shall run. This mode shall be used for testing and maintenance purposes. However, this mode may also be used for operation during an emergency when the automatic control system is out of order.
  - In OFF mode/position the drive/pump motor shall stop, if previously running, and shall not start.
  - In the AUTO mode/position the drive/pump motor shall be controlled automatically as per the "Primary" and "Backup" automatic operation and control philosophy. The AUTO mode shall be used as the normal operating mode.

    Mode Selection shall be accessible without opening the inner compartment door, i.e. shall be mounted on the inner compartment's door. A set of (volt-free) contacts for AUTO mode selection signal shall also be wired to PLC/RTU for automatic control and monitoring.
- Thermal Overload (TOL) protection (see MEW E101) for all motors. Also, wire the Thermal overload alarm signal to PLC/RTU for automatic control and monitoring.
- No-flow protection for each pump motor. Wire no-flow alarm signal to PLC/RTU for automatic control and monitoring.
- Pump seal-failure protection for each pump motor. Wire alarm signal to PLC/RTU for automatic control and monitoring
- Hard-wired interlocking, allowing only one pump operation at any time in mode of operation.

- Status and alarm indicating lights
- Provisions for testing of indicating lights.
- Fault reset push button located on the inner compartment door.
- Lamp test facility with only one lamp test button.
- Drive/Motor Running indicating light.

14.8 Requirements for Hard-wired Interlocking

Each motor starter shall include following inter-locking: -

- Only one Pump run at any time; i.e. either Pump-1 or Pump-2 shall operate at any time;
- Duty Pump starts and stops as per the automatic operation and control philosophy;
- Duty Pumps stops when any of the following occurs: -
  - VSD fault
  - Motor/drive over-load
  - Motor over-temperature
  - No-flow (with time delay)

14.9 Auto-control Compartment

Provide a separate compartment for auto-control system components. This compartment shall include a separate inner access door. This compartment shall contain all necessary equipment and systems including the followings:

- A Circuit Breaker for incoming 240V power supply. This Circuit Breaker shall include adjustable thermal and magnetic over-current protections.
- 24V DC power supply arrangement and system for supplying power to motor starters, PLC/RTU, Radio, instrument, and other electronic devices. Provide a 20A (output) rated 24V DC Power Supply Unit with 8-hours battery back-up. Provide separate circuit for 24V DC power supply to each IO module and to each device/instrument. Provide separate circuit protection and isolation device (e.g. fuse, circuit breaker) for each circuit.
- All necessary communications equipment/devices.
- Thermostat controlled anti-condensation heater(s).
- One 20 Amp, RCD protected, 250V AC, double/twin (switched) GPO.
- HMI (Touch Screen) – 15inch, colour.
- PLC/RTU IO interface terminals for cabling/wiring to PLC/RTU. Provide a separate group of IO interface terminals for each IO module.
- All other necessary devices and circuitry including terminals, relays, surge suppressors, etc.

All control cables entering or leaving the telemetry compartment do so via terminals. Tag terminals with the number of the wire connected to them on each side. Terminals shall be grouped, and suitable traffolyte labels shall be provided.

The auto-control compartment shall have following features:

- Have segregation between power (240V AC) and ELV (24V DC) circuitry.
- Gland plates shall be from bottom only to suit incoming cables. Gland plates shall be minimum 5mm thick marine grade aluminium.
- Have sufficient space between equipment.
- Have a minimum 20% spare space.
- Have suitable provision for ventilation to avoid heat build-up.

14.10 Switchboard Equipment

All equipment (e.g. Circuit Breakers, Contactors, Relays, Terminals, etc.) used in Electrical Switchboards shall comply with the requirements of MEW E101.

Equipment used shall be ex-stock in Australia and available within forty-eight (48) hours of order.

14.11 Power Surge Diverters (PSD)

Equipment housed in the switchboards shall be protected against mains voltage switching and Lighting surges by shunt surge protection units installed on incoming supply.

Power surge and transient protection devices (PSD) shall comply with the requirements of AS 2768. The following minimum requirement shall apply:

Location	Requirements
SCA	I max = 50kA (L-N) + 40kA (N-E) U phase < 850V @ 3kA Stand-off > 425V (L-N)

Provide provisions for remote indication of stage failure by means of pre-wired auxiliary contacts. Each contact shall be rated at 2A, 240 VAC/2A, 24 V DC.

50KA PSDs shall be 'T' connected off the load side of the main switch. The wiring to the PSD shall be kept as short and direct as possible, using at least 6 mm^2 SDI cable.

14.12 Multi-function Digital Power Meter

The multi-function Digital Power Meter (DPM) shall be high-performance power meter, and shall be suitable for:

- Local monitoring of the electrical parameters; and
- Energy management.

DPM shall include, as a minimum, following features:

- Panel mountable, compact 96 mm x 96 mm unit;
- Digital Power Meter with an integral 'easy-to-read' display unit;
- Suitable for 3-phase (4-wire), 425 V power supply; and
- Suitable for measurement of all three phases and neutral at the same time.

14.13 Local Indicating lights

The following local indicating lights shall be provided on the inner door: -

- Pump-1 Fault
- Pump-1 Running
- Pump-1 Duty
- Pump-2 Fault
- Pump-2 Running
- Pump-2 Duty
- Mains Power Failure

14.14 24V DC Power Supply Unit with 8-hours battery back-up

24V DC Power Supply Unit (PSU) shall comply with the following: -

- Rating: As per design requirements, however the minimum rating shall be 20A at 24V DC.
- Battery back-up: 8-hours back-up for full load.
- Overload Rating: 225% of continuous full load for 20 min
- Ambient Temperature: 0 deg C to +55 deg C
- Input Voltage: 240V AC ±20%
- Input Frequency: 50 ±2 Hz
- Output Voltage: 24V DC
- Alarms: Alarm contacts for unit failed to PLC/RTU

14.15 Switchboard Enclosure Painting and Finishing

Switchboard's metal treatment and paint finish systems shall be entirely suitable for the atmospheric and environmental conditions to be found at the site; and shall meet the requirements of MEW E101. The final/finished colours shall be as follows:

- Interiors of compartments – off-white Y35 to AS2700:2011.
- External colour – Orange X15.

14.16 Labelling of Switchboards

Labelling of Switchboards shall meet the requirements of MEW E101.

15 Building Services (Electrical)

15.1 General

Design, supply and installation of building services equipment including the following:

- Lighting
- EXIT signs (lights)
- 1-phase Socket Outlets (GPO)
- Smoke and Fire Alarm
- Intruder Alarm
- Air-Conditioning
- Ventilation/Exhaust Fans for other rooms.

230V/400V AC power supply for the building services shall be obtained from the Electrical Switchboard.

15.2 Lighting and Power Outlets

Provide adequate lighting for daytime and night-time operation. All lighting shall be designed in accordance with AS1680, AS1158, and AS 2293. All fittings, luminaries, switches, power outlets etc. shall be of a quality suitable for the chlorine environment.

240V AC power supply for the building and equipment shall be obtained from the distribution board in the large room. Provide layout and circuit diagrams of proposed internal and external lighting and power socket outlets for review by the Principal prior to construction.

Supply and installation of building services equipment including lamp and lamp holders, switches and socket outlets shall meet the requirements of MEW E101.

Provide a light with movement sensors at the entrance of each room. Provide appropriate sensor(s) and circuitry for turning ON and OFF (time delayed) this localised lighting system.

Use LED type energy saving light bulbs wherever possible and practical.

Internal light fittings shall be controlled by switches mounted near the door.

All outdoor light switches shall be surface mounted weatherproof industrial type with a degree of protection of IP56.

Provide a 240V AC, 3-pin, 15A, general purpose socket outlets (GPO) for each room. All GPO shall be industrial type, weatherproof, IP56 rated. Each Socket Outlet (GPO) shall have a separate switch for switching ON/OFF.

Provide all necessary wiring and cabling. Install all cables in conduits.

15.3 Smoke and Fire Detection System (Alarm)

Provide smoke and fire detector alarm system for each room, and telemetry signals.

Smoke and Fire Alarm system shall be suitable for detecting visible particles of combustion and shall be particularly responsive to smouldering fires and the smoke given off by PVC and/or XLPE cables/wires. Alarm system shall emit a loud and distinctive sound to alert occupants of potential danger soon after detecting smoke and/or fire.

Smoke and Fire Alarm shall comply with Australian Standard AS 3786, and shall be clearly marked on the packaging: -

- Approved to AS3786, or
- Accredited to AS3786

Provide photo-electric type Smoke and Fire Alarm system, as per the recommendation of NSW Fire Brigades. Each Alarm unit shall include a set of volt-free contacts for remote monitoring via Telemetry RTU/SCADA System.

Provide 240V AC power to the Smoke and Fire Alarm. Each Smoke and Fire Alarm shall include a battery back-up power supply.

15.4 Intruder/Security Alarm System

Provide man intruder alarm system for each room, and wire alarm signals to the PLC/RTU/HMI.

Intruder/Security Alarm System shall be a comprehensive, extremely reliable security system, and shall, preferably, be Australian made. This Alarm System shall comprise, as a minimum, the followings: -

- Intelligent Security Panel. This panel shall be powered from the mains power with a battery back-up fitted as standard.
- Easy-to-use Key-pad, which shall be used for full control of the system. This shall also be used to provide information (e.g. condition of stand-by battery, status of mains power, whether system is armed or disarmed, etc.) on the system at a glance.
- Motion Detectors. This shall feature the latest technology and shall be extremely reliable (i.e. shall ensure no false alarm). Each Detector shall include a light indicator when movement is detected, to show that the unit is functioning correctly, even when it is not armed. Provide motion detectors in each room and each critical area.
- Reed Switches which shall detect when a door or window is being tempered with before an intruder even enters the building.

Intruder/Security Alarm System shall include a set of volt-free contacts for remote monitoring via PLC/RTU/HMI and Telemetry SCADA system.

Alarm System shall include its own battery back-up power supply

The intruder/security system shall be set-off if the correct security code is not entered on the keypad adjacent to each door.

Installation of the Intruder/Security Alarm System shall be carried out by an Accredited Security Installer.

15.5 Ventilation

Provide ventilation fan for the chlorine storage room. This fan shall be suitable for corrosive / chlorine environment.

Provide suitable interlocking system between the Smoke and Fire Alarm and Building Ventilation system. This interlocking shall switch-off/turn off the Ventilation system when the Smoke and Fire Alarm is activated.

15.6 Air-conditioning for the Switchroom

Provide reverse-cycle, split type, air-conditioning units for the Electrical Switchroom. The Air-conditioning units shall be designed to maintain room temperature (adjustable) between +20 and +30 degrees centigrade.

The air-conditioning units shall be highly energy efficient system that includes advanced Inverter technology. Air-Conditioner shall be supplied from the Mitsubishi Electric (or approved equivalent) reverse-cycle air-conditioning system with advanced inverter technology.

15.7 Installation of Building Services

Installation of building services equipment shall meet the requirements of MEW E101 and relevant Australian Standards.

Wiring for the building services shall be double insulated (PVC/PVC) cable in conduit concealed in roof spaces, cavities or concrete slabs or fixed to wall surfaces. Wiring run in accessible roof spaces may be carried out using unenclosed PVC/PVC type cable but must ensure compliance with revised installation methods in AS3000:2018.

