Appendix A  Engineering logs and core photographs for geotechnical boreholes
<table>
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<td>GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION</td>
<td>CORE PHOTO CBH 5 8.10m – 12.00m</td>
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approved SM
date 5 APR 07
scale NTS
original size A4

client: MAUNSELL / AECOM
project: GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION
title: CORE PHOTO CBH6 4.00m – 14.00m
project no: GU2580AA
figure no: N/A
Scale (m)
drawn: CA
approved: SM
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scale: NTS
original size: A4

client: MAUNSELL / AECOM
project: GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION
title: CORE PHOTO CBH9 6.22m – 9.93m
project no: GU2580AA
figure no: N/A
Scale (m)

GU2580AA CBH10 22/3/07 Start Coring @ 4.20m

Scale (m)

0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

client: MAUNSELL / AECOM
project: GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION
title: CORE PHOTO CBH10 4.20 – 17.20m
project no: GU2580AA
figure no: N/A

drawn CA
approved SM
date 26 MAR 07
scale NTS
original size A4
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client: MAUNSELL / AECOM

project: GEOTECHNICAL INVESTIGATION
PRINCES HIGHWAY UPGRADE
PHASE 1; ROUTE SELECTION

title: CORE PHOTO CBH10 4.20 – 17.20m

project no: GU2580AA  figure no: N/A
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client: MAUNSELL / AECOM
project: GEOTECHNICAL INVESTIGATION
PRINCES HIGHWAY UPGRADE
PHASE 1; ROUTE SELECTION

title: CORE PHOTO CBH 16 5.10m – 15.00m
project no: GU2580AA
figure no: N/A
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client: MAUNSELL / AECOM

project: GEOTECHNICAL INVESTIGATION PRINCES HIGHWAY UPGRADE PHASE 1; ROUTE SELECTION

title: CORE PHOTO CBH 18 4.0m – 14.75m

project no: GU2580AA figure no: N/A
### Engineering Log - Borehole

**Client:** MAUNSELL AECOM  
**Principal:** RTA  
**Project:** GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE  
**Borehole Location:** DEVITTS LANE, MEROO MEADOW (REFER SITE PLAN)

#### Drilling Information
- **Drill model and mounting:** GEMCO TRAILER  
- **Hole diameter:** 100 mm  
- **Notes samples, tests, etc.:**  
- **Additional observations:**  

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Material</th>
<th>Observations</th>
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<tbody>
<tr>
<td>0.20</td>
<td>FILL</td>
<td>Organic, tree roots</td>
</tr>
<tr>
<td>0.21</td>
<td>GRAVEL</td>
<td>Extremely weathered</td>
</tr>
<tr>
<td>1.30</td>
<td>Sandy CLAY: high plasticity, orange to brown</td>
<td>Indications of highly weathered claystone SPT boring at 3.27m (3.00/120mm, T) V Bit Refusal @ 3.3m</td>
</tr>
<tr>
<td>1.90</td>
<td>CLAY: high plasticity, grey with brown mottled, traces of gravel</td>
<td></td>
</tr>
<tr>
<td>2.00</td>
<td>CLAY: dark grey, brown mottled, orange bands</td>
<td></td>
</tr>
<tr>
<td>3.00</td>
<td>Sandy CLAY: dark brown with grey bands, medium plasticity</td>
<td></td>
</tr>
<tr>
<td>3.10</td>
<td>Silty CLAY: dark grey, low plasticity, with angular gravel pieces</td>
<td></td>
</tr>
</tbody>
</table>

**Borehole CBH1 continued as cored hole**

---

**Notes:**
- **Classification symbols and soil description based on unified classification system:**
  - **Moisture:**
    - D: dry  
    - M: moist  
    - W: wet
  - **Consistency/density index:**
    - VO: very oilt  
    - S: soft  
    - F: firm  
    - Stiff  
    - VStiff  
    - H: hard  
    - V: very loose  
    - L: loose  
    - MD: medium dense  
    - D: dense  
    - VD: very dense

---

**Support:**  
- **Penetration:**
  - AS: auger screwing
  - AD: auger drilling
  - RR: roller/rotary
  - W: wash boring
  - CT: cable tool
  - HA: hand auger
  - DT: disturb
  - B: blank bit
  - V: V bit
  - T: T bit
  - C: casing
  - N: nil

**Water:**
- 10/1/98 water level on date shown
- Water inflow
- Water outflow
# Engineering Log - Cored Borehole

**Client:** MAUNSELL AECOM  
**Principal:** RTA  
**Project:** GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE  
**Borehole Location:** DEVITS LANE, MEROO MEADOW (REFER SITE PLAN)  
**Borehole No.:** CBH1  
**Date started:** 8.3.2007  
**Date completed:** 8.3.2007  
**Logged by:** CA  
**Checked by:**

<table>
<thead>
<tr>
<th>Drilling Information</th>
<th>Material Substance</th>
<th>Rock Mass Defects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method</td>
<td>Material</td>
<td>Description</td>
</tr>
<tr>
<td>DIU</td>
<td>N.C.</td>
<td>SILTSTONE: grey to dark grey, distinctly laminated @ 0 deg with approx 10 - 15% silica content (continued)</td>
</tr>
<tr>
<td>DIU</td>
<td>N.C.</td>
<td>SILTSTONE: fine grained, grey, distinctly laminated @ 0 to 20 deg. Some wavy laminae with up to 15% silica content</td>
</tr>
<tr>
<td>DIU</td>
<td>N.C.</td>
<td>CBH1 terminated at 10.1m</td>
</tr>
<tr>
<td>DIU</td>
<td>N.C.</td>
<td></td>
</tr>
</tbody>
</table>

**Drill model & mounting:** GEMCO TRAILER  
**Hole diameter:** 100 mm  
**Drilling fluid:**  
**Easting:** 282796.25  
**Northing:** 614599.87  
**Slope:** -90°  
**R.L. Surface:** 22.28

**Method:**
- DIU: DIU
- DIU: DIU
- DIU: DIU
- DIU: DIU

**Material:**
- SILTSTONE: grey to dark grey, distinctly laminated @ 0 deg with approx 10 - 15% silica content (continued)
- SILTSTONE: fine grained, grey, distinctly laminated @ 0 to 20 deg. Some wavy laminae with up to 15% silica content
- CBH1 terminated at 10.1m

