ACSEQUIP

2022

WARRUMBUNGLE SHIRE COUNCIL COONABARABRAN BORE 2 ASSESSMENT REPORT 05/12/2022

Every Bore is unique,

Your proactive preventative maintenance program should be too!

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ACS Equip Pty Ltd

Warrumbungle Shire Council – Coonabarabran Bore 2 Assessment Report 05/12/2022

COONABARABRAN BORE 2

Report No:	WARRSC05122022
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05/12/2022

Document history and revisions

Revision	Date	Description	Prepared By	Approved By
01	05/12/2022	WARRSC05122022	Luke Woods	Brad Dillon

Contents

Preface

This report was initiated in response to the findings of the ACS Equip Pty Ltd – CCTV Inspection and Bore Condition Assessment service commisioned on the 5th of December 2022 by the Warrumbungle Shire Council.

ACS were engaged by the Orana Water Utilities Alliance on behalf of the Warrumbungle Shire Council to assess the condition of the Coonabarabran Bore 2 as part of the bore condition assesment program.

Bore Details:

Bore ID:	Coonabarabran Bore 2
Ground Works Number:	GW003613
Bore Licence:	Not Supplied
Date drilled:	01/10/1938
Field:	Corner of Camp & Namoi Street
Location:	Coonabarabran NSW
Coordinates:	Not supplied
Bore Type:	Town Water Supply
Casing Outside Diameter:	162mm
Casing Inside Diameter:	155mm
Casing Wall Thickness:	3.50mm
Casing Stickup:	Mild Steel from 0.00m to 20.90m
Screen:	Open through Bedrock
Apertures:	Not Applicable
Slotted From – To:	Not Applicable
Bore Depth:	24.00m encountered depth
	36.60m constructed depth
Standing Water Level:	3.50m

Works Undertaken:

05/12/2022

- Establish onsite, site setup.
- Existing submersible pump, headworks and equipment removed from bore to allow the CCTV Downhole camera inspection and bore condition assessment to be completed.
- Submersible pump, headworks, and equipment reinstalled into Bore.
- Site pack up and clean up.

Initital CCTV inspection notes

- Bore headworks noted to be of poor design which would fail to meet the NSW health guidelines for groundwater. Bore headworks noted to be unsealed and open at ground level, which is allowing surface water run off and biological contaminants to enter the bore.
- Upon extraction of the submersible pump and poly pipe rising main was noted to be in reasonable condition.
- Submersible pump was noted to have moderate growth levels present on the pump body.
- Substaintial pitting and corrosion noted through mild steel casing wall above standing water table, this indicates that the apparent metal loss has been severe and the casing wall will be extremely thin.
- Large particles noted to be suspended in the water column and the water column was noted to have high turbidity levels present, visibility was noted to be very poor.
- Bore construction noted to consist of threaded mild steel casing.
- Standing water table at 3.50m.
- Large particles noted to be suspended in the water column and the water column was noted to have high turbidity levels present.
- Unable to accurately assess the condition of the mild steel casing below the standing water level due to growth levels present over the casing wall and poor visibility level.