16 PLC/RTU/HMI system

16.1 General

A PLC/RTU/HMI system shall be designed and installed to control and monitor the overall operation of the new work.

The local HMI (Touch Screen) pages shall provide a clear overview comprising static and dynamic information of the system. This shall include, as a minimum, chlorine dosing operation, reservoir operating levels, pump status, alarms, flow meter readings, online analyser readings, temperature of the reservoir water etc.

The operator shall be able to change the set points such as reservoir operating levels, chlorine dosage via HMI.

On the HMI page, the operator shall be able to select one of the following three modes described above

Mode 1: When the town demand is low, the large reservoir shall receive the bore water and then transferred to the small reservoir. Town shall be fed from the small reservoir only. Flow paced (paced to the magflow meter reading on the inlet to each reservoir) chlorine shall be able to be dosed to each reservoir.

Mode 2: When the town demand is high, both reservoirs can receive the bore water and both reservoirs can feed the town. Flow paced (paced to the magflow meter reading on the inlet to each reservoir) chlorine shall be able to be dosed to each reservoir.

Mode 3: When one reservoir is taken off for maintenance, receiving the bore water and feeding the town can be done via the remaining reservoir. Flow paced (paced to the magflow meter reading on the inlet of the operating reservoir) chlorine shall be able to be dosed to the reservoir.

Once selected, the HMI system shall open the HMI page relevant to the selected mode of operation. If appropriate, all three modes may be included in a single HMI page.

16.2 Signals on HMI

A PLC/RTU/HMI system shall be designed and installed to control and monitor the overall operation of the new work.

As a minimum, the following information shall be available on HMI:

1. Mains power failure (alarm)

2. Surge diverter failure (alarm)
3. Building/shed smoke & fire alarm.
4. Building/shed intruder alarm.
5. Switchboard 24V DC Power Supply Failure (alarm)
6. Switchboard 24V DC Power Supply Battery Voltage Low (alarm)
7. Transfer Pump No.1 – Running
8. Transfer Pump No.1 – Fault (alarm)
9. Transfer Pump No.2 – Running
10. Transfer Pump No.2 – Fault (alarm)
11. Chlorination system – Running
12. Chlorination system – Fault (alarm)
13. Chlorine level (in mg/L) of outlet of each reservoir and the trend
14. Chlorine low level alarm
15. Chlorine high level alarm
16. Chlorine low-low level alarm
17. Chlorine storage level (in kg)
18. Magflow meter 1 readings (in L/s)
19. Magflow meter 1 total flow (in kL)
20. Magflow meter 2 readings (in L/s)
21. Magflow meter 2 total flow (in kL)
22. Magflow meter 3 readings (in L/s)
23. Magflow meter 3 total flow (in kL)
24. Trend of all magflow meter readings
25. Turbidimeter reading and history
26. Temperature analyser reading
27. pH analyser reading
28. Reservoir levels
29. Vent pipe valve open/close
30. Any other information required for efficient operation and monitoring of the system
31. Minimum of twelve (12) digital output, six digital inputs and three analogue output as spare signals for future use.

As a minimum, the following additional signals shall be available on HMI:

32. Bore water flowrate
33. chlorine dosage
34. reservoir operating levels
35. flowrate between the two reservoirs

16.3 PLC Hardware and Software

PLC Hardware

PLC hardware shall be provided from the Allen-Bradley CompactLogix control system with following cards/modules: -

- CPU: 1769-L35E series with built-in Ethernet/IP communication port.
- Power supply unit: 169-PA4.
- 16-point digital input cards: 17689-IQ16
- 8-point relay output cards: 1769-OW8I
- 4-channel analogue input cards: 1769-IF41
- Other cards/modules, as required.

PLC Software Programming

PLC software programming works shall include software development, configuration, programming, implementing, debugging, documentation, testing, demonstration and commissioning.

Provide PLC all necessary software components including software licence(s). Configure and program the PLC to provide automatic operation, control and monitoring of the entire STP including new and existing equipment. The PLC programming system shall be carried out by using Ladder Diagram/Logic.

16.4 HMI (Touch Screen)

HMI Hardware

HMI (Touch Screen) shall be Red Lion – Model CR3000 industrial operator interface with following features: -

- Touch Screen – LCD Display
- Screen size: 15-inch
- 24V DC power supply
- Standard accessories and communication ports

HMI Software Programming

HMI software programming works shall include software development, configuration, programming, implementing, debugging, documentation, testing, demonstration and commissioning.

Provide HMI all necessary software components including software licence(s). Configure and program the HMI to provide automatic operation, control and monitoring of the entire system.

Provide separate screens for the following: -

- Main Menu with two access levels. Level 1 access to allow operators to change the STP operating parameters (e.g. Timers, level), and Level 2 access for maintenance staff to allow complete control of the STP (including timer setting, level and flow control PID set up).
- Drive Overview Screen with Modes of Operation.
- Pages for Reservoirs, chlorination system, reservoir, transfer pumps and oter equipment, as required.
- Trend screens providing graphical trends of all analogue instruments.
- Alarm Log.
- Alarm History.
- Events Logs.
- Maintenance screens: these screens shall provide the current hours run, number of starts, number of failure and the maintenance period for each drive.
- Telemetry screen detailing alarms, status, events, set points, etc.
- General help page detailing the symbols and icons used, equipment colour representation and status.

The above-mentioned screens are the minimum number of screens to be provided for effective monitoring and control of the system.

17 Telemetry

17.1 General

The extent of works shall include, but not limited to, the following: -

- Liaise and arrange with the Principal's Authorised Person for all works associated with the Telemetry Panel/Equipment.
- Supply all labour, tools, materials, and equipment necessary to complete the install works including software configuration and programming, testing, demonstration and commissioning.
- Provide (design, supply and install) a new Telemetry Panel for the site.
- Providing 230V mains power supply to each new Telemetry Panel from the electrical switchboard.
- Wire all necessary signals from the PLC/HMI via data communication cabling.
- Supply and install all necessary telemetry system components including hardware and software.
- Supply and install a new telemetry antenna and antenna cable at each site. Connect antenna cable to RTU/Radio and provide surge protection. Direct all telemetry signals to the relevant new Telemetry SCADA.
- Incorporate and integrate all signals into the Telemetry SCADA. Carryout software programming to incorporate all telemetry signals into the SCADA system.
- Carryout software configurations, programming and integration of all Telemetry system components including RTUs, Radios, FEPs and SCADA systems. The Contractor shall ensure correct operation of the entire telemetry system/network.
- Preparation of Inspection and Test Plans (ITP) for all inspection, testing and commissioning activities. Submit all ITPs to the Principal's Authorised Person for review.
- Carry out comprehensive testing, demonstration and commissioning of all telemetry equipment and system.
- Provide an Operations and Maintenance Manual (O&M) for the telemetry system.
- Provide all other necessary arrangements, equipment and systems to complete the installation of Telemetry system. All other necessary devices and accessories.

17.2 Telemetry Panel

The Telemetry Panel shall be indoor type, vermin proof, Form 1, IP54 (minimum) rated, surface-mountable. Provide necessary arrangements for installation.

The Telemetry Panel shall contain all necessary telemetry equipment and systems including the followings: -

- A Circuit Breaker for incoming 230V power supply. This Circuit Breaker shall include adjustable thermal and magnetic over-current protections. Trip settings shall be mentioned/indicated in the design drawings.
- 24V DC power supply system with 8-hour battery-up for supplying power to RTU and associated modules, Radio and other electronic devices. Provide a suitably rated 24V DC Power Supply Unit.
- Telemetry RTU, Radio and other modules and accessories including hardware and software.
- A single-phase (230V) general purpose socket outlet (GPO) for general power supply.
- All necessary communications equipment/devices.
- All other necessary devices and circuitry including terminals, relays, surge protection devices, etc.

The Telemetry Panel shall have following features: -

- Have segregation between power (230V AC) and ELV (24V DC) circuitry.
- Gland plates shall be from bottom only to suit incoming cables. Gland plates shall be minimum 5mm thick marine grade aluminium.
- Have sufficient space between equipment.
- Have a minimum 20% spare space.

- Have suitable provision for ventilation to avoid heat build-up.

17.3 Specific Requirements for the Telemetry System Components

The specific requirements for the Telemetry system components shall include, but not limited to, the following: -

- The Telemetry RTU shall be supplied from the BRODEREN RTU32S series and/or BRODEREN RTU32M series.
- The Telemetry Radio shall be supplied from the APRISA SR+ licenced Radio series.
- Utilizing the existing Radio Licences and allocated frequencies for radio communications.
- Using DNP3.x communication protocol in all instances of telemetry communication. All telemetry communication shall be AES xx encryption enabled.
- Remote access to any site shall be via approved IP sec VPN tunnel protocol.
- Data links between LANs shall be via IP sec VPN tunnel protocol.
- Incorporating and integrating all signals into the Council's Telemetry SCADA. Software programming to incorporate all telemetry signals into the SCADA system.

17.4 Antennae

Antennae type shall be approved by the ACMA and shall comply with relevant ACMA specifications.

Provide Lighting surge diverters and earthing systems for protection of radio antennae installations.

17.5 Signal Requirements

Provide all signals from the PLC/HMI system via data cabling.

18 Optional price

Submit an optional price for supply and install a 100L tank and a pump, one at the online chlorine analyser and the other at the online turbidimeter to collect and pump (intermittently) the sample water back to the reservoir. Power supply for the pump shall be provided. The frequency and duration of pumping shall be adjustable. Provide a drain for the tank.

19 Identification of Equipment & Pipework

19.1 Equipment Labels

All equipment including pumps, valves and instruments shall be identified and labelled.

Safety, Danger and warning signs shall be installed to comply with the relevant Australian Standards and other statutory requirements.

Minimum size of lettering shall be 10 mm high.

Labels shall be of Traffolyte, white background, screw fixed and black engraved lettering.

19.2 Pipe Markers for Exposed Pipes

All unburied pipes including those in pipe trays and trenches shall be marked with either vinyl or plastic pipe markers. Markers shall indicate direction of flow and fluid carried. Maximum distance between markers shall be 3 m. Self-adhesive pipe markers shall be fixed to the pipes.

The size shall be suitable for the pipe diameter and the colour shall be clearly visible against the pipe colour.

19.3 Equipment, Pipe Colours and Labelling

All pipework, equipment items, valves and tanks provided under this Contract shall have the final finish colour as per Walgett Shire Council requirements.

All equipment shall be labelled.

If there is no standard colour code available in the Council for generic pipework, labels shall be provided on all pipework at a distance not more than 1500mm between two labels.

All pipework colours in the chlorine dosing system shall follow the requirements of the AS 2927.

If no other standards are available for pipework of the dosing system, use the following colours

Service Water Pipework (for Building and chlorine feeders)	B15 Mid Blue
Chlorine Solution Pipework	Y33 Pale Primrose
Chlorine Gas	Golden Yellow
Water Sampling Line	Mid Blue
Water – Potable	Mid Blue

19.4 Labelling and Identification of Electrical Equipment

Labels which identify all electrical equipment in accordance with the equipment identification as detailed on the design drawings shall be supplied and installed. Labels within switchboards and cabinets shall not be obstructed by wiring. Labels shall not be fixed on removable wiring duct covers.