**Rock Mass Defects:**
- PT, PL, SO, RO, CN
- JT @ 45 deg, closed 2mm thick
- JT @ 10 deg, PL, RO
- JT @ 75 deg, 150mm long, PL, RO, CN

**Water Pressure Test Result:**
- Interval shown

**Weathering:**
- FT = fresh
- SW = slightly weathered
- MW = moderately weathered
- HW = highly weathered
- XW = extremely weathered
- DW = distinctly weathered (covers MW and HW)

**Strength:**
- VL = very low
- L = low
- M = medium
- H = high
- VH = very high
- EH = extremely high

**Defect Type:**
- JT = joints
- PT = parting
- SM = seam
- S2 = sheared zone
- CS = crushed seam

**Planarity:**
- PL = planar
- CU = curved
- UN = undulating
- ST = stepped
- IR = irregular

**Coating:**
- VR = very rough
- RO = rough
- SD = smooth
- SL = slickensided
- CN = clean
- SN = stained
- VN = veneer
- CO = coating
## Engineering Log - Piezometer

### Client:
MAUNSELL AECOM

### Principal:
RTA

### Project:
GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE

### Borehole Location:
DEVITTS LANE, MEROO MEADOW (REFER SITE PLAN)

#### Drilling Information

<table>
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<tr>
<th>Drilling Method</th>
<th>Penetration</th>
<th>Support</th>
<th>Notes, Samples, Tests, etc</th>
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<td>1, 2, 3</td>
<td>water</td>
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#### Material Substance

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<tr>
<td>FILL</td>
<td>Organic, tree roots</td>
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<tr>
<td>GRAVEL</td>
<td>D</td>
</tr>
<tr>
<td>Sandy CLAY: high plasticity, orange to brown</td>
<td>D, P/St</td>
</tr>
<tr>
<td>CLAY: high plasticity, grey with brown mottled, trace of gravel</td>
<td>D, VSt</td>
</tr>
<tr>
<td>CLAY: dark grey, brown mottled, orange bands</td>
<td>D</td>
</tr>
<tr>
<td>Sandy CLAY: dark brown with grey bands, medium plasticity</td>
<td>D/M</td>
</tr>
<tr>
<td>Silty CLAY: dark grey, low plasticity, with angular gravel pieces</td>
<td>D/M, H</td>
</tr>
<tr>
<td>SILSTONE: grey to dark grey, distinctly laminated @ 0 deg with approx 10 - 15% silica content</td>
<td>TC-Bit refusal at 4.03m</td>
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### Additional Observations

- Extremely weathered
- Indications of highly weathered claystone SPT 1 bouncing at 3.27m (3.20/120mm, -) V Bit refusal @ 3.3m
# Engineering Log - Piezometer

**Client:** MAUNSELL AECOM  
**Principal:** RTA  
**Project:** GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE  
**Borehole Location:** DEVITTS LANE, MEROO MEADOW (REFER SITE PLAN)

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<td>C casing</td>
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<td>2. auger drilling</td>
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<tr>
<td>3.</td>
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<td>4.</td>
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<tr>
<td>15.</td>
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<td>16.</td>
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Borehole terminated at 10.1m
**Engineering Log - Borehole**

**Client:** MAUNSELL AECOM  
**Principal:** RTA  
**Project:** GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE  
**Borehole Location:** TURNERS LANE, MEROO MEADOW (REFER SITE PLAN)  
**Borehole No.:** CBH2  
**Sheet:** 1 of 4  
**Project No.:** GEOTUNAN02580-AA  
**Date started:** 15.3.2007  
**Date completed:** 15.3.2007  
**Logged by:** DD  
**Checked by:**

**Drill model and mounting:** H-POWER SCOUT TRUCK  
**Easting:** 283473.35  
**Northing:** 6145307.28  
**slope:** -90°  
**R.L. Surface:** 18.24

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<th>support</th>
<th>notes samples, tests, etc</th>
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<th>depth metres</th>
<th>classification symbol</th>
<th>material</th>
<th>soil type: plasticity or particle characteristics, colour, secondary and minor components</th>
<th>medium consistency</th>
<th>consistency/density index</th>
<th>additional observations</th>
<th>structure and additional observations</th>
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<td>ADV</td>
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<td>10</td>
<td>1</td>
<td>Gravely SAND: fine to coarse grained, brown with fine to medium grained, sub-rounded to sub-angular, trace of motels</td>
<td>D</td>
<td>VL</td>
<td>RUNOFF SEDIMENTS</td>
<td>ALLUVIUM</td>
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<td></td>
<td>2.2,4</td>
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<td>17</td>
<td>2</td>
<td>Silty CLAY: medium plasticity, brownwired, with a trace of fine to coarse grained sand and fine to medium (grained gravel)</td>
<td>Wp</td>
<td>S</td>
<td>SPT sample 0.55m-0.65m</td>
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<td>N=6</td>
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<td>Silty CLAY: medium plasticity, brown/red/grey mottled, with a trace rootlet</td>
<td>VSI</td>
<td>X</td>
<td>SPT sample 1.5m-1.85m</td>
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<td>15</td>
<td>4</td>
<td>Silty CLAY: medium plasticity, browngrey mottled, with a trace of fine to medium grained sand and fine grained gravel (XW sandstone) sub-angular to sub-rounded</td>
<td>VSSH</td>
<td>X</td>
<td>SPT sample 3.0m to 3.1m</td>
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<td>14</td>
<td>5</td>
<td>CLAY: medium plasticity, pale grey, with some fine grained gravel, sub-rounded (XW sandstone) iron staining</td>
<td>Wp</td>
<td>VSI/Fb</td>
<td>SPT sample 3.1m to 3.4m</td>
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<td>13</td>
<td>6</td>
<td>Silty CLAY: low to medium plasticity, orange/grey, with trace of fine to medium grained gravel, sub-rounded</td>
<td>VSSH</td>
<td>X</td>
<td>SPT sample 3.0m to 3.1m</td>
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<td>12</td>
<td>7</td>
<td>Silty CLAY: low to medium plasticity, grey/orange mottled, with some fine to medium grained gravel, sub-rounded and fine to medium grained sand</td>
<td>H</td>
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<td>RESIDUAL SPT sample 5.4m to 5.5m</td>
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<td>11</td>
<td>8</td>
<td>Becoming brown/pale grey at 6.2m</td>
<td>VSSH</td>
<td>X</td>
<td>SPT sample 5.15m to 5.35m</td>
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<td>10</td>
<td></td>
<td>Silty CLAY: low to medium plasticity, with some fine grained sand, grey/brown/orange mottled, interbedded with XW-HW siltstone</td>
<td>VSSH</td>
<td>X</td>
<td>SPT sample 5.3m to 5.4m on 24</td>
<td></td>
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**method**  
AB: auger coring  
AD: auger drilling  
RR: reformation  
CT: cable tool  
HA: hand auger  
V: V bit  
T: TC bit  
*ce shown by suffix  
e.g. ADT

