coffey geotechnics

Borehole No. **BH50**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**

# Engineering Log - Borehole

Client: ***BROWN CONSULTING (QLD) PTY LTD***

Date started: ***21.4.2009***

Principal:

Date completed: ***21.4.2009***

Project: ***BELLVISTA 2***

Logged by: ***DF***

Borehole Location: ***REFER TO SITE PLAN***

Checked by:

drill model and mounting: EDSON CPI | Easting: 509397.734 | slope: -90° | R.L. Surface: 2.828

hole diameter: 100 mm | Northing 7035025.736 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa (100 200 300 400) | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | | | | | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | MD | | |
| | | | | D | | | | SP | **SAND:** fine to medium grained, grey/brown, trace of silt. | M/W | | | |
| | | | ▼ | | 2 | 1 | | | ...colour changing to dark brown. | W | VD | | |
| | | | ► | | | | | | ...colour changing to pale grey. | | D | | |
| | | | | ASS | | | | SC | **CLAYEY SAND:** fine to coarse grained, pale brown and pale grey, low plasticity fines. | D/M | | | |
| | | | | | 1 | 2 | | CH | **SANDY CLAY:** medium to high plasticity, orange/red and pale grey, fine to medium grained sand. | M | St | × | DIST PP=160kPa |
| | | | | | | | | | ...colour changing to pale grey. | | | | |
| | | | | | | | | | | | VSt | × | DIST PP=250kPa |
| | | | | | 0 | 3 | | | | | | | |
| | | | | | | | | | Borehole BH50 terminated at 3m | | | | LIMIT OF INVESTIGATION |
| | | | | | -1 | 4 | | | | | | | |
| | | | | | -2 | 5 | | | | | | | |
| | | | | | -3 | 6 | | | | | | | |
| | | | | | -4 | 7 | | | | | | | |
| | | | | | -5 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |

*bit shown by suffix e.g. ADT

**support**: M mud, C casing, N nil

**penetration**: 1 2 3 4 — no resistance ranging to refusal

**water**: ▼ 10/1/98 water level on date shown; ► water inflow; ◄ water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

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

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 2.6.09

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# Engineering Log - Borehole

Borehole No. **BH51**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **24.4.2009**

Principal:

Date completed: **24.4.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by:

drill model and mounting: EDSON CPI | Easting: 509510.506 | slope: -90° | R.L. Surface: 2.978

hole diameter: 100 mm | Northing 7035077.122 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | | | | | | SM | **SILTY SAND:** fine to medium grained, dark grey, with organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, grey. | | L/MD | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, dark brown. ...colour changing to pale brown. | | VD | | |
| | | | ▶ | | 2 | 1 | | | ...colour changing to pale brown/grey. | | MD | | |
| | | | | ASS | | | | SC | **CLAYEY SAND:** fine to coarse grained, pale grey/orange and red, medium plasticity fines. | | | | |
| | | | | | 1 | 2 | | CH | **SANDY CLAY:** medium to high plasticity, pale grey and red, fine to medium grained sand. | | St | × | DIST PP=150kPa |
| | | | | | 0 | 3 | | SC | **CLAYEY SAND:** fine to coarse grained, orange/red and pale grey, medium plasticity fines. | M/W | MD | | |
| | | | | | | | | | Borehole BH51 terminated at 3m | | | | LIMIT OF INVESTIGATION |
| | | | | | -1 | 4 | | | | | | | |
| | | | | | -2 | 5 | | | | | | | |
| | | | | | -3 | 6 | | | | | | | |
| | | | | | -4 | 7 | | | | | | | |
| | | | | | -5 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |
| *bit shown by suffix e.g. | ADT |

**support**

M mud N nil

C casing

**penetration** 1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown

water inflow

water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

**classification symbols and soil description**

based on unified classification system

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 2.6.09

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# Engineering Log - Borehole

Borehole No. **BH52**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **24.4.2009**

Principal:

Date completed: **24.4.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by:

drill model and mounting: EDSON CPI | Easting: 509614.286 | slope: -90° | R.L. Surface: 3.311

hole diameter: 100 mm | Northing 7035158.052 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | | D | 3 | 1 | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, grey, trace of silt. | | L/MD | | |
| | | | | | | | | | ...colour changing to pale grey. | M/W | MD | | |
| | | | | | | | | | ...colour changing to dark brown. | M | VD | | |
| | | | | ASS | 2 | 2 | | SP | **SAND:** fine to medium grained, dark brown, with silt and trace of clay fines. | W | MD | | |
| | | | | | | | | SC | **CLAYEY SAND:** fine to medium grained, grey/brown, low plasticity fines. | M/W | | | |
| | | | | | | | | | ...colour changing to pale grey. | | | | |
| | | | | | 1 | 3 | | CL | **SANDY CLAY:** medium plasticity, pale grey, fine to medium grained sand. | M | St | × | DIST PP=180kPa |
| | | | | | | | | | | | | × | DIST PP=180kPa |
| | | | | | 0 | 4 | | | Borehole BH52 terminated at 3m | | | | LIMIT OF INVESTIGATION |
| | | | | | -1 | 5 | | | | | | | |
| | | | | | -2 | 6 | | | | | | | |
| | | | | | -3 | 7 | | | | | | | |
| | | | | | -4 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |

*bit shown by suffix e.g. ADT

**support**

M mud N nil

C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown

water inflow

water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

**classification symbols and soil description**

based on unified classification system

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 2.6.09

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# Engineering Log - Borehole

Borehole No. **BH53**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **24.4.2009**

Principal:

Date completed: **24.4.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by:

drill model and mounting: EDSON CPI | Easting: 509690.015 | slope: -90° | R.L. Surface: 3.199

hole diameter: 100 mm | Northing 7035199.353 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa (100 200 300 400) | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | | ASS | 3 | | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, grey. | | | | |
| | | | | | | | | | ...colour changing to grey/brown. | | MD | | |
| | | | | | | | | | ...colour changing to dark brown. | D/M | VD | | |
| | | | | | 2 | 1 | | SP | **SAND:** fine to medium grained, dark brown, with silt and trace of clay fines. | W | MD | | |
| | | | | | | | | SC | **CLAYEY SAND:** fine to medium grained, pale grey, medium plasticity fines. | | | | |
| | | | | | 1 | 2 | | CH | **SANDY CLAY:** medium to high plasticity, pale grey, fine to medium grained sand. | M | VSt | × | DIST PP=270kPa |
| | | | | | | | | CH | **SILTY CLAY:** high plasticity, pale grey, trace of sand. | | | × | DIST PP=320kPa |
| | | | | | 0 | 3 | | | Borehole BH53 terminated at 3m | | | | LIMIT OF INVESTIGATION |
| | | | | | -1 | 4 | | | | | | | |
| | | | | | -2 | 5 | | | | | | | |
| | | | | | -3 | 6 | | | | | | | |
| | | | | | -4 | 7 | | | | | | | |
| | | | | | | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |

*bit shown by suffix e.g. ADT

**support**

M mud N nil

C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown

water inflow

water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

**classification symbols and soil description**

based on unified classification system

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 2.6.09

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# Engineering Log - Borehole

Borehole No. **BH54**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **26.4.2009**

Principal:

Date completed: **26.4.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by:

drill model and mounting: EDSON CPI | Easting: 509752.263 | slope: -90° | R.L. Surface: 2.813

hole diameter: 100 mm | Northing 7035247.374 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | | | | | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, grey, with silt present. | | | | |
| | | | ▼ | | 2 | 1 | | SP | **SAND:** fine to medium grained, pale brown and grey, trace of silt and fine grained gravel. | W | D/VD | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, dark brown, trace of silt. | | D | | |
| | | | | ASS | | | | SC | **CLAYEY SAND:** fine to medium grained, pale brown/orange and pale grey, medium plasticity fines. | M | MD | | |
| | | | | | 1 | 2 | | CH | **SANDY CLAY:** medium to high plasticity, pale grey, fine to medium grained sand. | | St/VSt | × | DIST PP=150kPa |
| | | | | | | | | | | | | × | DIST PP=280kPa |
| | | | | | 0 | 3 | | | | | | | |
| | | | | | | | | | Borehole BH54 terminated at 3m | | | | LIMIT OF INVESTIGATION |
| | | | | | -1 | 4 | | | | | | | |
| | | | | | -2 | 5 | | | | | | | |
| | | | | | -3 | 6 | | | | | | | |
| | | | | | -4 | 7 | | | | | | | |
| | | | | | -5 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |

*bit shown by suffix e.g. ADT

**support**

M mud N nil

C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

▼ 10/1/98 water level on date shown

► water inflow

◄ water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

**classification symbols and soil description**

based on unified classification system

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 2.6.09

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# Engineering Log - Borehole

Borehole No. **BH55**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **2.5.2009**

Principal:

Date completed: **2.5.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by: **RFM**

drill model and mounting: EDSON CPI | Easting: 509654.551 | slope: -90° | R.L. Surface: 7.382

hole diameter: 100 mm | Northing 7035759.228 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa (100 200 300 400) | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | | | 7 | 1 | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, dark grey, trace of silt. | | | | |
| | | | SEEPAGE | | 6 | | | SP | **SAND:** fine to medium grained, grey. ...colour changing to pale grey. ...colour changing to grey/brown. | W | MD | | |
| | | | | | | 2 | | SC | **CLAYEY SAND:** fine to medium grained, pale grey. | | | | |
| | | | | | 5 | | | CL | **SANDY CLAY:** medium plasticity, pale grey, fine to coarse grained sand. | M | VSt | × | DIST PP=220kPa |
| | | | | ASS | | 3 | | CH | **SANDY CLAY:** medium to high plasticity, pale grey, fine to medium grained sand. | | | × | DIST PP=250kPa |
| | | | | | 4 | | | | | | | | |
| | | | | | 3 | 4 | | | ...colour changing to pale grey and pale brown/orange. | | | × | DIST PP=350kPa |
| | | | | | | 5 | | | | | | | |
| | | | | | 2 | | | | | | | × | DIST PP=400kPa |
| | | | | | | 6 | | | Borehole BH55 terminated at 6m | | | | LIMIT OF INVESTIGATION |
| | | | | | 1 | | | | | | | | |
| | | | | | | 7 | | | | | | | |
| | | | | | 0 | | | | | | | | |
| | | | | | | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |

*bit shown by suffix e.g. ADT

**support**

M mud N nil

C casing

**penetration** 1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown

water inflow

water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

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

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 25.6.09

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Borehole No. **BH56**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**

# Engineering Log - Borehole

Client: ***BROWN CONSULTING (QLD) PTY LTD***

Date started: ***2.5.2009***

Principal:

Date completed: ***2.5.2009***

Project: ***BELLVISTA 2***

Logged by: ***DF***

Borehole Location: ***REFER TO SITE PLAN***

Checked by: ***RFM***

drill model and mounting: EDSON CPI | Easting: 509713.058 | slope: -90° | R.L. Surface: 6.609

hole diameter: 100 mm | Northing 7035689.589 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | ▶ | ASS | 6 | 1 | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, dark grey, trace of silt. ...colour changing to grey/brown. | M/W | MD | | |
| | | | | | 5 | 2 | | SC | **CLAYEY SAND:** fine to medium grained, grey/brown, low plasticity fines. | W | D | | |
| | | | | | | | | CL | **SANDY CLAY:** medium plasticity, pale grey, fine to coarse grained sand. ...colour changing to pale grey and orange. | M | St/VSt | × | DIST PP=260kPa |
| | | | | | 4 | 3 | | | | | | × | DIST PP=250kPa |
| | | | | | 3 | 4 | | | | | St | | |
| | | | | | 2 | 5 | | | | | | × | DIST PP=150kPa |
| | | | | | | | | SC | **CLAYEY SAND:** fine to coarse grained, pale grey, medium plasticity fines. | W | MD | | |
| | | | | | 1 | 6 | | | | | | | |
| | | | | | 0 | 7 | | | Borehole BH56 terminated at 6m | | | | LIMIT OF INVESTIGATION |
| | | | | | -1 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |

*bit shown by suffix e.g. ADT

**support**

M mud N nil

C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown

water inflow

water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

**classification symbols and soil description**

based on unified classification system

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 25.6.09

Form GEO 5.3 Issue 3 Rev.2

coffey geotechnics

# Engineering Log - Borehole

| | |
|---|---|
| Borehole No. | ***BH57*** |
| Sheet | 1 of 1 |
| Project No: | ***GEOTKPAR01560AA*** |
| Client: | ***BROWN CONSULTING (QLD) PTY LTD*** |
| Date started: | ***9.5.2009*** |
| Principal: | |
| Date completed: | ***9.5.2009*** |
| Project: | ***BELLVISTA 2*** |
| Logged by: | ***DF*** |
| Borehole Location: | ***REFER TO SITE PLAN*** |
| Checked by: | ***RFM*** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| drill model and mounting: | EDSON CPI | Easting: | 509783.534 | slope: | -90° | R.L. Surface: | 5.550 |
| hole diameter: | 100 mm | Northing | 7035588.995 | bearing: | | datum: | GDA94 |

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa (100 200 300 400) | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | ▶ | | 5 | 1 | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace or organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, dark grey, with silt present. ...trace of silt. | W | MD | | |
| | | | | | 4 | 2 | | CL | **CLAY:** medium plasticity, pale grey, fine to medium grained sand. | M | St | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, pale grey, trace of clay. | W | MD | | |
| | | | | | | | | SC | **CLAYEY SAND:** fine to coarse grained, pale grey, low plasticity fines. | | | | |
| | | | | ASS | 3 | 3 | | CH | **SANDY CLAY:** medium to high plasticity, pale grey, fine to medium grained sand. | M | VSt | × | DIST PP=240kPa |
| | | | | | | | | CL | **SANDY CLAY:** medium plasticity, pale grey, fine to medium grained sand. | | St | × | DIST PP=180kPa |
| | | | | | 2 | 4 | | SC | **CLAYEY SAND:** fine to medium grained, pale grey, medium plasticity fines. | W | MD | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, pale grey, trace of clay fines. | | | | |
| | | | | | 1 | 5 | | CH | **SILTY CLAY:** high plasticity, pale grey, with sand present. | M | VSt | × | DIST PP=250kPa |
| | | | | | 0 | 6 | | | | | | × | DIST PP=300kPa |
| | | | | | -1 | 7 | | | Borehole BH57 terminated at 6m | | | | LIMIT OF INVESTIGATION |
| | | | | | -2 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |
| *bit shown by suffix e.g. | ADT |

**support**

M mud N nil
C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

▼ 10/1/98 water level on date shown
▶ water inflow
◀ water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

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

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 25.6.09

Form GEO 5.3 Issue 3 Rev:2

coffey geotechnics

Borehole No. **BH58**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**

# Engineering Log - Borehole

Client: ***BROWN CONSULTING (QLD) PTY LTD***

Date started: ***3.5.2009***

Principal:

Date completed: ***3.5.2009***

Project: ***BELLVISTA 2***

Logged by: ***DF***

Borehole Location: ***REFER TO SITE PLAN***

Checked by: ***RFM***

drill model and mounting: EDSON CPI | Easting: 509775.137 | slope: -90° | R.L. Surface: 4.453

hole diameter: 100 mm | Northing 7035457.666 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | ▶ | | 4 | 1 | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, pale grey/pale brown, trace of silt. | M/W | MD | | |
| | | | | | 3 | 2 | | | ...colour changing to dark grey. | | | | |
| | | | | | | | | | ...colour changing to grey. | | | | |
| | | | | ASS | 2 | 3 | | CH | **SANDY CLAY:** medium to high plasticity, pale grey, fine to medium grained sand. | M | VSt | × | DIST PP=250kPa |
| | | | | | 1 | 4 | | | | | | × | DIST PP=300kPa |
| | | | | | 0 | 5 | | | ...colour changing to pale grey and red. | | | | |
| | | | | | | | | CH | **SANDY CLAY:** high plasticity, pale grey and red, fine to medium grained sand. | | | × | DIST PP=220kPa |
| | | | | | -1 | 6 | | | | | | | |
| | | | | | -2 | 7 | | | Borehole BH58 terminated at 6m | | | | LIMIT OF INVESTIGATION |
| | | | | | -3 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |

*bit shown by suffix e.g. ADT

**support**

M mud N nil

C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown

water inflow

water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

**classification symbols and soil description**

based on unified classification system

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 25.6.09

Form GEO 5.3 Issue 3 Rev.2

coffey geotechnics

Borehole No. **BH59**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**

# Engineering Log - Borehole

Client: ***BROWN CONSULTING (QLD) PTY LTD***

Date started: ***9.5.2009***

Principal:

