Volume 5

Appendix B

Borehole and Test Pit Logs

Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	20 - 63
Medium gravel	6 - 20
Fine gravel	2.36 - 6
Coarse sand	0.6 - 2.36
Medium sand	0.2 - 0.6
Fine sand	0.075 - 0.2

The proportions of secondary constituents of soils are described as:

Term	Proportion	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	20 - 35%	Sandy Clay
Slightly	12 - 20%	Slightly Sandy Clay
With some	5 - 12%	Clay with some sand
With a trace of	0 - 5%	Clay with a trace of sand

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	vs	<12
Soft	s	12 - 25
Firm	f	25 - 50
Stiff	st	50 - 100
Very stiff	vst	100 - 200
Hard	h	>200

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	SPT N value	CPT qc value (MPa)
Very loose	vl	<4	<2
Loose	l	4 - 10	2 -5
Medium dense	md	10 - 30	5 - 15
Dense	d	30 - 50	15 - 25
Very dense	vd	>50	>25

Soil Descriptions

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.

Rock Strength

Rock strength is defined by the Point Load Strength Index ($Is_{(50)}$) and refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects. The test procedure is described by Australian Standard 4133.4.1 - 1993. The terms used to describe rock strength are as follows:

Term	Abbreviation	Point Load Index $Is_{(50)}$ MPa	Approx Unconfined Compressive Strength MPa*
Extremely low	EL	<0.03	<0.6
Very low	VL	0.03 - 0.1	0.6 - 2
Low	L	0.1 - 0.3	2 - 6
Medium	M	0.3 - 1.0	6 - 20
High	H	1 - 3	20 - 60
Very high	VH	3 - 10	60 - 200
Extremely high	EH	>10	>200

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Extremely weathered	EW	Rock substance has soil properties, i.e. it can be remoulded and classified as a soil but the texture of the original rock is still evident.
Highly weathered	HW	Limonite staining or bleaching affects whole of rock substance and other signs of decomposition are evident. Porosity and strength may be altered as a result of iron leaching or deposition. Colour and strength of original fresh rock is not recognisable
Moderately weathered	MW	Staining and discolouration of rock substance has taken place
Slightly weathered	SW	Rock substance is slightly discoloured but shows little or no change of strength from fresh rock
Fresh stained	Fs	Rock substance unaffected by weathering but staining visible along defects
Fresh	Fr	No signs of decomposition or staining

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with some fragments
Fractured	Core lengths of 40-200 mm with some shorter and longer sections
Slightly Fractured	Core lengths of 200-1000 mm with some shorter and loner sections
Unbroken	Core lengths mostly > 1000 mm

Rock Descriptions

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq \text{100 mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or better. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Symbols & Abbreviations

Douglas Partners

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core Drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

Symbols & Abbreviations

Graphic Symbols for Soil and Rock

General


Asphalt


Road base


Concrete


Filling

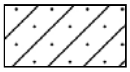
Soils


Topsoil

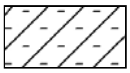

Peat


Clay

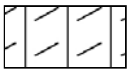

Silty clay

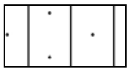

Sandy clay

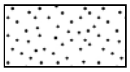

Gravelly clay

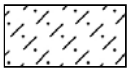

Shaly clay

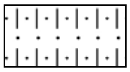

Silt


Clayey silt


Sandy silt


Sand

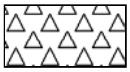

Clayey sand


Silty sand


Gravel


Sandy gravel


Cobbles, boulders

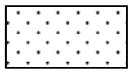

Talus

Sedimentary Rocks

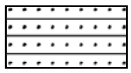

Boulder conglomerate

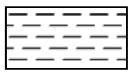

Conglomerate


Conglomeratic sandstone

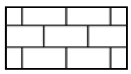

Sandstone


Siltstone


Laminite

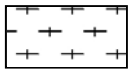

Mudstone, claystone, shale

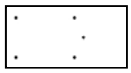

Coal


Limestone

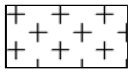
Metamorphic Rocks

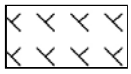

Slate, phyllite, schist

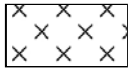

Gneiss

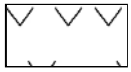

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 10.4 AHD
EASTING: 300399.2
NORTHING: 6276587
DIP/AZIMUTH: 90°/--

BORE No: BH1
PROJECT No: 73895
DATE: 27/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
10.4	0.0								Gatic Cover
10.1	0.3	FILLING - brown, sandy clay filling (topsoil) with some basalt gravel, moist (raining)		A	0.0 - 0.2				
		SANDY CLAY - brown, sandy clay with trace gravel and organic material, damp		A	0.4 - 0.5				
				A	0.9 - 1.0				
9.2	1.2	CLAY - grey mottled red, clay with trace ironstone gravel, damp		A	1.4 - 1.5				Gravel Pack
				A	1.9 - 2.0				
				A	2.4 - 2.5				Bentonite
				A	2.9 - 3.0				
									Gravel Pack
								▼	Machine slotted PVC screen
4.4	6.0	Bore discontinued at 6.0m - target depth reached							End cap

RIG: DT 100 **DRILLER:** SY **LOGGED:** MW **CASING:** Uncased

TYPE OF BORING: 150mm diameter Solid flight auger

WATER OBSERVATIONS: Free groundwater observed at 4.5m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U$_x$	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 11.4 AHD
EASTING: 300622.5
NORTHING: 6275939.1
DIP/AZIMUTH: 90°/--

