



Condition Assessment of Existing Groundwater Bores (SSWP129)

PHASE 1 – SCOPING STUDY DETAILED APPLICATION

Orana Water Utilities Alliance
Version 1.3
March 2019

KEY PROPOSAL DETAILS

PROPOSAL INFORMATION	
Proposal name	Condition Assessment of Existing Groundwater Bores
Lead proponent (e.g. Council)	Mid-Western Regional Council on behalf of Orana Water Utilities Alliance (OWUA). Note: Previously Lower Macquarie Water Utilities Alliance (LMWUA).
Lead proponent ABN	96 149 391 332
Proposal partners	There are 11 OWUA Member Councils in total. Five (5) of these LGAs will be participating in this project – Central Darling, Narromine, Walgett, Warren and Warrumbungle Shire Councils.
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PROPOSAL SCOPE	
Proposal summary for publication <i>Please provide 150 words or less</i>	<p>This project aims to undertake condition assessments of 31 existing groundwater bores across five (5) of the 11 Orana Water Utilities Alliance (OWUA) LGAs including Central Darling, Narromine, Walgett, Warren and Warrumbungle Shire Councils. These condition assessments are essential to determine the age, longevity and works required to critical infrastructure and ensure the bores can maintain safe, effective and reliable drinking water supplies across 17 towns within these 5 LGAs. The majority of these towns rely solely on bore water supply and with continuing drought conditions, even those towns who would normally use a primary river water supply are relying on bores to supply town water to their communities.</p>
PROPOSAL LOCATION	
Proposal address	Central Darling –Wilcannia (3) and Ivanhoe (2) Narromine – Narromine (4) Walgett – Walgett (2), Lightning Ridge (2), Burren Junction (1), Rowena (1) and Carinda (1) Warren – Warren (2) and Nevertire (1) Warrumbungle – Coonabarabran (4), Coolah (2), Dunedoo (1), Baradine (2), Bugaldie (1), Kenebri (1) and Mendooran (1)
Local government area	5 x LGA's – Central Darling, Narromine, Walgett, Warren, Warrumbungle Shire Councils
NSW electorate	Barwon – Central Darling, Walgett, Warren and Warrumbungle Shire Councils; Dubbo – Narromine Shire Council
Federal electorate	Parkes
SUPPORTING INFORMATION	
Attachments <i>Please list out all supporting information provided</i>	Links provided in References.

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1.3	Final	26/3/19	A Gleeson

1 INTRODUCTION

The Orana Water Utilities Alliance (OWUA) is a collaboration between 11 Local Councils across Western NSW, including:

- Bogan Shire Council
- Bourke Shire Council
- Brewarrina Shire Council
- Central Darling Shire Council
- Cobar Shire Council
- Gilgandra Shire Council
- Mid-Western Region Council
- Narromine Shire Council
- Walgett Shire Council
- Warren Shire Council
- Warrumbungle Shire Council

The OWUA represents 66,436 people ⁽¹⁾ living and working in isolated and remote communities in Western NSW with 23,617 water connections and covers an area of 237,367 square kilometres, 29% of NSW.

Previously the Lower Macquarie Water Utilities Alliance (LMWUA), the OWUA was established in September 2018 with a commitment to provide a unified approach to the sustainable delivery of water supply and sewerage services, and to achieve and maintain gazetted Best Practice by the earliest feasible date. The collaborative arrangement allows the member Councils to pool resources, reduce duplication and form a common platform to develop initiatives.

The OWUA is operated under the provisions of the Orana Joint Organisation (OJO).

2 CASE FOR CHANGE

2.1 BACKGROUND

Commissioned in 2014, the LMWUA Water and Drought Security Study ⁽²⁾ investigated the potential solutions to improve water supply security throughout the OWUA region by:

- Improving worst-case supply reliability to minimise transporting water and the evacuation of urban centres, and
- Reducing the frequency and severity of water restrictions.

The Study produced six key regional recommendations, including ‘carry out a condition survey of bores’ (recommendation 6). Following the release of these recommendations, this project was identified and aims to address water security, water quality and infrastructure renewals.

Many of the Councils within the OWUA region rely on bores as their primary water source. Some use bores to supplement a river or other water source when these regular water sources are scarce. While some bores in the area have been recently replaced, the state of a large number of the existing bores is unknown. This is in relation to the bore itself, associated pumping equipment and the state of the aquifer from which it pumps water.