Date completed: ***9.5.2009***

Project: ***BELLVISTA 2***

Logged by: ***DF***

Borehole Location: ***REFER TO SITE PLAN***

Checked by: ***RFM***

drill model and mounting: EDSON CPI | Easting: 509882.244 | slope: -90° | R.L. Surface: 4.809

hole diameter: 100 mm | Northing 7035545.983 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | ▶ | | 4 | 1 | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, dark grey, with silt present. | M/W | | | |
| | | | | | 3 | 2 | | SP | **SAND:** fine to medium grained, grey.<br>...trace of clay fines. | W | MD | | |
| | | | | | | | | SC | **CLAYEY SAND:** fine to medium grained, pale grey, medium plasticity fines. | M | | | |
| | | | | | 2 | 3 | | CL | **SANDY CLAY:** medium plasticity, pale grey, fine to medium grained sand. | | VSt | × | DIST PP=250kPa |
| | | | | ASS | 1 | 4 | | CH | **SILTY CLAY:** high plasticity, pale grey and red, trace of fine grained sand. | | | × | DIST PP=230kPa |
| | | | | | 0 | 5 | | | | | | × | DIST PP=240kPa |
| | | | | | -1 | 6 | | | Borehole BH59 terminated at 6m | | | | LIMIT OF INVESTIGATION |
| | | | | | -2 | 7 | | | | | | | |
| | | | | | -3 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |

*bit shown by suffix e.g. ADT

**support**

M mud N nil

C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown

water inflow

water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

**classification symbols and soil description**

based on unified classification system

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 25.6.09

Form GEO 5.3 Issue 3 Rev.2

coffey geotechnics

# Engineering Log - Borehole

| | |
|---|---|
| Borehole No. | **BH60** |
| Sheet | 1 of 1 |
| Project No: | **GEOTKPAR01560AA** |
| Client: | **BROWN CONSULTING (QLD) PTY LTD** |
| Date started: | **3.5.2009** |
| Principal: | |
| Date completed: | **3.5.2009** |
| Project: | **BELLVISTA 2** |
| Logged by: | **DF** |
| Borehole Location: | **REFER TO SITE PLAN** |
| Checked by: | **RFM** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| drill model and mounting: | EDSON CPI | Easting: | 509851.435 | slope: | -90° | R.L. Surface: | 2.723 |
| hole diameter: | 100 mm | Northing | 7035356.896 | bearing: | | datum: | GDA94 |

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | | | 2 | 1 | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, dark grey, trace of silt. | M/W | MD | | |
| | | | | | 1 | 2 | | SP | **SAND:** fine to medium grained, grey. ...colour changing to pale brown and grey. | W | D/VD | | |
| | | | | | 0 | 3 | | SP | **SAND:** fine to coarse grained, pale grey, trace of clay. | | D | | |
| | | | | | | | | SC | **CLAYEY SAND:** fine to medium grained, pale grey, medium plasticity fines. | M | | | |
| | | | | ASS | -1 | 4 | | CH | **SANDY CLAY:** medium to high plasticity, pale grey, fine to medium grained sand. | | VSt | × | DIST PP=230kPa |
| | | | | | | | | SC | **CLAYEY SAND:** fine to medium grained, pale grey, low plasticity fines. | W | MD | | |
| | | | | | -2 | 5 | | SP | **SAND:** fine to medium grained, pale grey, trace of clay fines. | | | | |
| | | | | | | | | SC | **CLAYEY SAND:** fine to medium grained, pale grey, medium plasticity fines. | | | | |
| | | | | | -3 | 6 | | CH | **SANDY CLAY:** high plasticity, pale grey, fine to medium grained sand. | M | St | × | DIST PP=150kPa |
| | | | | | -4 | 7 | | | Borehole BH60 terminated at 6m | | | | LIMIT OF INVESTIGATION |
| | | | | | -5 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |
| *bit shown by suffix e.g. | ADT |

**support**

M mud N nil
C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown
water inflow
water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

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

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 25.6.09

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coffey geotechnics

Borehole No. **BH61**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**

# Engineering Log - Borehole

Client: ***BROWN CONSULTING (QLD) PTY LTD***

Date started: ***9.5.2009***

Principal:

Date completed: ***9.5.2009***

Project: ***BELLVISTA 2***

Logged by: ***DF***

Borehole Location: ***REFER TO SITE PLAN***

Checked by: ***RFM***

drill model and mounting: EDSON CPI | Easting: 509949.571 | slope: -90° | R.L. Surface: 2.450

hole diameter: 100 mm | Northing 7035424.983 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | ▶ | | 2 | 1 | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, pale grey. | W | MD | | |
| | | | | | 1 | 2 | | CL | **SANDY CLAY:** medium plasticity, pale grey and pale brown, fine to medium grained sand. | M | VSt | × | DIST PP=150kPa |
| | | | | | 0 | 3 | | CH | **SANDY CLAY:** medium to high plasticity, pale grey and pale brown, fine to medium grained sand. | | | × | DIST PP=240kPa |
| | | | | ASS | -1 | 4 | | | | | | × | DIST PP=250kPa |
| | | | | | -2 | 5 | | CH | **SANDY SILTY CLAY:** high plasticity, pale grey and pale brown, fine to medium grained sand. | | | × | DIST PP=240kPa |
| | | | | | -3 | 6 | | | | | | | |
| | | | | | -4 | 7 | | | Borehole BH61 terminated at 6m | | | | LIMIT OF INVESTIGATION |
| | | | | | -5 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |
| *bit shown by suffix e.g. | ADT |

**support**

M mud N nil

C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown

water inflow

water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

**classification symbols and soil description**

based on unified classification system

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 25.6.09

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coffey geotechnics

Borehole No. **BH62**

Sheet 1 of 1

# Engineering Log - Borehole

Project No: **GEOTKPAR01560AA**

Client: **BROWN CONSULTING (QLD) PTY LTD**

Date started: **9.5.2009**

Principal:

Date completed: **9.5.2009**

Project: **BELLVISTA 2**

Logged by: **DF**

Borehole Location: **REFER TO SITE PLAN**

Checked by: **RFM**

drill model and mounting: EDSON CPI | Easting: 510034.665 | slope: -90° | R.L. Surface: 4.240

hole diameter: 100 mm | Northing 7035474.141 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | | | 4 | 1 | | SM | **SILTY SAND:** fine to medium grained, grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, pale brown/grey, trace of clay. | | MD | | |
| | | | | | | | | SC | **CLAYEY SAND:** fine to medium grained, pale grey and pale brown, medium plasticity fines. | | | | |
| | | | | | 3 | 2 | | CH | **SANDY CLAY:** medium to high plasticity, pale grey and orange/red, fine to medium grained sand. | | VSt | × | DIST PP=250kPa |
| | | | | | 2 | 3 | | | ...high plasticity, colour changing to pale grey. | | | × | DIST PP=260kPa |
| | | | ► | ASS | 1 | | | | | | | | SEEPAGE |
| | | | | | | 4 | | CH | **SILTY CLAY:** high plasticity, pale grey and red. | | | × | DIST PP=240kPa |
| | | | | | 0 | 5 | | | | | | × | DIST PP=230kPa |
| | | | | | -1 | 6 | | | | | | | |
| | | | | | -2 | 7 | | | Borehole BH62 terminated at 6m | | | | LIMIT OF INVESTIGATION |
| | | | | | -3 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |

*bit shown by suffix e.g. ADT

**support**

M mud N nil

C casing

**penetration** 1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown

water inflow

water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

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

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 25.6.09

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# Engineering Log - Borehole

| | |
|---|---|
| Borehole No. | ***BH63*** |
| Sheet | 1 of 1 |
| Project No: | ***GEOTKPAR01560AA*** |
| Client: | ***BROWN CONSULTING (QLD) PTY LTD*** |
| Date started: | ***3.5.2009*** |
| Principal: | |
| Date completed: | ***3.5.2009*** |
| Project: | ***BELLVISTA 2*** |
| Logged by: | ***DF*** |
| Borehole Location: | ***REFER TO SITE PLAN*** |
| Checked by: | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| drill model and mounting: | EDSON CPI | | Easting: | 509835.54 | slope: | -90° | R.L. Surface: 2.260 |
| hole diameter: | 100 mm | | Northing | 7035218.376 | bearing: | | datum: GDA94 |

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | SEEPAGE ▼ | | 2 | | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, pale brown and grey, trace of silt. | M/W | | | |
| | | | | | | | | SP | **SAND:** fine grained, pale brown and grey, with silt present. | M | MD | | |
| | | | | | 1 | 1 | | CH | **SANDY CLAY:** medium to high plasticity, pale brown/orange and pale grey, fine to medium grained sand. | | VSt | × | DIST PP=230kPa |
| | | | | | | 2 | | | ...colour changing to pale grey. | | | × | DIST PP=240kPa |
| | | | | ASS | 0 | | | | | | | | |
| | | | | | | 3 | | | | | | × | DIST PP=240kPa |
| | | | | | -1 | | | | | | | | |
| | | | | | | 4 | | CH | **SANDY CLAY:** high plasticity, pale grey, fine to medium grained sand. | | | × | DIST PP=320kPa |
| | | | | | -2 | | | SC | **CLAYEY SAND:** fine to medium grained, pale grey, low plasticity fines. | M/W | MD | | |
| | | | | | | 5 | | CH | **SANDY CLAY:** medium to high plasticity, pale grey, fine to medium grained sand. | M | VSt | | |
| | | | | | -3 | | | | | | | | |
| | | | | | | 6 | | | | | | | |
| | | | | | -4 | | | | Borehole BH63 terminated at 6m | | | | LIMIT OF INVESTIGATION |
| | | | | | | 7 | | | | | | | |
| | | | | | -5 | | | | | | | | |
| | | | | | | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |
| *bit shown by suffix e.g. | ADT |

**support**

M mud N nil
C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown
water inflow
water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

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

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 2.6.09

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Borehole No. **BH65**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**

# Engineering Log - Borehole

Client: ***BROWN CONSULTING (QLD) PTY LTD***

Date started: ***9.5.2009***

Principal:

Date completed: ***9.5.2009***

Project: ***BELLVISTA 2***

Logged by: ***DF***

Borehole Location: ***REFER TO SITE PLAN***

Checked by: ***RFM***

drill model and mounting: EDSON CPI | Easting: 510109.442 | slope: -90° | R.L. Surface: 2.724

hole diameter: 100 mm | Northing 7035396.648 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | | | 2 | 1 | | SM | **SILTY SAND:** fine grained, dark grey, trace of organics. | M | L / MD | | |
| | | | | | | | | CH | **SILTY CLAY:** high plasticity, grey, trace of sand. | | St | × | DIST PP=130kPa |
| | | | | | 1 | 2 | | CH | **SILTY CLAY:** high plasticity, pale grey. | | VSt | × | DIST PP=250kPa |
| | | | | ASS | 0 | 3 | | | | | | × | DIST PP=260kPa |
| | | | SEEPAGE ▼ | | -1 | 4 | | CH | **SILTY CLAY:** medium to high plasticity, grey, with fine grained sand. | M/W | St | × | DIST PP=120kPa |
| | | | | | | | | CH | **SILTY CLAY:** high plasticity, pale grey and pale brown/orange, trace of sand. | M | VSt | | |
| | | | | | -2 | 5 | | CL | **SILTY CLAY:** medium plasticity, brown and grey, with fine grained sand, trave of gravel. | D/M | VSt/H | | |
| | | | | | -3 | 6 | | | | | | | |
| | | | | | -4 | 7 | | | Borehole BH65 terminated at 6m | | | | LIMIT OF INVESTIGATION |
| | | | | | -5 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |

*bit shown by suffix e.g. ADT

**support**

M mud N nil

C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown

water inflow

water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

**classification symbols and soil description**

based on unified classification system

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 25.6.09

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# Engineering Log - Borehole

| | |
|---|---|
| Borehole No. | ***BH66*** |
| Sheet | 1 of 1 |
| Project No: | ***GEOTKPAR01560AA*** |
| Client: | ***BROWN CONSULTING (QLD) PTY LTD*** |
| Date started: | ***2.5.2009*** |
| Principal: | |
| Date completed: | ***2.5.2009*** |
| Project: | ***BELLVISTA 2*** |
| Logged by: | ***DF*** |
| Borehole Location: | ***REFER TO SITE PLAN*** |
| Checked by: | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| drill model and mounting: | EDSON CPI | | Easting: | 509654.065 | slope: | -90° | R.L. Surface: 6.598 |
| hole diameter: | 100 mm | | Northing | 7035692.587 | bearing: | | datum: GDA94 |

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa (100 200 300 400) | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | SEEPAGE ▼ | | 6 | 1 | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, grey, trace of silt. ...colour changing to pale grey. | W | | | |
| | | | | | 5 | | | CH | **SANDY CLAY:** medium to high plasticity, pale brown/orange and pale grey, fine to medium grained sand. | M | St | × | DIST PP=180kPa |
| | | | | | | 2 | | | | | VSt | × | DIST PP=220kPa |
| | | | | ASS | | | | | ...colour changing to pale grey. | | | | |
| | | | | | 4 | | | SC | **CLAYEY SAND:** fine to coarse grained, pale grey, medium plasticity fines. | | MD | | |
| | | | | | | 3 | | CH | **SANDY CLAY:** high plasticity, pale grey, fine to medium grained sand. | | VSt | × | DIST PP=240kPa |
| | | | | | 3 | | | SC | **CLAYEY SAND:** fine to coarse grained, pale grey, medium plasticity fines. | | D | | |
| | | | | | | 4 | | | Borehole BH66 terminated at 4m | | | | LIMIT OF INVESTIGATION |
| | | | | | 2 | | | | | | | | |
| | | | | | | 5 | | | | | | | |
| | | | | | 1 | | | | | | | | |
| | | | | | | 6 | | | | | | | |
| | | | | | 0 | | | | | | | | |
| | | | | | | 7 | | | | | | | |
| | | | | | -1 | | | | | | | | |
| | | | | | | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |
| *bit shown by suffix e.g. | ADT |

**support**

M mud N nil
C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown
water inflow
water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

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

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 2.6.09

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# Engineering Log - Borehole

| | |
|---|---|
| Borehole No. | ***BH67*** |
| Sheet | 1 of 1 |
| Project No: | ***GEOTKPAR01560AA*** |
| Client: | ***BROWN CONSULTING (QLD) PTY LTD*** |
| Date started: | ***2.5.2009*** |
| Principal: | |
| Date completed: | ***2.5.2009*** |
| Project: | ***BELLVISTA 2*** |
| Logged by: | ***DF*** |
| Borehole Location: | ***REFER TO SITE PLAN*** |
| Checked by: | ***RFM*** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| drill model and mounting: | EDSON CPI | Easting: | 509813.874 | slope: | -90° | R.L. Surface: | 4.803 |
| hole diameter: | 100 mm | Northing | 7035541.308 | bearing: | | datum: | GDA94 |

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | ▶ | | 4 | 1 | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, grey, trace of silt. | W | MD | | |
| | | | | | 3 | 2 | | | ...colour changing to dark brown. | | | | |
| | | | | ASS | | | | SC | **CLAYEY SAND:** fine to medium grained, grey, low plasticity fines. | | | | |
| | | | | | 2 | 3 | | | ...colour changing to pale grey and brown. | | | | |
| | | | | | | | | CH | **SANDY CLAY:** medium to high plasticity, pale grey, fine to medium grained sand. | M | VSt | × | DIST PP=250kPa |
| | | | | | | | | | | | | × | DIST PP=300kPa |
| | | | | | 1 | 4 | | | ...colour changing to pale grey. | | | × | DIST PP=220kPa |
| | | | | | | | | | Borehole BH67 terminated at 4m | | | | LIMIT OF INVESTIGATION |
| | | | | | 0 | 5 | | | | | | | |
| | | | | | -1 | 6 | | | | | | | |
| | | | | | -2 | 7 | | | | | | | |
| | | | | | -3 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |
| *bit shown by suffix e.g. | ADT |

**support**

M mud N nil
C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown
water inflow
water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

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

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 25.6.09

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# Engineering Log - Borehole

| | |
|---|---|
| Borehole No. | ***BH68*** |
| Sheet | 1 of 1 |
| Project No: | ***GEOTKPAR01560AA*** |
| Client: | ***BROWN CONSULTING (QLD) PTY LTD*** |
| Date started: | ***3.5.2009*** |
| Principal: | |
| Date completed: | ***3.5.2009*** |
| Project: | ***BELLVISTA 2*** |
| Logged by: | ***DF*** |
| Borehole Location: | ***REFER TO SITE PLAN*** |
| Checked by: | ***RFM*** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| drill model and mounting: | EDSON CPI | | Easting: | 509859.722 | slope: | -90° | R.L. Surface: 3.418 |
| hole diameter: | 100 mm | | Northing | 7035129.363 | bearing: | | datum: GDA94 |