BORE No: BH2
PROJECT No: 73895
DATE: 28/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.05	FILLING - brown, sandy clay filing (topsoil), damp		A	0.0				Gatic Cover
	0.2	SANDY CLAY - brown, sandy clay, damp			0.2				
		CLAY - brown-orange clay, damp		A	0.4 0.5				
	0.7	SANDY CLAY - light brown, sandy clay with some ironstone gravel, humid		A	0.9 1.0				Gravel Pack
				A	1.4 1.5				
				A	1.9 2.0				Bentonite
				A	2.4 2.5				
				A	2.9 3.0				Gravel Pack
								▼	Machine slotted PVC screen
	6.0	Bore discontinued at 6.0m - target depth reached							End cap

RIG: DT 100 **DRILLER:** SY **LOGGED:** MW **CASING:** Uncased

TYPE OF BORING: 150mm diameter Solid flight auger

WATER OBSERVATIONS: Free groundwater observed at 4.8m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U$_x$	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 17.1 AHD
EASTING: 301262
NORTHING: 6275407
DIP/AZIMUTH: 90°/--

BORE No: BH3
PROJECT No: 73895
DATE: 28/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
17	0.0								Gatic Cover
	0.2	SANDY CLAY - brown, sandy clay (topsoil), high organic material, moist		A	0.0 – 0.2				
		SANDY CLAY - brown, sandy clay, humid		A	0.4 – 0.5				
	0.6	CLAY - brown clay, humid							
	0.8	CLAY - grey clay, humid		A	0.9 – 1.0				Gravel Pack
16	1			A	1.4 – 1.5				
				A	1.9 – 2.0				
15	2								
	2.2	CLAY - brown-orange, clay with trace ironstone gravel, humid 2.2-2.6m: ironstone gravel		A	2.4 – 2.5				Bentonite
				A	2.7 – 3.0				
14	3								
									Gravel Pack
13	4								
									Machine slotted PVC screen
12	5							▼	
	6.0	Bore discontinued at 6.0m - target depth reached							End cap
11	6								
10	7								
9	8								
8	9								

RIG: DT 100 **DRILLER:** SY **LOGGED:** MW **CASING:** Uncased

TYPE OF BORING: 150mm diameter Solid flight auger

WATER OBSERVATIONS: Free groundwater observed at 5.6m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U$_x$	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 15.1 AHD
EASTING: 301813.4
NORTHING: 6275311
DIP/AZIMUTH: 90°/--

BORE No: BH4
PROJECT No: 73895
DATE: 27/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
15	0.0	FILLING - brown, sandy clay filling with trace gravel, moist (raining)		A	0.0				Gatic Cover
					0.2				
				A	0.4				
	0.8				0.5				
14	1	FILLING - brown clay filling, humid		A	0.9				1
					1.0				Gravel Pack
				A	1.4				
	1.7				1.5				
13	2	SANDY CLAY - black, sandy clay (former topsoil?), damp		A	1.9				2
	2.2				2.0				
		CLAY - light grey clay, humid		A	2.4				
					2.5				Bentonite
12	3			A	2.9				3
					3.0				Gravel Pack
11	4								4
									Machine slotted PVC screen
10	5								5
9	6								6
	6.0	Bore discontinued at 6.0m - target depth reached							End cap
8	7								7
7	8								8
6	9								9

RIG: DT 100 **DRILLER:** SY **LOGGED:** MW **CASING:** Uncased

TYPE OF BORING: 150mm diameter Solid flight auger

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 20.1 AHD
EASTING: 302933.3
NORTHING: 6273992.2
DIP/AZIMUTH: 90°/--

BORE No: BH5
PROJECT No: 73895
DATE: 27/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
20	0.2	FILLING - brown, silty, fine sand filling (topsoil) , moist		A	0.0				Gatic Cover
		FILLING - light brown, fine sand filling with trace gravel, humid		A	0.2 0.4 0.5				
	0.7	SANDY CLAY - light brown, sandy clay, humid		A	0.9 1.0				
19	1			A	1.4 1.5				Gravel Pack
18	2	- mottled grey-brown from 2.2m		A	1.9 2.0				
				A	2.4 2.5				Bentonite
17	3			A	2.9 3.0				
									Gravel Pack
16	4							▼	
									Machine slotted PVC screen
15	5								
14	6	6.0 Bore discontinued at 6.0m - target depth reached							End cap
13	7								
12	8								
11	9								

RIG: DT 100 **DRILLER:** SY **LOGGED:** MW **CASING:** Uncased

TYPE OF BORING: 150mm diameter Solid flight auger

WATER OBSERVATIONS: Free groundwater observed at 4.0m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U$_x$	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 13.8 AHD
EASTING: 300191.4
NORTHING: 6276479.9
DIP/AZIMUTH: 90°/--

BORE No: BH6
PROJECT No: 73895
DATE: 31/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
13	0.25	FILLING - brown sand, silt, clay filling with some gravel, damp		D	0.1				
	0.4	SILTY SAND - dark brown, silty sand, damp		D	0.5		pp = 300-400		
	0.5	CLAY - brown and orange-brown clay, MC=WP							
12	1	SILTY SANDY CLAY - light grey, silty sandy clay, MC=WP		D	1.0				
		- ironstone gravel from 1.4m		D	1.5		pp >400		
	1.75	Bore discontinued at 1.75m - refusal on possible ironstone cobbles							
11	2								
10	3								
9	4								
8	5								
7	6								
6	7								
5	8								
4	9								

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased
TYPE OF BORING: Dynamic push tumbe continuous sample
WATER OBSERVATIONS: No free groundwater observed
REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 19.3 AHD
EASTING: 300903
NORTHING: 6276359.3
DIP/AZIMUTH: 90°/--

