

GROUNDWATER



RESOURCE MANAGEMENT

PO Box 2310 Kardinya WA 6163
 23 Parry Street
 Fremantle WA 6160
 Ph: +61 8 9433 2222 Fx: +61 8 9433 2322
 Email: water@g-r-m.com.au

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|--|--------------------------------------|-------------------------------------|--|
| ID: WNWE013 | | JOB NUMBER: J080028 | |
| CLIENT: Minemakers | | PROJECT: Wonarah Feasibility | |
| COMMENCED: 15-Mar-09 | EASTING: 636070 | INCLINATION: 60 degrees | |
| COMPLETED: 16-Mar-09 | NORTHING: 7767130 | AZIMUTH: 305 degrees | |
| DRILLED BY: Tom Browne Drilling | ELEVATION: 260 | SWL (date): ND mbrp () | |
| LOGGED BY: SMW | GRID SYSTEM: MGA 94 - Zone 53 | | |

| Depth (m bgl) | Graphic + Stratigraphy | Lithological Description | Field Notes | Bore Construction |
|---------------|------------------------|--------------------------|-------------|-------------------|
|---------------|------------------------|--------------------------|-------------|-------------------|

| | | | | |
|-----|--|--|--|---------------------------------|
| 0 | | SAND, red-brown, fine grained, some silt, ALLUVIUM/COLLUVIUM | | 0-6m 165mm diameter open hole |
| 10 | | Clayey GRAVEL, red-brown, ironstone gravels | | |
| 20 | | SILTSTONE, white, soft, laminated, moderately weathered | | 0-6m 150mm Class 9 PVC Casing |
| 30 | | SILTSTONE, yellow-brown, soft, laminated, common limonite staining, moderate to highly weathered | | |
| 40 | | SILTSTONE, white and grey, soft, laminated, moderately weathered, interlayered with dolomite, minor chert bands. 24-26m: zone with limonite staining and is highly weathered | | |
| 50 | | SILTSTONE, yellow-brown, soft, laminated, common limonite staining, moderate to highly weathered | | |
| 60 | | SILTSTONE, dark grey to brown, minor dolomite layers with 5% manganese, dolomite layers are sub metre in thickness, moderately weathered ranging to highly weathered through some siltstone layers. 73-74m: Highly weathered zone of dark grey to yellow-brown clay. | | |
| 78 | | | 78m: Wet on rod change | |
| 80 | | CLAY, pale brown, moderate plasticity, completely weathered SILTSTONE | | 6-150m 152mm diameter open hole |
| 90 | | DOLOMITE, black to dark grey, massive, 15% manganese | | |
| 96 | | SILTSTONE, white, soft, laminated, moderately weathered | 96m: First continuous water, Q=0.2 L/s | |
| 99 | | QUARTZITE+CLAY, brown to translucent, predominantly clay with zones of rubbly quartzite (not infill, but in-situ based on the angular fragments and the way it drilled), common chert fragments. | 99-102m: Very problematic drilling, can not clear hole. Q=2 L/s. Water has a high proportion of suspended clay | |
| 114 | | SILTSTONE, dark grey to black, carbonaceous, laminated, slightly weathered. | 114m: Q=2L/s, EC=1.4mS/cm @ 38C, pH=8.5 | |
| 120 | | DOLOMITE, grey to pale brown, massive, slight reaction to acid, very siliceous in parts | | |
| 132 | | | 132m: Q=1.8L/s, EC=1.4mS/cm @ 38C, pH=8.5 | |
| 140 | | BASALT, black, fine grained, massive, fresh, hard, very weak haematite alteration. | | |
| 150 | | | 150m: Q=1.3L/s, EC=1.5mS/cm @ 38C, pH=8.5 Water has a high proportion of suspended clay. Will be difficult to establish a bore in this aquifer. Dust from cyclone while drilling | EOH 150m |
| 160 | | | | |
| 170 | | | | |

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| | | | |
|-------------|---------------------|--------------|----------------------------|
| ID: | WNWE014 | JOB NUMBER: | J080028 |
| CLIENT: | Minemakers | PROJECT: | Wonarah Feasibility |
| COMMENCED: | 17-Mar-09 | EASTING: | 636133 |
| COMPLETED: | 17-Mar-09 | NORTHING: | 7767089 |
| DRILLED BY: | Tom Browne Drilling | ELEVATION: | 260 |
| LOGGED BY: | SMW | GRID SYSTEM: | MGA 94 - Zone 53 |
| | | INCLINATION: | 60 degrees |
| | | AZIMUTH: | 305 degrees |
| | | SWL (date): | ND mbrp () |

| Depth (m bgl) | Graphic + Stratigraphy | Lithological Description | Field Notes | Bore Construction |
|---------------|------------------------|--------------------------|-------------|-------------------|
|---------------|------------------------|--------------------------|-------------|-------------------|

