Report No: 48/1993A

TOWN BORE OUTSTATION
Bore Completion Report
RN 16348 and RN 16349

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WATER RESOURCES BRANCH, ALICE SPRINGS

September 1993
SYNOPSIS

A successful community water supply bore, RN 16349, was constructed at Town Bore outstation, 220 km west of Alice Springs. The bore has a maximum recommended maximum yield of 1.5 L/s.

RN 16348, also drilled at the outstation, yielded around 1.2 L/s but has inferior water quality and is planned for stock use.

The water is drawn from alluvial Tertiary sediments and has a TDS of 629 mg/L. Recommendations for the equipping and operation of the bore are included.

KEYWORDS

SUBJECT
Community water supply
Standby bore

GEOLOGY
Arunta Block
Tertiary sediments

LOCATION
Derwent
Papunya
Haasts Bluff Aboriginal Land Trust
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ABBREVIATIONS

bgl below ground level
EC electrical conductivity
ID inside diameter
km kilometres
L/s litres per second
m metres
mg/L milligrams per litre
RN registered number
SWL standing water level
TDS total dissolved solids (in mg/L)
µS/cm microsiemens per centimetre

DISTRIBUTION

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AUTHOR 1
1. INTRODUCTION

Town Bore Outstation is located on the Haasts Bluff Aboriginal Land Trust, approximately 200 km west of Alice Springs (Figure 1).

The community is currently supplied by bore RN 4833, which was drilled in 1965. Following a request from TSB, a standby bore was constructed at the outstation.

2. GROUNDWATER HISTORY

RN 4833 was drilled for the community in 1965. The bore yielded 1.7 L/s of potable water from a brown sand layer at 26.5 m. The total depth of the bore was 27.4 m with the bore terminating in quartzite gravel and sand. See Appendix A for construction and lithological details. Minor corrosion has been experienced with galvanised iron water tanks and pump columns having a reduced lifespan.

Water quality has varied since commencement of pumping, but has remained within potable guidelines. Table 1 contains relevant chemical analyses. Although the chemical data is sparse it is reasonable to assume a gradual deterioration in quality occurs between creek flows, where upon fresh water recharge occurs, lowering the overall TDS level.

3. HYDROGEOLOGY

Town Bore Outstation lies approximately 4 km east of Haasts Bluff, near Derwent Creek. Haasts Bluff and similar hills to the south and east of the community consist of Heavitree Quartzite (only present at the top of the range and not relevant to the local hydrogeology) and schist and gneiss of the Pre-Cambrian Arunta Block. The Arunta Block has a poor groundwater history and is present under the community. This rock type was struck in both bores RN 16340 and RN 16349 at around 30 m and 32 m respectively. (RN 4833 was not continued to basement).
Above the basement, layers of clay, sand and gravel occur. The aquifer within these Tertiary sediments provide the water at the community. Further to the north and east the sediments are deeper (up to 100 m), with correspondingly larger available drawdowns, and hence, potential for larger supplies. The relatively thin sediments and small available drawdowns limits the volume of water available at this location. If demand remains at present levels no supply problems are expected.

4. DRILLING AND TESTING

RN 16348 was drilled approximately 90 m west of RN 4833 (see Figure 2) and struck 1.2 L/s of water in quartzite and schist gravel and sand at 28 - 30 m. Some difficulty with hole collapse was experienced and heavy foam and liquid polymer was used to stabilise the hole. The EC of the water was 1950 µS/cm. The bore was constructed with stainless steel screens and step tested at rates up to 1.2 L/s with the final EC being 1790 µS/cm. The yield and water quality was less than expected (and inferior to that of the current bore) and it was decided to drill a further hole closer to RN 4833. The bore was left in place following community request for use as a stock watering bore.

RN 16349 was drilled 30 m north-west of RN 4833. 9 m of surface casing was needed due to air blowing up around the annulus and heavy foam and liquid polymer was required to stabilise and clean the hole. The water was again struck in quartzite and schist gravel and sand at 28 - 30 m. Before casing the supply was 1.4 L/s with an EC of 1030 µS/cm. 1 mm aperture stainless steel screens were set between 27.9 m and 32.0 m.