BORE No: BH7
PROJECT No: 73895
DATE: 1/4/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
19	0.15	FILLING - dark brown, sandy clay filling (topsoil) with some gravel and abundant rootlets, MC=WP		D	0.1				
	0.45	CLAY - red-brown clay with trace gravel, MC<WP - tree root at 0.4m		D	0.4				
	0.9	SILTY SANDY CLAY - light grey mottled orange-brown, silty and sandy clay with some siltstone gravel, MC<WP		D	0.8				
18	1	Bore discontinued at 0.9m - refusal on siltstone							
17	2								
16	3								
15	4								
14	5								
13	6								
12	7								
11	8								
10	9								

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased
TYPE OF BORING: Dynamic push tumbe continuous sample
WATER OBSERVATIONS: No free groundwater observed
REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 11.8 AHD
EASTING: 300631.9
NORTHING: 6275912.5
DIP/AZIMUTH: 90°/--

BORE No: BH8
PROJECT No: 73895
DATE: 31/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.2	SANDY SILT - dark brown, sandy silt with some rootlets (grass covered), damp		D	0.1				
	0.6	CLAY - brown and orange-brown clay, MC=WP		D	0.5		pp >400		
		SANDY CLAY - grey and orange-brown, sandy clay, trace ironstone gravel, MC<WP		D	1.0		pp >400		
				D	1.5		pp = 400		
		- gravelly band from 1.7 to 2.0m							
		- grey, MC=WP from 2.0m		D	2.0		pp >400		
				D	2.5		pp = 250-400		
	3.0			D	3.0		pp >400		
		Bore discontinued at 3.0m - limit of investigation							

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased

TYPE OF BORING: Dynamic push tumbe continuous sample

WATER OBSERVATIONS: No free groundwater observed

REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 13 AHD
EASTING: 301149.8
NORTHING: 6275982.2

PIT No: TP10
PROJECT No: 73895
DATE: 3/4/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
13		CLAYEY SILT - stiff, dark brown, clayey silt with some sand, damp (root affected material to 50mm) (topsoil)		D	0.1				
	0.3	SILTY CLAY - stiff, orange-brown mottled red, silty clay with trace sand (MC<PL)			0.4				
				D	0.5		0.5-1.0m: Bulk sample		
				U_{50}					
		0.8m: red-brown mottled grey, very stiff			0.85				
		0.9m: hard							
12	1								1
		1.2m: grading into grey mottled orange-red with some ironstone gravel							
	1.5	SHALE - extremely low strength, extremely weathered, light grey mottled orange-red shale		D	1.5				
	1.8	Pit discontinued at 1.8m - at target depth							

RIG: 3.5 tonne Excavator with 300mm Bucket

LOGGED: JE

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: MC = Moisture Content; PL = Plastic Limit

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 13 AHD
EASTING: 300839.4
NORTHING: 6275725.4

PIT No: TP11
PROJECT No: 73895
DATE: 3/4/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
13		CLAYEY SILT - stiff to very stiff, dark brown, clayey silt with some fine sand, damp (root affected material to 50mm) (topsoil)		D	0.1				
	0.3	SILTY CLAY - very stiff, yellow-brown, silty clay with trace sand (MC<<PL) estimated high plasticity			0.4				
				U_{50} D	0.5		0.5-1.0m: Bulk sample		
					0.6				
12	1	1.2m: grading into grey mottled red (MC<PL)							1
				D	1.5				
		1.8m: grading into dark grey mottled red (MC~PL)							
11	2 2.0	Pit discontinued at 2.0m - at target depth		D	2.0				2

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: 3.5 tonne Excavator with 300mm Bucket

LOGGED: JE

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: MC = Moisture Content; PL = Plastic Limit

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 13.5 AHD
EASTING: 301028.7
NORTHING: 6275577.7
DIP/AZIMUTH: 90°/--

BORE No: BH13
PROJECT No: 73895
DATE: 31/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
13		SANDY SILT - dark brown, sandy silt with some gravel, moist to wet		D	0.1				
		- wet with some clay from 0.4m		D	0.5			▽	
	0.6	SILTY CLAY - grey mottled red-brown, silty clay, MC=WP		D	1.0		pp = 100-150		
12	1			D	1.5		pp >400		
		- MC<WP from 1.5m with trace ironstone gravel							
	2	- MC=WP from 2.0m to 2.4m		D	2.0		pp = 150-250		
11				D	2.5			▼	
	2.8	Bore discontinued at 2.8m - limit of investigation							
10	3								
9	4								
8	5								
7	6								
6	7								
5	8								
4	9								

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased

TYPE OF BORING: Dynamic push tumbe continuous sample

WATER OBSERVATIONS: Free groundwater observed at 2.4m. Seepage at 0.4m

REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 12.3 AHD
EASTING: 301636.5
NORTHING: 6275175.4
DIP/AZIMUTH: 90°/--

BORE No: BH14
PROJECT No: 73895
DATE: 27/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
12	0.2	TOPSOIL - brown, sandy silty clay (topsoil) with a trace of fine rootlets, MC=WP		D	0.1				
	0.5	SILTY CLAY - stiff, brown silty clay with a trace of fine sand, M>WP, medium plasticity		D	0.4		pp = 170-200		
11	1	CLAY - stiff to very stiff, light grey clay, MC=WP, medium to high plasticity		D	1.0		pp = 200-220		
10	2			D	2.0		pp = 200		
	2.8			D	2.8		pp = 200-250		
9	3	Bore discontinued at 2.8m - limit of investigation							
8	4								
7	5								
6	6								
5	7								
4	8								
3	9								