**notes, samples, tests**  
M: mud  
N: nil

**classification symbols and soil description**  
based on unified classification system

<table>
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<tr>
<th>soil description</th>
<th>moisture</th>
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<tr>
<td>VD</td>
<td>very soft</td>
<td>S soft</td>
</tr>
<tr>
<td>VS</td>
<td>soft</td>
<td>F firm</td>
</tr>
<tr>
<td>SSI</td>
<td>stiff</td>
<td>G stiff</td>
</tr>
<tr>
<td>VSI</td>
<td>very stiff</td>
<td>H hard</td>
</tr>
<tr>
<td>Wp</td>
<td>plastic limit</td>
<td>M moist</td>
</tr>
<tr>
<td>Wp</td>
<td>plastic limit</td>
<td>V wet</td>
</tr>
<tr>
<td>BX</td>
<td>very loose</td>
<td>L loose</td>
</tr>
<tr>
<td>E</td>
<td>environmental sample</td>
<td>MD medium dense</td>
</tr>
<tr>
<td>H</td>
<td>refusal</td>
<td>D dense</td>
</tr>
</tbody>
</table>
# Engineering Log - Borehole

**Client:** MAUNSELL AECOM  
**Principal:** RTA  
**Project:** GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE  
**Borehole Location:** TURNERS LANE, MEROO MEADOW (REFER SITE PLAN)  

**Borehole No.:** CBH2  
**Date started:** 15.3.2007  
**Date completed:** 15.3.2007  
**Logged by:** DD  
**Checked by:**

**Drill model and mounting:** H-POWER SCOUT TRUCK  
**Easting:** 283473.35  
**Northing:** 6145307.28  
**slope:** -90°  
**R.L. Surface:** 18.24

<table>
<thead>
<tr>
<th>Drilling Information</th>
<th>Material Substance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method</strong></td>
<td><strong>Notes, Samples, Tests</strong></td>
</tr>
<tr>
<td>ADT</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Silty CLAY: low to medium plasticity, with some fine to coarse grained sand and fine grained gravel, XW-HW sandstone/siltstone</td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>HW Siltstone: grey, with some fine to coarse grained sand</td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Borehole CBH2 continued as cased hole</td>
</tr>
</tbody>
</table>

**Support:**
- M: mud
- C: casing
- N: nil

**Penetration:**
- 0/ initial penetration
- 1/ refusal to refusal

**Notes:**
- V: void
- F: fine
- W: wet
- L: loose
- MD: medium dense
- G: gas

**Water:**
- 10/66 water level on date shown
- Water inflow
- Water outflow

**Classification Symbols and Soil Description:**
- Based on unified classification system
- Soil description

**Consistency/Density Index:**
- Very soft
- Soft
- Firm
- Stiff
- Very stiff
- Hard
- Fissile
- Very loose
- Loose
- Medium dense
### Engineering Log - Cored Borehole

**Client:** MAUNSELL AECOM  
**Principal:** RTA  
**Project:** GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE  
**Borehole Location:** TURNERS LANE, MEROO MEADOW (REFER SITE PLAN)  

**Borehole No.:** CBH2  
**Sheet:** 3 of 4  
**Project No.:** GEOTUNAN02580-AA  
**Date started:** 15.3.2007  
**Date completed:** 15.3.2007  
**Logged by:** DD  
**Checked by:**  

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<thead>
<tr>
<th>Drilling Information</th>
<th>Material Substance</th>
<th>Rock Mass Defects</th>
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<tr>
<td>Method</td>
<td>Core-lift</td>
<td>Water</td>
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</table>
## Engineering Log - Cored Borehole

**Client:** MAUNSELL AECOM  
**Principal:** RTA  
**Project:** GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE  
**Borehole Location:** TURNERS LANE, MEROO MEADOW (REFER SITE PLAN)  
**Sheet:** 4 of 4  
**Project No:** GEOTUNAN02580-AA  
**Date started:** 15.3.2007  
**Date completed:** 15.3.2007  
**Logged by:** DD  
**Checked by:**

|--------------------------------------------|-------------------|-------------|-------------------|
| hole diameter: 100 mm  
| Drilling fluid: | Northing: 6145307.28  
| bearing: | datum: |

<table>
<thead>
<tr>
<th>drilling information</th>
<th>material substance</th>
<th>rock mass defects</th>
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<tbody>
<tr>
<td>method</td>
<td>core-lift</td>
<td>water</td>
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<td>core-drill</td>
<td>water</td>
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<tr>
<td>diabase</td>
<td>casing used</td>
<td>barrel withdrawn</td>
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<td>auger drilling</td>
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<td>rock core bit</td>
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<td>NM6C</td>
<td></td>
<td></td>
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<td>HQ, PQ, PQ</td>
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<td>wireline core</td>
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**General**

CBH2 terminated at 16.2m
# Engineering Log - Piezometer

**Client:** MAUNSELL AECOM  
**Principal:** RTA  
**Project:** GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE  
**Borehole Location:** TURNERS LANE, MEROO MEADOW (REFER SITE PLAN)  