A 5 x 100 minute step test was carried out at rates of 0.5, 1.0, 1.5, 2.0 and 2.5 L/s. The final drawdown was 6.45 m. The available drawdown was 6.90 m.
A 8 hour constant rate test at 2.0 L/s was conducted. The final drawdown was 5.08 m (see Figure 3). The transmissivity was 90 m²/day with a storage co-efficient of 4.2 x 10⁻⁴. The bore recovered to within 1 m of the SWL 10 minutes after cessation of pumping. Figure 5 is a predicted drawdown versus yield graph for pumping rates between 0.5 and 2.5 L/s.

The water quality remained constant throughout the testing with the final EC being 1040 μS/cm.

5. DISCUSSION

RN 4833 is located next to The Derwent, a substantial creek. Anecdotal evidence suggests that RN 4833 has been flooded over in the past. For this reason RN 16348 was sited 110 m to the north east, so as to minimise flooding. Water quality in this bore however was inferior to that of RN 4833 and it is not planned to use the bore for production purposes.

RN 16349 was drilled 30 m north east of, and yielded water of similar quality, to RN 4833. This suggests there is a strip of better quality water associated with the creek.

RN 4833 and RN 16348 should sealed and equipped in a manner as to minimise damage from infrequent flooding.

6. CONCLUSIONS

A successful community water supply bore (RN 16349) was constructed at Town Bore Outstation. It produces water at a maximum recommended pumping rate of 1.5 L/s.

The water is produced from unconsolidated Tertiary sediments overlying metasediments of the Arunta Block. The water quality is good and, although some variation is expected, the water should remain potable.
RN 16348 has a recommended maximum pumping rate of 1.2 L/s and supplies potable water. The quality however, is substantially below that of the other bores and should not be connected to the reticulation system unless necessary.