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | ▶ | | 3 | 1 | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, dark grey, trace of silt. | W | MD | | |
| | | | | | | | | | ...colour changing to dark brown. | | | | |
| | | | | | 2 | 2 | | | ...colour changing to grey. | | | | |
| | | | | | | | | | ...colour changing to pale grey. | | | | |
| | | | | ASS | | | | SC | **CLAYEY SAND:** fine to medium grained, pale grey, medium plasticity fines. | | | | |
| | | | | | 1 | 3 | | CL | **SANDY CLAY:** medium plasticity, pale grey, fine to medium grained sand. | M | VSt | × | DIST PP=300kPa |
| | | | | | | | | CH | **SANDY CLAY:** medium to high plasticity, pale grey and orange, fine to medium grained sand. | | | × | DIST PP=300kPa |
| | | | | | 0 | 4 | | | | | | × | DIST PP=240kPa |
| | | | | | -1 | 5 | | | Borehole BH68 terminated at 4m | | | | LIMIT OF INVESTIGATION |
| | | | | | -2 | 6 | | | | | | | |
| | | | | | -3 | 7 | | | | | | | |
| | | | | | -4 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |
| *bit shown by suffix e.g. | ADT |

**support**: M mud, C casing, N nil

**penetration**: 1 2 3 4 — no resistance ranging to refusal

**water**: 10/1/98 water level on date shown; water inflow; water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

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

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 25.6.09

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# Engineering Log - Borehole

| | |
|---|---|
| Borehole No. | **BH69** |
| Sheet | 1 of 1 |
| Project No: | **GEOTKPAR01560AA** |
| Client: | **BROWN CONSULTING (QLD) PTY LTD** |
| Date started: | **2.5.2009** |
| Principal: | |
| Date completed: | **2.5.2006** |
| Project: | **BELLVISTA 2** |
| Logged by: | **DF** |
| Borehole Location: | **REFER TO SITE PLAN** |
| Checked by: | **RFM** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| drill model and mounting: | EDSON CPI | Easting: | 509962.416 | slope: | -90° | R.L. Surface: | 4.084 |
| hole diameter: | 100 mm | Northing | 7035492.924 | bearing: | | datum: | GDA94 |

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | ▶ | | | | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, dark grey, trace of silt. | | | | |
| | | | | | | | | | ...colour changing to grey. | W | MD | | |
| | | | | | 3 | 1 | | | ...colour changing to pale grey and brown. | | | | |
| | | | | | | | | | ...colour changing to brown. | | | | |
| | | | | | | | | | ...colour changing to pale grey. | | | | |
| | | | | ASS | 2 | 2 | | SC | **CLAYEY SAND:** fine to medium grained, pale grey, low plasticity fines. | | | | |
| | | | | | | | | CL | **SANDY CLAY:** medium plasticity, pale grey, fine to medium grained sand. | M | St | | |
| | | | | | 1 | 3 | | CH | **SANDY CLAY:** high plasticity, pale grey, fine to medium grained sand. | | St/VSt | × | DIST PP=250kPa |
| | | | | | | | | | | | | × | DIST PP=240kPa |
| | | | | | 0 | 4 | | | Borehole BH69 terminated at 4m | | | | LIMIT OF INVESTIGATION |
| | | | | | -1 | 5 | | | | | | | |
| | | | | | -2 | 6 | | | | | | | |
| | | | | | -3 | 7 | | | | | | | |
| | | | | | | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |
| *bit shown by suffix e.g. | ADT |

**support**: M mud, C casing, N nil

**penetration**: 1 2 3 4 — no resistance ranging to refusal

**water**: 10/1/98 water level on date shown; water inflow; water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

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

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 25.6.09

Form GEO 5.3 Issue 3 Rev.2

coffey geotechnics

# Engineering Log - Borehole

| | |
|---|---|
| Borehole No. | ***BH70*** |
| Sheet | 1 of 1 |
| Project No: | ***GEOTKPAR01560AA*** |
| Client: | ***BROWN CONSULTING (QLD) PTY LTD*** |
| Date started: | ***3.5.2009*** |
| Principal: | |
| Date completed: | ***3.5.2009*** |
| Project: | ***BELLVISTA 2*** |
| Logged by: | ***DF*** |
| Borehole Location: | ***REFER TO SITE PLAN*** |
| Checked by: | ***RFM*** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| drill model and mounting: | EDSON CPI | | Easting: | 509940.133 | slope: | -90° | R.L. Surface: 2.097 |
| hole diameter: | 100 mm | | Northing | 7035363.761 | bearing: | | datum: GDA94 |

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa (100 200 300 400) | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | | | 2 | | | SM | **SILTY SAND:** fine to medium grained, dark grey, with clay fines and trace of organics. | M | L | | |
| | | | | | | 1 | | SP | **SAND:** fine to medium grained, pale grey, trace of silt. | | MD | | |
| | | | | | 1 | | | SC | **CLAYEY SAND:** fine to medium grained, pale grey, medium plasticity fines. | | | | |
| | | | | | | | | CH | **SANDY CLAY:** medium to high plasticity, pale grey, fine to medium grained sand. | | St | × | DIST PP=150kPa |
| | | | | ASS | 0 | 2 | | | | | | | |
| | | | | | | | | | | | VSt | × | DIST PP=240kPa |
| | | | | | -1 | 3 | | | | | | | |
| | | | | | | | | CL | **SANDY CLAY:** medium plasticity, pale grey, fine to coarse grained sand. | | | × | DIST PP=240kPa |
| | | | | | | 4 | | | | | | | |
| | | | | | -2 | | | | Borehole BH70 terminated at 4m | | | | LIMIT OF INVESTIGATION |
| | | | | | | 5 | | | | | | | |
| | | | | | -3 | | | | | | | | |
| | | | | | | 6 | | | | | | | |
| | | | | | -4 | | | | | | | | |
| | | | | | | 7 | | | | | | | |
| | | | | | -5 | | | | | | | | |
| | | | | | | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |
| *bit shown by suffix | |
| e.g. | ADT |

**support**

M mud N nil
C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown

water inflow

water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

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

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 25.6.09

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Borehole No. **BH71**

# Engineering Log - Borehole

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**

Client: ***BROWN CONSULTING (QLD) PTY LTD***

Date started: ***3.5.2009***

Principal:

Date completed: ***3.5.2009***

Project: ***BELLVISTA 2***

Logged by: ***DF***

Borehole Location: ***REFER TO SITE PLAN***

Checked by:

drill model and mounting: EDSON CPI | Easting: 509908.723 | slope: -90° | R.L. Surface: 1.802

hole diameter: 100 mm | Northing 7035246.336 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | SEEPAGE ▼ | | 1 | 1 | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, pale grey, trace of silt. ... colour changing to pale grey and orange. | M/W M | MD | | |
| | | | | | 0 | 2 | | SC | **CLAYEY SAND:** fine to coarse grained, pale grey and orange, medium plasticity fines. | | | | |
| | | | | ASS | -1 | 3 | | CH | **SANDY CLAY:** medium to high plasticity, orange/red and pale grey, fine to coarse grained sand. ... colour changing to pale grey. | | VSt | × | DIST PP=250kPa |
| | | | | | -2 | 4 | | | | | | × | DIST PP=260kPa |
| | | | | | | | | CL | **SANDY CLAY:** medium plasticity, pale grey, fine to coarse grained sand, with trace of gravel. | | | × | DIST PP=250kPa |
| | | | | | -3 | 5 | | | Borehole BH71 terminated at 4m | | | | LIMIT OF INVESTIGATION |
| | | | | | -4 | 6 | | | | | | | |
| | | | | | -5 | 7 | | | | | | | |
| | | | | | -6 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |
| *bit shown by suffix e.g. | ADT |

**support**

M mud N nil

C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown

water inflow

water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

**classification symbols and soil description**

based on unified classification system

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 2.6.09

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coffey geotechnics

Borehole No. **BH73**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**

# Engineering Log - Borehole

Client: ***BROWN CONSULTING (QLD) PTY LTD***

Date started: ***1.5.2009***

Principal:

Date completed: ***1.5.2009***

Project: ***BELLVISTA 2***

Logged by: ***DF***

Borehole Location: ***REFER TO SITE PLAN***

Checked by:

drill model and mounting: EDSON CPI | Easting: 509720.84 | slope: -90° | R.L. Surface: 5.491

hole diameter: 100 mm | Northing 7035580.136 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | ▶ | ASS | 5 | 1 | | SM | **SILTY SAND:** fine to medium grained, dark grey, with clay fines and trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, dark grey, trace of silt. | | | | |
| | | | | | 4 | | | | ... colour changing to grey/brown. | W | MD | | |
| | | | | | | | | | ... colour changing to brown. | | | | |
| | | | | | | | | | ... colour changing to grey. | | | | |
| | | | | | | 2 | | SC | **CLAYEY SAND:** fine to medium grained, pale grey, medium plasticity fines. | M | | | |
| | | | | | 3 | | | CH | **SANDY CLAY:** medium to high plasticity, pale grey, fine to medium grained sand. | | St/VSt | | |
| | | | | | | 3 | | | Borehole BH73 terminated at 3m | | | | LIMIT OF INVESTIGATION |
| | | | | | 2 | | | | | | | | |
| | | | | | | 4 | | | | | | | |
| | | | | | 1 | | | | | | | | |
| | | | | | | 5 | | | | | | | |
| | | | | | 0 | | | | | | | | |
| | | | | | | 6 | | | | | | | |
| | | | | | -1 | | | | | | | | |
| | | | | | | 7 | | | | | | | |
| | | | | | -2 | | | | | | | | |
| | | | | | | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |

*bit shown by suffix e.g. ADT

**support**

M mud N nil

C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown

water inflow

water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

**classification symbols and soil description**

based on unified classification system

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 2.6.09

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Borehole No. **BH74**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**

# Engineering Log - Borehole

Client: ***BROWN CONSULTING (QLD) PTY LTD***

Date started: ***2.5.2009***

Principal:

Date completed: ***2.5.2009***

Project: ***BELLVISTA 2***

Logged by: ***DF***

Borehole Location: ***REFER TO SITE PLAN***

Checked by: ***RFM***

drill model and mounting: EDSON CPI | Easting: 509799.426 | slope: -90° | R.L. Surface: 6.436

hole diameter: 100 mm | Northing 7035659.35 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa (100 200 300 400) | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AST | | N | | | 6 | | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, grey/brown, trace of silt. | | | | |
| | | | | | | 1 | | SP | **SAND:** fine to medium grained, brown, with clay fines. | M/W | MD | | |
| | | | ► | | | | | CL | **SANDY CLAY:** medium plasticity, pale brown/orange and grey, fine to medium grained sand. | M | St | × | DIST PP=140kPa |
| | | | | ASS | 5 | | | | ... colour changing to pale grey and red. | | | | |
| | | | | | | 2 | | | | | | × | DIST PP=220kPa |
| | | | | | 4 | | | | ... colour changing to pale grey and orange. ... colour changing to pale grey. | | | | |
| | | | | | | | | | | | | × | DIST PP=240kPa |
| | | | | | | 3 | | | Borehole BH74 terminated at 3m | | | | LIMIT OF INVESTIGATION |
| | | | | | 3 | | | | | | | | |
| | | | | | | 4 | | | | | | | |
| | | | | | 2 | | | | | | | | |
| | | | | | | 5 | | | | | | | |
| | | | | | 1 | | | | | | | | |
| | | | | | | 6 | | | | | | | |
| | | | | | 0 | | | | | | | | |
| | | | | | | 7 | | | | | | | |
| | | | | | -1 | | | | | | | | |
| | | | | | | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |
| *bit shown by suffix e.g. | ADT |

**support**

M mud N nil

C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown

water inflow

water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

**classification symbols and soil description**

based on unified classification system

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 25.6.09

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# Engineering Log - Borehole

| | |
|---|---|
| Borehole No. | ***BH75*** |
| Sheet | 1 of 1 |
| Project No: | ***GEOTKPAR01560AA*** |
| Client: | ***BROWN CONSULTING (QLD) PTY LTD*** |
| Date started: | ***2.5.2009*** |
| Principal: | |
| Date completed: | ***2.5.2009*** |
| Project: | ***BELLVISTA 2*** |
| Logged by: | ***DF*** |
| Borehole Location: | ***REFER TO SITE PLAN*** |
| Checked by: | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| drill model and mounting: | EDSON CPI | Easting: | 509880.604 | slope: | -90° | R.L. Surface: | 6.059 |
| hole diameter: | 100 mm | Northing | 7035604.597 | bearing: | | datum: | GDA94 |

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa (100 200 300 400) | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | NONE OBSERVED | ASS | 5 | 1 | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, grey, trace of silt. | | | | |
| | | | | | | | | SC | **CLAYEY SAND:** fine to medium grained, pale brown/orange and pale grey, low plasticity fines. | | MD | | |
| | | | | | | | | CL | **SANDY CLAY:** medium plasticity, pale brown/orange and grey, fine to medium grained sand. | | St | | |
| | | | | | | | | CH | **SANDY CLAY:** medium to high plasticity, orange/red and pale grey, fine to medium grained sand. ... colour changing to pale grey. | | VSt | × | DIST PP=180kPa |
| | | | | | 4 | 2 | | | | | | × | DIST PP=240kPa |
| | | | | | | | | | | | | × | DIST PP=230kPa |
| | | | | | | 3 | | | | | | × | DIST PP=400kPa |
| | | | | | -1 | 4 | | | Borehole BH75 terminated at 3m | | | | LIMIT OF INVESTIGATION |
| | | | | | | 5 | | | | | | | |
| | | | | | | 6 | | | | | | | |
| | | | | | | 7 | | | | | | | |
| | | | | | | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |
| *bit shown by suffix e.g. | ADT |

**support**: M mud, C casing, N nil

**penetration**: 1 2 3 4 — no resistance ranging to refusal

**water**: 10/1/98 water level on date shown; water inflow; water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

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

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 2.6.09

Form GEO 5.3 Issue 3 Rev.2

coffey geotechnics

# Engineering Log - Borehole

| | |
|---|---|
| Borehole No. | **BH76** |
| Sheet | 1 of 1 |
| Project No: | **GEOTKPAR01560AA** |
| Client: | **BROWN CONSULTING (QLD) PTY LTD** |
| Date started: | **3.5.2009** |
| Principal: | |
| Date completed: | **3.5.2009** |
| Project: | **BELLVISTA 2** |
| Logged by: | **DF** |
| Borehole Location: | **REFER TO SITE PLAN** |
| Checked by: | **RFM** |

drill model and mounting: EDSON CPI | Easting: 509762.953 | slope: -90° | R.L. Surface: 3.472

hole diameter: 100 mm | Northing 7035392.797 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa (100 200 300 400) | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | | | 3 | 1 | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, dark grey, trace of silt. ... colour changing to dark brown. | W | MD | | |
| | | | | ASS | 2 | 2 | | SP | **SAND:** fine to medium grained, pale grey and pale brown, trace of silt and clay fines. | W | D/VD | | |
| | | | | | | | | SC | **CLAYEY SAND:** fine to coarse grained, pale grey and pale brown, medium plasticity fines. | M | MD | | |
| | | | | | 1 | 3 | | CH | **SANDY CLAY:** medium to high plasticity, pale grey and pale brown/orange, fine to medium grained sand. | | St/VSt | × | DIST PP=150kPa |
| | | | | | | | | | | | | × | DIST PP=260kPa |
| | | | | | 0 | 4 | | | Borehole BH76 terminated at 3m | | | | LIMIT OF INVESTIGATION |
| | | | | | -1 | 5 | | | | | | | |
| | | | | | -2 | 6 | | | | | | | |
| | | | | | -3 | 7 | | | | | | | |
| | | | | | -4 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |
| *bit shown by suffix | |
| e.g. | ADT |