Provide all necessary equipment nameplates, and danger and warning signs. All labels, nameplates and signs shall meet the requirements of the Council, MEW E101, NSW Work Cover Authority, the Occupational Health and Safety Act and relevant Australian Standards.

Identify all electrical equipment, such as motors, push-button stations, isolating switches, limit and level switches and the like with labels.

Fix all labels to permanent structures adjacent to the particular item of equipment they identify with the wording horizontal. Labels shall not be fixed directly on the item of equipment.

All labels shall be fixed with at least two chrome plated screws. Self-adhesive labels shall not be acceptable. All labels shall be manufactured from Traffolyte or similar material with black lettering engraved on white background.

Each item or sets of machinery shall have a danger sign mounted near and clearly visible:

WARNING - THIS MACHINERY STARTS AUTOMATICALLY.

20 Witness and Hold Points

A ‘witness point’ shall mean a point in the construction or verification process at which an activity is to be observed by the Authorised Person. Forty-eight (48) hours’ notice is required to be given by the Contractor for a witness point.

A ‘hold point’ shall mean a point in the construction or verification process beyond which the work may not proceed without the authorisation of the Principal. Forty-eight (48) hours advance notice is required to be given by the Contractor for a hold point, except for hold points to be carried out at manufacturers’ premises, which require seven (7) days advance notice, or where specified as longer elsewhere in the Specification.

Witness and hold points are to be scheduled for normal working hours of the Principal’s Authorised personnel. If personnel are required at other times, then the Principal may require the Contractor to pay for the overtime costs of the personnel.

The Authorised Person may, without penalty, convert hold points to witness points on a temporary or permanent basis.

The Contractor's Inspection and Test Plans for the Works shall include, but not be limited to, the following witness and hold point inspections by the Authorised Person. Include additional hold and witness points which are considered necessary for the Contractor's verification such as mandatory inspections by Statutory Authorities.

Include in relevant Inspection and Test Plans, the following witness and hold points for attendance by the Principal:

a) PRE-CONSTRUCTION

Provide WHS plan, QA plan & all other plans as required	-	hold point
Construction Program	-	hold point

b) ON-SITE PIPELINE CONSTRUCTION (If applicable)

Details of existing services affected by construction	-	hold point
Inspection of pipe installation before backfilling point	-	witness
Initial testing of pipeline before backfilling point	-	witness
Compaction of fill to 300 mm above pipe point	-	witness

c) BUILDING WORK

Delivery of the building to the site	-	hold point

d) TESTING, TRAINING AND COMMISSIONING

Site testing of the dosing system and aerator	-	hold point
Operator training program	-	hold point
Training manuals for concurrence	-	hold point
Commissioning of equipment	-	hold point

21 Drawings

21.1 Drawings supplied with the tender document

Any drawings attached to this document may not fully represent the conditions on site, either above or below ground.

21.2 Drawings with Tender Submission

Tenderers shall submit all drawings requested in Schedule of Technical Data with the tender submission.

21.3 Contractor's Detailed Design Drawings

The contractor shall submit an electronic copy in (both in the latest version of AutoCAD and pdf format) of the detailed design drawings. Some of the drawings that shall be submitted include the following:

General

- Drawing list
- Process and instrumentation diagrams
- Schematic flow diagram
- Design criteria summary

- Site layout with locations of the equipment, building, external pipes, valves, flow meters etc.
- Plans and elevations of the building
- Equipment layout in buildings
- Electrical drawings

Drawing Titles

All drawings, including manufacturer's standard drawings, workshop drawings, outline drawings and certified drawings required to be submitted by the contractor, shall clearly define the name of the contractor, the name of **Walgett Shire Council**, the name of the drawing, together with other relevant details in the title block of the Drawing.

Drawing Numbers

The drawing numbering system will be nominated and finalised by the Authorised Person during the preliminary design stage.

22 Testing, Demonstration and Commissioning

22.1 Overview

Testing is defined as tests by the Contractor prior to demonstration of the correct functioning of the new chlorinator systems to the Authorised Person or his specialist staff.

Demonstration is the testing of the chlorinator systems by the Contractor in the presence of the Principal or his specialist staff prior to commissioning.

Commissioning is a one (1) days operating period at the completion of the installation. Work-As- Executed Drawings shall be provided.

22.2 Demonstration

Upon successful completion of site testing of all equipment the Contractor shall notify the Authorised person that demonstration may now be commenced.

The Authorised Person will then arrange Council personnel and their specialist staff to be on site within ten (10) working days and the Contractor shall demonstrate that the equipment is fully operational and free from defects. Demonstration shall include verification of conformity with all clauses of the Specification.

In the event that all equipment cannot be demonstrated to operate satisfactorily and in accordance with the Contract during a period nominated in the construction program, then the Contractor shall reimburse the Principal the cost of having the specialist personnel on site again. This cost shall be based on $2,900 per person per day.

a) Inspecting the installation and testing of all equipment to ensure compliance with Specification/Contract drawings.

b) Verifying the performance and the accuracy of chlorine metering equipment and settings versus flow.

c) Verifying the performance and the accuracy of chlorine storage levels.

d) Auto/manual of the start-up/shut-down procedures.

e) Correct duty/standby plant operation.

f) Status/alarm signal and indications.

g) Activation of all alarms.

h) Chlorine leak test.

i) Checking of all interlocks and control logic, including operation of:

- flow switches
- limit switches
- status and alarm indication

j) Safety equipment/requirements.

k) Chlorine dosing accuracy and flow pacing accuracy.

l) Correct response to power failure during normal operation and restoration of power.

m) Pipework arrangements.

n) local emergency STOP pushbuttons or switches

o) Correct operation of the logic of PLC program in relation to overall chlorinator operation (if PLC is used).

p) Emergency Procedures

q) Any other as decided by the Principal during the demonstration period.

22.3 Commissioning

After successful demonstration to the Authorised Person or the Principal's specialist staff, commissioning of the new work will be carried.

The Work required during Commissioning includes but shall not necessarily be limited to:

a) Continuous operation; or stopping and starting as required by the water supply system;

b) Shut down of the chlorine dosing system (normal and emergency);

c) Revisions to Drawings and Manuals as and if required;

d) Testing of water quality;

Commissioning shall be deemed to be complete when the whole of the Works has been run continually without any faults for one day (24 hrs) at each site. The equipment shall start and stop during this period as may be required by the Authorised Person. If during this period, the chlorine dosing system does not function according to the specified standard, then the commissioning shall be recommenced for another day after the necessary rectification work has been completed.

During the period of Testing, Demonstration and Commissioning, the Contractor shall have onsite technical personnel who are specialists in the operation of the various equipment supplied and installed.

23 Operation and Maintenance Manuals

Submit to the Authorised Person for information only a draft copy of the Operational and Maintenance Manual, two (2) weeks prior to commencement of demonstration of the new work. At the end of the commissioning period, submit to the Authorised Person a Revised Version of the Manual for review. This version shall incorporate all the changes to the equipment, controls and electrics that have been made during the demonstration and commissioning periods. The marked-up copy with the Authorised Persons comments will be returned to the Contractor for correction. The Contractor shall incorporate all the corrections and return the revised copy to the Authorised Person within one (1) weeks from receipt of the marked-up copy.

23.1 Operation and Maintenance Instructions

The Operating Instructions shall be site specific, and sufficiently comprehensive to enable the operation of the plant in an efficient manner.

The Maintenance Instructions shall be in sufficient detail to enable the overhaul and replacement of all parts of the Plant to be carried out readily by WSC staff.

All the Instructions supplied shall have detailed indexes which will enable specific items to be quickly and accurately located.

Operating and maintenance manuals shall be in the English language.

23.2 General Content

Manuals shall include but not be limited to:

e) Overview of the O&M manual with an introduction on the chlorination plant.

f) Purpose of the chlorination plant and the aerator.

g) Functional specification.

h) A concise description of each item of equipment together with performance specifications and mode of operations. Include sufficient number of photographs of the components to assist the description of the system and operation.

i) Work-As-Executed (i.e. as built) of all Contract Drawings.

j) Procedures to be followed for equipment start-up, operations and shut-down.

k) Procedures to be followed for installation, testing, maintenance and fault finding. Fault finding procedures should be in the form of a chart listing "fault", "possible cause" and "remedy".

l) Contact details of all service providers for maintenance work including the specialist people who can carry out such maintenance work.

m) Recommended spare parts list.

n) A comprehensive routine maintenance schedule for the entire plant.

o) List of equipment in the Plant together with manufacturer's name, manufacturers nearest representative, address, telephone and facsimile numbers.

p) Procedure for calibrating the chlorine dose rates, and instructions for dismantling, re-assembly, repair and adjustment.

q) Standard operating procedures.

r) Emergency contact numbers.

a) Programmable Logic controller user manuals. (If PLC is used)

b) Ladder diagrams for all PLC Programs. (If PLC is used)

23.3 Operator Training

By arrangement with the Authorised Person the Contractor shall run a training course on-site for up to 4 operators nominated by the Authorised Person.

The training shall cover instruction on operation & maintenance of the Plant and on safety on all equipment and services supplied and installed under this contract. During this course the Contractor shall provide a fully informed technician for the instruction of these personnel. The course shall cover, but not be limited to the following:

- Description of the process and operation.
- Setting up, calibration, testing, maintenance and cleaning of all equipment.
- Inspecting the installation and testing of all equipment to ensure compliance with Specification/Contract drawings.
- Verifying the accuracy of metering equipment/flow meter setting versus flow rate graph.
- Auto/manual of the start-up/shut-down procedures for the plant.
- Status/alarm signals and indications.

- Safety equipment/requirements.
- Safety facilities provided at the plant.
- Regular Tests and Checks to be carried out on safety and safety equipment.
- Chlorine/water leakage.
- Pipework arrangements.
- Chlorine cylinder changing procedures.
- Correctness of operation and correctness for setting of parameters for each instrumentation loop
- Checking of all interlocks and control logic, including operation of:
  - flow switches
  - limit switches
  - status and alarm indication
- Emergency procedures.

Duration of Training

The training course shall run for minimum of three and half (3.5) hours. This can be carried out along with the demonstration and /or commission period.

24 Spares

Spares shall be readily available from Australian suppliers.

Supply all necessary spare parts, analyser reagent etc for a period of 12 months.

25 Post Completion Period

A Post Completion Period (PCP) of 12 months shall be provided under this contract. The post completion period shall commence from the Date of the successful completion of commissioning of the new work.

At any time prior to the 14th day after the expiration of the 12 Months PCP, the Authorised Person may direct the Contractor to rectify any omission or defect in the work carried out under the Contract during the 12 Months PCP. The direction shall identify the omission or defect and state a date by which the Contractor shall complete rectification. The direction may provide that in respect of the work of rectification there shall be a separate 12 Months PCP. A separate 12 Months PCP shall commence on the date the Contractor completes the work of rectification.

If the work of rectification is not completed by the stated date, the Authorised Person may have the work of rectification carried out at the Contractor's expense, but without prejudice to any other rights that the Authorised Person may have against the Contractor with respect to such omission or defect and the cost of the work of rectification incurred by the Authorised Person shall be a debt due from the Contractor. If it is necessary for the Contractor to carry out rectification, the Contractor shall do so at times and in a manner which causes as little inconvenience to the occupants of the Works as is reasonably possible.