| | | | | |
|-----|--|--|--|---------------------------------|
| 0 | | SAND, red-brown, fine grained, some silt, ALLUVIUM/COLLUVIUM | | 0-6m 165mm diameter open hole |
| 10 | | Clayey GRAVEL, red-brown, ironstone gravels, weak cementation | | 0-6m 150mm Class 9 PVC Casing |
| 20 | | SILTSTONE, white, soft, laminated, moderately weathered | | |
| 30 | | SILTSTONE, yellow-brown, soft, laminated, common limonite staining, moderate to highly weathered | | |
| 40 | | SILTSTONE, white, soft, laminated, moderately weathered | | |
| 50 | | SILTSTONE, white and grey, soft, laminated, moderately weathered, interlayered with dolomite, minor chert bands. | | |
| 60 | | SILTSTONE, yellow-brown, soft, laminated, common limonite staining, moderate to highly weathered | | |
| 70 | | SILTSTONE, white and grey, soft, laminated, moderately weathered, interlayered with dolomite, minor chert bands. | | |
| 80 | | SILTSTONE, yellow-brown, soft, laminated, common limonite staining, moderate to highly weathered | | 6-150m 152mm diameter open hole |
| 90 | | SILTSTONE, white and grey, soft, laminated, moderately weathered, interlayered with dolomite, minor chert bands. | 84m:Wet on rod change | |
| 100 | | DOLOMITE, dark grey to yellow-brown, highly weathered, very common moderate plasticity clay, 5-10% manganese | | |
| 110 | | SILTSTONE, white and grey, soft, laminated, moderately weathered, interlayered with dolomite, minor chert bands. | 102m:First continuous water,Q0.5 L/s | |
| 120 | | CLAY, brown, moderate plasticity, completely weathered SILTSTONE | 108m:Q=1L/s, EC=1.4mS/cm @ 38C, pH=8.7 | |
| 130 | | QUARTZITE+CLAY, brown to translucent, predominantly clay with zones of rubbly quartzite (not infill, but in-situ based on the angular fragments and the way it drilled), common chert fragments. | | |
| 140 | | SILTSTONE, dark grey to black, carbonaceous, laminated, minor quartz veins. | | |
| 150 | | DOLOMITE, grey to pale brown, massive, slight reaction to acid, very siliceous in parts | | |
| 160 | | BASALT, black, fine grained, massive, fresh, hard, very weak haematite alteration. | 150m:Q=1L/s, EC=1.4mS/cm @ 38C, pH=8.7 | EOH 150m |
| 170 | | | | |

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ID: **WNWE015**

JOB NUMBER: **J080028**

CLIENT: **Minemakers**

PROJECT: **Wonarah Feasibility**

| | | |
|---------------------------------|-------------------------------|----------------------------|
| COMMENCED: 18-Mar-09 | EASTING: 636196 | INCLINATION: 60 degrees |
| COMPLETED: 20-Mar-09 | NORTHING: 7767048 | AZIMUTH: 305 degrees |
| DRILLED BY: Tom Browne Drilling | ELEVATION: 260 | SWL (date): ND mbrp () |
| LOGGED BY: SMW | GRID SYSTEM: MGA 94 - Zone 53 | |

| Depth (m bgl) | Graphic + Stratigraphy | Lithological Description | Field Notes | Bore Construction |
|---------------|------------------------|--------------------------|-------------|-------------------|
|---------------|------------------------|--------------------------|-------------|-------------------|

| | | | | |
|-----|--|--|--|---------------------------------|
| 0 | | SAND, red-brown, fine grained, some silt, ALLUVIUM/COLLUVIUM | | 0-6m 165mm diameter open hole |
| 10 | | Clayey GRAVEL, red-brown, ironstone gravels, weak cementation | | 0-6m 150mm Class 9 PVC Casing |
| 20 | | SILTSTONE, white to pale pink, soft, laminated, moderately weathered | | |
| 30 | | SILTSTONE, white, soft, laminated, moderately weathered | | |
| 40 | | SILTSTONE, yellow-brown, soft, laminated, common limonite staining, moderate to highly weathered | | |
| 50 | | SILTSTONE, white, soft, laminated, moderately weathered | | |
| 60 | | SILTSTONE, yellow-brown, soft, laminated, common limonite staining, moderate to highly weathered | | |
| 70 | | SILTSTONE, yellow-brown, soft, laminated, common limonite staining, moderate to highly weathered | | |
| 80 | | SILTSTONE, white and grey, soft, laminated, moderately weathered, interlayered with dolomite, minor chert bands. | 84m: Wet on rod change | 6-150m 152mm diameter open hole |
| 90 | | CLAY, brown, moderate plasticity, completely weathered SILTSTONE | 90m: First continuous water, Q _{0.5} L/s | |
| 100 | | QUARTZITE+CLAY, brown to translucent, predominantly clay with zones of rubbly quartzite (not infill, but in-situ based on the angular fragments and the way it drilled), common chert fragments. | 102m: First continuous water, Q ₁ L/s, EC=1.4mS/cm @ 36, pH=8.7 | |
| 110 | | DOLOMITE, grey to pale brown, massive, slight reaction to acid, very siliceous in parts | | |
| 120 | | QUARTZITE+CLAY, brown to translucent, predominantly clay with zones of rubbly quartzite (not infill, but in-situ based on the angular fragments and the way it drilled), common chert fragments. | 120m: Q ₁ L/s, dust from cyclone while drilling | |
| 130 | | DOLOMITE, grey to pale brown, massive, slight reaction to acid, very siliceous in parts | | |
| 140 | | BASALT, grey-brown to purple-brown, fine grained, massive, moderately weathered, some haematitic alteration | | |
| 150 | | BASALT, grey-black, fine grained, massive, fresh, hard, weak haematite alteration. | 149m: Minor fracture | |
| 160 | | | 156m: Q=1L/s, EC=1.4mS/cm @ 36C, pH=8.7 | EOH 156m |
| 170 | | | | |