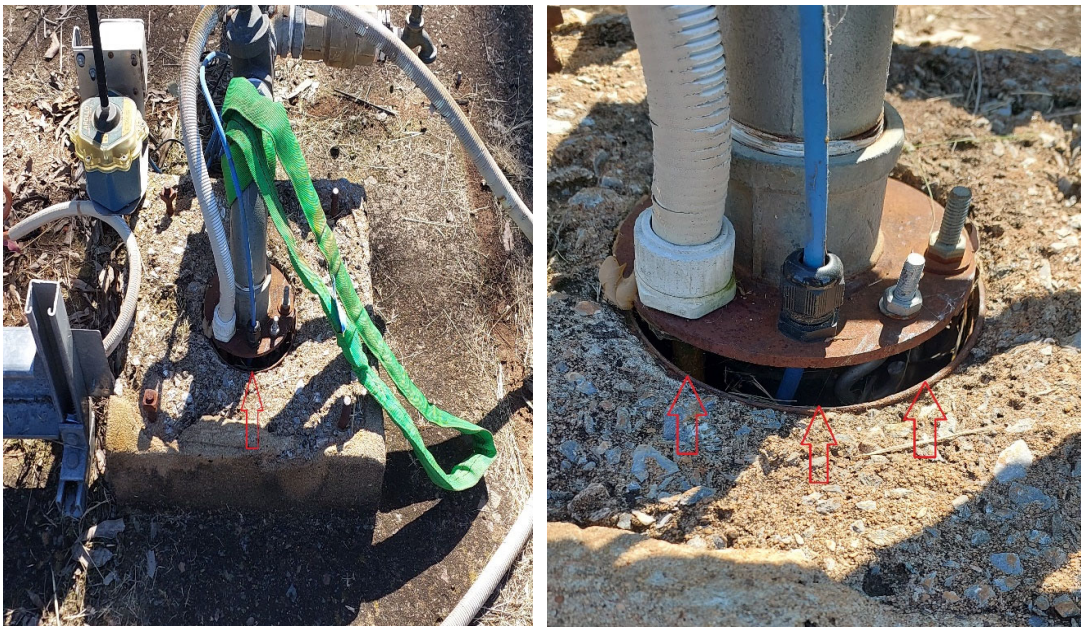
- Tree roots noted to have penetrated through the casing wall between 5.50m and 6.00m, hole visible.
- Tree roots noted to have penetrated through the casing wall at 6.60m, hole visible.
- Possible hole noted through mild steel casing wall at 14.60m.
- Corrosion and hole noted through mild steel casing wall at 17.40m.
- Significant corrosion and hole noted through mild steel casing wall at 19.40m.
- Bore construction noted to be of mild steel casing from 0.00m to 20.90m, bore casing then terminates at 20.90m and the remainder of the bore is open through rock.
- Large cavity noted through open section of the bore from 21.70m to 22.00m, lose gravels and rocks noted.
- Large cavity noted through open section of the bore from 22.90m to 23.30m, lose gravels and rocks noted.
- Large cavity noted through open section of the bore from 23.50m to 23.80m, lose gravels and rocks noted.
- Bottom depth encountered was 24.00m and the construction depth specified in the Groundworks report is 36.60m indicating that there is 12.60m of debris / fill present in the bottom of the bore.

Screen Section:

Bore open through rock from 20.90m to 24.00m

Illustrations of Bore headworks and Submersible pump:

The following figures are intended to demonstrate the general condition encountered of the bore headworks.



Unsealed headworks as viewed from surface.

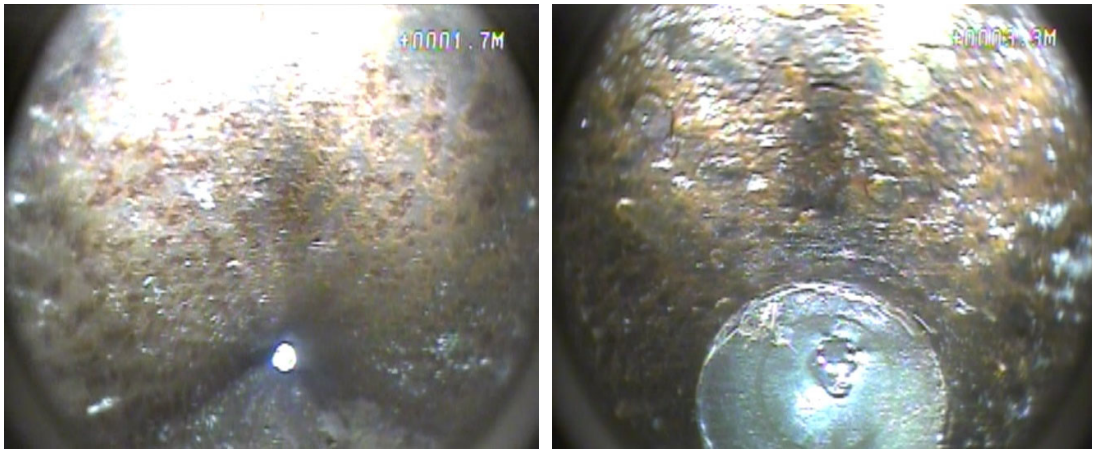
Condition of pumping equipment showing Iron Bacteria.

Identification plates as noted on submersible motor and wet end.