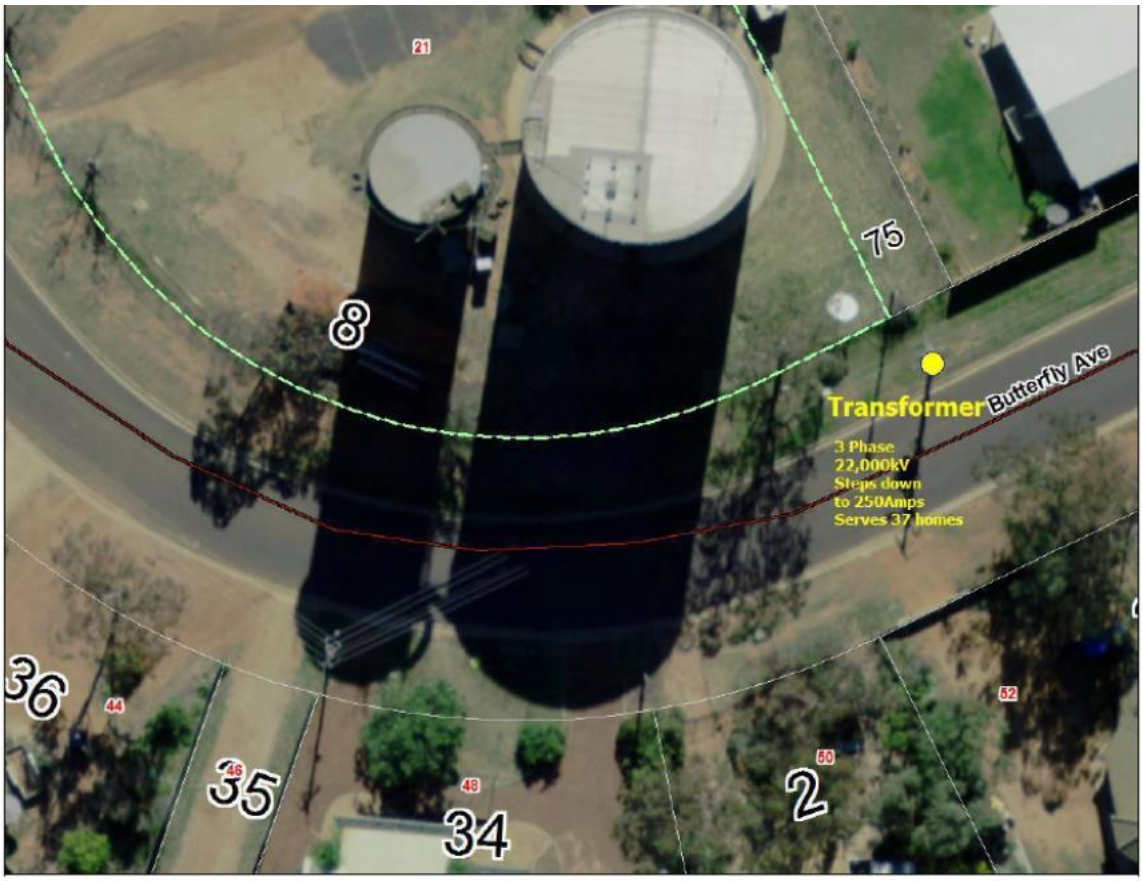
Process Verification, that is, operation up to full plant flow to verify compliance with the specification will be carried out during this period in addition to operational performance of the individual item of the chlorine dosing system and overall chlorine dosing process.

Include for two inspections by experienced personnel familiar with the Contract and operation of the chlorine dosing system accompanied by the Authorised Person during the sixth (6^{th}) and eleventh (11^{th}) months of the PCP. Submit a fully documented report of all tests and inspections including chlorine level verification.

END OF SECTION – TECHNICAL

Appendices

Appendix A: Site Photos



Walgett Shire Council
77 Fox Street
PO Box 31
WALGETT NSW 2832
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Important Notice!
This map is not a precise survey document. Accurate locations can only be determined by a survey on the ground.
This information has been prepared for Council's internal purposes and for no other purpose. No statement is made about the accuracy or suitability of the information for use for any purpose (whether the purpose has been notified to Council or not). While every care is taken to ensure the accuracy of this data, neither the Walgett Council nor the Department of Lands makes any representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the data being inaccurate or incomplete in any way and for any reason.
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GDA

True North, Grid North and Magnetic North are shown diagrammatically for the centre of the Walgett Local Government Area. Magnetic North is correct for 2001 moving easterly by 0.04° in about five years.

Important
This map was produced on the GEOCENTRIC DATUM OF AUSTRALIA 1994 (GDA94), which has superseded the Australian Geographic Datum of 1984 (AGD66/84). Heights are referenced to the Australia Height Datum (AHD) heights.
For most practical purposes GDA94 coordinates and satellite derived (GPS) coordinates based on the World Geodetic Datum 1984 (WGS84) are the same.

Aerial Photography:	
Projection:	MGA94 Zone 55
Date:	Friday, 22 September 2017
Produced By:	S Otieno
Map Zoom:	0.08034 km