**support**: M mud, C casing, N nil

**penetration**: 1 2 3 4 — no resistance ranging to refusal

**water**: 10/1/98 water level on date shown; water inflow; water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

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

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 25.6.09

Form GEO 5.3 Issue 3 Rev.2

coffey geotechnics

# Engineering Log - Borehole

| | |
|---|---|
| Borehole No. | ***BH77*** |
| Sheet | 1 of 1 |
| Project No: | ***GEOTKPAR01560AA*** |
| Client: | ***BROWN CONSULTING (QLD) PTY LTD*** |
| Date started: | ***2.5.2009*** |
| Principal: | |
| Date completed: | ***2.5.2009*** |
| Project: | ***BELLVISTA 2*** |
| Logged by: | ***DF*** |
| Borehole Location: | ***REFER TO SITE PLAN*** |
| Checked by: | |

drill model and mounting: EDSON CPI | Easting: 509895.411 | slope: -90° | R.L. Surface: 3.877

hole diameter: 100 mm | Northing 7035488.733 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | ▶ | ASS | 3 | 1 | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, dark grey, trace of silt. ... colour changing to grey. | W | | | |
| | | | | | | | | SC | **CLAYEY SAND:** fine to medium grained, pale brown and pale grey, low plasticity fines. ... colour changing to pale grey. | | MD | | |
| | | | | | 2 | 2 | | CH | **SANDY CLAY:** fine to medium grained, pale grey, fine to medium grained sand. | M | St/VSt | × | DIST PP=150kPa |
| | | | | | | | | | ... colour changing to pale grey and orange. | | | × | DIST PP=190kPa |
| | | | | | 1 | 3 | | | | | | × | DIST PP=210kPa |
| | | | | | | | | | Borehole BH77 terminated at 3m | | | | LIMIT OF INVESTIGATION |
| | | | | | 0 | 4 | | | | | | | |
| | | | | | -1 | 5 | | | | | | | |
| | | | | | -2 | 6 | | | | | | | |
| | | | | | -3 | 7 | | | | | | | |
| | | | | | -4 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |
| *bit shown by suffix e.g. | ADT |

**support**

M mud N nil
C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown
water inflow
water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

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

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 2.6.09

Form GEO 5.3 Issue 3 Rev.2

coffey geotechnics

# Engineering Log - Borehole

| | |
|---|---|
| Borehole No. | **BH78** |
| Sheet | 1 of 1 |
| Project No: | **GEOTKPAR01560AA** |
| Client: | **BROWN CONSULTING (QLD) PTY LTD** |
| Date started: | **3.5.2009** |
| Principal: | |
| Date completed: | **3.5.2009** |
| Project: | **BELLVISTA 2** |
| Logged by: | **DF** |
| Borehole Location: | **REFER TO SITE PLAN** |
| Checked by: | **RFM** |

drill model and mounting: EDSON CPI | Easting: 509845.621 | slope: -90° | R.L. Surface: 2.473

hole diameter: 100 mm | Northing 7035299.267 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetro-meter kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | | | 2 | 1 | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, dark grey, trace of silt. | | | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, pale grey. | W | MD | | |
| | | | | | | | | SC | **CLAYEY SAND:** fine to medium grained, pale grey and pale brown/orange, low plasticity fines. | M | | | |
| | | | | ASS | 1 | 2 | | CL | **SANDY CLAY:** medium plasticity, pale grey and pale brown, fine to medium grained sand. | | St | x | DIST PP=140kPa |
| | | | | | 0 | 3 | | CH | **SANDY CLAY:** medium to high plasticity, pale grey, fine to medium grained sand. | | VSt | x | DIST PP=280kPa |
| | | | | | | | | SC | **CLAYEY SAND:** fine to coarse grained, pale grey, medium plasticity fines. | | MD | | |
| | | | | | -1 | 4 | | | Borehole BH78 terminated at 3m | | | | LIMIT OF INVESTIGATION |
| | | | | | -2 | 5 | | | | | | | |
| | | | | | -3 | 6 | | | | | | | |
| | | | | | -4 | 7 | | | | | | | |
| | | | | | -5 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |
| *bit shown by suffix | |
| e.g. | ADT |

**support**

M mud N nil

C casing

**penetration**

1 2 3 4 — no resistance ranging to refusal

**water**

10/1/98 water level on date shown

water inflow

water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

**classification symbols and soil description**

based on unified classification system

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 1.7.09

Form GEO 5.3 Issue 3 Rev.2

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Borehole No. **BH79**

Sheet 1 of 1

Project No: **GEOTKPAR01560AA**

# Engineering Log - Borehole

Client: ***BROWN CONSULTING (QLD) PTY LTD***

Date started: ***2.5.2009***

Principal:

Date completed: ***2.5.2009***

Project: ***BELLVISTA 2***

Logged by: ***DF***

Borehole Location: ***REFER TO SITE PLAN***

Checked by:

drill model and mounting: EDSON CPI | Easting: 510025.243 | slope: -90° | R.L. Surface: 2.208

hole diameter: 100 mm | Northing 7035406.406 | bearing: | datum: GDA94

**drilling information** | **material substance**

| method | penetration 1 2 3 | support | water | notes samples, tests, etc | RL | depth metres | graphic log | classification symbol | material: soil type: plasticity or particle characteristics, colour, secondary and minor components. | moisture condition | consistency/ density index | pocket penetrometer kPa 100 200 300 400 | structure and additional observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADT | | N | | | 2 | | | SM | **SILTY SAND:** fine to medium grained, dark grey, trace of organics. | M | L | | |
| | | | | | | | | SP | **SAND:** fine to medium grained, grey, trace of silt. | | | | |
| | | | | | 1 | 1 | | CH | **SANDY CLAY:** high plasticity, pale brown/orange and pale grey, fine to medium grained sand. | | St | × | DIST PP=130kPa |
| | | | | ASS | | | | | | | | | |
| | | | ▶ | | 0 | 2 | | SC | **CLAYEY SAND:** fine to medium grained, pale grey, low plasticity fines. | | MD | | |
| | | | | | | | | | ... colour changing to pale grey and orange. | M/W | | | |
| | | | | | | 3 | | CH | **SANDY CLAY:** high plasticity, pale grey and orange, fine to medium grained sand. | M | VSt | × | DIST PP=220kPa |
| | | | | | -1 | 4 | | | Borehole BH79 terminated at 3m | | | | LIMIT OF INVESTIGATION |
| | | | | | -2 | 5 | | | | | | | |
| | | | | | -3 | 6 | | | | | | | |
| | | | | | -4 | 7 | | | | | | | |
| | | | | | -5 | 8 | | | | | | | |

**method**

| | |
|---|---|
| AS | auger screwing* |
| AD | auger drilling* |
| RR | roller/tricone |
| W | washbore |
| CT | cable tool |
| HA | hand auger |
| DT | diatube |
| B | blank bit |
| V | V bit |
| T | TC bit |

*bit shown by suffix e.g. ADT

**support**: M mud, C casing, N nil

**penetration**: 1 2 3 4 — no resistance ranging to refusal

**water**: 10/1/98 water level on date shown; water inflow; water outflow

**notes, samples, tests**

| | |
|---|---|
| $U_{50}$ | undisturbed sample 50mm diameter |
| $U_{63}$ | undisturbed sample 63mm diameter |
| D | disturbed sample |
| N | standard penetration test (SPT) |
| N* | SPT - sample recovered |
| Nc | SPT with solid cone |
| V | vane shear (kPa) |
| P | pressuremeter |
| Bs | bulk sample |
| E | environmental sample |
| R | refusal |

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

**moisture**

| | |
|---|---|
| D | dry |
| M | moist |
| W | wet |
| Wp | plastic limit |
| $W_L$ | liquid limit |

**consistency/density index**

| | |
|---|---|
| VS | very soft |
| S | soft |
| F | firm |
| St | stiff |
| VSt | very stiff |
| H | hard |
| Fb | friable |
| VL | very loose |
| L | loose |
| MD | medium dense |
| D | dense |
| VD | very dense |

PROJECT FILE: GK01560AA.GPJ. LIBRARY FILE: COFGEOTECHVER7REV1.GLB. TEMPLATE FILE: COFFEY.GDT FRAME TITLE: BOREHOLE. DATE: 2.6.09

Form GEO 5.3 Issue 3 Rev.2

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# **Soil Description** Explanation Sheet (1 of 2)

### DEFINITION:

In engineering terms soil includes every type of uncemented or partially cemented inorganic or organic material found in the ground. In practice, if the material can be remoulded or disintegrated by hand in its field condition or in water it is described as a soil. Other materials are described using rock description terms.

### CLASSIFICATION SYMBOL & SOIL NAME

Soils are described in accordance with the Unified Soil Classification (UCS) as shown in the table on Sheet 2.

### PARTICLE SIZE DESCRIPTIVE TERMS

| NAME | SUBDIVISION | SIZE |
|---|---|---|
| Boulders | | >200 mm |
| Cobbles | | 63 mm to 200 mm |
| Gravel | coarse | 20 mm to 63 mm |
| | medium | 6 mm to 20 mm |
| | fine | 2.36 mm to 6 mm |
| Sand | coarse | 600 μm to 2.36 mm |
| | medium | 200 μm to 600 μm |
| | fine | 75 μm to 200 μm |

### MOISTURE CONDITION

**Dry** Looks and feels dry. Cohesive and cemented soils are hard, friable or powdery. Uncemented granular soils run freely through hands.

**Moist** Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.

**Wet** As for moist but with free water forming on hands when handled.

### CONSISTENCY OF COHESIVE SOILS

| TERM | UNDRAINED STRENGTH $s_u$ (kPa) | FIELD GUIDE |
|---|---|---|
| Very Soft | <12 | A finger can be pushed well into the soil with little effort. |
| Soft | 12 - 25 | A finger can be pushed into the soil to about 25mm depth. |
| Firm | 25 - 50 | The soil can be indented about 5mm with the thumb, but not penetrated. |
| Stiff | 50 - 100 | The surface of the soil can be indented with the thumb, but not penetrated. |
| Very Stiff | 100 - 200 | The surface of the soil can be marked, but not indented with thumb pressure. |
| Hard | >200 | The surface of the soil can be marked only with the thumbnail. |
| Friable | – | Crumbles or powders when scraped by thumbnail. |

### DENSITY OF GRANULAR SOILS

| TERM | DENSITY INDEX (%) |
|---|---|
| Very loose | Less than 15 |
| Loose | 15 - 35 |
| Medium Dense | 35 - 65 |
| Dense | 65 - 85 |
| Very Dense | Greater than 85 |

### MINOR COMPONENTS

| TERM | ASSESSMENT GUIDE | PROPORTION OF MINOR COMPONENT IN: |
|---|---|---|
| Trace of | Presence just detectable by feel or eye, but soil properties little or no different to general properties of primary component. | Coarse grained soils: <5%<br>Fine grained soils: <15% |
| With some | Presence easily detected by feel or eye, soil properties little different to general properties of primary component. | Coarse grained soils: 5 - 12%<br>Fine grained soils: 15 - 30% |

### SOIL STRUCTURE

| ZONING | | CEMENTING | |
|---|---|---|---|
| Layers | Continuous across exposure or sample. | Weakly cemented | Easily broken up by hand in air or water. |
| Lenses | Discontinuous layers of lenticular shape. | Moderately cemented | Effort is required to break up the soil by hand in air or water. |
| Pockets | Irregular inclusions of different material. | | |

### GEOLOGICAL ORIGIN

#### WEATHERED IN PLACE SOILS

Extremely weathered material — Structure and fabric of parent rock visible.

Residual soil — Structure and fabric of parent rock not visible.

#### TRANSPORTED SOILS

Aeolian soil — Deposited by wind.

Alluvial soil — Deposited by streams and rivers.

Colluvial soil — Deposited on slopes (transported downslope by gravity).

Fill — Man made deposit. Fill may be significantly more variable between tested locations than naturally occurring soils.

Lacustrine soil — Deposited by lakes.

Marine soil — Deposited in ocean basins, bays, beaches and estuaries.

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# **Soil Description** Explanation Sheet (2 of 2)

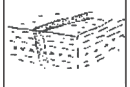
## SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION

| FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60 mm and basing fractions on estimated mass) | | | | | | | USC | PRIMARY NAME |
|---|---|---|---|---|---|---|---|---|
| COARSE GRAIINED SOILS More than 50% of materials less than 63 mm is larger than 0.075 mm | (A 0.075 mm particle is about the smallest particle visible to the naked eye) | GRAVELS More than half of coarse fraction is larger than 2.0 mm | CLEAN GRAVELS (Little or no fines) | Wide range in grain size and substantial amounts of all intermediate particle sizes. | | | GW | GRAVEL |
| | | | | Predominantly one size or a range of sizes with more intermediate sizes missing. | | | GP | GRAVEL |
| | | | GRAVELS WITH FINES (Appreciable amount of fines) | Non-plastic fines (for identification procedures see ML below) | | | GM | SILTY GRAVEL |
| | | | | Plastic fines (for identification procedures see CL below) | | | GC | CLAYEY GRAVEL |
| | | SANDS More than half of coarse fraction is smaller than 2.0 mm | CLEAN SANDS (Little or no fines) | Wide range in grain sizes and substantial amounts of all intermediate sizes | | | SW | SAND |
| | | | | Predominantly one size or a range of sizes with some intermediate sizes missing. | | | SP | SAND |
| | | | SANDS WITH FINES (Appreciable amount of fines) | Non-plastic fines (for identification procedures see ML below). | | | SM | SILTY SAND |
| | | | | Plastic fines (for identification procedures see CL below). | | | SC | CLAYEY SAND |
| FINE GRAINED SOILS More than 50% of material less than 63 mm is smaller than 0.075 mm | | | IDENTIFICATION PROCEDURES ON FRACTIONS <0.2 mm. | | | | | |
| | | SILTS & CLAYS Liquid limit less than 50 | **DRY STRENGTH** | **DILATANCY** | **TOUGHNESS** | | | |
| | | | None to Low | Quick to slow | None | | ML | SILT |
| | | | Medium to High | None | Medium | | CL | CLAY |
| | | | Low to medium | Slow to very slow | Low | | OL | ORGANIC SILT |
| | | SILTS & CLAYS Liquid limit greater than 50 | Low to medium | Slow to very slow | Low to medium | | MH | SILT |
| | | | High | None | High | | CH | CLAY |
| | | | Medium to High | None | Low to medium | | OH | ORGANIC CLAY |
| HIGHLY ORGANIC SOILS | | | Readily identified by colour, odour, spongy feel and frequently by fibrous texture. | | | | Pt | PEAT |

• Low plasticity – Liquid Limit $W_L$ less than 35%. • Medium plasticity – $W_L$ between 35% and 50%.