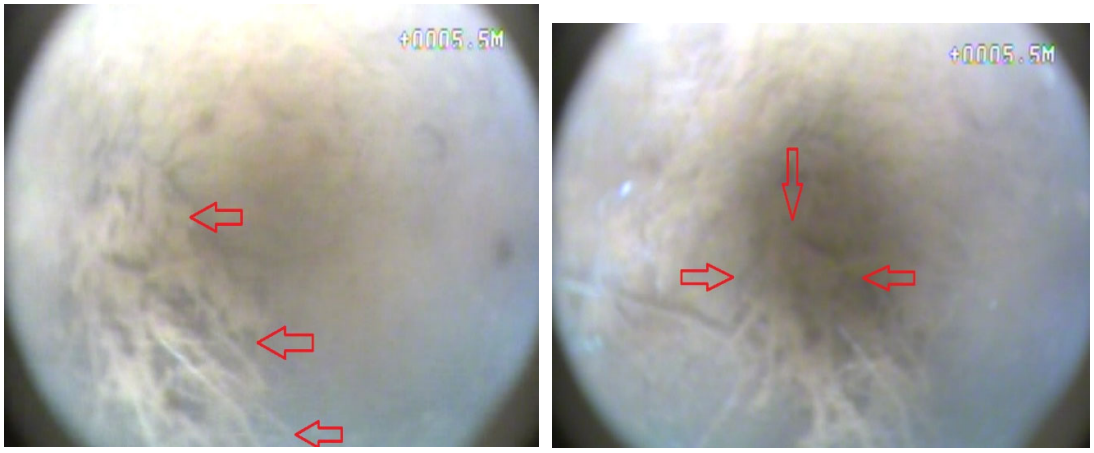
Illustrations of CCTV inspection:

The following figures are a quick reference guide intended to demonstrate the general condition of the bore.

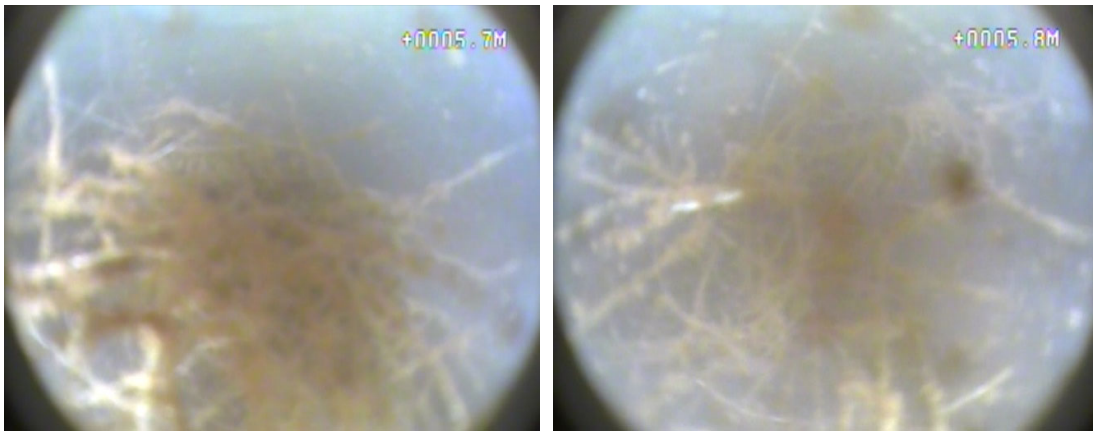
A full copy of the inspection footage has been provided to the Warrumbungle Shire Council for further reference.



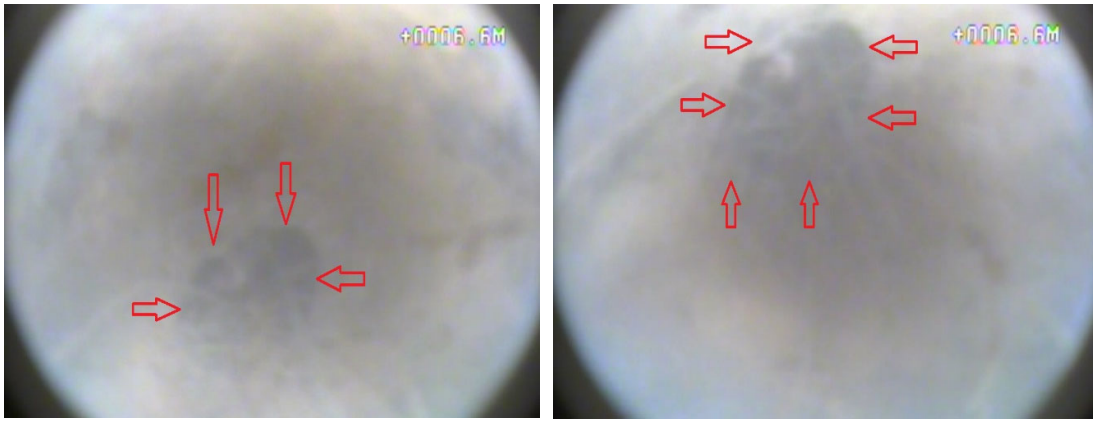
Bore at 1.70m and 3.30m showing condition of mild steel casing above the standing water level.