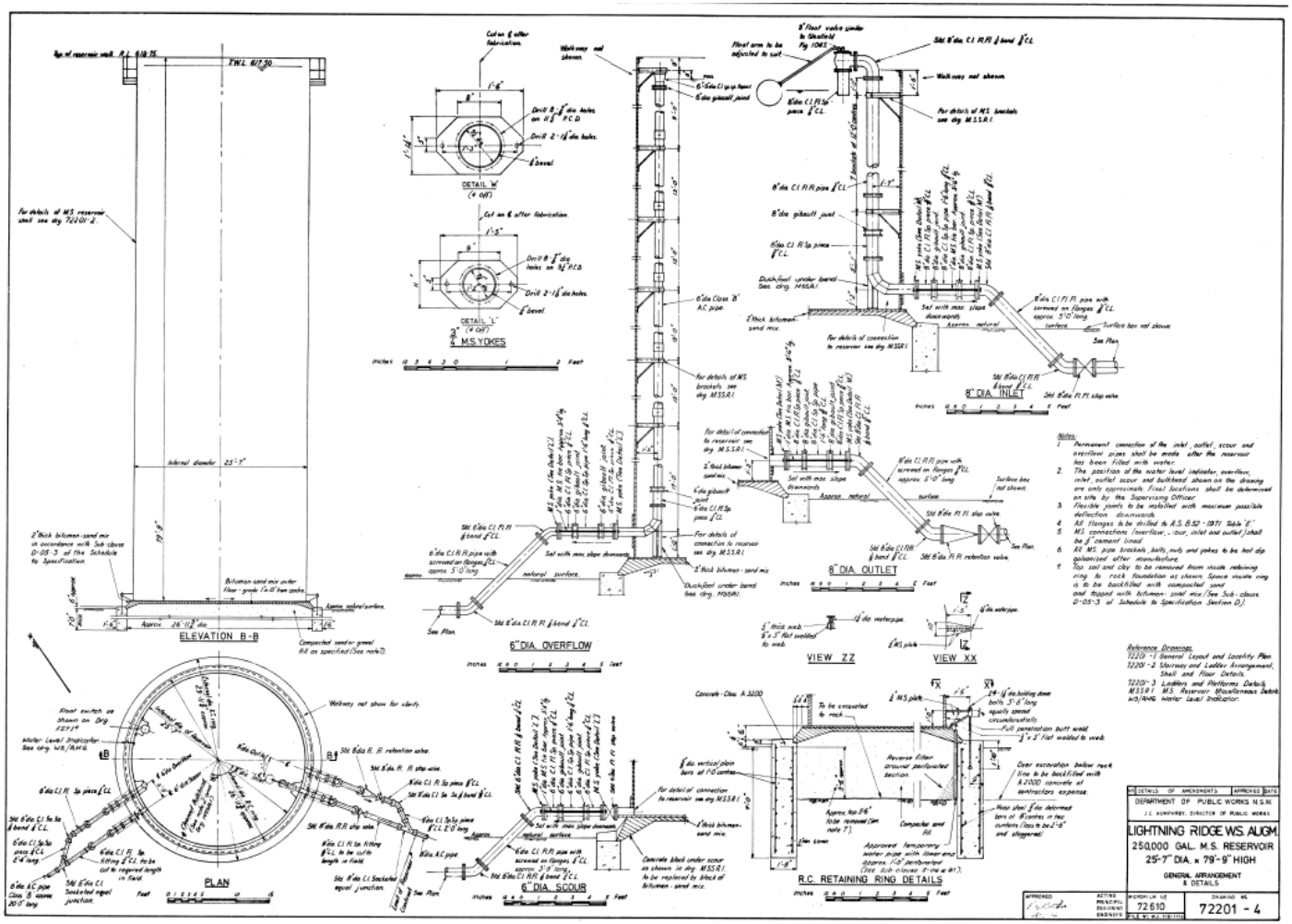
Lighting Ridge Cooling Tower

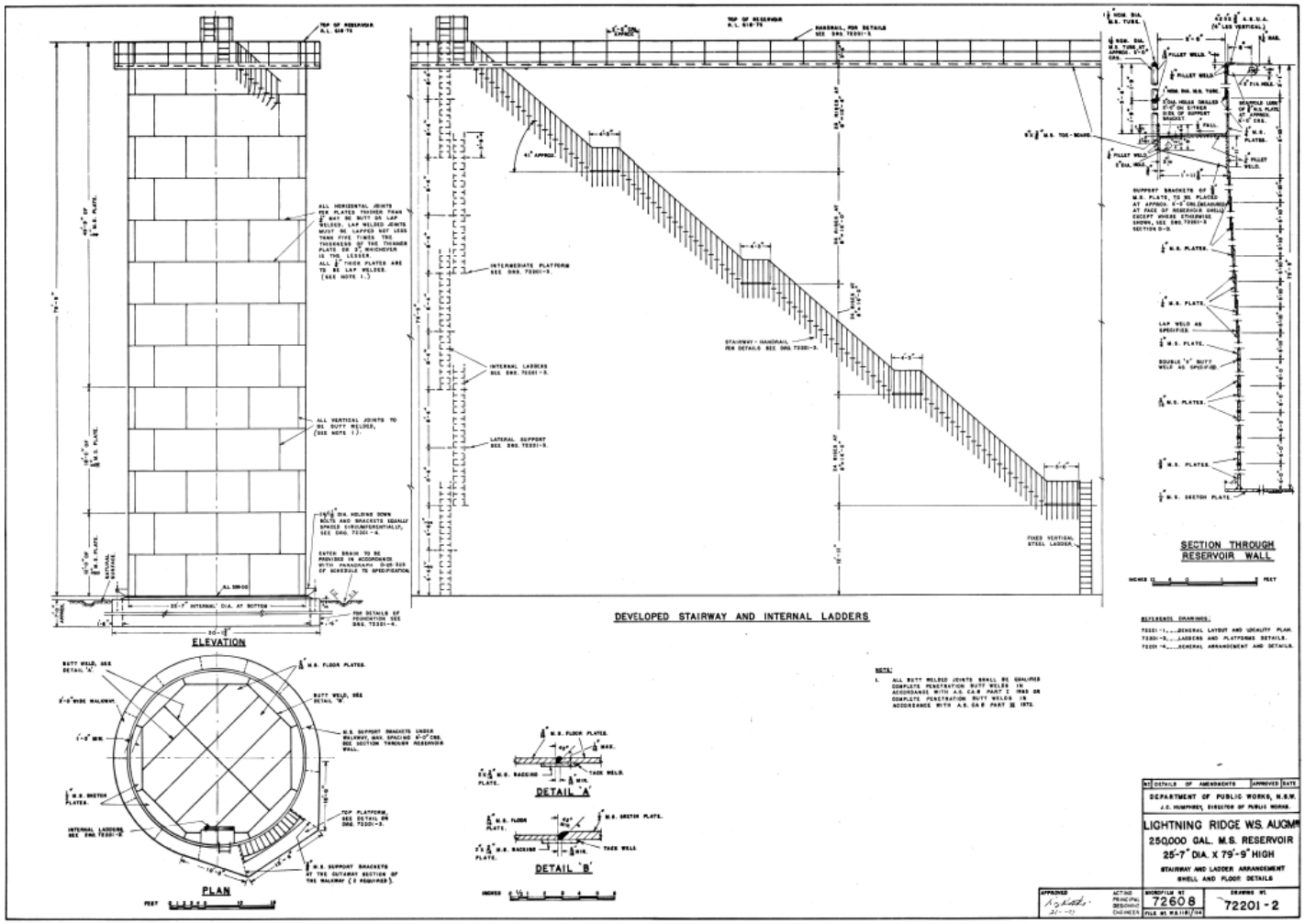
Transformer Location & Details

Map Scale: 1:422.9 at A4

Photos of two reservoirs

Appendix B: Small Reservoir Drawings




ELEVATION
PLAN
DEVELOPED STAIRWAY AND INTERNAL LADDERS
SECTION THROUGH RESERVOIR WALL
DETAIL 'A'
DETAIL 'B'
DEPARTMENT OF PUBLIC WORKS, N.S.W.
J.C. HUMPHREY, DIRECTOR OF PUBLIC WORKS.
LIGHTNING RIDGE W.S. AUGMN
250,000 GAL. M.S. RESERVOIR
25'-7" DIA. X 79'-9" HIGH
STAIRWAY AND LADDER ARRANGEMENT
SHELL AND FLOOR DETAILS
72608
72201 - 2

Appendix C: Water Quality Data

Certificate of Analysis by DOH on 14/06/2017

	BORE1	BORE2
	2017001365	2017001366
Aluminium	0.01	0.01
Antimony	<0.001	<0.001
Arsenic	0.001	0.001
Barium	<0.1	<0.1
Boron	0.2	0.2
Cadmium	<0.001	<0.001
Calcium	1.9	1.9
Chloride	65	65
Chromium	<0.01	<0.01
Copper	<0.1	<0.1
Fluoride	0.51	0.50
Iodine	0.04	0.03
Iron	0.06	0.02
Lead	<0.005	<0.005
Magnesium	0.04	0.04
Manganese	0.01	0.01
Mercury	<0.0001	<0.0001
Molybdenum	<0.01	<0.01
Nickel	<0.01	<0.01
Nitrate	<1.0	<1.0
Nitrite	<0.1	<0.1
pH	8.5 ***	8.5 ***
Selenium	<0.005	<0.005
Silver	<0.01	<0.01
Sodium	229 ***	228 ***
Sulfate	<1	<1
TDS	485	476
Total Hardness as $CaCO_3$	4.9	4.9
True Colour	1	<1
Turbidity	<0.1	<0.1
Uranium	<0.005	<0.005
Zinc	0.01	0.01

Report Remarks: *** NON-COMPLYING WITH ADWG

Results in mg/L except for Turbidity (NTU), Colour (HU), Conductivity (µS/cm) and pH

Appendix B Noise Impact Assessment – Lightning Ridge Water Supply System Upgrade (Cooling Tower)

SMK

CONSULTANTS

surveying – irrigation – environmental – planning

ABN 63 061 919 003

39 Frome Street
PO Box 774
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Lightning Ridge Water Supply System Upgrade

Noise Impact Assessment

Walgett Shire Council

77 Fox Street, Walgett NSW 2832

October 2017

SMK

CONSULTANTS

surveying – irrigation – environmental – planning

ABN 63 061 919 003

Document Control

Project Name	Lightning Ridge Water Supply System Upgrade Noise Impact Assessment
Proponent	Walgett Shire Council
Project Reference	17/315
Report Number	17/315 – NIA
Prepared for	Walgett Shire Council 77 Fox Street, Walgett NSW 2832
Prepared by	SMK Consultants 39 Frome Street Moree, NSW 2400
Contact	James Maxwell jmaxwell@smk.com.au 02 6752 1021

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	J.Maxwell
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Position	Environment & Resource Consultant
Company	SMK Consultants

Reviewed By	
	Peter Taylor
Name	Peter Taylor BSc. MEIANZ
Position	Director
Company	SMK Consultants

Revision History			
Version Number	Date	Authority	Details
0	October 2017	James Maxwell	Initial Issue

TABLE OF CONTENTS

1 Introduction

SMK Consultants have been engaged by Walgett Shire Council to undertake a Noise Impact Assessment (NIA) for the proposed upgrade of the Lightning Ridge Water Supply. The purpose of this NIA is to determine the potential noise impacts of the proposed development, on the local residents and amenity.

2 Project Details

Walgett Shire Council propose to improve the quality of the water supply at Lightning Ridge by installing a cooling tower, permanent chlorination system and 54 kL balance tank.

The cooling tower will be an induced draught counter-flow tower, with a maximum capacity of 30 L/s, mounted on a steel support structure and reaching a total height of 5m. While there will be two submersible pumps operating within the 54kL balance tank, the primary source of noise produced by the plant will originate from the operation of the cooling tower itself. Noise has been identified as running water.

Figure 2, below, shows an aerial view of the site in Lightning Ridge and proposed development site and proximity to residential receptors. The works will be constructed adjacent to an existing water tower.

The proposed cooling tower is designed to operate on an “on demand” basis, when water volumes decrease below the determined threshold. Therefore, the facility has no fixed operational hours and could potentially be operational at any time, day or night.

2.1 Existing Walgett Facility

Walgett Shire currently maintain a water treatment facility for the Walgett water supply, similar to the proposed Lightning Ridge upgrade. This facility, shown in Figure 1, is situated on an analogous elevation profile in a less confined, residentially zoned, location within Walgett and currently also operates “on demand” without resulting in any significant disturbance to nearby residential receptors.

Figure 1: Walgett Water Supply Cooling Tower & Balance Tank.

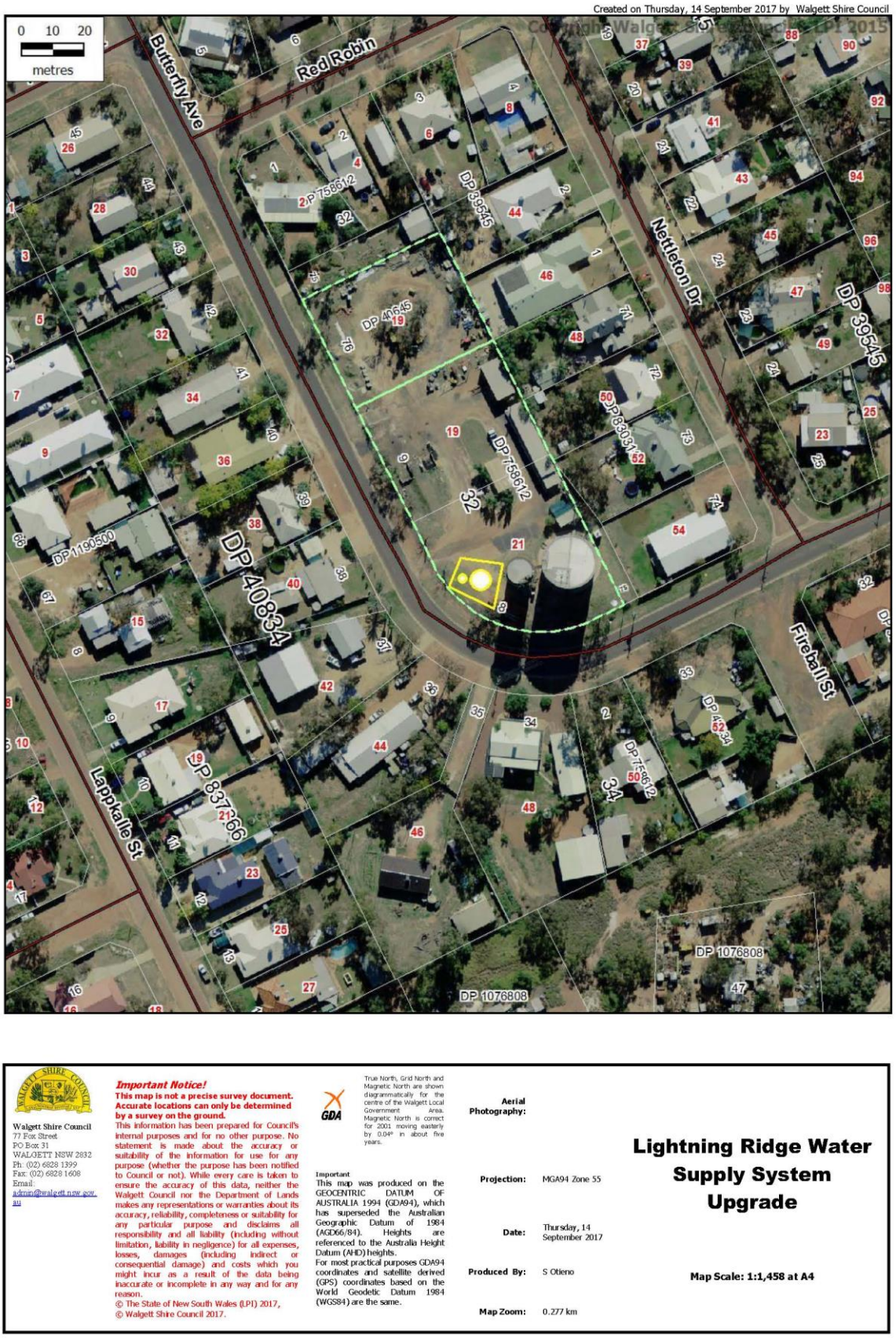

Figure 2: Proposed Development Site.

3 Criteria

The project site is located within a residential area of Lightning Ridge, as shown in Figure 3. In accordance with guidelines descriptions under the NSW Industrial Noise Policy (INP), this is considered a suburban area, meaning that it is "*an area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry*".