Bores, like any constructed asset, can deteriorate with age. This can lead to the bore owner experiencing issues with bore performance and ultimately water supply problems. The severity of these problems can range from the bore becoming unsuitable for its intended purpose to less significant issues such as encrustation or scaling. ⁽³⁾

The focus of the project will be to provide a long-term solution to the provision of reliable and consistent water supplies from groundwater to local communities in Western NSW, particularly to those Councils who rely on a bore source for their urban water supply.

The current Australia Drinking Water Guidelines (2011) ⁽⁴⁾ recommend regular monitoring of bores, including bore construction. Regular assessments intend to confirm that preventative measures implemented to control hazards are functioning properly and effectively, and therefore, not putting the health and safety of the public at risk.

Five ⁽⁵⁾ or the 11 Councils within the OWUA will take part in this project, with the support of all OWUA Councils. The project brief is to conduct a condition assessment of 31 individual bores. A breakdown of these locations is below. Some of the bores identified are up to 40 years old while other ages are unknown. In some locations and depending on the materials used in construction, bores may only have a life expectancy of 5 to 10 years ⁽⁵⁾.

The condition assessment will provide detailed information for the OWUA Member Councils, which either individually or as a group, can then plan the operation and maintenance/replacement of these bores which are critical infrastructure in these communities.

2.2 PROJECT LOCATION

The condition assessment of existing groundwater bores will be undertaken across five (5) LGA's within the OWUA region, including 17 towns or localities and 31 individual bore sites. These are outlined below:

Table 2.2 Locations of bores to be assessed

COUNCIL	BORE LOCATION	NUMBER OF BORES TO BE ASSESSED
Central Darling	Wilcannia	3
	Ivanhoe	2
Narromine	Narromine	4
Walgett	Walgett	2
	Lightning Ridge	2
	Burren Junction	1
	Rowena	1
	Carinda	1
Warren	Warren	2
	Nevertire	1
Warrumbungle	Coonabarabran	4
	Coolah	2
	Dunedoo	1
	Baradine	2
	Bugaldie	1
	Kenebri	1
	Mendooran	1
TOTAL		31

2.3 OBJECTIVES AND OUTCOMES

Undertaking a condition assessment of 31 identified groundwater bores will provide valuable information and allow the following:

- Plan future infrastructure upgrades and renewals of bores which will in turn:
 - Ensure water supplies in the region are safe and secure
 - Improve productivity and efficiency of ground water supply
 - Provide confidence to local communities that their water supply is safe and not putting the public at risk
 - Provide confidence within the local community which may lead to future developments within the region
- Provide bore configuration data and hydrological characteristics to ensure long term sustainability of water supply.
- Provide information that will allow potable bore water supplies to be accurately categorised in respect to Microbial Health Based Targets (MBT).

3 SCOPE OF WORK

This project will involve the condition assessment of 31 bores used for urban water supply in the Local Government areas of Central Darling, Narromine, Walgett, Warren and Warrumbungle. Many of these Councils rely solely on bore supply. For those LGA's which do have access to surface water in some towns and localities, bore supply becomes the primary water source during periods of drought where surface water availability is limited or non-existent.

The project has been broken down in to three separate tasks, with each task contributing to a final report outlining the current condition of each bore and recommended works required to this critical infrastructure. An outline is each task is below:

TASK ONE

Review in detail (from Office of Water records) the condition of all bores currently used by each Water Utility, including:

- Date of construction
- Diameter of bores
- Method of cementing (inside and out or down the outside)
- Geological strata, including the presence or otherwise of saline zones from shale water above Pilliga Sandstone for GAB bores
- Pump diameters and yield
- Water quality data from construction, or subsequent, if available.

Timeline: Two (2) to three (3) weeks

Output: A report outlining a risk ranking based on whether the bore may have issues in relation to salinity casing corrosion, screen clogging by bacterial iron or encrusting scales, or declining head characteristics.

Budget: \$25,000

TASK TWO

Interrogate Council files and undertake site visits to provide a more accurate analysis of the current performance of each bore, including:

- Inspection of the bore casing and pump details as appropriate
- Analysis of drawdown data on the long-term performance of each bore and bore field.
 - This will provide more site-specific data and will attempt to gain an understanding of whether ongoing drawdown data and pumping rates need to be collected to understand the parameter, specific capacity (drawdown v pumping rate). All other things being equal, this parameter should not change unless there is a change in bore efficiency.
 - It will be important to understand the degree to which each bore/bore-field contains regular monitoring of water level and pumping rate. To achieve this, the recommendation may be to install a pressure transducer in each bore to manually or automatically measure changes in pressure head, or as in the case of Narromine, having computerised output of such important criteria on an ongoing basis to manage the groundwater effectively and continually.

