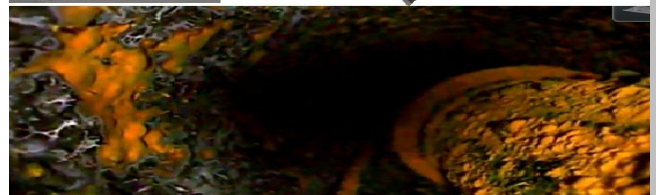


2022

WARRUMBUNGLE SHIRE COUNCIL DUNEDOO OLD BORE ASSESSMENT REPORT 16/12/2022



*Every Bore is unique,
Your proactive preventative maintenance
program should be too!*



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Water Industry Operators Association of Australia

ACS Equip Pty Ltd

Warrumbungle Shire Council – Dunedoo Old
Bore Assessment Report 16/12/2022



DUNEDOO OLD BORE

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Document history and revisions

Revision	Date	Description	Prepared By	Approved By
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Preface

This report was initiated in response to the findings of the ACS Equip Pty Ltd – CCTV Inspection and Bore Condition Assessment service commissioned on the 16th 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 Dunedoo Old Bore as part of the bore condition assessment program.

Bore Details:

Bore ID:	Dunedoo Old Bore
Ground Works Number:	GW059164
Bore Licence:	80CA716938
Date drilled:	01/12/1983
Field:	Whiteley Street
Location:	Dunedoo NSW
Bore Type:	Town Water Supply
Casing Outside Diameter:	315mm
Casing Inside Diameter:	305mm
Casing Wall Thickness:	5.00mm
Casing Stickup:	0.45m
Casing Type:	Mild Steel
Screen:	Wirewound Stainless Steel
Apertures:	1.52mm
Screen From – To:	See report
Bore Depth:	33.50m encountered depth 38.00m constructed depth
Standing Water Level:	4.90m



Works Undertaken:

15/12/2022

- 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.

16/12/2022

- CCTV Downhole camera inspection and bore condition assessment completed.
- Site pack up and clean up.

Initial CCTV inspection notes

All depths are referenced as top of bore casing as being 0.00m, the Dunedoo Old Bore is located in a concrete pit with a depth measured as being 2.41m below ground level.

- The top of the mild steel casing was noted to be 0.45m above the pit floor and 1.96m below ground level.
- 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 would be allowing biological contaminants to enter the bore.
- Bore headworks noted to be in extremely poor condition with rust, corrosion and holes evident.
- Rising main construction noted to be 145mm Galvanized steel column in 3.00m lengths with threaded couplings. Column couplings and threads were noted to be seized and required cutting during pump extraction.
- The bore pump was noted to be 3m in length with a PVC shroud fitted, below the shroud a 3m section of stainless steel screen was also fitted. This indicates that the bore has had previous issues with gravel ingress. The stainless steel screen was noted to have collapsed due to the suction pressure.
- The Pump set depth was noted to be approximately 30m to the top of the pump and 36m to the bottom of the pump screen.



- Substantial 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. Bore construction noted to consist of welded mild steel casing.
- Corrosion and holes noted through mild steel weld joint at 0.80m.
- Standing water table at 4.90m.
- Corrosion, holes, and separation noted on mild steel weld joint at 7.50m.
- Significant levels of iron related bacteria growth noted to be present on the mild steel casing wall.
- Corrosion and holes noted through mild steel casing wall at 16.30m.
- Corrosion and holes noted through mild steel casing wall at 27.80m.
- Screen section noted to commence at 29.70m
- Corrosion and holes noted on mild steel to stainless steel weld joint at commencement of screen section at 29.70m.
- Screen section noted to have significant growth and biofouling levels present.
- Screen apertures through screen section suffering from significant growth, resulting in a decreased draw area of the bore and increased suction velocities.
- Bottom depth encountered was 33.50m and the construction depth specified in the Groundworks report is 38.00m indicating that there is 4.50m of debris / fill present in the bottom of the bore.

Screen Section:

Screen Section: 29.70m to 33.50m



Illustrations of Bore headworks and Submersible pump:

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



Condition of pumping headworks.



Condition of pumping headworks and column.