7. RECOMMENDATIONS

1. RN 16349 should be pumped at a maximum continuous rate of 1.5 L/s.

2. Means to monitor water levels and a water meter should be fitted to the production bores.

3. The SWL and total depth should be noted each time pumping equipment is removed from either bore.

4. Both RN 4833 and RN 16349 should be equipped to allow for true standby capacity.

5. Simultaneous pumping should be avoided if possible due to interference between the bores.

6. A water sample should be submitted for full chemical analysis from each production bore on a yearly basis.

7. To minimise the risk of aquifer contamination no development should occur with 200 m of the production bores.

8. The bores should be equipped so as to minimise the effects of flooding.
<table>
<thead>
<tr>
<th>BORE REGISTERED NUMBER</th>
<th>DATE OF SAMPLING</th>
<th>SPECIFIC CONDUCTANCE</th>
<th>TOTAL DISSOLVED SOLIDS</th>
<th>SODIUM</th>
<th>POTASSIUM</th>
<th>CALCIUM</th>
<th>MAGNESIUM</th>
<th>TOTAL HARDNESS</th>
<th>TOTAL ALKALINITY</th>
<th>NICKEL</th>
<th>SILICA</th>
<th>CHLORIDE</th>
<th>SULPHATE</th>
<th>NITRATE</th>
<th>BICARBONATE</th>
<th>FLUORIDE (CALC FROM CHLORIDE)</th>
<th>NAMCI</th>
<th>COMMENTS</th>
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<tr>
<td>4833</td>
<td>23/10/71</td>
<td>830</td>
<td>7.5</td>
<td>124</td>
<td>7</td>
<td>120</td>
<td>30</td>
<td>423</td>
<td>208</td>
<td>7.3</td>
<td>33</td>
<td>221</td>
<td>175</td>
<td>48</td>
<td>1</td>
<td>290</td>
<td>0.5</td>
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<tr>
<td>23/08/79</td>
<td>510</td>
<td>340</td>
<td>6.5</td>
<td>16</td>
<td>5</td>
<td>75</td>
<td>11</td>
<td>203</td>
<td>187</td>
<td>11.9</td>
<td>37</td>
<td>20</td>
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<td>4</td>
<td>1</td>
<td>290</td>
<td>0.4</td>
<td>46</td>
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<td>09/04/86</td>
<td>1450</td>
<td>970</td>
<td>7.7</td>
<td>157</td>
<td>30</td>
<td>76</td>
<td>30</td>
<td>355</td>
<td>278</td>
<td>0.1</td>
<td>90</td>
<td>190</td>
<td>183</td>
<td>92</td>
<td>1</td>
<td>239</td>
<td>1.2</td>
<td>46</td>
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<td>27/08/88</td>
<td>470</td>
<td>335</td>
<td>7.1</td>
<td>16</td>
<td>4</td>
<td>61</td>
<td>11</td>
<td>198</td>
<td>157</td>
<td>0.6</td>
<td>46</td>
<td>29</td>
<td>48</td>
<td>1</td>
<td>1</td>
<td>192</td>
<td>0.2</td>
<td>46</td>
</tr>
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<td>1260</td>
<td>7.9</td>
<td>236</td>
<td>9</td>
<td>94</td>
<td>72</td>
<td>5.6</td>
<td>531</td>
<td>257</td>
<td>58</td>
<td>346</td>
<td>299</td>
<td>6</td>
<td>325</td>
<td>0.6</td>
<td>570</td>
<td>Airlift, 28 m</td>
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<td>760</td>
<td>7.6</td>
<td>39</td>
<td>6</td>
<td>85</td>
<td>23</td>
<td>1.6</td>
<td>307</td>
<td>167</td>
<td>48</td>
<td>97</td>
<td>97</td>
<td>5</td>
<td>293</td>
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<td>143</td>
<td>Airlift, 30.7 m</td>
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<td>619</td>
<td>7.6</td>
<td>78</td>
<td>7</td>
<td>84</td>
<td>29</td>
<td>8.5</td>
<td>329</td>
<td>185</td>
<td>47</td>
<td>125</td>
<td>136</td>
<td>6</td>
<td>226</td>
<td>0.3</td>
<td>206</td>
<td>Airlift, 33.8 m</td>
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<td>31/08/03</td>
<td>858</td>
<td>650</td>
<td>7.6</td>
<td>78</td>
<td>7</td>
<td>84</td>
<td>29</td>
<td>8.5</td>
<td>329</td>
<td>185</td>
<td>47</td>
<td>125</td>
<td>136</td>
<td>6</td>
<td>226</td>
<td>0.3</td>
<td>206</td>
<td>Airlift, 33.8 m</td>
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<td>02/09/03</td>
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<td>629</td>
<td>6.7</td>
<td>90</td>
<td>6</td>
<td>64</td>
<td>33</td>
<td>0.2</td>
<td>348</td>
<td>200</td>
<td>47</td>
<td>108</td>
<td>147</td>
<td>5</td>
<td>244</td>
<td>0.2</td>
<td>178</td>
<td>Pump test</td>
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</table>

NHMRC GUIDELINES → 1500 6.5-8.5

WATER QUALITY DATA

DERWENT OUTSTATION

TABLE 1
Figures
TOWN BORE OUTSTATION
BORE LOCATION MAP

FIGURE 2
TOWN BORE OUTSTATION

LOCAL GEOLOGY

(After Quinlan and Forman, 1968)

FIGURE 3
Total available drawdown 6.04m
SWL BEFORE TESTING 21.46

TOWN BORE OUTSTATION
RN 16349
PREDICTED DRAWDOWN GRAPH

FIGURE 5
Appendices
<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Construction Log</th>
<th>Graphic Log</th>
<th>Stratigraphic Description</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>152mm ID blank steel casing</td>
<td></td>
<td>Red/brown CLAY</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>Red/brown fine grained silty and clayey SAND</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td>Brown, medium to coarse clayey SAND</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td>Pink, brown and grey sandy CLAY</td>
</tr>
<tr>
<td>20</td>
<td>152mm ID perforated steel casing</td>
<td></td>
<td>Quartzite gravel with clayey SAND</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
<td>Cream and brown silty and sandy CLAY</td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
<td>Medium to coarse clean brown SAND</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Quartzite GRAVEL to 100mm</td>
</tr>
</tbody>
</table>