- Review available chemical and other data regarding each bore and any pumping-test data which is at hand to provide an analysis of:
 - Safe yield
 - Optimum pump setting and pumping rates
- Record or calculate important aquifer characteristics such as transmissivity and storage coefficient, where possible.

Timeline: Four (4) to five (5) weeks.

Output: A report that will further refine the risk ranking and determine the urgency of completing rehabilitation measures.

Budget: \$60,000

TASK THREE

Field measurements to ascertain what rehabilitation may be required. This may include:

- Removing pumps and completing downhole camera survey
- Calliper scale sampling
- Other down hole logs, including sonic logs to understand casing integrity
- Close inspection of screens for encrusting scales or bacterial iron.

Timeline: dependant on measurements required

Budget: \$20,000 per bore (\$620,000 total for 31 bores)

Once the condition assessment of each bore is complete, the decision may then need to be made as to whether infrastructure rehabilitation or abandonment is the most suitable or preferred option.

Pumping tests, especially step drawdown tests will indicate bore efficiency and these will then be undertaken for suspect bores prior to any rehabilitation measures. The use of bacterial acids for iron fouling and dry penetrating acids and surging and wire brushing of screens to improve efficiency will also be undertaken where required.

Some of these costs are outlined in this application; however, it is too early to understand the status of the bore networks until the above tasks are completed. These works may be the subject of future funding applications once this stage is complete.

4 STRATEGIC ASSESSMENT

The condition assessment of existing groundwater bores project aligns with a number of key objectives and priorities identified in State and Regional frameworks, including:

Table 4.1 Alignment with State and Regional Strategic Frameworks

Framework	Objective	Alignment
NSW Regional Development Framework	<p>Providing quality services and infrastructure in regional NSW.</p> <p>All people in regional NSW should and will have access to essential services and infrastructure including hospitals, schools, roads, water, police and emergency services. This is our commitment to ensuring that no one in regional NSW should have to choose between where they live and work and having access to the most essential services.</p>	This project aligns with the key priorities of providing quality services and infrastructure, including water through by providing a long-term solution to the provision of reliable and consistent water supplies from groundwater.
NSW State Infrastructure Strategy	<p>Ensuring a competitive and connected regional economy.</p> <p>Support the critical needs of regional industries and communities, by ensuring water security and quality of supply.</p>	This project supports the conclusion that improvements to water security and quality are required and will lead to improved water quality and security in regional NSW.
Orana Joint Organisation Statement of Strategic Regional Priorities	<p>Priority 3 An environmentally sustainable region: Water security – rural and urban (key priority 2019-21).</p>	This project supports the actions and measures of this priority by further assessing infrastructure challenges and opportunities, improving water use and security and collecting data on infrastructure needs.
Regional Economic Development Strategy – Castlereagh (Warrumbungle Shire Council)	<p>Strategy Element 2 Invest in Water and Energy Utilities Infrastructure to achieve a sustainable economy and improve quality of life.</p>	This project aligns with the strategy outcome of increasing water security and meets the priorities identified including the replacement of end-of-life water infrastructure and exploring alternative water sources and enhanced management of current resources.
Regional Economic Development Strategy – Far West (Central Darling Shire Council)	<p>Strategy Element 4 Improve economic and social resilience by delivering telecommunications infrastructure to empower businesses and residents through improved connectivity in the digital economy</p>	This project aligns with priorities including water infrastructure and water monitoring.

Regional Economic Development Strategy – Western Plains (Warren and Walgett Shire Councils)	Strategy Element 3 Unlock growth in Agriculture, Manufacturing of agricultural products and Mining by improving energy and water infrastructure.	This project aligns with the strategy activities and priorities including investing in regional and small-scale water infrastructure projects and investigate feasibility studies and businesses cases for energy and water infrastructure projects.
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5 ECONOMIC ASSESSMENT

The condition assessment of 31 existing groundwater bores throughout the OWUA region has important short and long-term implications for a number of small and remote communities throughout Western NSW.