**Borehole No.:** CBH2  
**Date started:** 15.3.2007  
**Date completed:** 15.3.2007  
**Logged by:** DD

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<thead>
<tr>
<th>Borehole</th>
<th>Method</th>
<th>Support</th>
<th>Notes, Samples, Tests</th>
<th>Material</th>
<th>Classification Symbols and Soil Description</th>
<th>Consistency/Density Index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AS</td>
<td>Casing</td>
<td>Undisturbed sample 50mm diameter</td>
<td>Gravelly SAND: fine to coarse granulated, brown with fine to medium grained, sub-rounded to sub-angular, trace of rootlets</td>
<td>VS</td>
<td>very soft</td>
</tr>
<tr>
<td></td>
<td>AD</td>
<td></td>
<td>Disturbed sample</td>
<td>Silty CLAY: medium plasticity, brown/grey, with a trace of fine to coarse grained sand and fine to medium gravel</td>
<td>S</td>
<td>soft</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Standard Penetration Test (SPT)</td>
<td>Silty CLAY: medium plasticity, brown/grey/grey mottled, with a trace of fine to medium textured</td>
<td>N*</td>
<td>firm</td>
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<tr>
<td></td>
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<td></td>
<td>SPT sample recovered</td>
<td>Silty CLAY: medium to high plasticity, brown/red/grey mottled, with a trace rootlet</td>
<td>SPT</td>
<td>stiff</td>
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<tr>
<td></td>
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<td></td>
<td>SPT with solid cone</td>
<td>CLAY: medium plasticity, pale grey, with some fine grained gravel, sub-rounded (XW sandstone) iron staining</td>
<td>P</td>
<td>VS1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pressure meter</td>
<td>Silty CLAY: low to medium plasticity, orange/grey, with trace of fine to medium grained gravel, sub-rounded</td>
<td>D</td>
<td>hard</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Bulk sample</td>
<td>Silty CLAY: low to medium plasticity, grey/orange mottled, with some fine to medium grained gravel, sub-rounded and fine to medium grained sand</td>
<td>R</td>
<td>friable</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Refusal</td>
<td>Becoming brown/pale grey at 6.2m</td>
<td>E</td>
<td>very loose</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Environmental sample</td>
<td>Silty CLAY: low to medium plasticity, with some fine grained sand, grey/brown/orange mottled, interbedded with XW-HW silstone</td>
<td>PID</td>
<td>L</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>Piezometer</td>
<td>VS/FSb</td>
<td>Md</td>
<td>medium dense</td>
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<td></td>
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<td></td>
<td>Water sample</td>
<td>VS/FSb</td>
<td>D</td>
<td>dense</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Water quality</td>
<td>VS/FSb</td>
<td>VO</td>
<td>very dense</td>
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</table>
### Engineering Log - Piezometer

**Client:** MAUNSELL AECOM  
**Principal:** RTA  
**Project:** GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE  
**Borehole Location:** TURNERS LANE, MEROO MEADOW (REFER SITE PLAN)

<table>
<thead>
<tr>
<th>Drilling Information</th>
<th>Material Substance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Well Method:</strong> ADT</td>
<td><strong>Material:</strong> Silty CLAY: low to medium plasticity, with some fine to coarse grained sand and fine grained gravel. XW-HW sandstone/siltstone</td>
</tr>
</tbody>
</table>
| **Depth:** 9.0m | **Moisture Condition:** Wp  
**Consistency Checks:** VSIF8  
**Additional Observations:** XW SILTSTONE |
| **Depth:** 10.0m | **Material:** HW SILTSTONE: grey, with some fine to coarse grained sand  
**Moisture Condition:** D  
**Consistency Checks:** VSIFH  
**Additional Observations:** HW SILTSTONE |
| **Depth:** 11.0m | **Material:** SILTSTONE: distinctly laminated @ 0 deg, pale grey to grey  
**Moisture Condition:** TC Bit Refusal  
**Additional Observations:** |
| **Depth:** 12.0m | **Material:** Silty SANDSTONE: pale grey/grey, fine to medium grained  
**Moisture Condition:** |
| **Depth:** 13.0m | **Material:** NO CORE: 12.66m to 12.69m  
**Moisture Condition:** Silty SANDSTONE: fine to medium grained, pale grey/grey  
**Additional Observations:** |
# Engineering Log - Piezometer

**Client:** MAUNSELL AECOM  
**Project:** GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE  
**Borehole Location:** TURNERS LANE, MEROO MEADOW (REFER SITE PLAN)

<table>
<thead>
<tr>
<th>Method</th>
<th>Support</th>
<th>Notes, Samples, Tests</th>
<th>Material</th>
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</tbody>
</table>

**Drilling Information**

- **Easting:** 283473.35  
- **Nordthing:** 614530.28  
- **Slope:** -9.5°  
- **K.L. Surface:** 18.24

**Additional Observations**

- Borehole terminated at 10.2m
## Engineering Log - Borehole

### Client: MAUNSELL AECOM
### Principal: RTA
### Project: GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE
### Borehole Location: TURNERS LANE, MEREO MEADOW (REFER SITE PLAN)

<table>
<thead>
<tr>
<th>method</th>
<th>support</th>
<th>notes, samples, tests, etc</th>
<th>material</th>
<th>medium condition</th>
<th>classification symbol</th>
<th>description</th>
<th>consistency/density index</th>
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<tbody>
<tr>
<td>ADV</td>
<td>C</td>
<td></td>
<td>Organic Silty CLAY: dark brown</td>
<td>M</td>
<td>S</td>
<td></td>
<td>vertical pressure (kPa)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Silty CLAY: low plasticity, dark brown</td>
<td></td>
<td></td>
<td></td>
<td>vertical pressure (kPa)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Silty CLAY: low to medium plasticity, orange brown</td>
<td></td>
<td></td>
<td></td>
<td>vertical pressure (kPa)</td>
</tr>
<tr>
<td>SPT 3.6,9 N=15</td>
<td>CL</td>
<td>CLAY: low to medium plasticity, orange with pale green and brown</td>
<td>D/M</td>
<td>St</td>
<td></td>
<td></td>
<td>vertical pressure (kPa)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CLAY: low to medium plasticity, pale orange</td>
<td>D</td>
<td>F/St</td>
<td></td>
<td>vertical pressure (kPa)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CLAY: low plasticity, pale grey with pale orange, green and brown bands</td>
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<td></td>
<td>vertical pressure (kPa)</td>
</tr>
<tr>
<td>SPT 15,16,20 N=36</td>
<td>CH</td>
<td>CH/CLAY: low plasticity, pale brown with trace line to medium angular gravel plocios</td>
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<td>vertical pressure (kPa)</td>
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<tr>
<td>ADT</td>
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<td>Silty CLAY: low plasticity, pale brown with trace line to medium angular gravel plocios</td>
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<td>vertical pressure (kPa)</td>
</tr>
</tbody>
</table>