## COMMON DEFECTS IN SOIL

| TERM | DEFINITION | DIAGRAM |
|---|---|---|
| PARTING | A surface or crack across which the soil has little or no tensile strength. Parallel or sub parallel to layering (eg bedding). May be open or closed. |  |
| JOINT | A surface or crack across which the soil has little or no tensile strength but which is not parallel or sub parallel to layering. May be open or closed. The term 'fissure' may be used for irregular joints <0.2 m in length. |  |
| SHEARED ZONE | Zone in clayey soil with roughly parallel near planar, curved or undulating boundaries containing closely spaced, smooth or slickensided, curved intersecting joints which divide the mass into lenticular or wedge shaped blocks. |  |
| SHEARED SURFACE | A near planar curved or undulating, smooth, polished or slickensided surface in clayey soil. The polished or slickensided surface indicates that movement (in many cases very little) has occurred along the defect. |  |

| TERM | DEFINITION | DIAGRAM |
|---|---|---|
| SOFTENED ZONE | A zone in clayey soil, usually adjacent to a defect in which the soil has a higher moisture content than elsewhere. |  |
| TUBE | Tubular cavity. May occur singly or as one of a large number of separate or inter-connected tubes. Walls often coated with clay or strengthened by denser packing of grains. May contain organic matter |  |
| TUBE CAST | Roughly cylindrical elongated body of soil different from the soil mass in which it occurs. In some cases the soil which makes up the tube cast is cemented. |  |
| INFILLED SEAM | Sheet or wall like body of soil substance or mass with roughly planar to irregular near parallel boundaries which cuts through a soil mass. Formed by infilling of open joints. |  |

# Appendix D

## Laboratory Test Certificates

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

1/36 Kerryl Street, Kunda Park, QLD,4556
Ph: (07) 5445 4952 Fax: (07) 5445 3764

# determination of emerson class number

client : ***Brown Consulting (Qld) Pty Ltd***
job no : ***GEOTKPAR01560AA***

principal :
laboratory : ***KUNDA PARK***

project : ***Bellvista 2***
date : ***May 18, 2009***

location : ***Area 3***
test report no. : ***GEOTKPAR01560AA***

test procedure : ***AS 1289.3.8.1*** date sampled: ***12/05/09*** material source: ***BH2***

sample number:

sample identification: ***Sandy Clay, dark grey/grey. Depth: 0.6m to 0.8m***

## test data

### air dried crumbs

time start of test:

time dispersion commences:

time dispersion completed:

### remoulded material

time start of test:

time dispersion commences:

time dispersion completed:

### material description

type of water used:

water temperature: ° ***C***

## immersion of air dried crumbs

- does not slake ☒
- slakes ☐
  - swell ☐ (7)
  - does not swell ☒ (8)
  - complete dispersion ☐ (1)
  - partial dispersion ☐ (2)
  - no dispersion ☐

## immersion of remoulded material

- disperses ☐ (3)
- does not disperse ☐
  - calcite or gypsum
    - present ☐ (4)
    - absent ☐
      - vigorous shaking
        - disperses ☐ (5)
        - flocculates ☐ (6)

**Emerson class number** ***8***

Form Number L4.8R1 Version 6.1

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

1/36 Kerryl Street, Kunda Park, QLD,4556
Ph: (07) 5445 4952 Fax: (07) 5445 3764

# determination of emerson class number

client : ***Brown Consulting (Qld) Pty Ltd***
job no : ***GEOTKPAR01560AA***
principal :
laboratory : ***KUNDA PARK***
project : ***Bellvista 2***
date : ***May 18, 2009***
location : ***Area 3***
test report no. : ***GEOTKPAR01560AA***

test procedure : ***AS 1289.3.8.1*** date sampled: ***12/05/09*** material source: ***BH4***
sample number:
sample identification: ***Sandy Silty Clay, grey, with traces of fine grained gravel. Depth: 5.5m***

## test data

### air dried crumbs

time start of test:

time dispersion commences:

time dispersion completed:

### remoulded material

time start of test:

time dispersion commences:

time dispersion completed:

### material description

type of water used:

water temperature: ° ***C***

## immersion of air dried crumbs

- does not slake ☐
- slakes ☒
  - swell ☐ (7)
  - does not swell ☐ (8)
  - complete dispersion ☐ (1)
  - partial dispersion ☐ (2)
  - no dispersion ☒

## immersion of remoulded material

- disperses ☐ (3)
- does not disperse ☒
  - calcite or gypsum
    - present ☐ (4)
    - absent ☒
      - vigorous shaking
        - disperses ☒ (5)
        - flocculates ☐ (6)

**Emerson class number** ***5***

Form Number L4.8R1 Version 6.1

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

1/36 Kerryl Street, Kunda Park, QLD,4556
Ph: (07) 5445 4952 Fax: (07) 5445 3764

# determination of emerson class number

client : ***Brown Consulting (Qld) Pty Ltd***
job no : ***GEOTKPAR01560AA***
principal :
laboratory : ***KUNDA PARK***
project : ***Bellvista 2***
date : ***May 18, 2009***
location : ***Area 3***
test report no. : ***GEOTKPAR01560AA***

test procedure : ***AS 1289.3.8.1*** date sampled: ***12/05/09*** material source: ***Topsoil BH8***
sample number:
sample identification: ***Silty sand, Dark Grey, with organics fines (root fragments) Depth: 0.0m to 0.25m***

## test data

### air dried crumbs

time start of test: ***11.15***
time dispersion commences: ***11.16***
time dispersion completed:

### remoulded material

time start of test:
time dispersion commences:
time dispersion completed:

### material description

type of water used: ***distilled***
water temperature: ° ***C***

## immersion of air dried crumbs

- does not slake ☐
- slakes ☒
  - swell ☐ (7)
  - does not swell ☐ (8)
  - complete dispersion ☐ (1)
  - partial dispersion ☐ (2)
  - no dispersion ☒

## immersion of remoulded material

- disperses ☐ (3)
- does not disperse ☒
  - calcite or gypsum
    - present ☐ (4)
    - absent ☒
      - vigorous shaking
        - disperses ☒ (5)
        - flocculates ☐ (6)

**Emerson class number** ***5***

Form Number L4.8R1 Version 6.1

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

1/36 Kerryl Street, Kunda Park, QLD,4556
Ph: (07) 5445 4952 Fax: (07) 5445 3764

# determination of emerson class number

client : ***Brown Consulting (Qld) Pty Ltd***
job no : ***GEOTKPAR01560AA***
principal :
laboratory : ***KUNDA PARK***
project : ***Bellvista 2***
date : ***May 18, 2009***
location : ***Area 3***
test report no. : ***GEOTKPAR01560AA***

test procedure : ***AS 1289.3.8.1*** date sampled: ***12/05/09*** material source: ***Subsoil BH24***
sample number:
sample identification: ***Silty Clay, Pale Grey, with some fine to medium grained sand. Depth: 1.5m to 2.0m***

## test data

### air dried crumbs

time start of test:

time dispersion commences:

time dispersion completed:

### remoulded material

time start of test:

time dispersion commences:

time dispersion completed:

### material description

type of water used:

water temperature: ° ***C***

## immersion of air dried crumbs

- does not slake ☐
- slakes ☒
  - swell ☐ (7)
  - does not swell ☐ (8)
  - complete dispersion ☐ (1)
  - partial dispersion ☐ (2)
  - no dispersion ☒

## immersion of remoulded material

- disperses ☐ (3)
- does not disperse ☒
  - calcite or gypsum
    - present ☐ (4)
    - absent ☒
      - vigorous shaking
        - disperses ☒ (5)
        - flocculates ☐ (6)

**Emerson class number** ***5***

Form Number L4.8R1 Version 6.1

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

1/36 Kerryl Street, Kunda Park, QLD,4556
Ph: (07) 5445 4952 Fax: (07) 5445 3764

# determination of emerson class number

client : ***Brown Consulting (Qld) Pty Ltd***
job no : ***GEOTKPAR01560AA***
principal :
laboratory : ***KUNDA PARK***
project : ***Bellvista 2***
date : ***May 18, 2009***
location : ***Area 3***
test report no. : ***GEOTKPAR01560AA***

test procedure : ***AS 1289.3.8.1*** date sampled: ***12/05/09*** material source: ***BH31***
sample number:
sample identification: ***Silty Clay. pale grey. Depth: 1.2m to 1.5m***

## test data

### air dried crumbs

time start of test:

time dispersion commences:

time dispersion completed:

### remoulded material

time start of test:

time dispersion commences:

time dispersion completed:

### material description

type of water used:

water temperature: ° ***C***

## immersion of air dried crumbs

- does not slake ☐
- slakes ☒
  - swell ☐ (7)
  - does not swell ☐ (8)
  - complete dispersion ☐ (1)
  - partial dispersion ☐ (2)
  - no dispersion ☒

## immersion of remoulded material

- disperses ☐ (3)
- does not disperse ☒
  - calcite or gypsum
    - present ☐ (4)
    - absent ☒
      - vigorous shaking
        - disperses ☒ (5)
        - flocculates ☐ (6)

**Emerson class number** ***5***

Form Number L4.8R1 Version 6.1

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

1/36 Kerryl Street, Kunda Park, QLD,4556
Ph: (07) 5445 4952 Fax: (07) 5445 3764

# determination of emerson class number

client : ***Brown Consulting (Qld) Pty Ltd***
job no : ***GEOTKPAR01560AA***

principal :
laboratory : ***KUNDA PARK***

project : ***Bellvista 2***
date : ***May 18, 2009***

location : ***Area 3***
test report no. : ***GEOTKPAR01560AA***

test procedure : ***AS 1289.3.8.1*** date sampled: ***12/08/09*** material source: ***BH36***

sample number:

sample identification: ***Depth: 1.2m to 1.5m***

## test data

### air dried crumbs

time start of test:

time dispersion commences:

time dispersion completed:

### remoulded material

time start of test:

time dispersion commences:

time dispersion completed:

### material description

type of water used:

water temperature: ° ***C***

## immersion of air dried crumbs

- does not slake ☐
- slakes ☒
  - swell ☐ (7)
  - does not swell ☐ (8)
  - complete dispersion ☐ (1)
  - partial dispersion ☐ (2)
  - no dispersion ☒

## immersion of remoulded material

- disperses ☐ (3)
- does not disperse ☒
  - calcite or gypsum
    - present ☐ (4)
    - absent ☒
      - vigorous shaking
        - disperses ☒ (5)
        - flocculates ☐ (6)

**Emerson class number** ***5***

Form Number L4.8R1 Version 6.1

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

1/36 Kerryl Street, Kunda Park, QLD,4556
Ph: (07) 5445 4952 Fax: (07) 5445 3764

# determination of emerson class number

client : ***Brown Consulting (Qld) Pty Ltd***
job no : ***GEOTKPAR01560AA***
principal :
laboratory : ***KUNDA PARK***
project : ***Bellvista 2***
date : ***May 18, 2009***
location : ***Area 3***
test report no. : ***GEOTKPAR01560AA***

test procedure : ***AS 1289.3.8.1*** date sampled: ***12/05/09*** material source: ***BH49***
sample number:
sample identification: ***Sandy Clay, pale grey. Depth: 1.2m to 1.5m***

## test data

### air dried crumbs

time start of test:

time dispersion commences:

time dispersion completed:

### remoulded material

time start of test:

time dispersion commences:

time dispersion completed:

### material description

type of water used:

water temperature: ° ***C***

## immersion of air dried crumbs

- does not slake ☐
- slakes ☒
  - swell ☐ (7)
  - does not swell ☐ (8)
  - complete dispersion ☐ (1)
  - partial dispersion ☐ (2)
  - no dispersion ☒

## immersion of remoulded material

- disperses ☐ (3)
- does not disperse ☒
  - calcite or gypsum
    - present ☐ (4)
    - absent ☒
      - vigorous shaking
        - disperses ☐ (5)
        - flocculates ☒ (6)

**Emerson class number** ***5***

Form Number L4.8R1 Version 6.1

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

1/36 Kerryl Street, Kunda Park, QLD,4556
Ph: (07) 5445 4952 Fax: (07) 5445 3764

# determination of emerson class number

client : ***Brown Consulting (Qld) Pty Ltd***
job no : ***GEOTKPAR01560AA***
principal :
laboratory : ***KUNDA PARK***
project : ***Bellvista 2***
date : ***May 18, 2009***
location : ***Area 3***
test report no. : ***GEOTKPAR01560AA***

test procedure : ***AS 1289.3.8.1*** date sampled: ***12/05/09*** material source: ***BH52***
sample number:
sample identification: ***Silty Sand, dark grey/grey. Depth: 0.2m to 0.5m***

## test data

### air dried crumbs

time start of test: ***11.30***

time dispersion commences:

time dispersion completed:

### remoulded material

time start of test:

time dispersion commences:

time dispersion completed:

### material description

type of water used: ***distilled***

water temperature: ° ***C***

## immersion of air dried crumbs

- does not slake ☒
- slakes ☐
  - swell ☐ (7)
  - does not swell ☒ (8)
  - complete dispersion ☐ (1)
  - partial dispersion ☐ (2)
  - no dispersion ☐

## immersion of remoulded material

- disperses ☐ (3)
- does not disperse ☐
  - calcite or gypsum
    - present ☐ (4)
    - absent ☐
      - vigorous shaking
        - disperses ☐ (5)
        - flocculates ☐ (6)

**Emerson class number** ***8***

Form Number L4.8R1 Version 6.1

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

1/36 Kerryl Street, Kunda Park, QLD,4556
Ph: (07) 5445 4952 Fax: (07) 5445 3764

# determination of emerson class number

client : ***Brown Consulting (Qld) Pty Ltd***
job no : ***GEOTKPAR01560AA***
principal :
laboratory : ***KUNDA PARK***
project : ***Bellvista 2***
date : ***20/05/09***
location : ***Area 4***
test report no. : ***GEOTKPAR01560AA***

test procedure : ***AS 1289.3.8.1***
date sampled:
material source: ***Topsoil BH56***
sample number:
sample identification: ***Depth 0.25m***

## test data

### air dried crumbs

time start of test:

time dispersion commences:

time dispersion completed:

### remoulded material

time start of test:

time dispersion commences:

time dispersion completed:

### material description

type of water used: ***distilled***

water temperature: ***20.5*** ° ***C***

## immersion of air dried crumbs

- does not slake ☐
- slakes ☒
  - swell ☐ (7)
  - does not swell ☐ (8)
  - complete dispersion ☐ (1)
  - partial dispersion ☐ (2)
  - no dispersion ☒

## immersion of remoulded material

- disperses ☐ (3)
- does not disperse ☒
  - calcite or gypsum
    - present ☒ (4)
    - absent ☐
      - vigorous shaking
        - disperses ☐ (5)
        - flocculates ☐ (6)

**Emerson class number** ***4***

Form Number L4.8R1 Version 6.1

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

1/36 Kerryl Street, Kunda Park, QLD,4556
Ph: (07) 5445 4952 Fax: (07) 5445 3764

# determination of emerson class number

client : ***Brown Consulting (Qld) Pty Ltd***
job no : ***GEOTKPAR01560AA***
principal :
laboratory : ***KUNDA PARK***
project : ***Bellvista 2***
date : ***20/05/09***
location : ***Area 4***
test report no. : ***GEOTKPAR01560AA***

test procedure : ***AS 1289.3.8.1***
date sampled:
material source: ***Subsoil BH56***
sample number:
sample identification: ***Depth 2.5m***

## test data

### air dried crumbs

time start of test:

time dispersion commences:

time dispersion completed:

### remoulded material

time start of test:

time dispersion commences:

time dispersion completed:

### material description

type of water used: ***distilled***

water temperature: ***20.5*** ° ***C***

## immersion of air dried crumbs

- does not slake ☐
- slakes ☒
  - swell ☐ (7)
  - does not swell ☐ (8)
  - complete dispersion ☐ (1)
  - partial dispersion ☐ (2)
  - no dispersion ☒

## immersion of remoulded material

- disperses ☐ (3)
- does not disperse ☒
  - calcite or gypsum
    - present ☒ (4)
    - absent ☐
      - vigorous shaking
        - disperses ☐ (5)
        - flocculates ☐ (6)

**Emerson class number** ***4***

Form Number L4.8R1 Version 6.1

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

1/36 Kerryl Street, Kunda Park, QLD,4556
Ph: (07) 5445 4952 Fax: (07) 5445 3764

# determination of emerson class number

client : ***Brown Consulting (Qld) Pty Ltd***
job no : ***GEOTKPAR01560AA***
principal :
laboratory : ***KUNDA PARK***
project : ***Bellvista 2***
date : ***20/05/09***
location : ***Area 4***
test report no. : ***GEOTKPAR01560AA***

test procedure : ***AS 1289.3.8.1***
date sampled:
material source: ***Topsoil BH78***
sample number:
sample identification:

## test data

### air dried crumbs

time start of test:

time dispersion commences:

time dispersion completed:

### remoulded material

time start of test:

time dispersion commences:

time dispersion completed:

### material description

type of water used: ***distilled***

water temperature: ***20.5*** ° ***C***

## immersion of air dried crumbs

- does not slake ☐
- slakes ☒
  - swell ☐ (7)
  - does not swell ☐ (8)
  - complete dispersion ☐ (1)
  - partial dispersion ☐ (2)
  - no dispersion ☒

## immersion of remoulded material

- disperses ☒ (3)
- does not disperse ☐
  - calcite or gypsum
    - present ☐ (4)
    - absent ☐
      - vigorous shaking
        - disperses ☐ (5)
        - flocculates ☐ (6)

**Emerson class number** ***3***

Form Number L4.8R1 Version 6.1

coffey geotechnics
SPECIALISTS MANAGING THE EARTH

1/36 Kerryl Street, Kunda Park, QLD,4556
Ph: (07) 5445 4952 Fax: (07) 5445 3764

# determination of emerson class number

client : ***Brown Consulting (Qld) Pty Ltd***
job no : ***GEOTKPAR01560AA***
principal :
laboratory : ***KUNDA PARK***
project : ***Bellvista 2***
date : ***20/05/09***
location : ***Area 4***
test report no. : ***GEOTKPAR01560AA***

test procedure : ***AS 1289.3.8.1***
date sampled:
material source: ***Subsoil BH78***
sample number:
sample identification: ***Depth 2.5m***

## test data

### air dried crumbs

time start of test:

time dispersion commences:

time dispersion completed:

### remoulded material

time start of test:

time dispersion commences:

time dispersion completed:

### material description

type of water used: ***distilled***

water temperature: ***20.5*** ° ***C***

## immersion of air dried crumbs

- does not slake ☒
- slakes ☐
  - swell ☐ (7)
  - does not swell ☒ (8)
  - complete dispersion ☐ (1)
  - partial dispersion ☐ (2)
  - no dispersion ☐

## immersion of remoulded material

- disperses ☐ (3)
- does not disperse ☐
  - calcite or gypsum
    - present ☐ (4)
    - absent ☐
      - vigorous shaking
        - disperses ☐ (5)
        - flocculates ☐ (6)