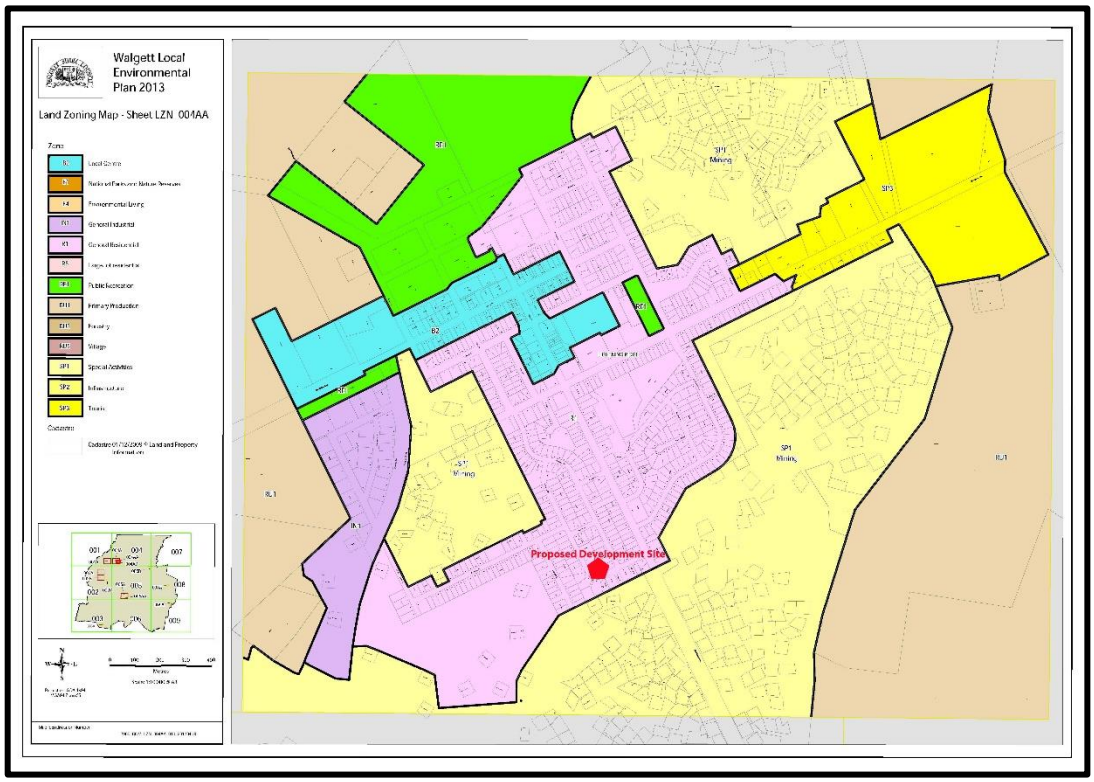

Figure 3: Surrounding Land Zoning

The Project Specific Noise Levels for this development have been adopted from the INP recommended amenity criteria for suburban areas. These levels are regulated over three daily periods, as detailed in Table 1.

Table 1: NSW Industrial Noise policy equivalent noise criteria for Lightning Ridge

Indicative Noise Amenity	Time of Day	Recommended LAeq Noise level dB(A)	
		Acceptable	Recommended Maximum
Suburban	Day (7am-6pm)	55	60
	Evening (6pm-10pm)	45	50
	Night (10pm-7am)	40	45

4 Methodology

The methodology adopted for this assessment involved the following scope:

- Conduct attended monitoring of the Walgett cooling tower facility to identify noise generated by a system of similar design to the proposed development.
- Conduct attended monitoring of the proposed Lightning Ridge development site to determine local background amenity and establish Project Specific Noise Levels.
- Calculate distance attenuation of predicted sound power and assess impact on local amenity and nearby residential receivers.

5 Results

5.1 Existing Walgett Facility

Attended monitoring was undertaken at the Walgett facility during both operational and non-operational periods. Sites were selected at the property boundary, half-distance to the boundary and a third location to the rear of the facility. The position of these monitoring locations is shown on the attached Figure 5 in Appendix 1.

Observation from attended monitoring sessions at the existing Walgett facility suggest that noise produced by the water treatment plant constitutes a steady drone. This is supported by the limited variation between recorded L_{A90} and L_{Aeq} figures, shown in Table 2. Recorded, higher L_{Amax} figures can be attributed to intermittent local traffic on the adjoining Kamilaroi Highway, as evidenced by the higher L_{Amax} figure at Site 1, during a non-operational period.

Table 2: Summary of attended noise monitoring at Walgett Facility

Location	$L_{Aeq(15min)}$	L_{Amax}	L_{Amin}	L_{A90}
Site 1 – Operational	57.3	59.3	52	56.55
Site 1 – Non-operational	49.1	67.8	29.9	35.1
Site 2 – Operational	52.4	63.4	47.5	51.4
Site 3 – Operational	50	62.3	47.4	48.6

5.2 Proposed Development Site

The proposed development site is currently utilised as Council depot and water reservoir. Attended monitoring of the site was undertaken over a weekday afternoon, throughout which, the site was accessed by WSC staff numerous times.

The RBL calculation highlights that daytime background noise levels at the proposed development site were consistent with project estimates, given the residential/suburban surroundings.

Table 4: Summary of background noise levels at development site.

Location	L_{Aeq15}	L_{Amax}	RBL
Site 4	60	79	56

* All samples recorded during Day period (Attended monitoring).

Attended monitoring of the site identified that these noise levels are the result of intermittent, low-level residential noise, with L_{Amax} figures resulting primarily from local traffic and natural sources, such as bird calls and wind.

6 Noise Emission Calculations

The monitoring of an existing, similar facility, provides real-time noise levels that are directly comparable to the proposed development. These levels can be used to predict noise emissions and the footprint of noise from the proposed cooling tower installation.

Following monitoring of the existing cooling tower under operational conditions, the facility has been determined to produce a Sound Power Level (SWL) of 91.8 dB at its point source. The following table presents the calculated distance attenuation of noise levels predicted for a range of distance in increments of 15m from the such a cooling tower.

Table 5: Noise attenuation predictions based on a calculated Sound Power Level (SWL) of 91.8 dB

Distance	Attenuation	Predicted Sound pressure level at Distance (SPL)	Minimum Noise Criteria and Monitoring Results
			Night-time Levels (10pm-7am) LAeq(9hr)
5m	-	66.8 dB	Max 45 dB
15m	9.5 dB	57.3 dB	Max 45 dB
30m	15.6 dB	51.2 dB	Max 45 dB
45m	19.05 dB	47.75 dB	Max 45 dB
60m	21.56 dB	45.24 dB	Max 45 dB
75m	23.5 dB	43.3 dB	Max 45 dB

These noise distance attenuation figures are shown in the below Figure 4 as noise contours, overlaying recent aerial imagery of the proposed development site and its surrounds.

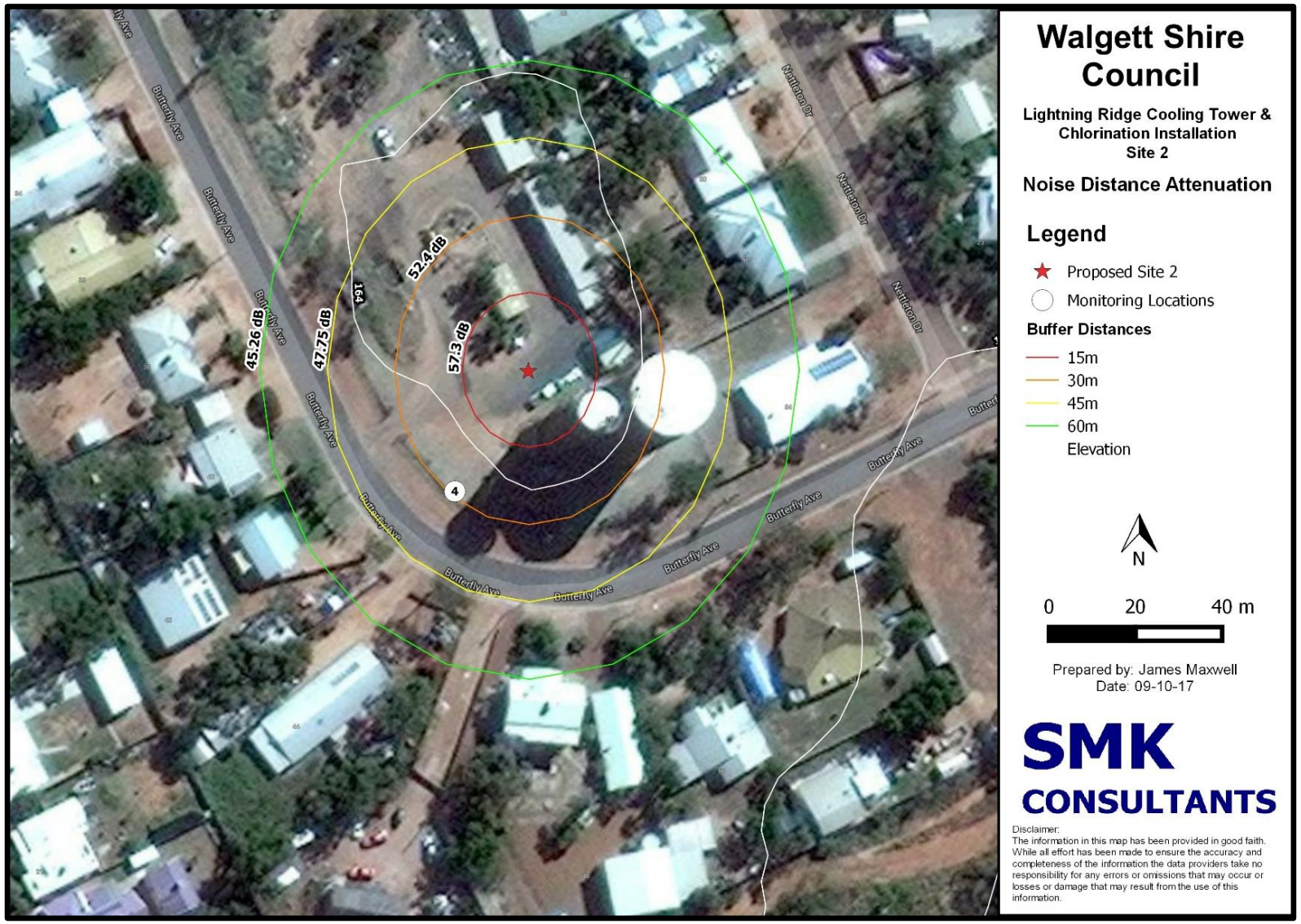

Figure 4: Projected noise distance attenuation over proposed development site.

The location of the proposed water cooling tower has been chosen to minimise the potential noise impact on the surrounding residential receptors. This location limits the greatest impact of the development to the residences located at 50 and 52 Nettleton Drive, shown to fall inside the green contour of 45.26 dB. Projected noise levels at these two residences are expected to exceed the INP recommended night-time maximum of 45 dB by approximately 1-3 dB. While 54 Nettleton Drive also falls within this contour, the existing water tower would prove a significant barrier to noise produced at the proposed point source.

7 Discussion

The proposed water supply upgrade aims to improve the water quality of the Lightning Ridge municipal water supply. This facility will be run by an automated system that will engage in response to demand and peak load requirements. As a result, the facility will operate intermittently throughout day, evening and night periods. Given the morning demand upon the Lightning Ridge water supply, the facility will regularly be required to operate in the early morning hours, prior to 7am.

With this in mind, the proposed siting of the cooling tower has been located to a more central location of the development site, limiting the potential noise impact to fewer nearby residential receptors by maximising the buffer distance from the receptors.

At this location, noise generated by the cooling tower is expected to fall beneath the INP recommended maximum criteria at all residential receptors throughout the day and evening periods. During night periods however, the projected L_{AEQ15}'s of 45-48 dB are likely to exceed the adopted threshold by 1-3 dB, potentially resulting in a minor noise disturbance to the north-eastern receptors.

This impact can be mitigated with the installation of a noise shielding barrier, such as a shielding wall, to stop the direct emission of noise via line of sight from the cooling tower facility to the north-eastern residences. The shielding can consist of 2mm colour bond sheeting installed between the primary noise source and the receptors. This may be achievable on the tower/stand arrangement where the cooling tower is installed.