Borehole CBH3 continued as cored hole

TC Bit Refusal

---

**Method abbreviations:**
- ADT: Auger drilling
- SPT: Standard Penetration Test
- ADV: Auger sampling

**Notations:**
- AD: Auger drilling
- AS: Auger sampling
- RL: metres
- R: no resistance
- M: medium
- C: casing
- G: gravel
- B: bank fill
- V: water inflow
- T: water outflow
### Engineering Log - Cored Borehole

#### Client:
MAUNSELL AECOM

#### Principal:
RTA

#### Project:
GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE

#### Borehole Location:
TURNERS LANE, MEROO MEADOW (REFER SITE PLAN)

#### Borehole No.:
CBH3

#### Sheet:
2 of 3

#### Project No.:
GEOOTUAN02580-AA

#### Date started:
15.3.2007

#### Date completed:
15.3.2007

#### Logged by:
CA

#### Checked by:

**Drill Model & Mounting:** GEMCO TRAILER

**Easting:** 283491.25  **Slope:** -90°  **R.L.:** Surface: 6.60

**Northing:** 6144671.59  **Bearing:**

---

#### Drilling Information

<table>
<thead>
<tr>
<th>Method</th>
<th>Core-lift</th>
<th>Graphic Log</th>
<th>Core Recovery</th>
<th>Water</th>
<th>Material</th>
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</table>

#### Material Substance

- **Rock Type:** Grey, laminated @ U deg with approx 10% silicon content, trace calcite - rich inclusions

#### Rock Mass Defects

<table>
<thead>
<tr>
<th>Defect</th>
<th>Description</th>
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<tbody>
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</tbody>
</table>

---

#### Water

- **Water Inflow:** Partial drill fluid loss
- **Complete Drill Fluid Loss:**

#### Weathering

- **FR:** Fresh
- **SW:** Slightly Weathered
- **MW:** Moderately Weathered
- **HW:** Highly Weathered
- **EX:** Externally Weathered
- **DW:** Distinctly Weathered (covers MW and HW)

#### Strength

- **VL:** Very Low
- **L:** Low
- **M:** Medium
- **H:** High
- **EH:** Extremely High

#### Water Pressure Test Result

<table>
<thead>
<tr>
<th>Depth Interval</th>
<th>Water Level</th>
</tr>
</thead>
</table>
| 10/1/05 water level on date shown

#### Defect Type

- **JT:** Joints
- **PT:** Pitting
- **SM:** Staining
- **SZ:** Sheared Zone
- **SS:** Sheared Surface
- **CS:** Crushed Seam

#### Planarity

- **PL:** Planar
- **CU:** Curved
- **UN:** Unidirectional
- **ST:** Stopped
- **IR:** Irregular

#### Coating

- **VR:** Very Rough
- **RO:** Rough
- **SN:** Smooth
- **SL:** Sliskened
- **DN:** Dished

---

**Note:**

- **D:** Depth
- **A:** Angle
- **R:** Roughness
- **S:** Smoothness
- **L:** Laminated
- **PL:** Planar
- **CU:** Curved
- **UN:** Unidirectional
- **ST:** Stopped
- **IR:** Irregular
## Engineering Log - Cored Borehole

**Client:** MAUNSELL AECOM  
**Principal:** RTA  
**Project:** GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE  
**Borehole Location:** TURNERS LANE, MERROO MEADOW (REFER SITE PLAN)

**Borehole No.: CBH3**  
**Sheet:** 3 of 3  
**Project No.: GEOTUNAN02580-AA**  
**Date started:** 15.3.2007  
**Date completed:** 15.3.2007  
**Logged by:** CA  
**Checked by:**

### Drilling Information

- **Drill model & mounting:** GEMCO TRAILER  
- **Easting:** 283491.25  
- **Nordrth:** 6144671.59  
- **Hole diameter:** 100 mm  
- **Drilling fluid:**  
- **Slope:** 90°  
- **R.I. Surface:** 6.80  
- **Datum:**

### Material Substance

<table>
<thead>
<tr>
<th>Material</th>
<th>Rock Mass Defects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silty SANDSTONE: fine to medium grained, grey with white speckling and a fine sand fraction and trace shells</td>
<td></td>
</tr>
<tr>
<td>Sandy SILTSTONE: grey with white speckling and pyrite fragments.</td>
<td></td>
</tr>
<tr>
<td>Sandy SILTSTONE: grey with white speckling</td>
<td></td>
</tr>
<tr>
<td>Silty SANDSTONE: grey, laminated @ 0 deg with approx 10% silicon content, trace calcite - rich inclusions (continued)</td>
<td></td>
</tr>
<tr>
<td>Silty SANDSTONE: grey, laminated @ 0 deg with approx 30% silica content</td>
<td></td>
</tr>
<tr>
<td>Siltstone: dark grey, laminated @ 0 deg</td>
<td></td>
</tr>
</tbody>
</table>

### Water Level

- **Water level on date shown:**

### Weathering

- **Pr:** fairly  
- **SW:** slightly weathered  
- **MW:** moderately weathered  
- **HW:** highly weathered  
- **XW:** extremely weathered  
- **DW:** distinctly weathered (covers MV and HW)

### Strength

- **VL:** very low  
- **L:** low  
- **M:** medium  
- **H:** high  
- ** Avengers:** very high  
- **EH:** extremely high

### Defect Type

- **J1:** joint  
- **M1:** fault  
- **SM:** seam  
- **SZ:** shared zone  
- **SS:** shared surface  
- **CS:** crushed seam

### Planarity

- **PL:** planar  
- **CU:** curved  
- **SN:** stained  
- **UN:** undulating  
- **ST:** stepped  
- **IR:** irregular

### Coating

- **CO:** coating

### Cores

- **CL:** casing used  
- **CR:** core recoverd  
- **S:** symbols indicate material  
- **G:** no core recovered  
- **W:** wireline core

### Water Pressure Test Result

- **T:** water pressure test result (lugeon) for depth interval shown

---

**Cut out: CBH3 terminated at 15m**
## Engineering Log - Piezometer

**Client:** MAUNSELL AECOM  
**Principal:** RTA  
**Project:** GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE  
**Borehole Location:** TURNERS LANE, MEREO MEADOW (REFER SITE PLAN)

<table>
<thead>
<tr>
<th>Drilling Information</th>
<th>Material Substance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method</strong></td>
<td><strong>Support</strong></td>
</tr>
<tr>
<td>ADV</td>
<td>C</td>
</tr>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Drill model & mounting:** GENCO TRAILER  
**Easting:** 283491.25  
**Northing:** 6144671.59  
**Slope:** -90°  
**Datum:** K.L. Surface: 6.50