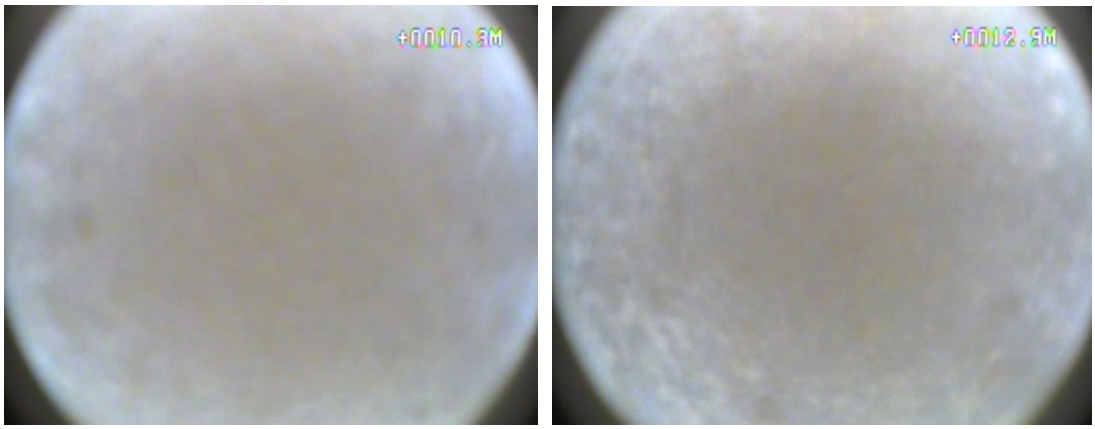
Tree roots noted to have penetrated through the casing wall between 5.50m and 6.00m.



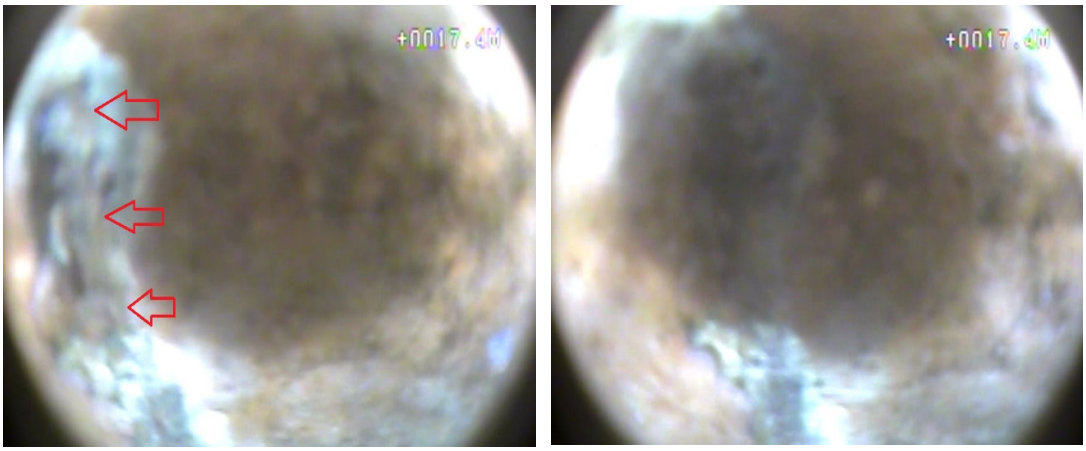
Tree roots noted to have penetrated through the casing wall between 5.50m and 6.00m.