SWL: 16/4/65
Discharge: 1.7 L/s

TOWN BORE OUTSTATION RN 4833

APPENDIX A
POWER
AND
WATER
AUTHORITY

WATER RESOURCES

COMPOSITE LOG OF BORE

<table>
<thead>
<tr>
<th>DEPTH (m)</th>
<th>BORE CONSTRUCTION LOG</th>
<th>STRATA DESCRIPTION (Water Struck)</th>
<th>AQUIFERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>203mm ID blank steel casing</td>
<td>Red/brown clayey SAND with some hard brown clay</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>152mm ID x 1mm stainless steel screens</td>
<td>Fine to coarse grained, slightly clayey SAND with rounded to angular quartzite and schist gravels to 40mm</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>152mm ID blank steel casing</td>
<td>Soft, highly weathered, grey biotitic schist</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>152mm ID blank steel casing</td>
<td>Slightly weathered grey biotitic schist</td>
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</tr>
<tr>
<td>SWL</td>
<td>26/8/93</td>
<td>▼ 1.2 L/s</td>
<td></td>
</tr>
</tbody>
</table>

TOWN BORE OUTSTATION RN 16348

APPENDIX B
**COMPOSITE LOG OF BORE**

<table>
<thead>
<tr>
<th>DEPTH (m)</th>
<th>BORE CONSTRUCTION LOG</th>
<th>GRAPHIC</th>
<th>STRATA DESCRIPTION (Water Struck)</th>
<th>AQUIFERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>200mm ID blank steel casing</td>
<td></td>
<td>Red/brown sandy CLAY with minor mica</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>Red/brown sandy CLAY with hard grey clay layers</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td>Clean white and red fine to coarse grained sand</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>152mm ID x 1mm stainless steel screen</td>
<td></td>
<td>Brown/yellow sandy CLAY with minor rounded quartzite gravel to 10mm</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td>Fine to large grained quartz SAND with some angular to rounded quartzite and schist gravels</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
<td>Brown clayey SAND with highly weathered grey biotite schist</td>
<td></td>
</tr>
</tbody>
</table>

**TOWN BORE OUTSTATION RN 16349**

APPENDIX C
Bore Location: Town Bore Outstation
Client: TSB
Intended Use: Domestic
Map: Hermannsburg
Grid Reference: 

**RECOMMENDATIONS**

Pumping Rate: 1.0 L/s  
Pump Setting: 26.0 m below Ground Level.

General recommendations are given on the reverse side. The aquifer and bore sustain cannot higher pumping rates with deeper pump settings or for short periods. Further advice can be obtained from:

Water Resources Branch, Nth Stuart Highway, ALICE SPRINGS, NT., 0870

(In all correspondence please refer to bore’s RN number)

**COMPLETION DETAILS**

Finished depth: 27.44 m
Completion Date: 4-657
Standing Water Level: 21.9 m on 4-657

**BORE CONSTRUCTION**

Interval (m)  Description
0.0 - 21.9   152 mm ID blank steel casing
21.9 - 27.4   152 mm ID perforated steel casing

**WARNING:** Minimum internal bore diameter is 152 mm.

Notes:  
1. Top of casing as constructed was 0.45 m above ground level.
2. All depths are measured from natural ground level.
3. Test rates are not necessarily indicative of sustainable long term pumping rates.

**COMMENTS**

The above recommendations are based on a constant rate test at 1.6 L/s for 8 hours and assumes hydrogeological conditions remain constant.

Provision to monitor water levels and obtain water samples should be incorporated when equipping the bore.

A water meter should be fitted to the bore.