**Logged by:** CA  
**Checked by:**

---

**Notes:**
1. **SPT**  
2. **N**
3. **D**
4. **M**
5. **S**
6. **TC**
7. **P**
8. **T**
9. **W**
10. **V**
11. **B**
12. **C**
13. **E**
14. **F**
15. **St**
16. **VS**
17. **S**
18. **F**
19. **H**
20. **L**
21. **MD**
22. **D**
23. **VS**
24. **S**
25. **F**
26. **H**
27. **L**
28. **MD**
29. **D**
30. **VS**
31. **S**
32. **F**
33. **H**
34. **L**
35. **MD**
36. **D**
# Engineering Log - Piezometer

**Client:** MAUNSELL AECOM  
**Principal:** RTA  
**Project:** GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE  
**Borehole Location:** TURNERS LANE, MEROO MEADOW (REFER SITE PLAN)

<table>
<thead>
<tr>
<th>drill model &amp; mounting: OCMCO TRAILER</th>
<th>Casting: 203471.20</th>
<th>slope: -90°</th>
<th>R.L. Surface: 0.60</th>
</tr>
</thead>
<tbody>
<tr>
<td>hole diameter:</td>
<td>Northing: 614471.59</td>
<td>bearing:</td>
<td>datum:</td>
</tr>
</tbody>
</table>

## Drilling Information

<table>
<thead>
<tr>
<th>method</th>
<th>support</th>
<th>water</th>
<th>notes samples, tests, etc</th>
<th>well</th>
<th>RL</th>
<th>depth</th>
<th>moisture condition</th>
<th>consistency/density index</th>
<th>structure and additional observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>9</td>
<td>SILTSTONE: grey, laminated @ 0 deg with approx 10% silicon content, trace calcite - rich inclusions (continued)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>10</td>
<td>Sandy SILTSTONE: grey with speckling, laminated @ 0 deg with approx 30% silica content</td>
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<td></td>
<td></td>
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<td></td>
<td>3</td>
<td>4</td>
<td>11</td>
<td>Sandy SILTSTONE: grey with med white speckling and pyrite fragments</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>5</td>
<td>12</td>
<td>Silty SANDSTONE: fine to medium grained, grey with white fragments</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>6</td>
<td>13</td>
<td>Sandy SILTSTONE: grey with white speckling and a fine sand fraction and trace shells</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td>7</td>
<td>14</td>
<td>SILTSTONE: dark grey, laminated @ 0 deg</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7</td>
<td>8</td>
<td>15</td>
<td>Borehole terminated at 15m</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
<td>9</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- Method: auger screwing, auger drilling, roll Merrione, washbore, cable tool, disturbe, blank bit, V, T, TC bit, TRX, Tube, +
- Support: casing, N nil
- Penetration: no resistance ranging to refusal
- Water: 10/168 water level on date shown
- Water inflow: water outflow
- Water: undisturbed sample 50mm diameter, disturbed sample
- Standard penetration test (SPT)
- SPT with solid cone
- Pressure meter
- Full sample
- Refusal
- Environmental sample
- PID measurement
- Water sample
- Piezometer
- Air void test

**Consistency/Density Index:**
- VS: very soft
- S: soft
- F: firm
- St: stiff
- VH: very stiff
- H: hard
- T: trace
- VL: very loose
- L: loose
- MD: medium dense
- D: dense
- VD: very dense
# Engineering Log - Borehole

**Client:** MAUNSELL AECOM  
**Principal:** RTA  
**Project:** GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE  
**Borehole Location:** STRONGS LANE, JASPERS BRUSH (REFER SITE PLAN)

**Sheet:** 1 of 3  
**Project No.:** GEOTUNAN02580-AA  
**Date started:** 12.3.2007  
**Date completed:** 13.3.2007  
**Logged by:** CA  
**Checked by:**

---

**Drill model and mounting:** GEMCO TRAILER  
**Eastings:** 285700.68  
**Northing:** 6146419.88  
**slope:** 48°  
**datum:** R.L. Surface: 30.55

---

### Drilling Information

<table>
<thead>
<tr>
<th>method</th>
<th>penetration</th>
<th>notes</th>
<th>support</th>
<th>water</th>
<th>RL</th>
<th>depth metres</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADV</td>
<td></td>
<td>CLAY FILL: medium plasticity, dark brown</td>
<td>D</td>
<td>F</td>
<td>39</td>
<td>1</td>
</tr>
<tr>
<td>SPT</td>
<td>K&lt;sub&gt;c&lt;/sub&gt; N&lt;sub&gt;c&lt;/sub&gt;</td>
<td>Silty CLAY: medium to high plasticity, orange/brown with angular gravel pieces</td>
<td>DM</td>
<td>M</td>
<td>38</td>
<td>1</td>
</tr>
<tr>
<td>SPT</td>
<td>6.13 R N&lt;sub&gt;c&lt;/sub&gt;</td>
<td>CLAY: low plasticity, orange to medium brown</td>
<td>DM</td>
<td>V5H</td>
<td>36</td>
<td>2</td>
</tr>
<tr>
<td>SPT</td>
<td>20, N&lt;sub&gt;c&lt;/sub&gt;</td>
<td>CLAY: low plasticity, grey, orange and brown</td>
<td>D</td>
<td>35</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Silty Gravely CLAY: low to medium plasticity, grey to dark brown</td>
<td>M</td>
<td>34</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SILTSTONE</td>
<td>33</td>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Classification Symbols and Soil Description**

- **Soil type:** plasticity or particle characteristics, colour, secondary and minor components.
- **Moisture:** D - dry, M - moist, W - wet, Wp - plastic limit, Wl - liquid limit
- **Density:** VS - very soft, S - soft, F - firm, St - stiff

---

**Notes, Samples, Tests**

- Undisturbed sample 60mm diameter
- Undisturbed sample 83mm diameter
- SPT with solid cone
- Vane shear (kPa)
- Bulk sample
- Environmental sample
- Refusal

---

**Classification Symbols and Consistency/Density Index**

- **Moisture:** D - dry, M - moist, W - wet
- **Density:** VS - very soft, S - soft, F - firm, St - stiff, VS - very stiff, H - hard, Fs - firm, VL - very loose, L - loose, MD - medium dense, D - dense, VD - very dense
## Engineering Log - Cored Borehole
### Client: MAUNSELL AECOM
### Principal: RTA
### Project: GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE
### Borehole Location: STRONGS LANE, JASPERS BRUSH (REFER SITE PLAN)