RIG: 4WD Utility Vehicle **DRILLER:** MVH **LOGGED:** MVH **CASING:** Uncased
TYPE OF BORING: Dynamic push tumbe continuous sample
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 31.6 AHD
EASTING: 301904.1
NORTHING: 6275586.9
DIP/AZIMUTH: 90°/--

BORE No: BH15
PROJECT No: 73895
DATE: 27/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
31	0.2	TOPSOIL - brown, clayey sandy silt (topsoil), moist		D	0.1				
		SILTY SANDY CLAY - very stiff, brown, silty sandy clay, MC<WP		D	0.5				
	0.9								
30	1	CLAY - very stiff to hard, light brown mottled red-brown, clay with a trace of sand, MC<WP			1.0		pp = 300-400		1
				D	1.2				
	1.31	SANDY CLAY - hard, light grey mottled orange-brown, medium grained sandy clay, MC<WP		D	1.35		pp >400		
	1.5	From 1.4m: grading into a weathered rock			1.4				
29	2	Bore discontinued at 1.5m - refusal on weathered rock							2
28	3								3
27	4								4
26	5								5
25	6								6
24	7								7
23	8								8
22	9								9

RIG: 4WD Utility Vehicle **DRILLER:** MVH **LOGGED:** MVH **CASING:** Uncased
TYPE OF BORING: Dynamic push tumbe continuous sample
WATER OBSERVATIONS: No free groundwater observed
REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 17.1 AHD
EASTING: 302237.1
NORTHING: 6275168.9

PIT No: TP17
PROJECT No: 73895
DATE: 3/4/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
17		CLAYEY SILT - firm to stiff, dark brown, clayey silt with some fine sand, moist (root affected material to 50mm) (topsoil)		D	0.1				
	0.3	SILTY CLAY - firm to stiff, yellow-brown-grey, silty clay with some sand (MC<PL), estimated medium plasticity			0.45				
				D	0.5		0.5-1.0m: Bulk sample		
		0.6m: red-brown, very stiff		U_{50}					
					0.82				
		0.9m: red-brown mottled black, trace root material							
	1			D	1.0				1
16									
		1.7m: red, grey mottled black							
	2	2.0		D	2.0				2
		Pit discontinued at 2.0m - at target depth							

RIG: 3.5 tonne Excavator with 300mm Bucket

LOGGED: JE

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: MC = Moisture Content; PL = Plastic Limit

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 35.7 AHD
EASTING: 302384.6
NORTHING: 6275383.1
DIP/AZIMUTH: 90°/--

BORE No: BH18
PROJECT No: 73895
DATE: 27/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
35	0.1	TOPSOIL - brown, sandy silt (topsoil) with trace of fine rootlets, dry		D	0.05				
	0.6	SILTY SANDY CLAY - very stiff, silty sandy clay, MC<WP, medium plasticity		D	0.5				
	0.9	CLAY - very stiff to hard, red-brown clay, medium to high plasticity,		D	0.8		pp = 300-400		
34		SHALE - extremely low strength, extremely weathered rock with soil like properties			1.5		pp >400		
	2.0	Bore discontinued at 2.0m - refusal on weathered rock		D	2.0				

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased

TYPE OF BORING: Dynamic push tumbe continuous sample

WATER OBSERVATIONS: No free groundwater observed

REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 16.3 AHD
EASTING: 302445.9
NORTHING: 6274946.9
DIP/AZIMUTH: 90°/--

BORE No: BH19
PROJECT No: 73895
DATE: 27/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
16	0.2	TOPSOIL - brown, sandy silt (topsoil) with a trace of fine rootlets, MC<Wp		D	0.1				
	0.6	SILTY CLAY - very stiff, light grey silty clay with a trace of sand, MC<WP, medium to hard plasticity		D	0.5		pp = 300-400		
15	1	CLAY - very stiff, light grey-brown clay, MC=WP, medium to high plasticity		D	1.0		pp = 200-300		1
				D	1.5				
14	2			D	2.0		pp = 200-250		2
				D	2.5				
	3			D	3.0		pp = 250-300		3
	3.0	Bore discontinued at 3.0m - limit of investigation							
13	4								4
12	5								5
11	6								6
10	7								7
9	8								8
8	9								9
7									

RIG: 4WD Utility Vehicle **DRILLER:** MVH **LOGGED:** MVH **CASING:** Uncased
TYPE OF BORING: Dynamic push tumbe continuous sample
WATER OBSERVATIONS: No free groundwater observed
REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 30.2 AHD
EASTING: 302566.4
NORTHING: 6275245.8
DIP/AZIMUTH: 90°/--

BORE No: BH20
PROJECT No: 73895
DATE: 27/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
30	0.2	TOPSOIL - brown, sandy silt (topsoil) with a trace of fine rootlets, MC<WP		D	0.1				
		SANDY CLAYEY SILT - stiff, grey-brown, sandy clayey silt, MC<WP, low to medium plasticity		D	0.5				
	0.7	CLAY - hard, brown clay with trace of silt and fine sand, MC<WP, medium plasticity		D	1.0		pp >400		
29	1								1
	1.3	GRAVELLY CLAY - clay with some red ironstone gravel, MC<PL, medium plasticity		D	1.5				
	2			D	2.0		pp >400		2
28	2.3	SILTY CLAY - hard, light grey, silty clay, MC<WP, medium plasticity							
	2.75	From 2.6m: grading into weathered rock with soil like properties		D	2.7		pp >400		
	3	Bore discontinued at 2.75m - refusal on weathered rock							3
27									
	4								4
26									
	5								5
25									
	6								6
24									
	7								7
23									
	8								8
22									
	9								9
21									