The SWL and the total depth of the bore should be recorded each time pumping equipment is removed from the bore.

**WATER QUALITY**

See analysis number 88/89/1070

Prepared by: I Matthews

*APPENDIX D*
RECOMMENDATIONS FOR FINISHING, OPERATING AND PROTECTING GROUNDWATER BORES

Attention the following points will ensure a long and safe life for the bore supply and help prevent pollution of the groundwater resource.

1. Construct a concrete apron around the bore head to prevent surface flow, seepage and waste from entering the bore.

2. Seal the space between the casing and pump equipment to prevent entry of vermin, dirt and pollutants.

3. Maintain pumping equipment in good order to prevent pollution. Prevent spillage of fuel and oil on the ground around the bore. Store fertiliser and other chemicals at least 50 m away.

4. Keep stock away from the bore head. Discourage domestic activity at the bore. The first tap on the pipeline should not be less than 5 m from the bore head.

5. Pumping the bore a higher than recommended rates may fork the bore leading to instability or pump maintenance problems. Seek the professional advice of an hydrogeologist or groundwater engineer.

6. If the bore is no longer required, the casing is to be removed or securely capped and the bore backfilled with clayey material. A cement plug may be required in some instances.

IN ADDITION, please ensure that the BORE IDENTIFICATION TAG is retained securely at all times. The registered bore number is Water Resources Division's only reference to the scientific and engineering data on this bore, and hence important to WRD's further advice to bore owners.

BORE LOCATION MAP
WATER RESOURCES DIVISION

TEST REPORT - BORE RN. 16348

Bore Location: Town Bore Cutstation
Client: TSB
Intended Use: Stock
Map: Hermannsburg
Grid Reference: 

RECOMMENDATIONS

Pumping Rate: 1.2 L/s Pump Setting: 27 m below Ground Level.

General recommendations are given on the reverse side. The aquifer and bore cannot sustain higher pumping rates with deeper pump settings or for short periods. Further advice can be obtained from:

Water Resources Branch, Nth Stuart Highway, ALICE SPRINGS, NT, 0870
(In all correspondence please refer to bore's RN number)

COMPLETION DETAILS

Finished depth: 36.6 m
Completion Date: 26-08-93
Standing Water Level: 22.5 m on 26-08-93

BORE CONSTRUCTION

<table>
<thead>
<tr>
<th>Interval (m)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0 - 6.4</td>
<td>203 mm ID blank steel casing</td>
</tr>
<tr>
<td>6.0 - 27.3</td>
<td>152 mm ID blank steel casing</td>
</tr>
<tr>
<td>27.3 - 31.5</td>
<td>152 mm ID x 1 mm stainless steel screen</td>
</tr>
<tr>
<td>31.5 - 36.6</td>
<td>152 mm ID blank steel screen</td>
</tr>
</tbody>
</table>

WARNING: Minimum internal bore diameter is 152 mm.

Notes: 1. Top of casing as constructed was 0.8 m above ground level.
2. All depths are measured from natural ground level.
3. Test rates are not necessarily indicative of sustainable long term pumping rates.

COMMENTS

The above recommendations are based on an airlift test of 0.5 hours and assumes hydrogeological conditions remain constant.

Provision to monitor water levels and obtain water samples should be incorporated when equipping the bore.

The SWL and total depth of the bore should be recorded each time pumping equipment is removed from the bore.

WATER QUALITY

See analysis number

Prepared by: I Matthews

APPENDIX E
RECOMMENDATIONS FOR FINISHING, OPERATING AND PROTECTING GROUNDWATER BORES

Attention the following points will ensure a long and safe life for the bore supply and help prevent pollution of the groundwater resource.

1. Construct a concrete apron around the bore head to prevent surface flow, seepage and waste from entering the bore.

2. Seal the space between the casing and pump equipment to prevent entry of vermin, dirt and pollutants.

3. Maintain pumping equipment in good order to prevent pollution. Prevent spillage of fuel and oil on the ground around the bore. Store fertiliser and other chemicals at least 50 m away.