**Emerson class number** ***8***

Form Number L4.8R1 Version 6.1

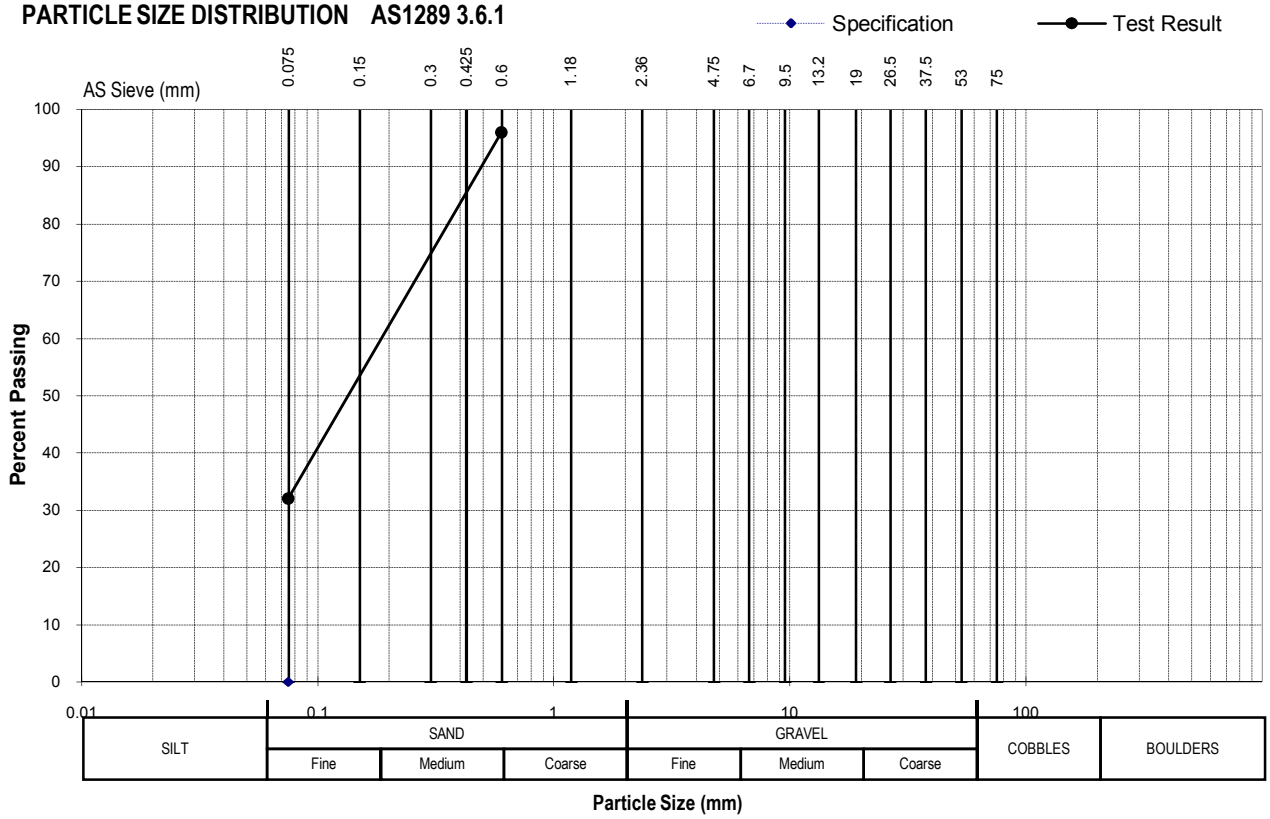
coffey geotechnics
SPECIALISTS MANAGING THE EARTH

Correspondence: PO Box 5537, Maroochydore Qld 4558 Fax (07) 5445 3764
1/36 KERRYL STREET, KUNDA PARK QLD 4556 (07) 5445 4952

| | | | | | |
|---|---|---|---|---|---|
| Client: | BROWN CONSULTING (QLD) PTY LTD | Job No: | GEOTKPAR01560AA | Laboratory: | Kunda Park |
| Principal: | | Test Date: | 12-May-2009 | Sampled by: | LC |
| Project: | BELLVISTA 2 | Date Sampled: | | Report No: | |
| Location: | REFER PLAN | Test No.: | BH52 0.2 - 0.5M | Page: | 1 of 4 |
| Sample ID: | | Material Description | | | |

# MATERIAL CLASSIFICATION REPORT

## PARTICLE SIZE DISTRIBUTION AS1289 3.6.1




| Sieve Size mm | % Passing | Specification Upper | Specification Lower |
|---|---|---|---|
| 75 | | | |
| 53 | | | |
| 37.5 | | | |
| 26.5 | | | |
| 19 | | | |
| 13.2 | | | |
| 9.5 | | | |
| 6.7 | | | |
| 4.75 | | | |
| 2.36 | | | |
| 1.18 | | | |
| 600µm | 96 | | |
| 425µm | | | |
| 300µm | | | |
| 150µm | | | |
| 75µm | 32 | | |

**ATTERBERG LIMITS**

| | | | Procedures |
|---|---|---|---|
| Liquid Limit | % | | A |
| Plastic Limit | % | | B |
| Plasticity Index | % | | C |
| Linear Shrinkage | % | | |
| Mould Length | mm | | |
| Crumbling &/or Curling | | | |
| Sample History | | Oven Dried ☐ | Air Dried ☐ |
| Sample Preparation | | Dry Sieved ☐ | Wet Sieved ☐ |

(A) AS 1289.3.1.1 Liquid Limit – Standard Method
(B) AS 1289.3.2.1 Plastic Limit – Standard Limit
(C) AS 1289.3.3.1 Plasticity Index – Standard Method
(D) AS 1289.C4.1 Linear Shrinkage – Standard Method
(NO) Not obtainable

**EMERSON CLASS NUMBER - AS 1289 3.8.1**

Emerson Class No.

Water Type: Water Temperature:

**REMARKS:**

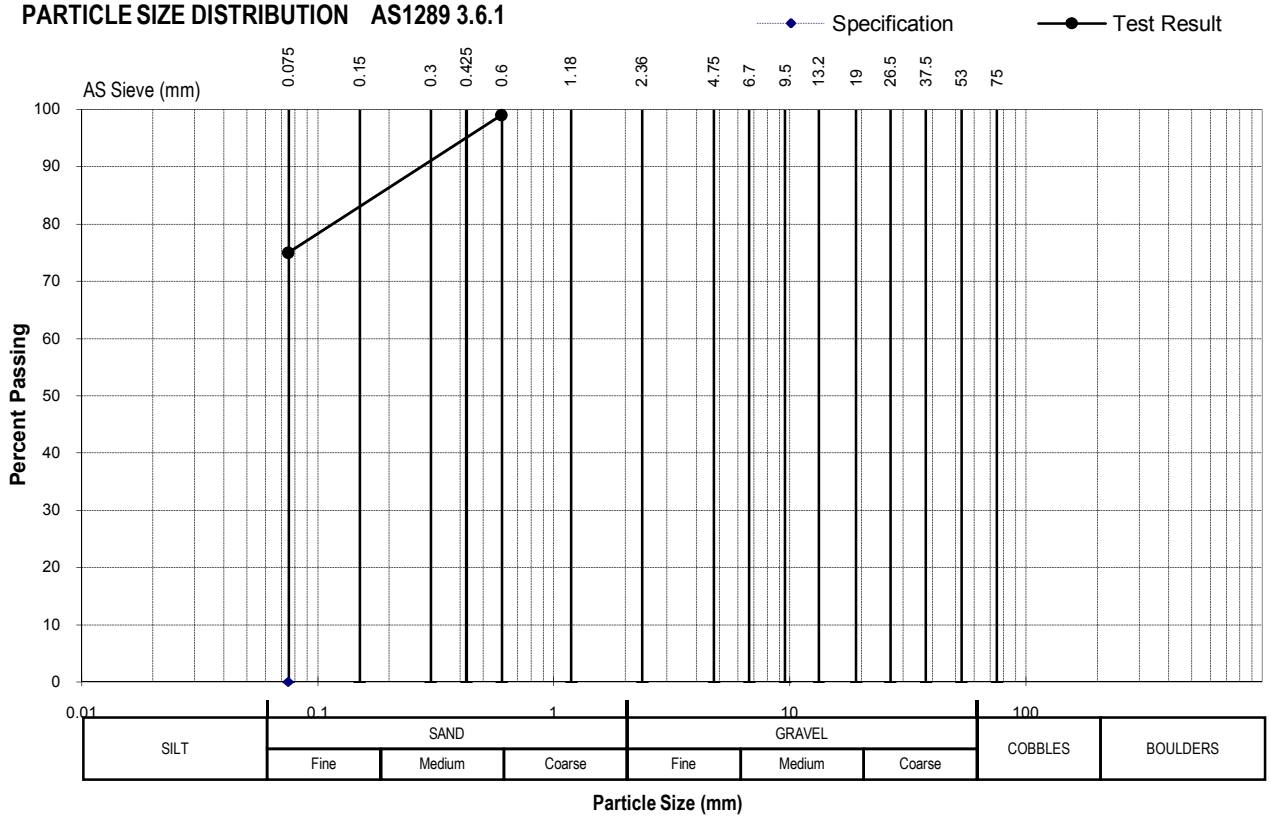
coffey geotechnics
SPECIALISTS MANAGING THE EARTH

Correspondence: PO Box 5537, Maroochydore Qld 4558 Fax (07) 5445 3764
1/36 KERRYL STREET, KUNDA PARK QLD 4556 (07) 5445 4952

| | | | | | |
|---|---|---|---|---|---|
| Client: | BROWN CONSULTING (QLD) PTY LTD | Job No: | GEOTKPAR01560AA | Laboratory: | Kunda Park |
| Principal: | | Test Date: | 12-May-2009 | Sampled by: | LC |
| Project: | BELLVISTA 2 | Date Sampled: | | Report No: | |
| Location: | REFER PLAN | Test No.: | BH31 1.2 - 1.5M | | 2 of 4 |
| Sample ID: | | Material Description | | | |

# MATERIAL CLASSIFICATION REPORT

## PARTICLE SIZE DISTRIBUTION AS1289 3.6.1




| Sieve Size mm | % Passing | Specification Upper | Specification Lower |
|---|---|---|---|
| 75 | | | |
| 53 | | | |
| 37.5 | | | |
| 26.5 | | | |
| 19 | | | |
| 13.2 | | | |
| 9.5 | | | |
| 6.7 | | | |
| 4.75 | | | |
| 2.36 | | | |
| 1.18 | | | |
| 600µm | 99 | | |
| 425µm | | | |
| 300µm | | | |
| 150µm | | | |
| 75µm | 75 | | |

**ATTERBERG LIMITS**

| | | | Procedures |
|---|---|---|---|
| Liquid Limit | % | | A |
| Plastic Limit | % | | B |
| Plasticity Index | % | | C |
| Linear Shrinkage | % | | |
| Mould Length | mm | | |
| Crumbling &/or Curling | | | |
| Sample History | | Oven Dried ☐ | Air Dried ☐ |
| Sample Preparation | | Dry Sieved ☐ | Wet Sieved ☐ |

(A) AS 1289.3.1.1 Liquid Limit – Standard Method
(B) AS 1289.3.2.1 Plastic Limit – Standard Limit
(C) AS 1289.3.3.1 Plasticity Index – Standard Method
(D) AS 1289.C4.1 Linear Shrinkage – Standard Method
(NO) Not obtainable

**EMERSON CLASS NUMBER - AS 1289 3.8.1**

Emerson Class No.

Water Type: Water Temperature:

**REMARKS:**

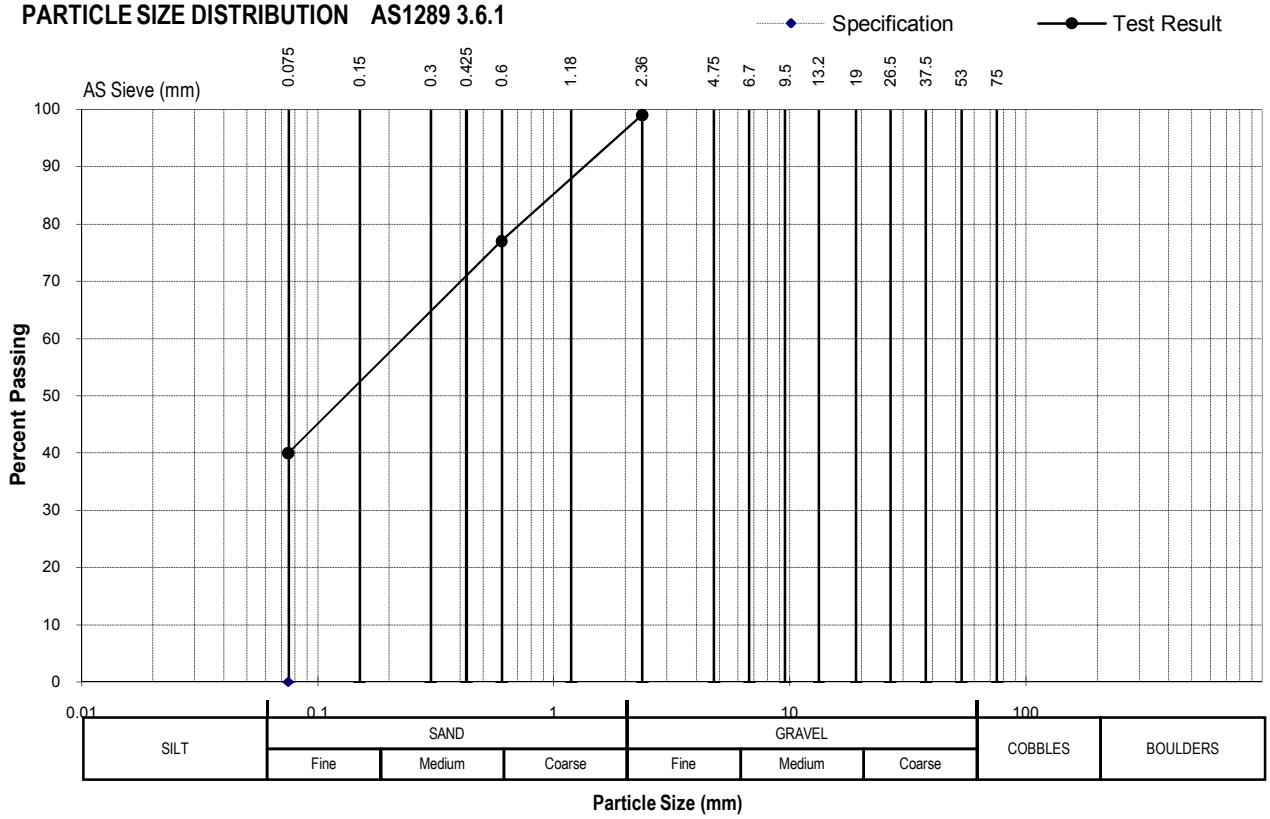
coffey geotechnics
SPECIALISTS MANAGING THE EARTH

Correspondence: PO Box 5537, Maroochydore Qld 4558 Fax (07) 5445 3764
1/36 KERRYL STREET, KUNDA PARK QLD 4556 (07) 5445 4952

| | | | | | |
|---|---|---|---|---|---|
| Client: | BROWN CONSULTING (QLD) PTY LTD | Job No: | GEOTKPAR01560AA | Laboratory: | Kunda Park |
| Principal: | | Test Date: | 12-May-2009 | Sampled by: | LC |
| Project: | BELLVISTA 2 | Date Sampled: | | Report No: | |
| Location: | REFER PLAN | Test No.: | BH24 1.5 - 2.0M | 3 of 4 | |
| Sample ID: | | Material Description | | | |

# MATERIAL CLASSIFICATION REPORT

## PARTICLE SIZE DISTRIBUTION AS1289 3.6.1




| Sieve Size mm | % Passing | Specification Upper | Specification Lower |
|---|---|---|---|
| 75 | | | |
| 53 | | | |
| 37.5 | | | |
| 26.5 | | | |
| 19 | | | |
| 13.2 | | | |
| 9.5 | | | |
| 6.7 | | | |
| 4.75 | | | |
| 2.36 | 99 | | |
| 1.18 | | | |
| 600µm | 77 | | |
| 425µm | | | |
| 300µm | | | |
| 150µm | | | |
| 75µm | 40 | | |

**ATTERBERG LIMITS**

| | | | Procedures |
|---|---|---|---|
| Liquid Limit | % | | A |
| Plastic Limit | % | | B |
| Plasticity Index | % | | C |
| Linear Shrinkage | % | | |
| Mould Length | mm | | |
| Crumbling &/or Curling | | | |
| Sample History | | Oven Dried ☐ | Air Dried ☐ |
| Sample Preparation | | Dry Sieved ☐ | Wet Sieved ☐ |

(A) AS 1289.3.1.1 Liquid Limit – Standard Method
(B) AS 1289.3.2.1 Plastic Limit – Standard Limit
(C) AS 1289.3.3.1 Plasticity Index – Standard Method
(D) AS 1289.C4.1 Linear Shrinkage – Standard Method
(NO) Not obtainable

**EMERSON CLASS NUMBER - AS 1289 3.8.1**

Emerson Class No.