<table>
<thead>
<tr>
<th>Drilling Information</th>
<th>Material Substance</th>
<th>Rock Mass Defects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling Method</td>
<td>Material</td>
<td>Defect Description</td>
</tr>
<tr>
<td>Core-Lift</td>
<td>Rock type, grain characteristics, colour, structure, minor components</td>
<td>Type, incision, planarity, roughness, coating, thickness</td>
</tr>
<tr>
<td>Core-Dip</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth (m)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graphic Log/ Core Recovery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Infusion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial Drill Fluid Loss</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete Drill Fluid Loss</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Pressure Test Result (kg/cm²) for Depth Interval Shown</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Drilling Information
- **Easting:** 285700.88
- **Northings:** 6146419.88
- **R.L. Surface:** 39.56
- **Drill Model & Mounting:** GEMCO TRAILER
- **Hole Diameter:** 100 mm
- **Drilling Fluid:**
- **Depth (m):**
  - 39
  - 38
  - 37
  - 36
  - 35
  - 34
  - 33
  - 32

### Rock Mass Defects
- **Defect Type:**
  - Jt joint
  - Pt parting
  - Sm seam
  - Sz sheared zone
  - Ss sheared surface
  - Cs crushed seam
- **Roughness:**
  - Vr very rough
  - Ro rough
  - So smooth
  - Sl slickened
  - Sl slickened
  - Co coating
- **Planarity:**
  - Pn planar
  - Cn clean
  - Sn stained
  - Vn veneer

### Weathering
- **Weathering:**
  - Pn mass
  - SW slightly weathered
  - MW moderately weathered
  - HW highly weathered
  - XW extremely weathered
  - DW distinctly weathered (covers MW and HW)

### Core-Lift
- **Core Lift:**
  - Casing used
  - Barrel withdrawn

### Water
- **Water Level:** 10/1/96 water level on date shown
- **Water Inflow:**
  - Partial drill fluid loss
  - Complete drill fluid loss
- **Water Pressure Test Result:** (kg/cm²) for depth interval shown

### Other
- **Checked by:** CA
**Engineering Log - Piezometer**

**Client:** MAUNSELL AECOM  
**Principal:** RTA  
**Project:** GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE  
**Borehole Location:** STRONGS LANE, JASPERS BRUSH (REFER SITE PLAN)

---

### Drilling Information

<table>
<thead>
<tr>
<th>Method</th>
<th>Support</th>
<th>Notes, Samples, Tests</th>
<th>Material Substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADV 20R</td>
<td>Casing</td>
<td>N nil</td>
<td>CLAY FILL: medium plasticity, dark brown</td>
</tr>
<tr>
<td>SPT 20R</td>
<td>N=RI</td>
<td></td>
<td>Silty CLAY: medium to high plasticity, orange/brown with angular gravel pieces</td>
</tr>
<tr>
<td>SPT 6.13 R</td>
<td>N=RI</td>
<td></td>
<td>CLAY: low plasticity, orange to medium brown</td>
</tr>
<tr>
<td>ADT</td>
<td>Tubex</td>
<td></td>
<td>Silty Gravelly CLAY: low to medium plasticity, grey to dark brown</td>
</tr>
</tbody>
</table>

---

### Soil Description

- **U**<sub>so</sub>: undisturbed sample 50mm diameter
- **D**: disturbed sample
- **N**: standard penetration test (SPT)
- **N**<sub>*</sub>: SPT - sample recovered
- **E**: environmental sample
- **M**: moisture
- **W**: wet
- **P**: plastic limit
- **W**: water
- **V**: void ratio
- **T**: teneur
- **B**: bulk density
- **G**: dry density
- **F**: firmness
- **S**: sand
- **M**: moisture
- **V**: void ratio
- **L**: loose
- **D**: dense

**Soil Classification Symbols and Consistency/Deatnty Index:**

- **VS**: very soft
- **S**: soft
- **F**: firm
- **I**: indurated
- **T**: hard
- **Sh**: shell
- **Va**: very stiff
- **H**: hard
- **Fb**: friable
- **VL**: very loose
- **L**: loose
- **MD**: medium dense
- **D**: dense
- **VD**: very dense

---

**Additional Observations:**

<table>
<thead>
<tr>
<th>Material</th>
<th>Moisture</th>
<th>Consistency/Deatnty</th>
</tr>
</thead>
<tbody>
<tr>
<td>FILL</td>
<td>D</td>
<td>F</td>
</tr>
<tr>
<td>RESIDUAL</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>SPT Bouncing @ 1.02m (11/120mm, R, R)</td>
<td>DM VGMT</td>
<td></td>
</tr>
<tr>
<td>SPT Bouncing @ 3.36m (6.13.10/50mm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPT Bouncing @ 4.65m (20/150.1R) Extremely to highly weathered alstone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V Bit Refusal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SILTSTONE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Engineering Log - Piezometer

### Details
- **Client:** MAUNSELL AECOM
- **Principal:** RTA
- **Project:** GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE
- **Borehole Location:** STRONGS LANE, JASPERS BRUSH (REFER SITE PLAN)
- **Borehole Terminated at:** 15.14m
- **Date started:** 12.3.2007
- **Date completed:** 13.3.2007
- **Lopped by:** CA
- **Checked by:**

### Drilling Information
- **Method:** auger screwing
- **Support:** C casing
- **Notes, Samples, Tests:** undisturbed sample 50mm diameter

### Material Substance
- **Soil Type:** dark grey with orange/brown iron staining, laminated at 0 deg (continued)
- **Material:** Siltstone
- **Additional Observations:** Silty CLAY: highly weathered infilled seam, orange grey
- **Material:** Siltstone: grey, some wavy bedding at 0 to 20 deg.