8 Conclusions

Noise generated by the water cooling tower during operations will consist of a continuous drone, occurring intermittently throughout its 24hr cycle, as the automated system will initiate operations based on required demand.

The noise produced by the proposed facility will meet the adopted INP thresholds for Day and Evening periods, but will exceed the maximum recommended Night (10pm-7am) L_{Aeq} at north-eastern receptors by 1-3 dB.

This level of intrusion may result in a minor disturbance to the surrounding residential amenity. It is worth noting however, that the noise generated by the facility is similar in character to domestic air-conditioning units, prevalent within the Lightning Ridge residential areas. Therefore, the impact may be less noticeable, particularly throughout the summer months.

Lastly, if required, the installation of a noise wall around the north-western quarter of the cooling tower, would significantly reduce the impact on the most affected residences, making the structure compliant with acceptable night-time threshold criteria.

9 References

- NSW Environment Protection Agency (2000). NSW Industrial Noise Policy, NSW Environment Protection Agency, Sydney;
- NSW Environment Protection Agency (1999). Environmental criteria for road traffic noise, NSW Environment Protection Agency, Sydney;
- Department of Environment, Climate Change and Water NSW. NSW Road Noise Policy. DECCW (2011);

Appendix 1: Noise Monitoring Locations at Walgett Cooling Tower Facility

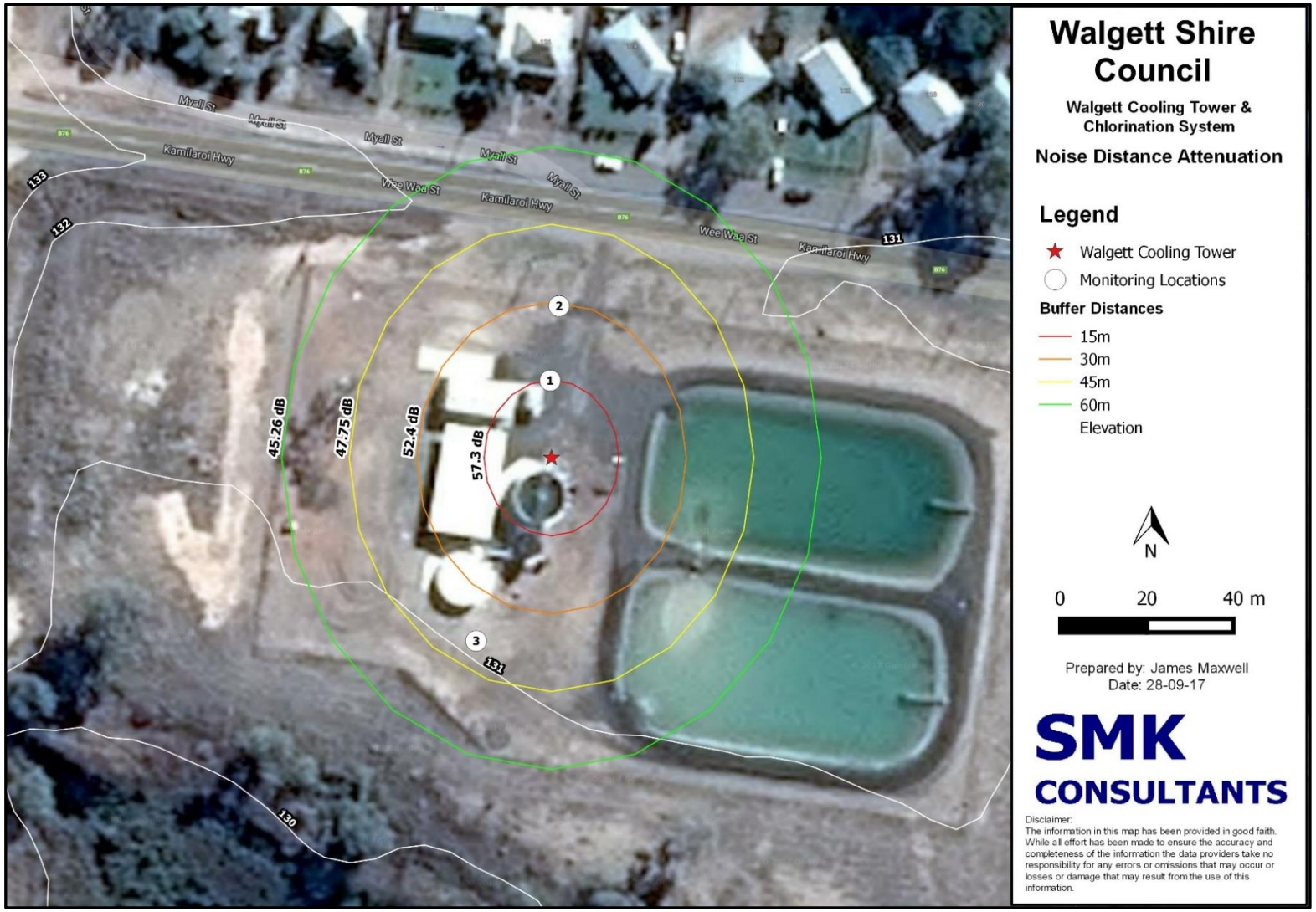

Figure 5: Walgett Facility Noise Monitoring Locations and Distance Attenuation Contours

Appendix C Section 10.7 Planning Certificate

WALGETT SHIRE COUNCIL

PO Box 31, WALGETT, NSW, 2832.

Telephone: (02) 6828 1399 Email: admin@walgett.nsw.gov.au

PLANNING CERTIFICATE

(Issued pursuant to the Environmental Planning and Assessment Act 1979, S10.7(2))

APPLICATION DETAILS:

Fee: $133.00 Receipt No: 340112

Applicant: Public Works Advisory
66 Harrington Street
SYDNEY NSW 2000

DESCRIPTION OF LAND:

Property Address: 21 Butterfly Avenue LIGHTNING RIDGE 2834
Property Title: LOT: 8 SEC: 32 DP: 758612 CRN: 89414
Council's Ass. No: 57661
Owner: Walgett Shire Council

SCHEDULE 4 ITEM	REPLY
1. NAMES OF RELEVANT PLANNING INSTRUMENTS AND DCPs (1) The name of each environmental planning instrument that applies to the carrying out of development on the land.	Walgett Local Environmental Plan 2013. SEPP 1 – Development Standards SEPP 21 – Caravan Parks SEPP 30 – Intensive Agriculture SEPP 32 – Urban Consolidation (Redevelopment of Urban Land) SEPP 33 – Hazardous and Offensive Development SEPP 36 – Manufactured Home Estates SEPP 44 – Koala Habitat Protection SEPP 55 – Remediation of Land SEPP 62 – Sustainable Aquaculture SEPP 64 – Advertising and Signage SEPP 65 – Design Quality of Residential Flat Development. SEPP – (Affordable Rental Housing) 2009 SEPP – Building Sustainability Index BASIX 2004 SEPP – (Exempt & Complying Development Codes) 2008 SEPP (Housing for Seniors or People with a Disability) 2004 SEPP – (Infrastructure) 2007 SEPP – (Major Developments) 2005 SEPP – (Mining, Petroleum Production and Extractive Industries) 2007 SEPP – (Miscellaneous Consent Provisions) 2007 SEPP – (Rural Lands) 2008 SEPP – (State & Regional Development) 2011 SEPP – (Temporary Structures) 2007 A full copy of the SEPPs are available on the NSW Legislation website – www.legislation.nsw.gov.au

SCHEDULE 4 ITEM	REPLY
(2) The name of each proposed environmental planning instrument that will apply to the carrying out of development on the land and that is or has been the subject of community consultation or on public exhibition under the Act (unless the Director-General has notified the council that the making of the proposed instrument has been deferred indefinitely or has not been approved).	
(3) The name of each development control plan that applies to the carrying out of development on the land.	Walgett Shire Development Control Plan 2016.
(4) In this clause, proposed environmental planning instrument includes a planning proposal for a LEP or a draft environmental planning instrument.	-
2. ZONING AND LAND USE UNDER RELEVANT LEPs (a) For each environmental planning instrument or proposed instrument referred to in clause 1 (other than a SEPP or proposed SEPP) that includes the land in any zone (however described):the identity of the zone, whether by reference to a name (such as "Residential Zone" or "Heritage Area") or by reference to a number (such as "Zone No 2 (a)"),	Zone R1 General Residential
(b) the purposes for which the plan or instrument provides that development may be carried out within the zone without the need for development consent,	**See attached copy of zoning development control table**
(c) the purposes for which the plan or instrument provides that development may not be carried out within the zone except with development consent,	**See attached copy of zoning development control table**
(d) the purposes for which the plan or instrument provides that development is prohibited within the zone,	**See attached copy of zoning development control table**

SCHEDULE 4 ITEM	REPLY
(e) whether any development standards applying to the land fix minimum land dimensions for the erection of a dwelling-house on the land and, if so, the minimum land dimensions so fixed,	No.
(f) whether the land includes or comprises critical habitat,	No.
(g) whether the land is in a conservation area (however described),	No.
(h) whether an item of environmental heritage (however described) is situated on the land.	No
2A. ZONING AND LAND USE UNDER STATE ENVIRONMENTAL PLANNING POLICY (SYDNEY REGION GROWTH CENTRES) 2006 To the extent that the land is within any zone (however described) under: a) Part 3 of the *State Environmental Planning Policy (Sydney Region Growth Centres) 2006* (***the 2006 SEPP***), or b) a Precinct Plan (within the meaning of the 2006 SEPP), or c) a proposed Precinct Plan that is or has been the subject of community consultation or on public exhibition under the Act, the particulars referred to in clause 2 (a)–(h) in relation to that land (with a reference to "the instrument" in any of those paragraphs being read as a reference to Part 3 of the 2006 SEPP, or the Precinct Plan or proposed Precinct Plan, as the case requires). (i)	Not applicable.

SCHEDULE 4 ITEM	REPLY
3. COMPLYING DEVELOPMENT (1) The extent to which the land is land on which complying development may be carried out under each of the codes for complying development because of the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4), 1.18 (1) (c3) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008..	Complying Development may be carried out under the State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 on the subject land.
(2) The extent to which complying development may not be carried out on that land because of the provisions of clauses 1.17A (1) (c) to (e), (2), (3) and (4), 1.18 (1) (c3) and 1.19 of that Policy and the reasons why it may not be carried out under those clauses. (3) If the council does not have sufficient information to ascertain the extent to which complying development may or may not be carried out on the land, a statement that a restriction applies to the land, but it may not apply to all of the land, and that council does not have sufficient information to ascertain the extent to which complying development may or may not be carried out on the land.	
4, 4A & 4B COASTAL PROTECTION Questions from Schedule 4 regarding coastal protection do not apply to the Walgett local government area as there are no beaches, coasts, or coastal protection works.	
5. MINE SUBSIDENCE Whether or not the land is proclaimed to be a mine subsidence district within the meaning of section 15 of the *Mine Subsidence Compensation Act 1961.*	No. See also note 1.
6. ROAD WIDENING AND REALIGNMENT Whether or not the land is affected by any road widening or road realignment under: (a) Division 2 of Part 3 of the *Roads Act 1993*, or	No.
(b) any environmental planning instrument, or	No.
(c) any resolution of the council.	No.