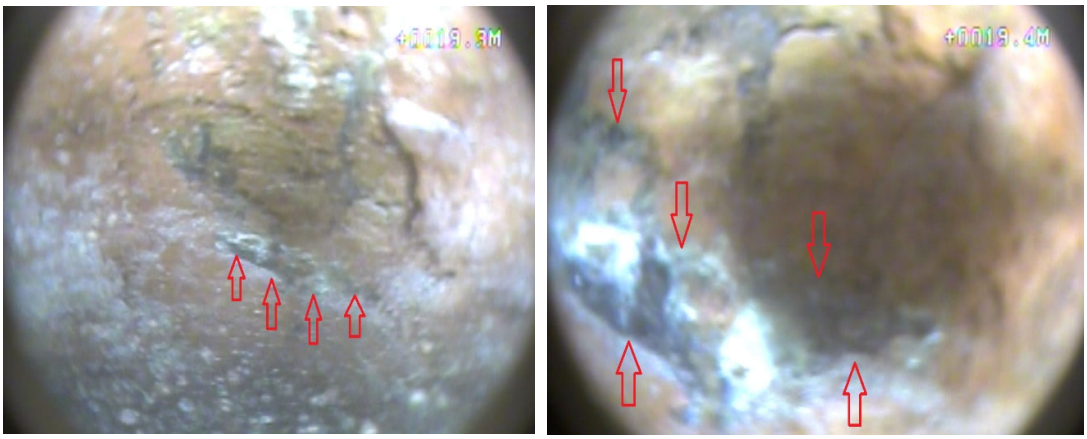
Tree roots noted to have penetrated through the casing wall between at 6.60m.



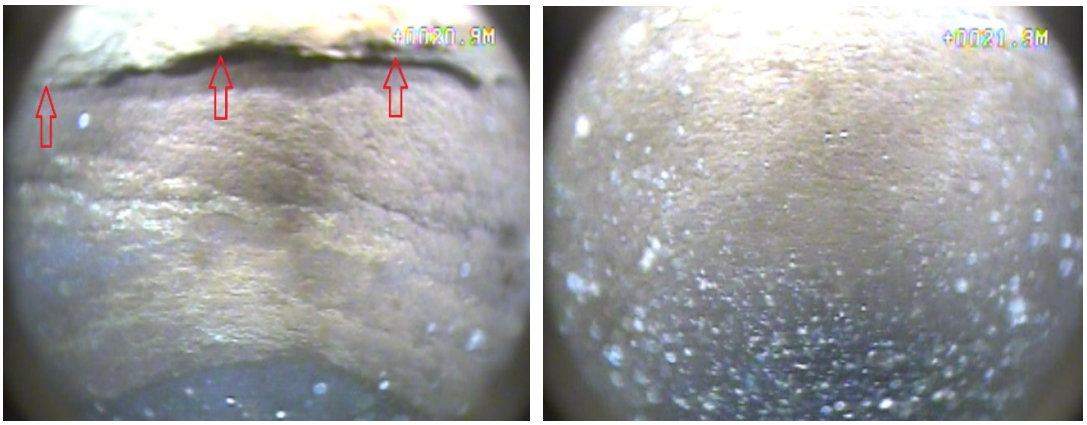
Bore at 10.30m & 12.90 showing turbidity levels and poor visibility.



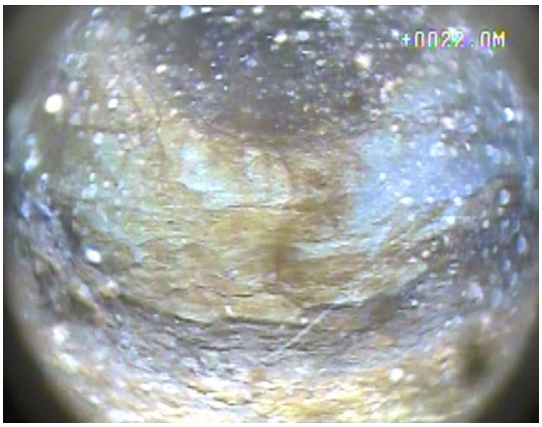
Corrosion and hole noted through mild steel casing wall at 17.40m.



Significant corrosion and hole noted through mild steel casing wall at 19.40m.