### Material Substance (continued)
- **Siltstone:** dark grey with orange/brown iron staining, laminated at 0 deg
- **R.L. Surface:** 39.55
- **Easting:** 285700.68
- **Northing:** 6146419.88
- **Datum:**

### Classification Symbols and Soil Description
- **Based on Unified Classification System:**
  - **Moisture:** D: Dry
  - **Consistency/Density Index:**
    - VS: very soft
    - S: soft
    - F: firm
    - N: stiff
    - VSI: very stiff
    - M: moist
    - T: hard
    - Fb: friable
    - W: wet
    - VL: very loose
    - Wp: plastic limit
    - L: loose
    - Ws: water sample
    - Md: medium dense
    - PZ: piezometer
    - D: dense
    - ALT: air lift test
    - VD: very dense
# Engineering Log - Borehole

**Client:** MAUNSELL AECOM  
**Principal:** RTA  
**Project:** GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE  
**Borehole Location:** SWAMP ROAD, JASPER'S BRUSH (REFER SITE PLAN)  

## Drilling Information

<table>
<thead>
<tr>
<th>Drilling method</th>
<th>Support</th>
<th>Notes</th>
<th>Water</th>
<th>Graphic Log</th>
<th>Classification</th>
<th>Soil Type</th>
<th>Material Characteristics</th>
<th>Moisture Content</th>
<th>O.C.</th>
<th>Penetration Resistance (kPa)</th>
<th>Structure and Additional Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADT</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PEAT: low to medium plasticity, black</td>
<td>M</td>
<td>VS</td>
<td>Organic layer</td>
<td>ALLUVIUM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silty CLAY: high plasticity, grey</td>
<td>M</td>
<td>W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silty SAND: fine grained, pale orange, yellow and grey</td>
<td>MD</td>
<td></td>
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<tr>
<td></td>
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<td></td>
<td>CLAY: high plasticity, grey</td>
<td>St</td>
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<td></td>
<td></td>
<td>Silty Sandy CLAY: high plasticity, grey with fine angular gravel</td>
<td>F/S</td>
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<tr>
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<td>Silty Clayey SAND: fine grained, pale green</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CLAY: low plasticity, orange with fine angular gravel</td>
<td>F/S</td>
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<td></td>
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<td></td>
<td>Clayey SAND: fine grained, pale green with some fine angular gravel</td>
<td>X</td>
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<td></td>
<td></td>
<td>CLAY: low plasticity, orange</td>
<td>M</td>
<td>VD</td>
<td></td>
<td>ALLUVIUM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Clayey GRAVEL, fine to coarse grained, angular with interbedded clay bands and shale bands.</td>
<td>W</td>
<td>MD</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Notes:** SPT bouncing @ 4.65m (25, - -) continued with rock roller.  
SPT bouncing @ 6.72m (23, 2ST50/70mm, - -)
<table>
<thead>
<tr>
<th>Method</th>
<th>Support</th>
<th>Material</th>
<th>Notes, Samples, Tests</th>
<th>Consistency/Density Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS</td>
<td>N, R</td>
<td>soil type: plasticity or particle characteristics, colour, secondary and minor components.</td>
<td>Vd, undisturbed sample 50mm diameter&lt;br&gt;Us, undisturbed sample 63mm diameter&lt;br&gt;D, disturbed sample&lt;br&gt;N, 4 standard penetration test (SPT)&lt;br&gt;SPT - sample recovered&lt;br&gt;V, vane shear (kPa)&lt;br&gt;W, wet&lt;br&gt;L, very loose&lt;br&gt;MD, medium dense&lt;br&gt;VD, very dense</td>
<td>vs, very soft&lt;br&gt;S, soft&lt;br&gt;F, firm&lt;br&gt;Dt, stiff&lt;br&gt;VS, very stiff&lt;br&gt;H, hard&lt;br&gt;Fh, friable&lt;br&gt;VL, very loose&lt;br&gt;L, loose&lt;br&gt;MD, medium dense&lt;br&gt;D, dense&lt;br&gt;VD, very dense</td>
</tr>
<tr>
<td>AD</td>
<td>M, C</td>
<td>moisture</td>
<td>D, dry&lt;br&gt;M, moist&lt;br&gt;W, wet&lt;br&gt;Wp, plastic limit&lt;br&gt;Wl, liquid limit</td>
<td>Moisture system</td>
</tr>
<tr>
<td>RR</td>
<td>cable tool</td>
<td>classification symbols and soil description</td>
<td>based on unified classification system</td>
<td></td>
</tr>
<tr>
<td>CT</td>
<td>hand auger</td>
<td>notes, samples, tests</td>
<td>10/1/98 water level&lt;br&gt;on date shown</td>
<td></td>
</tr>
<tr>
<td>HA</td>
<td>auger drilling</td>
<td>penetration</td>
<td>no resistance ranging to refusal</td>
<td></td>
</tr>
<tr>
<td>DT</td>
<td>auger auger</td>
<td>notes, samples, tests</td>
<td>water intake&lt;br&gt;water outflow</td>
<td></td>
</tr>
<tr>
<td>Vb</td>
<td>auger auger</td>
<td>notes, samples, tests</td>
<td>water intake&lt;br&gt;water outflow</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>auger auger</td>
<td>notes, samples, tests</td>
<td>water intake&lt;br&gt;water outflow</td>
<td></td>
</tr>
<tr>
<td>*bit shown by suffix</td>
<td>notes, samples, tests</td>
<td>notes, samples, tests</td>
<td>water intake&lt;br&gt;water outflow</td>
<td></td>
</tr>
</tbody>
</table>

Borehole CBH5 continued as cored hole
Borehole No: CBH5  
Date started: 21.3.2007  
Date completed: 21.3.2007  
Logged by: CA  
Checked by: 

**Sheet** 3 of 3  
**Project No:** GEOTUNAN02580-AA  

**Client:** MAUNSELL AECOM  
**Principal:** RTA  
**Project:** GERRINGONG TO BOMADERRY, PRINCES HWY UPGRADE  
**Borehole Location:** SWAMP ROAD, JASPIRS BRUSH (REFER SITE PLAN)  

**drill model & mounting:** FOX UB40 TRUCK  
**hole diameter:** 100 mm  
**Drilling fluid:** Water  
**datum:** 

<table>
<thead>
<tr>
<th>drill depth</th>
<th>material</th>
<th>rock mass defects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 9</td>
<td>Cobble gravel and clay, cobbles and gravel rounded to sub rounded, brown to grey, clay pale grey and orange brown</td>
<td>DW</td>
</tr>
<tr>
<td>10 to 16</td>
<td>Cobble gravel and clay, cobbles and gravel rounded to sub rounded, brown to grey, clay pale grey and orange brown</td>
<td></td>
</tr>
</tbody>
</table>

CBH5 terminated at 12m