RIG: 4WD Utility Vehicle **DRILLER:** MVH **LOGGED:** MVH **CASING:** Uncased
TYPE OF BORING: Dynamic push tumbe continuous sample
WATER OBSERVATIONS: No free groundwater observed
REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 32.9 AHD
EASTING: 302904
NORTHING: 6274722.1

PIT No: TP22
PROJECT No: 73895
DATE: 3/4/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
32	0.0	CLAYEY SILT - dark brown, clayey silt with some sand and trace ironstone gravel, damp (root affected material to 50mm) (topsoil)		D	0.1				
	0.3	SILTY CLAY - very stiff, red silty clay with some fine sand (MC<PL), estimated medium plasticity			0.3				
		0.45m: hard		U_{50}					
				D	0.5		0.5-1.0m: Bulk sample		
					0.55				
	1								1
		1.2m: grey mottled red							
				D	1.5				
31	1.8	Pit discontinued at 1.8m - at target depth							

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: 3.5 tonne Excavator with 300mm Bucket

LOGGED: JE

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: MC = Moisture Content; PL = Plastic Limit

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 37.1 AHD
EASTING: 303134.7
NORTHING: 6275191.7
DIP/AZIMUTH: 90°/--

BORE No: BH23
PROJECT No: 73895
DATE: 31/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
37	0.25	FILLING - brown, sandy silty clay filling with some coal gravel, MC=WP		D	0.1				
	0.6	GRAVELLY CLAY - brown gravelly clay, MC=WP		D	0.5				
		CLAY - stiff to very stiff, red-brown mottled light brown clay		D	0.7		pp = 150-250		
36	1.0	SILTY SANDY CLAY - very stiff, light grey and orange-brown, silty sandy clay, MC<WP		D	1.0		pp = 200-250		
	1.5	Bore discontinued at 1.5m - refusal on sandstone		D	1.5				
35	2								
34	3								
33	4								
32	5								
31	6								
30	7								
29	8								
28	9								

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased
TYPE OF BORING: Dynamic push tumbe continuous sample
WATER OBSERVATIONS: No free groundwater observed
REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 49.8 AHD
EASTING: 303073.2
NORTHING: 6275550.1
DIP/AZIMUTH: 90°/--

BORE No: BH24
PROJECT No: 73895
DATE: 31/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
49	0.1	SANDY SILT - brown, sandy silt (topsoil) with some rootlets, humid (grass covered)		D	0.1				
		CLAY - red-brown and brown clay, MC<WP		D	0.5				
	1			D	1.0				1
48	1.1	SILTY CLAY - light grey mottled red-brown, silty clay, MC<WP		D	1.5				
	2			D	2.0				2
	2.4	Bore discontinued at 2.4m - refusal on sandstone/siltstone		D	2.4				
47	3								3
46	4								4
45	5								5
44	6								6
43	7								7
42	8								8
41	9								9
40									

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased
TYPE OF BORING: Dynamic push tumbe continuous sample
WATER OBSERVATIONS: No free groundwater observed
REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 26.1 AHD
EASTING: 303146.2
NORTHING: 6274537.6
DIP/AZIMUTH: 90°/--

BORE No: BH25
PROJECT No: 73895
DATE: 31/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
26		CLAYEY SILT - brown, clayey silt with trace gravel, damp (grass covered)		D	0.1				
	0.4	CLAY - very stiff, red-brown and brown clay, MC=WP		D	0.5		pp = 150-250		
25	1			D	1.0		pp = 300-350		
		- MC<WP, hard, grey mottled red and orange-brown from 1.3m		D	1.5				
24	2			D	2.0		pp >400		
		- some ironstone gravel from 2.5m		D	2.5		pp >400		
23	3	3.0		D	3.0		pp >400		
		Bore discontinued at 3.0m - limit of investigation							
22	4								
21	5								
20	6								
19	7								
18	8								
17	9								

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased
TYPE OF BORING: Dynamic push tumbe continuous sample
WATER OBSERVATIONS: No free groundwater observed
REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 33 AHD
EASTING: 303558.8
NORTHING: 6275200.4
DIP/AZIMUTH: 90°/--

BORE No: BH26
PROJECT No: 73895
DATE: 31/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
33	0.15	FILLING - brown, orange and grey, clay filling with some sand and trace rootlets, MC=WP (grass covered)		D	0.1				
		CLAY - stiff to very stiff, red-brown and brown clay, MC=WP		D	0.5		pp = 200-250		
32	1	- red-brown mottled light grey from 0.8m		D	1.0		pp = 250-350		1
	1.15	SILTY SANDY CLAY - hard, light grey and orange-brown, sandy silty clay, MC<WP		D	1.5		pp >400		
31	2			D	2.0				2
				D	2.5		pp = 350-400		
	2.9	- grading into extremely low strength sandstone from 2.7m		D	2.9				
30	3	Bore discontinued at 2.9m - refusal on sandstone							3
29	4								4
28	5								5
27	6								6
26	7								7
25	8								8
24	9								9

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased
TYPE OF BORING: Dynamic push tumbe continuous sample
WATER OBSERVATIONS: No free groundwater observed
REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 50 AHD
EASTING: 303851.6
NORTHING: 6275754.1
DIP/AZIMUTH: 90°/--

BORE No: BH27
PROJECT No: 73895
DATE: 31/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
50	0.15	FILLING - brown and red-brown, clayey sand filling with some rootlets, moist (grass covered)		D	0.1				
		CLAY - very stiff red-brown and brown clay, MC=WP		D	0.5		pp = 300-400		
	0.65	- MC<WP from 0.4m							
49	1	SILTY CLAY - hard, light grey and red-brown, silty clay with some ironstone gravel, MC<WP		D	1.0		pp >400		1
	1.1	Bore discontinued at 1.1m - refusal on sandstone/siltstone							
48	2								2
47	3								3
46	4								4
45	5								5
44	6								6
43	7								7
42	8								8
41	9								9