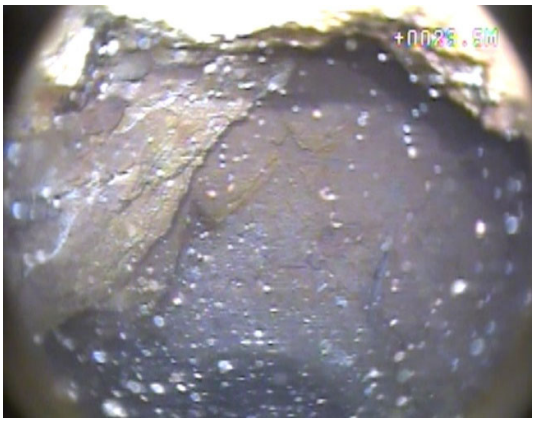


Termination of mild steel casing at 20.90m and open hole section at 21.30m.

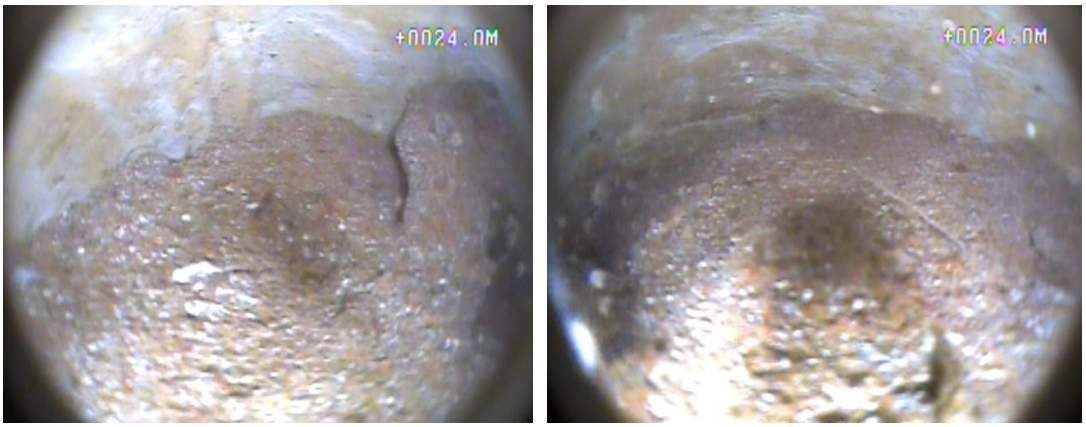


Open hole section of bore at 21.70m & 22.00m, showing large cavity.

Open hole section of bore at 22.90m & 23.20m, showing large cavity.



Open hole section of bore at 23.50m & 23.60m, showing large cavity.



Bottom of bore at 24.00m, obstructions encountered and bore noted to be filled with sand and gravel.

Findings

During the camera inspection implemented on the 05/12/2022 the overall structural condition of the bore was noted to be extremely poor. Numerous areas of significant corrosion were noted through the mild steel casing wall and tree roots were noted to be penetrating through the mild steel casing. Holes were also visible, and gravel was visible through these holes. This indicates that the mild steel casing has reached the end of its useful lifespan.

The construction of the bore was noted to have the mild steel casing terminate at 20.90m with the remainder of the bore open through rock to 36.60m. However, the open hole section of the bore was noted to have become unstable with large cavities and loose formation noted which has resulted in the bore having approximately 12.60m of fill and debris present in the bottom and an encountered depth of 24.00m.

Asset Condition Rating:

The asset condition rating established from the findings of the bore condition assessment undertaken on the 05/12/2022 is as follows;

5 – Very Poor

This rating has been allocated for the following reasons, Failure of the mild steel casing has occurred, and continued failure is imminent. The condition of the asset poses risk to safety, environment, or reputation beyond tolerable limits and the asset is in Urgent need for renewal of major components, replacement, or removal of asset from service.

Condition Rating Table: IIMM condition rating system of 1 – 5.