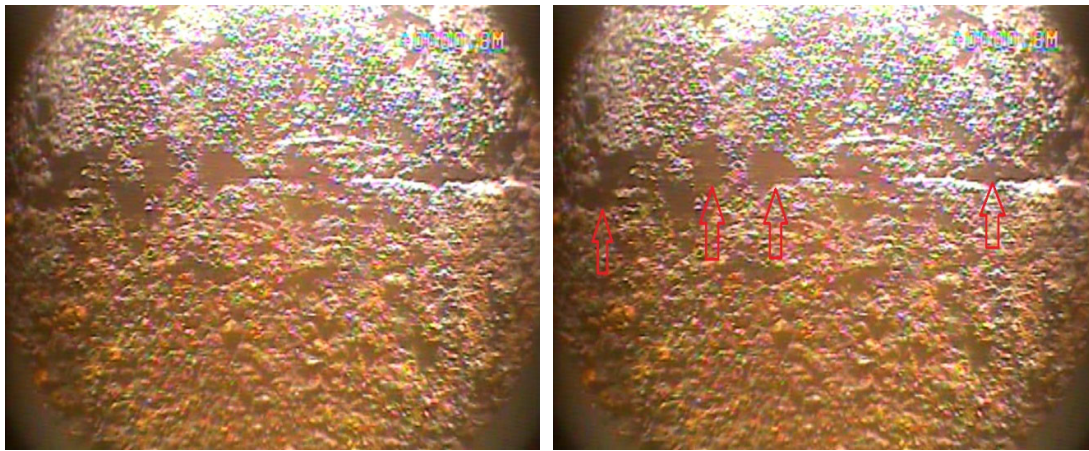
Illustration of stainless-steel screen fitted to pump.



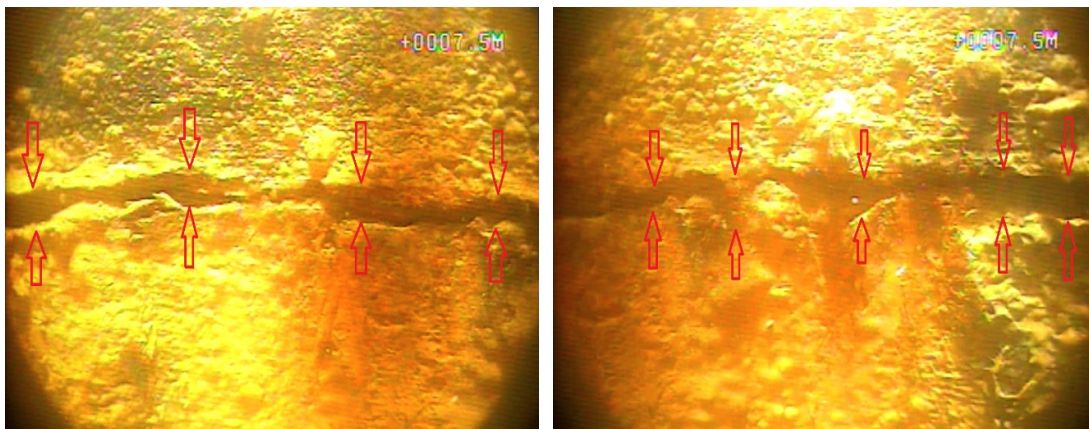
Illustrations of CCTV inspection:

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.

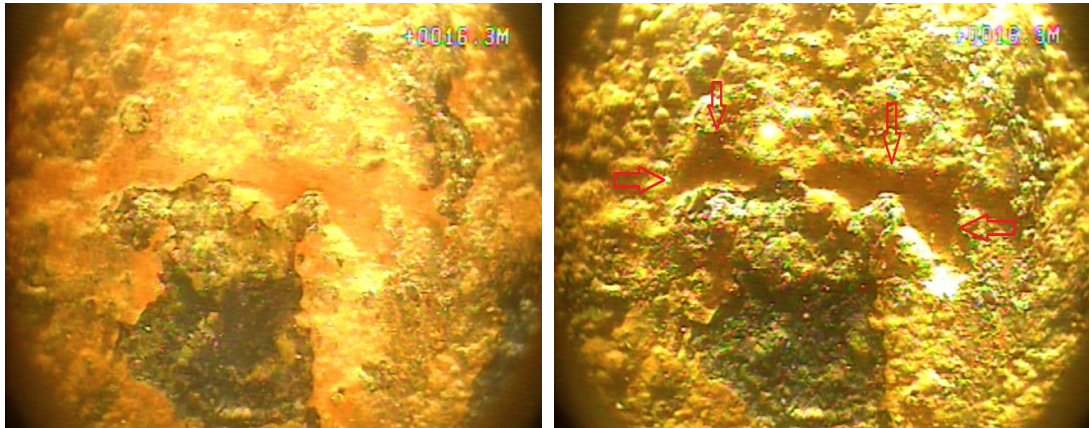


Corrosion and holes noted through mild steel weld joint at 0.80m.