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased
TYPE OF BORING: Dynamic push tumbe continuous sample
WATER OBSERVATIONS: No free groundwater observed
REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 20.6 AHD
EASTING: 299603
NORTHING: 6276174.6
DIP/AZIMUTH: 90°/--

BORE No: BH28
PROJECT No: 73895
DATE: 1/4/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
20.6	0.0	FILLING - light brown, gravelly clay filling with some rootlets, MC=WP		D	0.1				
	0.4	SANDY CLAY - very stiff to hard, red-brown mottled grey, sandy clay with trace ironstone gravel, MC<WP - gravelly band from 0.65m to 0.95m		D	0.5		pp = 350-400		
				D	1.0				
				D	1.5				
	1.6	SILTY SANDY CLAY - hard, light grey mottled red-brown, silty sandy clay with some ironstone gravel bands, MC<WP		D	2.0		pp >400		
				D	2.5				
	3.0	Bore discontinued at 3.0m - limit of investigation		D	3.0		pp >400		

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased
TYPE OF BORING: Dynamic push tumbe continuous sample
WATER OBSERVATIONS: No free groundwater observed
REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U$_x$	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 18.7 AHD
EASTING: 300165.3
NORTHING: 6276206
DIP/AZIMUTH: 90°/--

BORE No: BH29
PROJECT No: 73895
DATE: 31/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
18	0.08	FILLING - grey, sandy gravel filling, moist (grass covered)		D	0.1				
	0.2	SANDY SILT - brown, sandy silt with some rootlets, damp							
	0.4	SILTY SANDY CLAY - light brown and orange, silty sandy clay with trace rootlets, humid		D	0.5		pp = 250-300		
	0.85	CLAY - grey and orange-brown, clay with trace sand, MC=WP		D	1.0				
17		SILTY CLAY - light grey and orange-brown, silty clay with some siltstone gravel, MC<WP		D	1.5		pp >400		
		- red-brown ironstone gravel from 1.65m							
	2.0	Bore discontinued at 2.0m		D	2.0				
		- refusal on possible ironstone cobbles							

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased

TYPE OF BORING: Dynamic push tumbe continuous sample

WATER OBSERVATIONS: No free groundwater observed

REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 15.3 AHD
EASTING: 299705.3
NORTHING: 6276029.5
DIP/AZIMUTH: 90°/--

BORE No: BH30
PROJECT No: 73895
DATE: 1/4/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
15	0	FILLING - brown and grey clay, gravel and silt filling with some sand, moist		D	0.1				
				D	0.5				
	0.6	CLAYEY SAND - brown and orange-brown, clayey sand, wet		D	0.9			▽	
14	1	- gravelly from 1.0m, damp							
	1.3	SANDY CLAY - brown and orange-red-brown, sandy clay with trace ironstone gravel, Mc<WP		D	1.5				
13	2	- silty, grey brown from 2.0m		D	2.0		pp >400		
				D	2.5				
	2.9	Bore discontinued at 2.9m		D	2.9		pp >400		
12	3	- limit of investigation							
11	4								
10	5								
9	6								
8	7								
7	8								
6	9								

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased

TYPE OF BORING: Dynamic push tumbe continuous sample

WATER OBSERVATIONS: No free groundwater observed. Likely water seepage at 0.75m

REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 22.8 AHD
EASTING: 299738.4
NORTHING: 6275364.4

PIT No: TP31
PROJECT No: 73895
DATE: 3/4/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
		CLAYEY SILT - stiff, dark brown, clayey silt, slightly sandy with some angular, fine to medium ironstone gravel, moist (root affected material to 100mm) (topsoil) - possible slope wash		D	0.1				
	0.4	SILTY CLAY - stiff, red-brown mottled grey, silty clay with trace sand (MC~PL)			0.4				
				D	0.5		0.5-1.0m: Bulk sample		
22		0.75m: hard			0.7				
	1	1.0m: light grey mottled red (MC<PL)							1
	1.3	SHALE - extremely low strength, extremely weathered, light grey mottled red shale		D	1.5				
	1.6	Pit discontinued at 1.6m - on at very low strength shale							
21									

RIG: 3.5 tonne Excavator with 300mm Bucket

LOGGED: JE

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: MC = Moisture Content; PL = Plastic Limit

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 21.6 AHD
EASTING: 299989.9
NORTHING: 6275535.3
DIP/AZIMUTH: 90°/--

BORE No: BH32
PROJECT No: 73895
DATE: 1/4/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
21	0.2	TOPSOIL FILLING - brown, clayey silt topsoil/filling with some organic matter, rootlets, coal chitter and gravel, damp (grass covered)		D	0.1				
	0.4	GRAVELLY CLAY - hard, brown and red-brown, gravelly clay, MC<WP		D	0.5				
	1	CLAY - hard, brown and grey, slightly sandy clay with some fine ironstone gravel, MC=WP - MC<WP from 0.8m		D	1.0		pp >400		1
20		- gravelly band from 1.5m to 1.65m		D	1.5				
	1.7	SILTY SANDY CLAY - hard, light grey and orange-brown, silty sandy clay with a trace of ironstone gravel, MC<WP		D	2.0		pp >400		2
19	2.8	Bore discontinued at 2.8m - refusal on possible bedrock/ironstone band		D	2.8		pp = 350-400		3
18	3								
	4								4
17									
	5								5
16									
	6								6
15									
	7								7
14									
	8								8
13									
	9								9
12									