Grade	Condition	Description
1	Excellent	New or as new condition. Only normal cyclic maintenance required. Negligible wear and/or undamaged or damaged repaired to original condition.
2	Very Good	Sound condition with some wear and tear. Minor maintenance required along with normal cyclic maintenance. Minor components may need replacement. Low risk to safety, environment, or reputation due to asset condition.
3	Good	Significant deterioration evident. Maintenance other than normal cyclic maintenance required on a regular basis to sustain asset. Minor failures may be occurring. Condition is impacting performance of the asset. Risk to safety, environment, or reputation due to asset condition within tolerable limits but requires high level of maintenance.
4	Poor	Failure likely in short term. Asset not performing required function or not performing function without significant additional maintenance activity on top of normal cyclic maintenance. Risk to safety, environment, or reputation due to asset condition approaching tolerable limits. Significant renewal or replacement required.
5	Very Poor	Failure occurred or failure imminent. Risk to safety, environment, or reputation due to asset condition beyond tolerable limits. Urgent need for renewal of major components, replacement, or removal of asset.

Asset Condition Rating system

Recommendations:

In the bores current condition further use is not advisable (continued use can result in catastrophic bore failure) due to the structural failings identified in the mild steel casing wall;

It is likely that the mild steel casing will continue to develop failures, these failures can result in;

- gravel / sand intrusion into the bore or more likely, catastrophic bore failure which has the potential to result in complete loss of bore asset: bore, submersible pump etc.

The following recommendations are made to maintain a reliable potable town water supply from the Coonabarabran Bore 2 that will meet the NSW health guidelines for groundwater.

- Removal of the bore pump to allow the corrective works to be undertaken.
- Removal of the fill noted in the bottom of the bore and reopening the bore back to its original constructed depth via bailing operations.
- Stainless steel swage relining operations to be undertaken over the full depth of the bore with stainless steel screens installed over the uncased section and stainless-steel casing over the mild steel section. This will effectively create a full stainless steel bore design.
- Redeveloping and reconditioning the water bearing zone via the ACS Equip redevelopment operations consisting of an Aquaclear Bore Cleaner dosage to be injected over the entire length of the bore followed by high pressure redevelopment operations for gravel pack development.
- Manufacture and installation of a shroud over the submersible pump to redirect the intake vertically and decrease the suction velocities. This will also force the pump to draw water over the motor during operation which will assist in cooling and prolong the operational life of the pump.
- Corrective works undertaken on the headworks to meet the NSW health guidelines for ground water. This will need to include IP68 rated electrical glands and redesign of the bore cap to allow a weatherproof seal to the top of the bore casing.
- Disinfection and cleaning of the bore pump prior to reinstallation.

Appendices:

Appendix A: Groundworks report

WaterNSW
Work Summary

GW003613

Licence: **Licence Status:**

Authorised Purpose(s):
Intended Purpose(s): PUBLIC/MUNICIPL

Work Type: Bore - GAB
Work Status: Supply Obtained
Construct.Method: Cable Tool
Owner Type: Local Govt

Commenced Date: **Final Depth:** 36.60 m
Completion Date: 01/10/1938 **Drilled Depth:** 36.60 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property: **Standing Water Level (m):** 5.900
GWMA: **Salinity Description:** Fresh
GW Zone: **Yield (L/s):** 5.050

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:			
Licensed:	GOWEN	COONABARRABRAN	7030//1002143

Region: 80 - Macquarie-Western **CMA Map:** 8735-S
River Basin: 420 - CASTLEREAGH RIVER **Grid Zone:** **Scale:**
Area/District:

Elevation: 0.00 m (A.H.D.) **Northing:** 6537990.000 **Latitude:** 31°16'20.4"S
Elevation Source: Unknown **Easting:** 716306.000 **Longitude:** 149°16'19.2"E

GS Map: - **MGA Zone:** 55 **Coordinate Source:** GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Threaded Steel	-0.20	12.90	203			Suspended in Clamps

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
15.80	23.40	7.60	(Unknown)	5.90		5.05			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.91	0.91	Soil	Soil	
0.91	7.92	7.01	Sand Silt	Sand	
7.92	21.95	14.03	Sandstone Water Supply	Sandstone	
21.95	23.16	1.21	Gravel Water Supply	Gravel	
23.16	23.47	0.31	Hard Water Supply	Unknown	
23.47	26.21	2.74	Shale	Shale	
26.21	35.05	8.84	Shale Sticky	Shale	

35.05	36.58	1.53	Driller	Unknown	

Remarks

01/11/1983: COONABARABRAN TWS

***** End of GW003613 *****

Appendix B: Bore Location