Water Type: Water Temperature:

**REMARKS:**

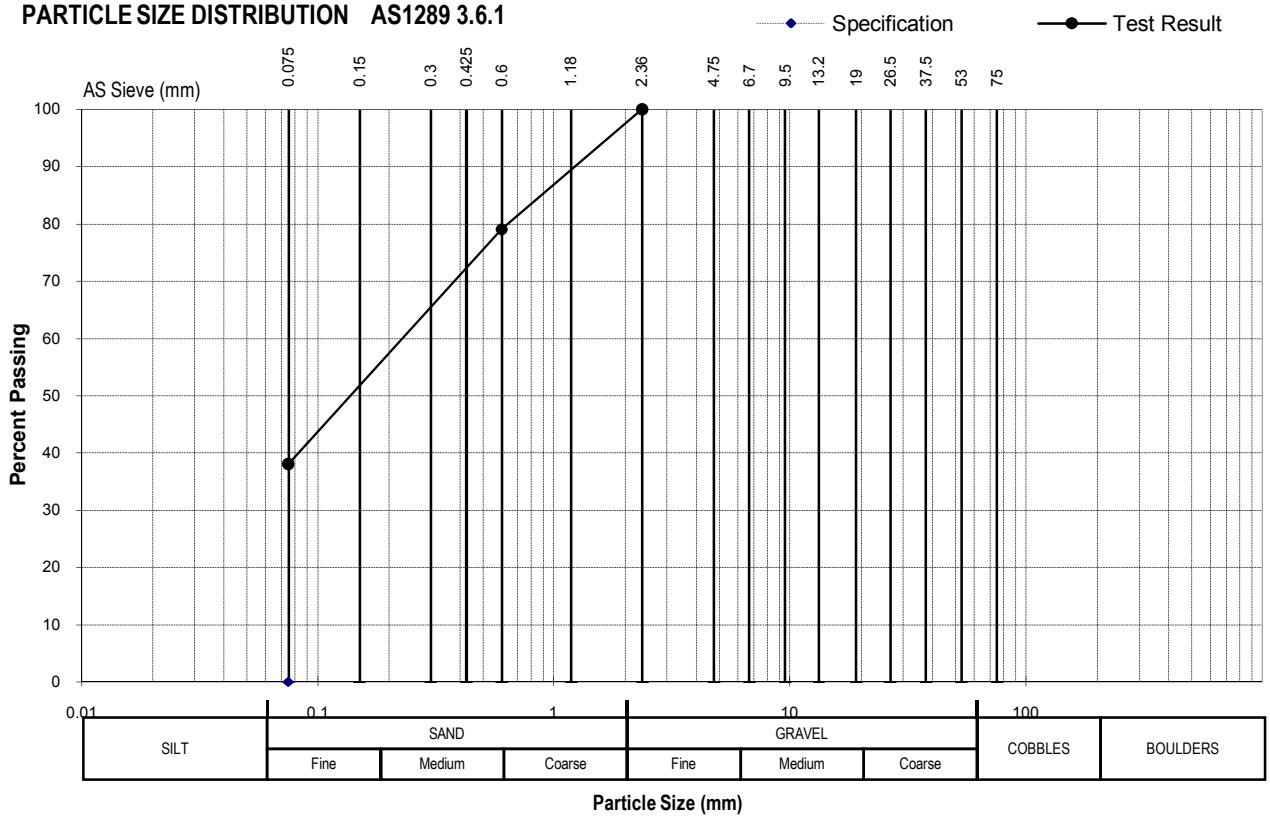
coffey geotechnics
SPECIALISTS MANAGING THE EARTH

Correspondence: PO Box 5537, Maroochydore Qld 4558 Fax (07) 5445 3764
1/36 KERRYL STREET, KUNDA PARK QLD 4556 (07) 5445 4952

| | | | | | |
|---|---|---|---|---|---|
| Client: | BROWN CONSULTING (QLD) PTY LTD | Job No: | GEOTKPAR01560AA | Laboratory: | Kunda Park |
| Principal: | | Test Date: | 12-May-2009 | Sampled by: | LC |
| Project: | BELLVISTA 2 | Date Sampled: | | Report No: | |
| Location: | REFER PLAN | Test No.: | BH36 1.2 - 1.5M | 4 of 4 | |
| Sample ID: | | Material Description | | | |

# MATERIAL CLASSIFICATION REPORT

## PARTICLE SIZE DISTRIBUTION AS1289 3.6.1




| Sieve Size mm | % Passing | Specification Upper | Specification Lower |
|---|---|---|---|
| 75 | | | |
| 53 | | | |
| 37.5 | | | |
| 26.5 | | | |
| 19 | | | |
| 13.2 | | | |
| 9.5 | | | |
| 6.7 | | | |
| 4.75 | | | |
| 2.36 | 100 | | |
| 1.18 | | | |
| 600µm | 79 | | |
| 425µm | | | |
| 300µm | | | |
| 150µm | | | |
| 75µm | 38 | | |

**ATTERBERG LIMITS**

| | | | Procedures |
|---|---|---|---|
| Liquid Limit | % | | A |
| Plastic Limit | % | | B |
| Plasticity Index | % | | C |
| Linear Shrinkage | % | | |
| Mould Length | mm | | |
| Crumbling &/or Curling | | | |
| Sample History | | Oven Dried ☐ | Air Dried ☐ |
| Sample Preparation | | Dry Sieved ☐ | Wet Sieved ☐ |

(A) AS 1289.3.1.1 Liquid Limit – Standard Method
(B) AS 1289.3.2.1 Plastic Limit – Standard Limit
(C) AS 1289.3.3.1 Plasticity Index – Standard Method
(D) AS 1289.C4.1 Linear Shrinkage – Standard Method
(NO) Not obtainable

**EMERSON CLASS NUMBER - AS 1289 3.8.1**

Emerson Class No.

Water Type: Water Temperature:

**REMARKS:**

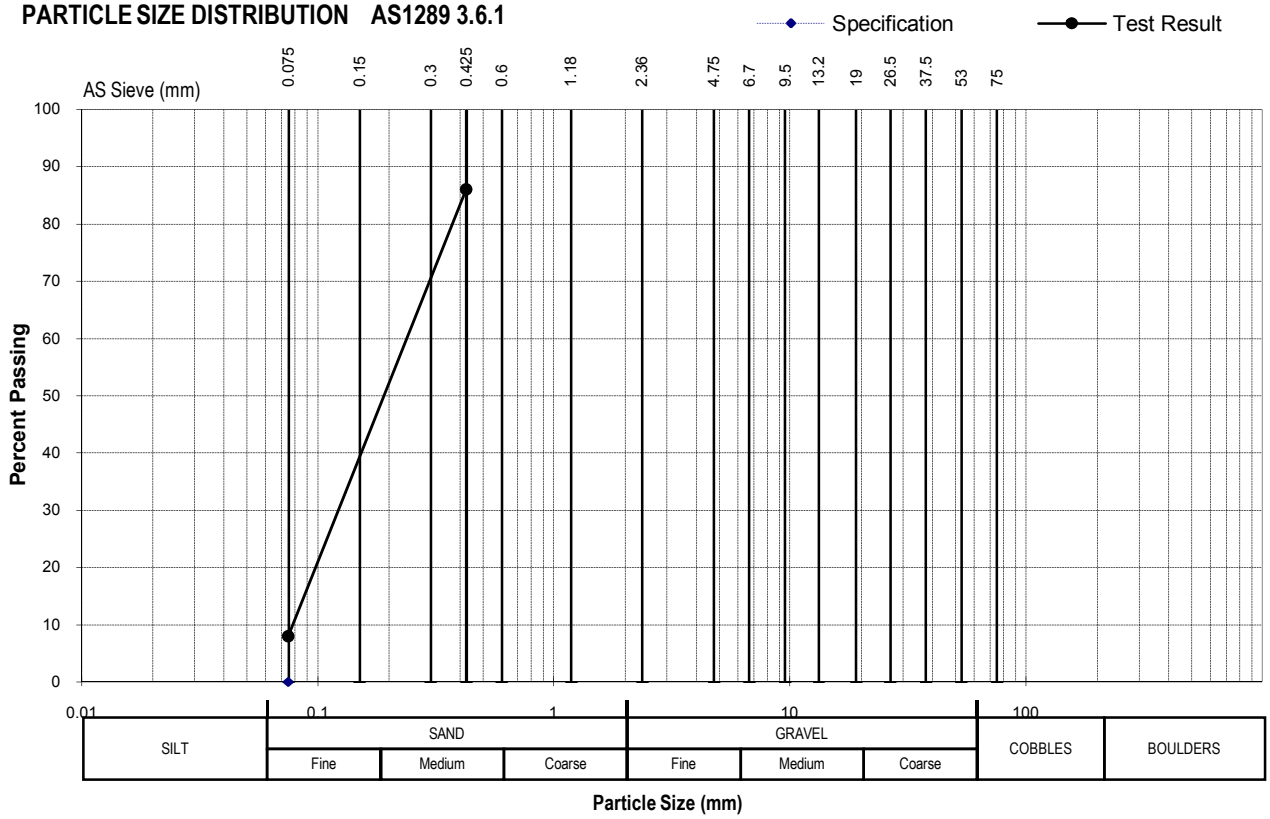
coffey geotechnics
SPECIALISTS MANAGING THE EARTH

Correspondence: PO Box 5537, Maroochydore Qld 4558 Fax (07) 5445 3764
1/36 KERRYL STREET, KUNDA PARK QLD 4556 (07) 5445 4952

| | | | | | |
|---|---|---|---|---|---|
| Client: | **Brown Consulting (Qld) Pty Ltd** | Job No: | **GEOTKPAR01560AA** | Laboratory: | **Kunda Park** |
| Principal: | | Test Date: | **20-May-2009** | Sampled by: | **MT** |
| Project: | **Bellvista 2 - Area 4** | Date Sampled: | | Report No: | |
| Location: | **REFER PLAN** | Test No.: | **BH 78** | | 1 of 3 |
| Sample ID: | **Topsoil** | Material Description | | | |

# MATERIAL CLASSIFICATION REPORT

## PARTICLE SIZE DISTRIBUTION AS1289 3.6.1




| Sieve Size mm | % Passing | Specification Upper | Specification Lower |
|---|---|---|---|
| 75 | | | |
| 53 | | | |
| 37.5 | | | |
| 26.5 | | | |
| 19 | | | |
| 13.2 | | | |
| 9.5 | | | |
| 6.7 | | | |
| 4.75 | | | |
| 2.36 | | | |
| 1.18 | | | |
| 600µm | | | |
| 425µm | 86 | | |
| 300µm | | | |
| 150µm | | | |
| 75µm | 8 | | |

**ATTERBERG LIMITS**

| | | | Procedures |
|---|---|---|---|
| Liquid Limit | % | | A |
| Plastic Limit | % | | B |
| Plasticity Index | % | | C |
| Linear Shrinkage | % | | |
| Mould Length | mm | | |
| Crumbling &/or Curling | | | |
| Sample History | | Oven Dried ☐ | Air Dried ☐ |
| Sample Preparation | | Dry Sieved ☐ | Wet Sieved ☐ |

(A) AS 1289.3.1.1 Liquid Limit – Standard Method
(B) AS 1289.3.2.1 Plastic Limit – Standard Limit
(C) AS 1289.3.3.1 Plasticity Index – Standard Method
(D) AS 1289.C4.1 Linear Shrinkage – Standard Method
(NO) Not obtainable

**EMERSON CLASS NUMBER - AS 1289 3.8.1**

Emerson Class No.

Water Type: Water Temperature:

**REMARKS:**

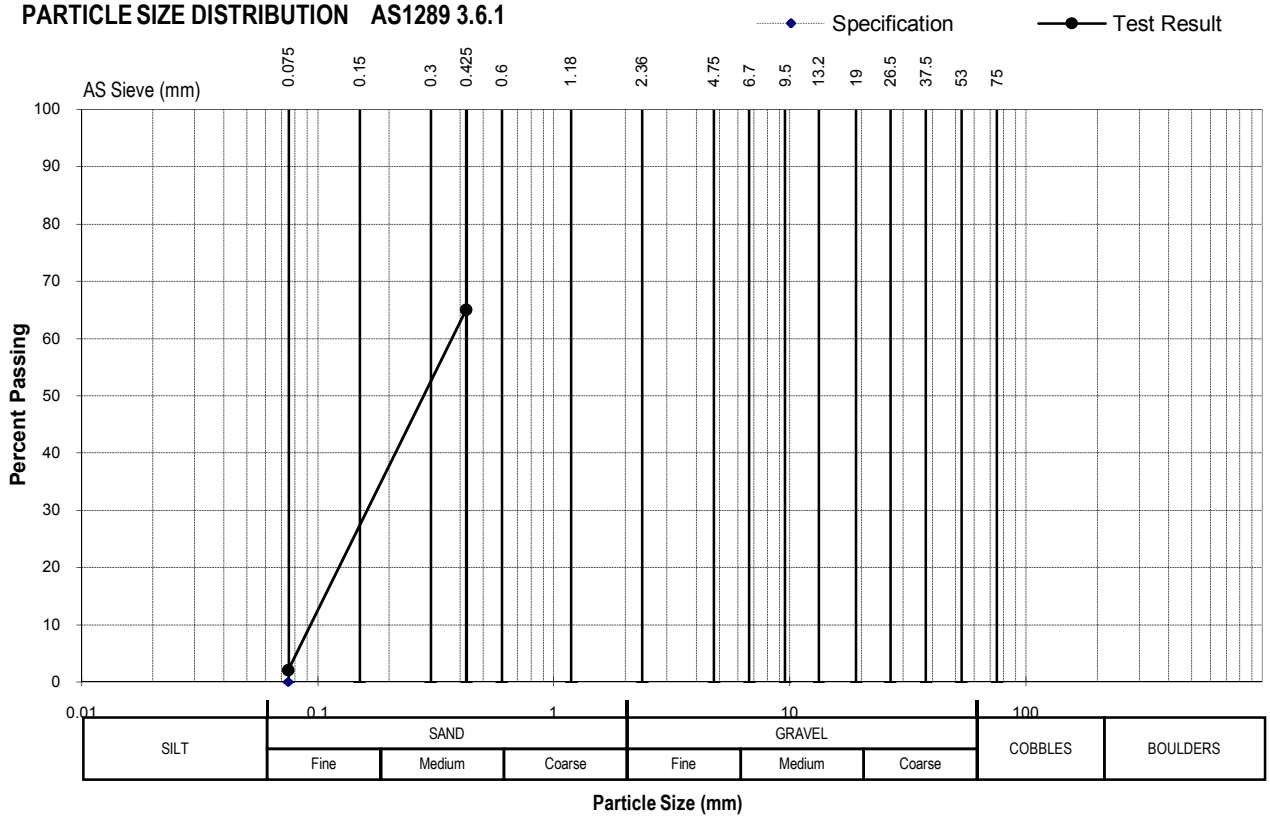
coffey geotechnics
SPECIALISTS MANAGING THE EARTH

Correspondence: PO Box 5537, Maroochydore Qld 4558 Fax (07) 5445 3764
1/36 KERRYL STREET, KUNDA PARK QLD 4556 (07) 5445 4952

| | | | | | |
|---|---|---|---|---|---|
| Client: | **Brown Consulting (Qld) Pty Ltd** | Job No: | **GEOTKPAR01560AA** | Laboratory: | **Kunda Park** |
| Principal: | | Test Date: | **20-May-2009** | Sampled by: | **MT** |
| Project: | **Bellvista 2 - Area 4** | Date Sampled: | | Report No: | |
| Location: | **REFER PLAN** | Test No.: | **BH 55** | | 2 of 3 |
| Sample ID: | **Subsoil 2.5m to 3.0m** | Material Description | | | |

# MATERIAL CLASSIFICATION REPORT

## PARTICLE SIZE DISTRIBUTION AS1289 3.6.1




| Sieve Size mm | % Passing | Specification Upper | Specification Lower |
|---|---|---|---|
| 75 | | | |
| 53 | | | |
| 37.5 | | | |
| 26.5 | | | |
| 19 | | | |
| 13.2 | | | |
| 9.5 | | | |
| 6.7 | | | |
| 4.75 | | | |
| 2.36 | | | |
| 1.18 | | | |
| 600µm | | | |
| 425µm | 65 | | |
| 300µm | | | |
| 150µm | | | |
| 75µm | 2 | | |

**ATTERBERG LIMITS**

| | | | Procedures |
|---|---|---|---|
| Liquid Limit | % | | A |
| Plastic Limit | % | | B |
| Plasticity Index | % | | C |
| Linear Shrinkage | % | | |
| Mould Length | mm | | |
| Crumbling &/or Curling | | | |
| Sample History | | Oven Dried ☐ | Air Dried ☐ |
| Sample Preparation | | Dry Sieved ☐ | Wet Sieved ☐ |

(A) AS 1289.3.1.1 Liquid Limit – Standard Method
(B) AS 1289.3.2.1 Plastic Limit – Standard Limit
(C) AS 1289.3.3.1 Plasticity Index – Standard Method
(D) AS 1289.C4.1 Linear Shrinkage – Standard Method
(NO) Not obtainable

**EMERSON CLASS NUMBER - AS 1289 3.8.1**

Emerson Class No.