The scoping study stage of this project will provide cost savings for each Council through a collaborative approach and the condition assessment reports produced at the conclusion of this stage of the project will be used to identify and plan future infrastructure projects which will:

- Ensure water supplies in the region are safe and secure
- Improve productivity and efficiency of ground water supply
- Provide confidence to local communities that their water supply is safe and not putting the public at risk
- Provide confidence within the local community which may lead to future developments within the region

6 AFFORDABILITY AND DELIVERABILITY

6.1 PROJECTED COSTS AND FUNDING

A cost estimation to undertake the full assessment (broken down in to three tasks) of 31 bores within the five (5) OWUA LGA's is outlined below.

Table 6.1 – Cost Estimation

TASK	DESCRIPTION	BUDGET
1	Assessment of bore condition	\$25,000
2	Analysis of current performance	\$60,000
3	Field measurements	\$620,000 (\$20,000 per bore)
TOTAL		\$705,000 (\$22,742 per bore)

Table 6.2 – Cost Distribution

COUNCIL	BORES	TASK 1	TASK 2	TASK 3	TOTAL	Funding Council (25%)	Funding Grant (75%)
Central Darling	5	\$4,032.26	\$9,677.42	\$100,000.00	\$113,709.68	\$28,427.42	\$85,282.26
Narromine	4	\$3,225.81	\$7,741.94	\$80,000.00	\$90,967.75	\$22,741.94	\$68,225.80
Walgett	7	\$5,645.16	\$13,548.39	\$140,000.00	\$159,193.55	\$39,798.39	\$119,395.16
Warren	3	\$2,419.35	\$5,806.45	\$60,000.00	\$68,225.80	\$17,056.45	\$51,169.36
Warrumbungle	12	\$9,677.42	\$23,225.81	\$240,000.00	\$272,903.23	\$68,225.81	\$204,677.42
TOTAL	31	\$25,000.00	\$60,000.00	\$620,000.00	\$705,000.00	\$176,250.00	\$528,750.00

The capacity of each Council to fund future infrastructure projects is dependent on outcomes of the condition assessments.

6.2 PROCUREMENT METHOD

As the sponsoring Council of OWUA, services are procured through the Mid-Western Regional Council in line with Council's Procurement Policy (5).

Project costs are then distributed to each participating Council based on their involvement in the project and in this instance, the number of bores to be assessed.

6.3 DELIVERABILITY

The OWUA employs a dedicated Project Officer whose role is to provide administrative and project management support directly to the Alliance. The pooling of resources and the joint nature of this project removes duplication and streamlines the approach to the management of the project.

While individual Council staff are required to provide data and facilitate site visits, the Project Officer will coordinate and oversee the project. With a proven background in the delivery of projects on time and within the budget, the Project Officer will work directly with the contractor to ensure projects milestones are achieved.

Without the ability to join forces across the OWUA, projects such as this would not be possible. Some of the smaller and more isolated Councils within the OWUA region do not have the budget, resource or capacity to undertake these types of projects alone. Without the support of the OWUA in conducting an assessment of the existing groundwater bores, the likelihood of future infrastructure failures increases. This could have huge health, social and economic implications on local communities.

The overall timeline for the delivery of the condition assessment of the 31 identified existing groundwater bores within the OWUA region is 18 months.

7 REFERENCES

1. 2016 Census
(http://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/036)
2. Water and Drought Security Report 2016
(<https://www.oranajointorganisation.nsw.gov.au/assets/uploads/139/files/OWUA/Policies%20and%20Reports/LMWUA%20Water%20and%20Drought%20Security%20Report%20SUMMARY.pdf>)
3. Minimum Construction Requirements for Water Bores in Australia 2012 – National Uniform Drillers Licensing Committee (<https://www.adia.com.au/documents/item/290>).
4. Australian Drinking Water Guidelines 2011 (<https://www.nhmrc.gov.au/about-us/publications/australian-drinking-water-guidelines>)
5. Background Review of Bore Integrity – Department of Environment 2014 (Sinclair Knight Merz Pty Ltd) (<https://www.environment.gov.au/system/files/resources/00f77463-2481-4fe8-934b-9a496dbf3a06/files/background-review-bore-integrity.pdf>)
6. Mid-Western Regional Council Procurement Policy 2019
(<http://www.midwestern.nsw.gov.au/council/council-documents/Policies--Strategies-2/Procurement-Policy/>)