4. Keep stock away from the bore head. Discourage domestic activity at the bore. The first tap on the pipeline should not be less than 3 m from the bore head.

5. Pumping the bore at a higher than recommended rates may fork the bore leading to instability or pump maintenance problems. Seek the professional advice of an hydrogeologist or groundwater engineer.

6. If the bore is no longer required, the casing is to be removed or securely capped and the bore backfilled with clayey material. A cement plug may be required in some instances.

IN ADDITION, please ensure that the BORE IDENTIFICATION TAG is retained securely at all times. The registered bore number is Water Resources Division’s only reference to the scientific and engineering data on this bore, and hence important to WRD’s further advice to bore owners.

BORE LOCATION MAP
TEST REPORT - BORE RN. 16349

Bore Location: Town Bore Outstation
Client: TSB
Intended Use: Domestic
Map: Hermannsburg

Grid Reference: Hermannsburg

RECOMMENDATIONS

Pumping Rate: 1.5 L/s
Pump Setting: 27.5 m below Ground Level.

General recommendations are given on the reverse side. The aquifer and bore cannot sustain higher pumping rates with deeper pump settings or for short periods. Further advice can be obtained from:

Water Resources Branch, Nth Stuart Highway, ALICE SPRINGS, NT., 0870

(In all correspondence please refer to bore's RN number)

COMPLETION DETAILS

Finished depth: 34.0 m
Completion Date: 31-08-93
Standing Water Level: 20.84 m on 31-08-93

BORE CONSTRUCTION

<table>
<thead>
<tr>
<th>Interval (m)</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>0.0 - 3.9</td>
<td>203 mm ID blank steel casing</td>
</tr>
<tr>
<td>0.0 - 27.9</td>
<td>152 mm ID blank steel casing</td>
</tr>
<tr>
<td>27.9 - 32.0</td>
<td>152 mm ID x 1mm stainless steel screen</td>
</tr>
<tr>
<td>32.0 - 34.0</td>
<td>152 mm ID blank steel casing</td>
</tr>
</tbody>
</table>

WARNING: Minimum internal bore diameter is 152 mm.

Notes:
1. Top of casing as constructed was 0.4 m above ground level.
2. All depths are measured from natural ground level.
3. Test rates are not necessarily indicative of sustainable long term pumping rates.

COMMENTS

The above recommendations are based on a constant rate test at 2.0 L/s for 8 hours and assumes hydrogeological conditions remain constant.

Provision to monitor water levels and obtain water samples should be incorporated when equipping the bore.

A water meter should be fitted to the bore.

The SWL and total depth of the bore should be recorded each time pumping equipment is removed from the bore.

WATER QUALITY

See analysis number

Prepared by: I Matthews
RECOMMENDATIONS FOR FINISHING, OPERATING AND PROTECTING GROUNDWATER BORES

Attention the following points will ensure a long and safe life for the bore supply and help prevent pollution of the groundwater resource.

1. Construct a concrete apron around the bore head to prevent surface flow, seepage and waste from entering the bore.

2. Seal the space between the casing and pump equipment to prevent entry of vermin, dirt and pollutants.

3. Maintain pumping equipment in good order to prevent spillage of fuel and oil on the ground around the bore. Store fertiliser and other chemicals at least 50 m away.

4. Keep stock away from the bore head. Discourage domestic activity at the bore. The first tap on the pipeline should not be less than 5 m from the bore head.

5. Pumping the bore at higher than recommended rates may fork the bore leading to instability or pump maintenance problems. Seek the professional advice of an hydrogeologist or groundwater engineer.

6. If the bore is no longer required, the casing is to be removed or securely capped and the bore backfilled with clayey material. A cement plug may be required in some instances.

IN ADDITION, please ensure that the BORE IDENTIFICATION TAG is retained securely at all times. The registered bore number is Water Resources Division's only reference to the scientific and engineering data on this bore, and hence important to WRD's further advice to bore owners.

BORE LOCATION MAP