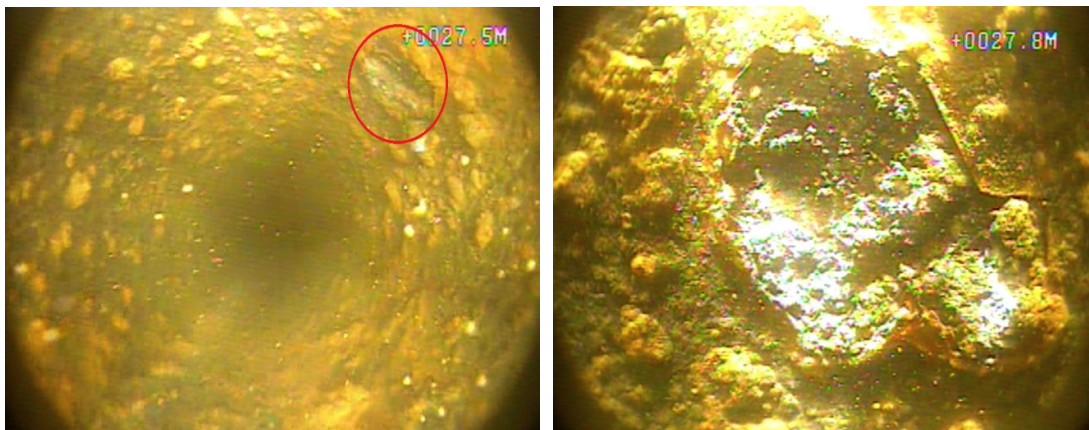


Corrosion, holes, and separation noted on mild steel weld joint at 7.50m.

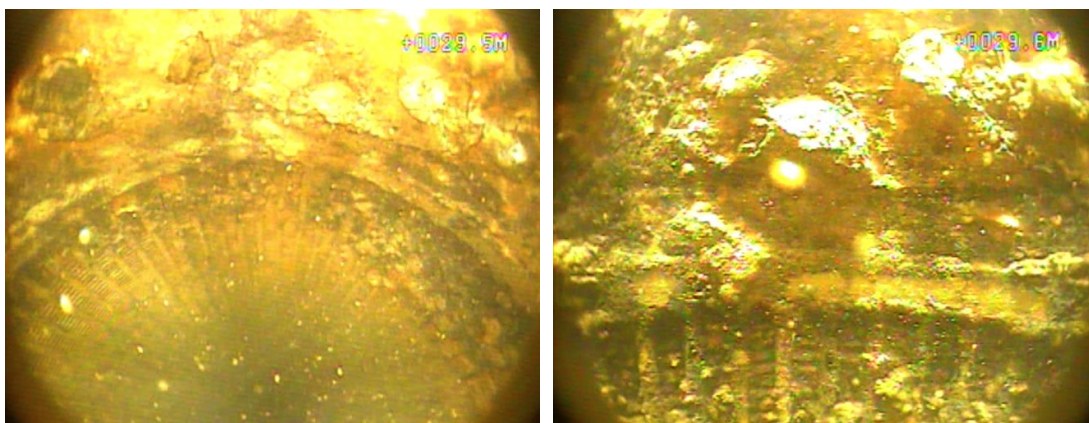




Corrosion and holes noted through mild steel casing wall at 16.30m.

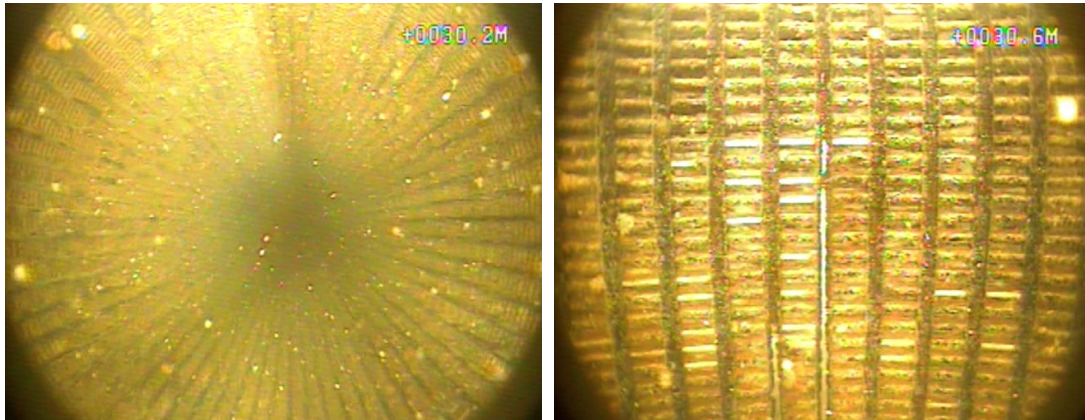


Corrosion and holes noted through mild steel casing wall at 27.80m.