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased
TYPE OF BORING: Dynamic push tumbe continuous sample
WATER OBSERVATIONS: No free groundwater observed
REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 22.5 AHD
EASTING: 300192
NORTHING: 6275557.9
DIP/AZIMUTH: 90°/--

BORE No: BH33
PROJECT No: 73895
DATE: 1/4/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
22	0.1	TOPSOIL - dark brown, clayey silt topsoil with abundant rootlets, wet		D	0.05				
				D	0.3				
		GRAVELLY CLAYEY SAND - brown, gravelly clayey sand (possible filling), wet to saturated							
	0.7	CLAY - red-brown and brown, clay with some ironstone gravel							
	1			D	1.0				
21		- slightly sandy from 1.4m		D	1.5		pp >400		
	2	2.0 Bore discontinued at 2.0m - refusal on possible ironstone band							
20	3								
19	4								
18	5								
17	6								
16	7								
15	8								
14	9								
13									

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased

TYPE OF BORING: Dynamic push tumbe continuous sample

WATER OBSERVATIONS: Free groundwater observed at 0.18m

REMARKS: Bore collapse back to 1.6m following removal of tubes

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 20.2 AHD
EASTING: 300446
NORTHING: 6275579.3
DIP/AZIMUTH: 90°/--

BORE No: BH34
PROJECT No: 73895
DATE: 31/3/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
20	0.05	FILLING - grey-brown, clayey sand (topsoil) filling, wet to saturated		D	0.1				
		FILLING - brown, red and orange, clay filling with a trace of gravel, MC<WP		D	0.5				
	0.7	CLAYEY SAND - grey and brown, clayey sand, wet		D	0.8				
19	1.0	CLAY - stiff, light brown and grey, clay with some sand, MC=WP		D	1.1		pp = 100-200		
	1.3	SANDY CLAY - stiff then very stiff, grey and orange-brown, sandy clay, MC=WP		D	1.5		pp = 150		
18		- some ironstone gravel from 1.8m to 2.0m		D	2.0		pp = 100-250		
				D	2.5		pp = 250-300		
17	2.8	Bore discontinued at 2.8m - limit of investigation							
16									
15									
14									
13									
12									
11									

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased

TYPE OF BORING: Dynamic push tumbe continuous sample

WATER OBSERVATIONS: No free groundwater observed. Minor seepage expected in clayey sand

REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 23.2 AHD
EASTING: 300455.1
NORTHING: 6275151.8
DIP/AZIMUTH: 90°/--

BORE No: BH35
PROJECT No: 73895
DATE: 1/4/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
23	0.15	FILLING - dark brown, clayey silt filling with some gravel, wet		D	0.1				
	0.4	FILLING - brown, gravelly sandy clay filling, MC>WP		D	0.3			▽	
		CLAY - very stiff to hard, brown and red-brown, clay with trace ironstone gravel, MC<WP		D	0.8		pp = 350-400		
22	1.2	SILTY SANDY CLAY - stiff, light grey and red-orange-brown, sandy and silty clay, MC=WP - MC<WP from 1.45m		D	1.2		pp = 100-150	▼	
	1.8	Bore discontinued at 1.8m - refusal on hard clay/weathered bedrock		D	1.8				
21	2								
20	3								
19	4								
18	5								
17	6								
16	7								
15	8								
14	9								

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased

TYPE OF BORING: Dynamic push tumbe continuous sample

WATER OBSERVATIONS: Free groundwater observed at 1.5m; Seepage at 0.3m

REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 25 AHD
EASTING: 300681
NORTHING: 6275389.8
DIP/AZIMUTH: 90°/--

BORE No: BH36
PROJECT No: 73895
DATE: 9/4/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
25	0.15	TOPSOIL - brown, sandy clayey silt (topsoil) with a trace of fine rootlets, M<Wp		D	0.05				
		CLAY - medium plasticity, very stiff, orange-brown clay, M=Wp From 0.5m: trace gravel		D	0.5		pp = 200-300		
24	1.05	SILTY CLAY - medium plasticity, very stiff to hard, light grey silty clay, M<Wp		D	1.0		pp = 350-400		
	1.4	SHALE - extremely low strength, extremely weathered, light grey-red, ironstained shale with soil like properties		D	1.5		pp >400		
23	1.9	Bore discontinued at 1.9m - refusal on weathered rock		D	1.9				
22									
21									
20									
19									
18									
17									
16									

RIG: Toyota 4WD **DRILLER:** MVH **LOGGED:** MVH **CASING:** Uncased
TYPE OF BORING: Dynamic push tumbe continuous sample
WATER OBSERVATIONS: No free groundwater observed
REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 28.6 AHD
EASTING: 300511.6
NORTHING: 6274879.3
DIP/AZIMUTH: 90°/--

BORE No: BH37
PROJECT No: 73895
DATE: 1/4/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
28	0.15	TOPSOIL - brown, sandy silt topsoil with abundant rootlets, humid		D	0.1				
	0.35	GRAVELLY SAND - brown, gravelly sand, damp		D	0.4				
	1	SANDY CLAY - grey and orange-brown, sandy clay, MC<WP		D	0.8				1
	1.2	Bore discontinued at 1.2m - refusal on hard clay/weathered bedrock		D	1.2				
27	2								2
26	3								3
25	4								4
24	5								5
23	6								6
22	7								7
21	8								8
20	9								9
19									

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased
TYPE OF BORING: Dynamic push tumbe continuous sample
WATER OBSERVATIONS: No free groundwater observed
REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 15.1 AHD
EASTING: 301259.2
NORTHING: 6275147.3
DIP/AZIMUTH: 90°/--