Water Type: Water Temperature:

**REMARKS:**

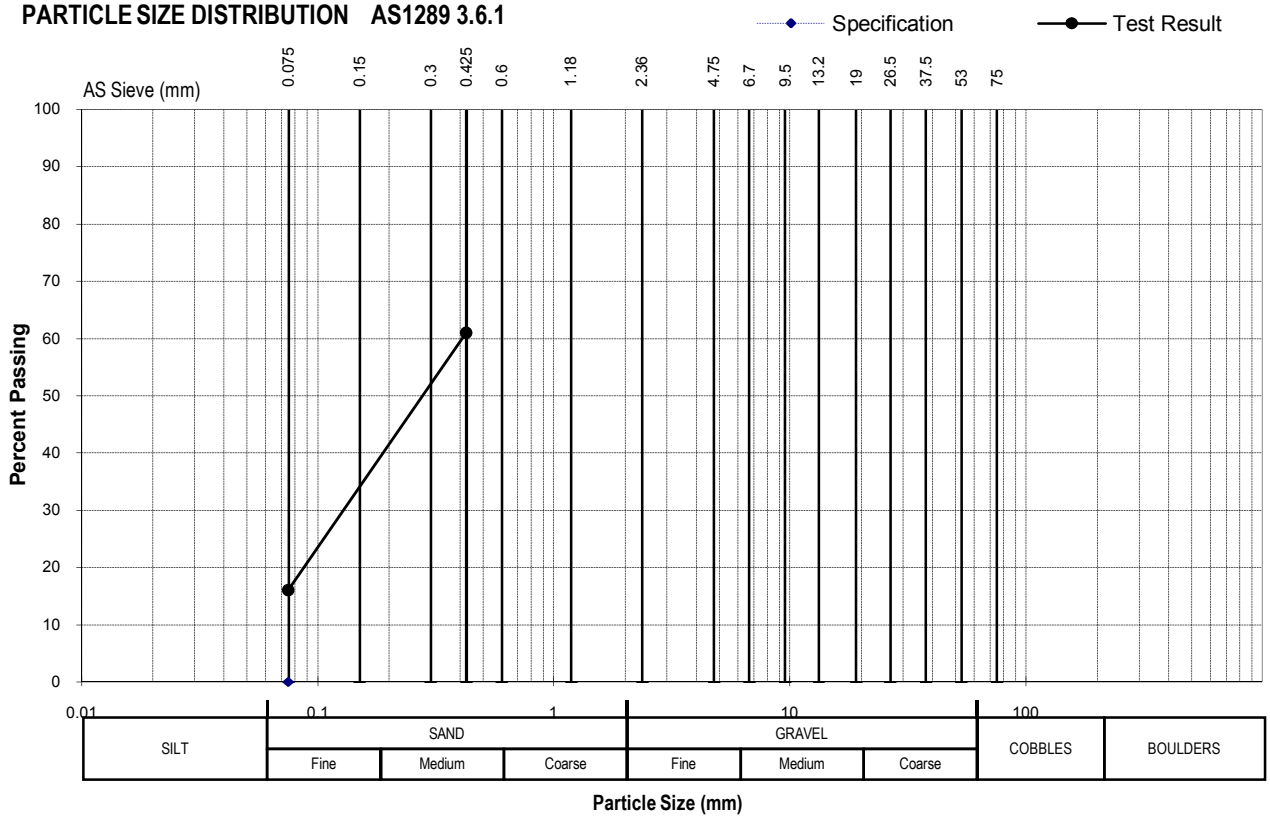
coffey geotechnics
SPECIALISTS MANAGING THE EARTH

Correspondence: PO Box 5537, Maroochydore Qld 4558 Fax (07) 5445 3764
1/36 KERRYL STREET, KUNDA PARK QLD 4556 (07) 5445 4952

| | | | | | |
|---|---|---|---|---|---|
| Client: | Brown Consulting (Qld) Pty Ltd | Job No: | GEOTKPAR01560AA | Laboratory: | Kunda Park |
| Principal: | | Test Date: | 20-May-2009 | Sampled by: | MT |
| Project: | Bellvista 2 - Area 4 | Date Sampled: | | Report No: | |
| Location: | REFER PLAN | Test No.: | BH 68 | | 3 of 3 |
| Sample ID: | 3m to 4m | Material Description | | | |

# MATERIAL CLASSIFICATION REPORT

## PARTICLE SIZE DISTRIBUTION AS1289 3.6.1




| Sieve Size mm | % Passing | Specification Upper | Specification Lower |
|---|---|---|---|
| 75 | | | |
| 53 | | | |
| 37.5 | | | |
| 26.5 | | | |
| 19 | | | |
| 13.2 | | | |
| 9.5 | | | |
| 6.7 | | | |
| 4.75 | | | |
| 2.36 | | | |
| 1.18 | | | |
| 600µm | | | |
| 425µm | 61 | | |
| 300µm | | | |
| 150µm | | | |
| 75µm | 16 | | |

**ATTERBERG LIMITS**

| | | | Procedures |
|---|---|---|---|
| Liquid Limit | % | | A |
| Plastic Limit | % | | B |
| Plasticity Index | % | | C |
| Linear Shrinkage | % | | |
| Mould Length | mm | | |
| Crumbling &/or Curling | | | |
| Sample History | | Oven Dried ☐ | Air Dried ☐ |
| Sample Preparation | | Dry Sieved ☐ | Wet Sieved ☐ |

(A) AS 1289.3.1.1 Liquid Limit – Standard Method
(B) AS 1289.3.2.1 Plastic Limit – Standard Limit
(C) AS 1289.3.3.1 Plasticity Index – Standard Method
(D) AS 1289.C4.1 Linear Shrinkage – Standard Method
(NO) Not obtainable

**EMERSON CLASS NUMBER - AS 1289 3.8.1**

Emerson Class No.

Water Type: Water Temperature:

**REMARKS:**

# Appendix E

## Rainer Outputs

********** RAINER **********
DEPARTMENT of CONSERVATION and LAND MANAGEMENT
Date: 25/05/2009

Rainfall Intensity (mm/h) for BELLVISTA 2

| | |
|---|---|
| 1 hour, 2 years | 51.00 |
| 12 hour, 2 years | 10.00 |
| 72 hour, 2 years | 3.50 |
| 1 hour, 50 years | 91.00 |
| 12 hour, 50 years | 20.00 |
| 72 hour, 50 years | 8.50 |
| Skewness | 0.12 |
| Geographical factor F2 | 4.39 |
| Geographical factor F50 | 17.50 |

| \DUR | 5m | 6m | 10m | 20m | 30m | 1h | 2h | 3h | 6h | 12h | 24h | 48h | 72h | User |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ARI | | | | | | | | | | | | | | |
| 1 | 126 | 118 | 97 | 71 | 58 | 39.7 | 25.3 | 19.3 | 12.1 | 7.64 | 5.14 | 3.39 | 2.59 | 0.00 |
| 2 | 160 | 150 | 123 | 90 | 74 | 51 | 32.4 | 24.8 | 15.7 | 9.92 | 6.76 | 4.50 | 3.46 | 0.00 |
| 5 | 196 | 185 | 152 | 112 | 91 | 63 | 40.8 | 31.5 | 20.2 | 12.9 | 9.08 | 6.24 | 4.90 | 0.00 |
| 10 | 217 | 204 | 168 | 124 | 102 | 70 | 45.8 | 35.5 | 22.9 | 14.8 | 10.5 | 7.37 | 5.85 | 0.00 |
| 20 | 247 | 232 | 191 | 141 | 116 | 80 | 53 | 40.9 | 26.5 | 17.2 | 12.5 | 8.83 | 7.07 | 0.00 |
| 50 | 285 | 268 | 221 | 164 | 134 | 93 | 62 | 48.0 | 31.4 | 20.5 | 15.1 | 10.9 | 8.78 | 0.00 |
| 100 | 314 | 295 | 244 | 181 | 148 | 103 | 68 | 54 | 35.1 | 23.1 | 17.1 | 12.5 | 10.2 | 0.00 |
| User | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Estimated Rainfall Factor (R): 5540  Estimated 1:10 Storm (S10): 3580

| | Years | | | | | | |
|---|---|---|---|---|---|---|---|
| min | 1 | 2 | 5 | 10 | 20 | 50 | 100 |
| 7 | 112 | 142 | 175 | 193 | 219 | 254 | 280 |
| 8 | 106 | 135 | 166 | 184 | 209 | 241 | 266 |
| 9 | 101 | 129 | 159 | 176 | 199 | 231 | 254 |
| 10 | 97 | 123 | 152 | 168 | 191 | 221 | 244 |
| 11 | 93 | 118 | 146 | 162 | 184 | 213 | 235 |
| 12 | 90 | 114 | 141 | 156 | 177 | 205 | 227 |
| 13 | 87 | 110 | 136 | 151 | 171 | 198 | 219 |
| 14 | 84 | 107 | 132 | 146 | 166 | 192 | 212 |
| 15 | 81 | 103 | 128 | 142 | 161 | 186 | 206 |
| 16 | 79 | 100 | 124 | 138 | 156 | 181 | 200 |
| 17 | 77 | 98 | 121 | 134 | 152 | 176 | 195 |
| 18 | 75 | 95 | 117 | 130 | 148 | 172 | 190 |
| 19 | 73 | 93 | 115 | 127 | 145 | 167 | 185 |
| 20 | 71 | 90 | 112 | 124 | 141 | 164 | 181 |
| 21 | 69 | 88 | 109 | 121 | 138 | 160 | 177 |
| 22 | 68 | 86 | 107 | 119 | 135 | 156 | 173 |
| 23 | 66 | 84 | 104 | 116 | 132 | 153 | 169 |
| 24 | 65 | 83 | 102 | 114 | 129 | 150 | 166 |
| 25 | 64 | 81 | 100 | 111 | 127 | 147 | 162 |
| 26 | 62 | 79 | 98 | 109 | 124 | 144 | 159 |
| 27 | 61 | 78 | 96 | 107 | 122 | 141 | 156 |
| 28 | 60 | 76 | 95 | 105 | 120 | 139 | 154 |
| 29 | 59 | 75 | 93 | 103 | 118 | 136 | 151 |
| 30 | 58 | 74 | 91 | 102 | 116 | 134 | 148 |
| 31 | 57 | 73 | 90 | 100 | 114 | 132 | 146 |
| 32 | 56 | 71 | 88 | 98 | 112 | 130 | 144 |
| 33 | 55 | 70 | 87 | 97 | 110 | 128 | 141 |
| 34 | 54 | 69 | 86 | 95 | 109 | 126 | 139 |
| 35 | 53 | 68 | 84 | 94 | 107 | 124 | 137 |
| 36 | 53 | 67 | 83 | 92 | 105 | 122 | 135 |
| 37 | 52 | 66 | 82 | 91 | 104 | 121 | 133 |
| 38 | 51 | 65 | 81 | 90 | 102 | 119 | 131 |
| 39 | 50 | 64 | 80 | 89 | 101 | 117 | 130 |
| 40 | 49.7 | 63 | 79 | 87 | 100 | 116 | 128 |
| 41 | 49.1 | 62 | 78 | 86 | 98 | 114 | 126 |
| 42 | 48.4 | 62 | 77 | 85 | 97 | 113 | 125 |
| 43 | 47.8 | 61 | 76 | 84 | 96 | 111 | 123 |
| 44 | 47.2 | 60 | 75 | 83 | 95 | 110 | 122 |
| 45 | 46.6 | 59 | 74 | 82 | 94 | 109 | 120 |
| 46 | 46.1 | 59 | 73 | 81 | 93 | 107 | 119 |
| 47 | 45.5 | 58 | 72 | 80 | 91 | 106 | 118 |
| 48 | 45.0 | 57 | 71 | 79 | 90 | 105 | 116 |
| 49 | 44.5 | 57 | 70 | 78 | 89 | 104 | 115 |
| 50 | 44.0 | 56 | 70 | 78 | 88 | 103 | 114 |
| 51 | 43.5 | 55 | 69 | 77 | 88 | 102 | 113 |
| 52 | 43.0 | 55 | 68 | 76 | 87 | 101 | 111 |
| 53 | 42.6 | 54 | 68 | 75 | 86 | 100 | 110 |
| 54 | 42.1 | 54 | 67 | 74 | 85 | 99 | 109 |
| 55 | 41.7 | 53 | 66 | 74 | 84 | 98 | 108 |
| 56 | 41.3 | 53 | 65 | 73 | 83 | 97 | 107 |
| 57 | 40.9 | 52 | 65 | 72 | 82 | 96 | 106 |
| 58 | 40.5 | 52 | 64 | 72 | 82 | 95 | 105 |
| 59 | 40.1 | 51 | 64 | 71 | 81 | 94 | 104 |

# Appendix F

## RUSLE Calculations

## SWMP Commentary, Detailed Calculations

Note: These "Detailed Calculation" spreadsheets relate only to high erosion hazard lands as identified in figure 4.6 or where the designer chooses to use the RUSLE to size sediment basins. The "Standard Calculation" spreadsheets should be used on low erosion hazard lands as identified by figure 4.6 and where the designer chooses not to run the RUSLE in calculations.

# 1. Site Data Sheet

**Site Name: Bellvista 2**

**Site Location: Caloundra**

**Precinct: Area 3**

**Description of Site:**

| Site area | Sub-catchments | | | | | | Remarks |
|---|---|---|---|---|---|---|---|
| | Area 3 | | | | | | |
| Total catchment area (ha) | 27 | | | | | | |
| Disturbed catchment area (ha) | 27 | | | | | | |

**Soil analysis (enter sediment type if known, or laboratory particle size data)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sediment Type (C, F or D) if known: | D | | | | | | |
| % sand (fraction 0.02 to 2.00 mm) | | | | | | | |
| % silt (fraction 0.002 to 0.02 mm) | | | | | | | |
| % clay (fraction finer than 0.002 mm) | | | | | | | |
| Dispersion percentage | | | | | | | |
| % of whole soil dispersible | | | | | | | |
| Soil Texture Group | D | | | | | | |

**Rainfall data**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Design rainfall depth (days) | 5 | | | | | | |
| Design rainfall depth (percentile) | 85 | | | | | | |
| x-day, y-percentile rainfall event | 57.7 | | | | | | |
| Rainfall R-factor (if known) | 5540 | | | | | | |
| IFD: 2-year, 6-hour storm (if known) | 15.7 | | | | | | |

**RUSLE Factors**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Rainfall erosivity (*R*-factor) | 5540 | | | | | | Auto-filled from above |
| Soil erodibility (*K*-factor) | 0.05 | | | | | | |
| Slope length (m) | 80 | | | | | | |
| Slope gradient (%) | 2 | | | | | | |
| Length/gradient (*LS*-factor) | 0.41 | | | | | | |
| Erosion control practice (*P*-factor) | 1.3 | | | | | | |
| Ground cover (*C*-factor) | 1 | | | | | | |

**Calculations**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Soil loss (t/ha/yr) | 147 | | | | | | |
| Soil Loss Class | 1 | | | | | | See Section 4.3 and Table 4-2. |
| Soil loss ($m^3$/ha/yr) | 113 | | | | | | |
| Sediment basin storage volume, $m^3$ | 518 | | | | | | See Sections 6.5.3 and 6.6.3 |