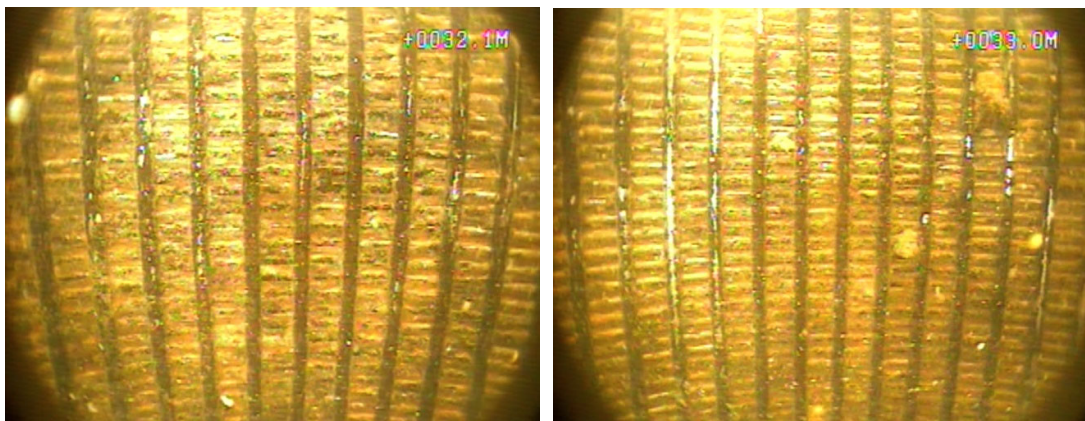


Commencement of screen section at 29.70m, corrosion and holes noted on mild steel to stainless steel weld join.

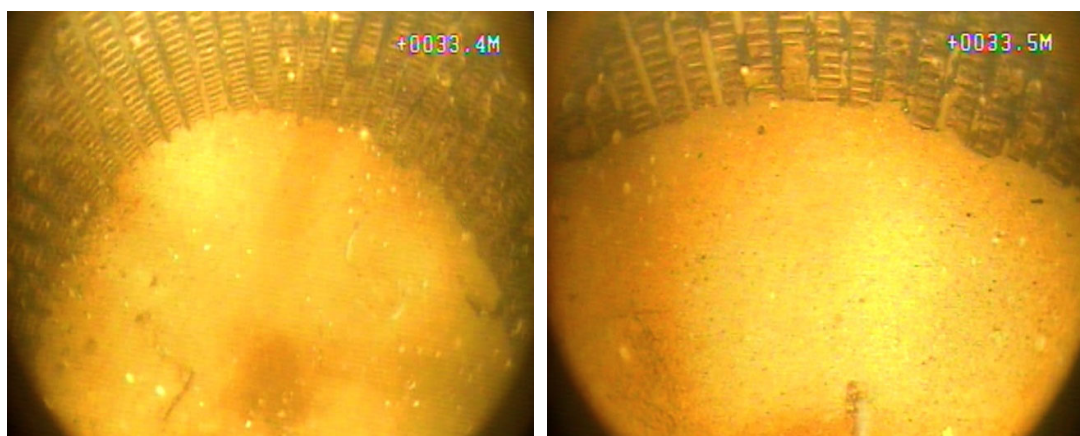




Screen section at 30.20m & 30.60m, showing significant growth levels present.



Screen section at 32.10m & 33.00m, showing significant growth levels present.



Bottom of bore encountered at 33.50m.



Findings

During the camera inspection implemented on the 16/12/2022 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. This indicates that the mild steel casing has reached the end of its useful lifespan.

The operational condition of the bore was noted to be poor. The Bore was noted to have significant biofouling and iron related bacterial growth present through both screen sections which is adversely affecting the available draw area and increasing the suction velocities through the remaining open areas, this in turn can increase the turbidity levels present in the bore by promoting the propagation of fine materials through the screen area

The encountered bottom depth was 33.50m and the construction depth specified in the groundworks report is 38.00m indicating that the bore has 4.50m of fill and debris present in the bottom.