SCHEDULE 4 ITEM	REPLY
7. COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS Whether or not the land is affected by a policy: (a) adopted by the council, or (b) adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council, that restricts the development of the land because of the likelihood of land slip, bush fire, flooding, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).	No.
7A. FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION. (1) Whether or not development on that land or part of that land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) is subject to flood related development controls.	No
(2) Whether or not development on that land or part of that land for any other purpose is subject to flood related development controls.	
(3) Words and expressions in this clause have the same meanings as in the instrument set out in the Schedule to the *Standard Instrument (Local Environmental Plans) Order 2006*	---

SCHEDULE 4 ITEM	REPLY
8. LAND RESERVED FOR ACQUISITION Whether or not any environmental planning instrument, deemed environmental planning instrument or draft environmental planning instrument applying to the land provides for the acquisition of the land by a public authority, as referred to in section 27 of the Act.	No.
9. CONTRIBUTIONS PLANS The name of each contributions plan applying to the land.	Not applicable.
9A. BIODIVERSITY CERTIFIED LAND If the land is biodiversity certified land under Part 8 of the Biodiversity Conservation Act 2016, a statement to that effect.	No.
10. BIOBANKING AGREEMENTS. If the land is a biodiversity stewardship site under a biodiversity stewardship agreement under Part 5 of the Biodiversity Conservation Act 2016, a statement to that effect (but only if the council has been notified of the existence of the agreement by the Chief Executive of the Office of Environment and Heritage).	Council has not been notified of an agreement.
10A. NATIVE VEGETATION CLEARING SET ASIDES. If the land contains a set aside area under section 60ZC of the Local Land Services Act 2013, a statement to that effect (but only if the council has been notified of the existence of the set aside area by Local Land Services or it is registered in the public register under that section).	
11. BUSH FIRE PRONE LAND If any of the land is bush fire prone land (as defined in the Act), a statement that all or, as the case may be, some of the land is bush fire prone land. If none of the land is bush fire prone land, a statement to that effect.	This land mapped as not being bush fire prone on the bush fire prone land map prepared by the NSW Rural Fire Service for the Walgett Shire.

SCHEDULE 4 ITEM	REPLY
12. PROPERTY VEGETATION PLANS If the land is land to which a property vegetation plan approved under Part 4 of the Native Vegetation Act 2003 (and that continues in force) applies, a statement to that effect (but only if the council has been notified of the existence of the plan by the person or body that approved the plan under that Act).)	No - Council has no record of a Property Vegetation Plan under the Native Vegetation Act 2003 applying to the land.
13. ORDERS UNDER: TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006 Whether an order has been made under the *Trees (Disputes Between Neighbours Act 2006)* to carry out work in relation to a tree on the land (but only if Council has been notified of the order)	Council has not been notified that an order has been made.
14. DIRECTIONS UNDER PART 3A If there is a direction by the Minister in force under section 75P (2) (c1) of the Act that a provision of an environmental planning instrument prohibiting or restricting the carrying out of a project or stage of a project on the land under Part 4 of the Act does not have effect, a statement to that effect identifying the provision that does not have effect.	No.

SCHEDULE 4 ITEM	REPLY
15. SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING. If the land is land to which *State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004* applies: (a) a statement of whether there is a current site compatibility certificate (seniors housing), of which the council is aware, in respect of proposed development on the land and, if there is a certificate, the statement is to include: (i) the period for which the certificate is current and (ii) that a copy may be obtained from the head office of the Department of Planning, and	Not applicable.
(b) a statement setting out any terms of a kind referred to in clause 18 (2) of that Policy that have been imposed as a condition of consent to a development application granted after 11 October 2007 in respect of the land.	Not applicable.
16. SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE, SCHOOLS OR TAFE ESTABLISHMENTS A statement of whether there is a valid site compatibility certificate (infrastructure), of which the council is aware, in respect of proposed development on the land and, if there is a certificate, the statement is to include: (a) The period for which the certificate is valid, and (b) That a copy may be obtained from the head office of the Department of Planning.	Not applicable.

SCHEDULE 4 ITEM	REPLY
17. SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING (1) A statement of whether there is a current site compatibility certificate (affordable rental housing), of which the council is aware, in respect of proposed development on the land and, if there is a certificate, the statement is to include: (a) The period for which the certificate is current, and (b) That a copy may be obtained from the head office of the Department of Planning.	Council is not aware of any certificate.
(2) A statement setting out any terms of a kind referred to in clause 17 (1) or 38 (1) of *State Environmental Planning Policy (Affordable Rental Housing) 2009* that have been imposed as a condition of consent to a development application in respect of the land.	Not applicable.
18. PAPER SUBDIVISION INFORMATION (1) The name of any development plan adopted by a relevant authority that applies to the land or that is proposed to be subject to a consent ballot. (2) The date of any subdivision order that applies to the land. (3) Words and expressions used in this clause have the same meaning as they have in Part 16C of this Regulation.	Not applicable.

SCHEDULE 4 ITEM	REPLY
19 SITE VERIFICATION CERTIFICATES A statement of whether there is a current site verification certificate, of which the council is aware, in respect of the land and, if there is a certificate, the statement is to include: (a) the matter certified by the certificate, and Note. A site verification certificate sets out the Director-General's opinion as to whether the land concerned is or is not biophysical strategic agricultural land or critical industry cluster land—see Division 3 of Part 4AA of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007. (b) the date on which the certificate ceases to be current (if any), and (c) that a copy may be obtained from the head office of the Department of Planning and Infrastructure.	Council is not aware of any site verification certificates being issued for the land to which the certificate relates.
20 LOOSE-FILL ASBESTOS INSULATION If the land includes any residential premises (within the meaning of Division 1A of Part 8 of the Home Building Act 1989) that are listed on the register that is required to be maintained under that Division, a statement to that effect.	No notification from NSW Fair Trading in relation to the property has been received.

SCHEDULE 4 ITEM	REPLY
21 AFFECTED BUILDING NOTICES AND BUILDING PRODUCT RECTIFICATION ORDERS (1) A statement of whether there is any affected building notice of which the council is aware that is in force in respect of the land. (2) A statement of: (a) whether there is any building product rectification order of which the council is aware that is in force in respect of the land and has not been fully complied with, and (b) whether any notice of intention to make a building product rectification order of which the council is aware has been given in respect of the land and is outstanding. (3) In this clause: affected building notice has the same meaning as in Part 4 of the Building Products (Safety) Act 2017. building product rectification order has the same meaning as in the Building Products (Safety) Act 2017.	Council is not aware of any affected building notice being issued for the land to which the certificate relates.

SCHEDULE 4 ITEM	REPLY
NOTE: The following matters are prescribed by section 59 (2) of the *Contaminated Land Management Act 1997* as additional matters to be specified in a planning certificate: (a) that the land to which the certificate relates is significantly contaminated land within the meaning of that Act – if the land (part of the land) is significantly contaminated land at the date when the certificate is issued, (b) that the land to which the certificate relates is subject to a management order within the meaning of that Act – if it is subject to such an order at the date when the certificate is issued, (c) that the land to which the certificate relates is the subject of an approved voluntary management proposal within the meaning of that Act – if it is the subject of such approved proposal at the date when the certificate is issued, (d) that the land to which the certificate relates is the subject to an ongoing maintenance order within the meaning of that Act – if it is subject to such an order at the date when the certificate is issued, (e) that the land to which the certificate relates is the subject of a site audit statement within the meaning of that Act – if a copy of such statement has been provided at any time to the local authority issuing the certificate.	Not applicable.

NOTE: The information contained in this certificate needs to be considered in conjunction with the provisions of the Environmental Planning and Assessment Act 1979 as well as any other relevant State or Federal government legislation.

The above information has been taken from the Council's records, however Council cannot accept responsibility for any omission or inaccuracy.

Jess McDonald, Director Environmental Services, Walgett Shire Council:

jmcdonell.

Date: 20/08/2019

Any request for further information in connection with the above should be marked for the attention of the Director Environmental Services, Walgett Shire Council.

Telephone No (02) 6828 1399

Note 1 – Allotments in Opal Fields
There is generally no information regarding previous opal mining operations in the Lightning Ridge area. Applicants should make their own enquiries regarding existing excavations on the land or adjoining parcels.

Walgett Shire Council

P.O. Box 31, WALGETT, N.S.W. 2832.

Telephone: (02) 6828 1399 Facsimile: (02) 6828 1608

PLANNING CERTIFICATE - ANNEXURE

(Issued under section 10.7(5) of the Environmental Planning and Assessment Act 1979)

	REPLY
a) Has any development consent with respect to the land been granted within the previous two years?	No Development Applications No Complying Developments
b) Does the Walgett Local Environmental Plan specify a minimum lot size for subdivision?	700 M sqr
c) Is the land affected by any resolution of Council to seek amendment to any environmental planning instrument or draft environmental planning instrument applying to the land?	
FURTHER COMMENTS:	

ZONING DEVELOPMENT CONTROL TABLE

Walgett Local Environment Plan 2013

Zone R1 General Residential

1 Objectives of zone

To provide for the housing needs of the community.

To provide for a variety of housing types and densities.

To enable other land uses that provide facilities or services to meet the day to day needs of residents.

To enable development that is compatible with the surrounding residential environment and that is unlikely to adversely affect the amenity of residential development on land in the zone.

2 Permitted without consent

Environmental protection works; Home occupations; Roads

3 Permitted with consent

Attached dwellings; Bed and breakfast accommodation; Boarding houses; Building identification signs; Business identification signs; Centre-based child care facilities; Community facilities; Dwelling houses; Food and drink premises; Group homes; Home industries; Hostels; Kiosks; Multi dwelling housing; Neighbourhood shops; Places of public worship; Residential flat buildings; Respite day care centres; Semi-detached dwellings; Seniors housing; Serviced apartments; Shop top housing; Any other development not specified in item 2 or 4

4 Prohibited

Agriculture; Air transport facilities; Airstrips; Amusement centres; Animal boarding or training establishments; Biosolids treatment facilities; Boat building and repair facilities; Car parks; Charter and tourism boating facilities; Commercial premises; Correctional centres; Crematoria; Depots; Eco-tourist facilities; Extractive industries; Farm buildings; Forestry; Freight transport facilities; Heavy industrial storage establishments; Helipads; Highway service centres; Industrial retail outlets; Industrial training facilities; Industries; Marinas; Mortuaries; Open cut mining; Public administration buildings; Pubs; Recreation facilities (major); Research stations; Restricted premises; Rural industries; Rural workers' dwellings; Service stations; Sewage treatment plants; Sex services premises; Signage; Storage premises; Tourist and visitor accommodation; Transport depots; Truck depots; Vehicle body repair workshops; Vehicle repair stations; Warehouse or distribution centres; Waste or resource management facilities; Water treatment facilities; Wharf or boating facilities; Wholesale supplies

399 – 10.7 Certificate – Lot 8 DP758612 - Address 21 Butterfly Avenue LIGHTNING RIDGE 2834 - Owner Walgett Shire Council - Applicant- Public Works Advisory – Ass 57661 – PN 16035

NSW GOVERNMENT Public Works Advisory

66 Harrington Street, Sydney NSW 2000
PO Box N408, Grosvenor Place NSW 1220
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