Asset Condition Rating:

The asset condition rating established from the findings of the bore condition assessment undertaken on the 16/12/2022 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 Dunedoo Old Bore that will meet the NSW health guidelines for groundwater.

- Removal of the bore pump to allow the corrective works to be undertaken.
- 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.
- 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 all mild steel cased sections. 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.
- Following the Redeveloping and reconditioning operations it is also recommended that the Dunedoo Old Bore is subject to shock disinfection operations prior to recommissioning. The recommended operations would involve establishing disinfection levels above a predetermined ppm and sustaining those levels for 24hrs during circulation. Following the disinfection operations, the bore will be discharged to waste for a predetermined number of hole volumes.
- Disinfection and cleaning of the bore pump prior to reinstallation.
- Upgrading the pump rising main from the stainless-steel column to a 127mm Flexibore 250 crusader hose for ease of future maintenance.



Appendices:

Appendix A: Groundworks report

WaterNSW Work Summary

GW059164

Licence: 80CA716938

Licence Status: CURRENT

Authorised Purpose(s): TOWN WATER SUPPLY
Intended Purpose(s): TOWN WATER SUPPL

Work Type: Bore
Work Status: Supply Obtained
Construct.Method: Rotary Mud
Owner Type: Local Govt

Commenced Date:
Completion Date: 01/12/1983

Final Depth: 38.00 m
Drilled Depth: 50.00 m

Contractor Name: (None)
Driller:
Assistant Driller:

Property: DUNEDOO T W S Whiteley St
DUNEDOO 2844 NSW
GWMA: 019 - COOLABURRAGUNDY -
TALBRAGER VALLEY
GW Zone: -

Standing Water Level 8.600
(m):
Salinity Description:
Yield (L/s): 29.180

Site Details

Site Chosen By:

County
Form A: LINCOLN
Licensed: LINCOLN
Parish
BOLARO
BOLARO
Cadastre
7009/93529
Whole Lot
7009/93529

Region: 80 - Macquarie-Western
River Basin: 421 - MACQUARIE RIVER
Area/District:

CMA Map: 8733-N
Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown

Northing: 6455743.000
Easting: 725608.000

Latitude: 32°00'43.1"S
Longitude: 149°23'18.7"E

GS Map: -

MGA Zone: 55

Coordinate Source: GIS - Geogra

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		Annulus	Waterworn/Rounded	0.00	38.00		431		Graded
1		Backfill	Backfill	38.00	50.00				
1	1	Casing	Welded Steel	0.00	31.00	342			Seated
1	1	Opening	Screen	31.00	36.00	275		1	Stainless Steel, A: 1.52mm

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)
31.00	36.00	5.00	Unconsolidated	8.60		29.18			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.00	1.00	Driller	(Unknown)	
1.00	4.00	3.00	Clay Red	Clay	



4.00	13.00	9.00	Clay Grey	Clay	
13.00	14.00	1.00	Clay Grey Some Fine Sand	Clay	
14.00	18.00	4.00	Clay Grey Some Coarse Sand	Clay	
18.00	21.00	3.00	Clay Orange	Clay	
21.00	26.00	5.00	Clay Orange Some Fine Sand	Clay	
26.00	29.00	3.00	Clay Yellow	Clay	
29.00	30.00	1.00	Clay Yellow, Sand White Medium	Clay	
30.00	32.00	2.00	Sand White Medium Water Supply, some Clay	Sand	
32.00	36.00	4.00	Sand White Medium Clean Water Supply	Sand	
36.00	37.00	1.00	Clay White Sandy	Clay	
37.00	38.00	1.00	Clay White, Sand Yellow	Clay	
38.00	39.00	1.00	Sand Yellow Medium, Clay Yellow	Sand	
39.00	45.00	6.00	Clay White	Clay	
45.00	48.00	3.00	Clay White, Sand Bands	Clay	
48.00	50.00	2.00	Clay Yellow Sandy	Clay	
50.00	50.01	0.01	Shale	Shale	

Remarks

09/03/1987: DUNEDOO TOWN WATER SUPPLY.
23/07/2012: Nat Carling, 23-July-2012; Updated coordinates, as provided by water licensing. Also updated cadastre (was entered as 'TS&CR 49654).

*** End of GW059164 ***

Warning To Clients: This raw data has been supplied to the WaterNSW by drillers, licensees and other sources. WaterNSW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.



Appendix B: Bore Location