BORE No: BH38
PROJECT No: 73895
DATE: 9/4/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
15	0.2	FILLING - generally loosely placed, brown clay and clayey silt filling, M>Wp		D	0.1				
	0.4	SANDY SILT - brown, sandy silt with trace decomposed organic matter (topsoil), M=Wp		D	0.3		pp = 200-250		
14	1	CLAY - medium plasticity, stiff to very stiff, orange-brown clay, M=Wp From 1.0m: becoming light grey-red ironstained and very stiff, trace gravel, M>Wp		D	0.8		pp = 250-350		1
				D	1.5		pp = 350		
	1.8	GRAVELLY CLAY - hard, grey-brown-red ironstained gravelly clay							
13	2								2
	2.1	Bore discontinued at 2.1m - refusal on gravel		D	2.1		pp >400		
12	3								3
11	4								4
10	5								5
9	6								6
8	7								7
7	8								8
6	9								9

RIG: Toyota 4WD **DRILLER:** MVH **LOGGED:** MVH **CASING:** Uncased

TYPE OF BORING: Dynamic push tumbe continuous sample

WATER OBSERVATIONS: No free groundwater observed

REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 19.5 AHD
EASTING: 300334.2
NORTHING: 6274616.9
DIP/AZIMUTH: 90°/--

BORE No: BH39
PROJECT No: 73895
DATE: 1/4/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
19	0.3	SANDY SILT - dark brown, sandy silt with trace rootlets, damp - clayey from 0.2m		D	0.1				
		CLAY - very stiff, brown and red-brown clay, MC=WP		D	0.5		pp = 250		
	0.8	SILTY SANDY CLAY - very stiff, light grey and orange-brown, silty sandy clay, MC<WP		D	1.0				
18				D	1.5		pp = 250		
	2	- ironstone gravel at 1.95m - slightly cemented band at 2.05m to 2.2m		D	2.0				
17	2.5	Bore discontinued at 2.5m - limit of investigation		D	2.5		pp >400		

RIG: 4WD Utility Vehicle **DRILLER:** TDM **LOGGED:** TDM **CASING:** Uncased
TYPE OF BORING: Dynamic push tumbe continuous sample
WATER OBSERVATIONS: No free groundwater observed
REMARKS: MC = Moisture Content; WP = Plastic Limit

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Mott MacDonald Australia Pty Ltd
PROJECT: Land Capability, Salinity & Contamination
LOCATION: Vineyard Precinct

SURFACE LEVEL: 31.5 AHD
EASTING: 300660.2
NORTHING: 6274627.4

PIT No: TP40
PROJECT No: 73895
DATE: 3/4/2014
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
31	0.1	SILTY CLAY - stiff, red-brown, silty clay with trace sand (MC<PL) (root affected material to 50mm)							
		SILTY CLAY - stiff, grey mottled orange, silty clay, slightly sandy and gravelly, fine to medium angular ironstone gravel (MC<PL)		D	0.1				
				D	0.3				
	0.5			D	0.5				
	0.55	SHALE - extremely low strength, light grey mottled yellow-red shale							
		Pit discontinued at 0.55m - on very low strength shale							
30	1								1

5 10 15 20

RIG: 3.5 tonne Excavator with 300mm Bucket

LOGGED: JE

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: MC = Moisture Content; PL = Plastic Limit

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Appendix C

Groundwater Field Sheets

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Groundwater Field Sheet

Project and Bore Installation Details			
Bore / Standpipe ID:	**BH1**		
Project Name:	Land Capability Assessment		
Project Number:	73895		
Site Location:	Vineyard Precinct		
Bore Easting:	303307.4	Northing:	6276587
Installation Date:	31/03/2014		
GW Level (during drilling):	4.5 m bgl		
Well Depth:	6.0 m bgl		
Screened Interval:	3.0 m bgl		
Contaminants/Comments:	N/A		
Bore Development Details			
Date/Time:	31/03/2014		
Purged By:	M.West		
GW Level (pre-purge):	0.6 m bgl		
GW Level (post-purge):	5.45 m bgl		
PSH observed:	~~Yes~~ / No (interface/visual).		
Observed Well Depth:	6 m bgl		
Estimated Bore Volume:	43 L		
Total Volume Purged:	25 - dry L		
Equipment:	12v Submersible Pump		
Micropurge and Sampling Details			
Date/Time:	10/04/2014		
Sampled By:	M.West		
Weather Conditions:	Cloudy		
GW Level (pre-purge):	0.8 m bgl		
GW Level (post sample):	1.45 m bgl		
PSH observed:	~~Yes~~ / No (interface/visual).		
Observed Well Depth:	6.03 m bgl		
Estimated Bore Volume:	37 L		
Total Volume Purged:	2.8 L		
Equipment:	Geopump		

Water Quality Parameters

Time (am)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Redox (mV)	Salinity (ppt)
Stabilisation Criteria (3 readings)	***0.1° C***	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10 mV**	**+/- 10 ppt**
10.49	20.8	2.53	32,658	6.15	84.6	20.46
10.50	20.8	2.47	32,561	6.1	67.5	20.44
10.53	20.8	2.38	32,648	6.09	80.5	20.42
10.55	20.8	2.22	32,631	6.09	82.3	20.42
10.56	20.8	2.07	32,646	6.08	83.7	20.42
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			

Sample Details

Sampling Depth (rationale):	4 m bgl,
Sample Appearance (e.g. colour, siltiness, odour):	Clear, slightly silty
Sample ID:	BH1
QA/QC Samples:	N/A
Sampling Containers and filtration:	1L glass, 2x 40mL glass vials (HCl) , 1x500ml plastic, 1x200ml plastic (H2SO4), 1x 100mL plastic (HNO3 (filtered)).
Comments / Observations:	N/A

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Groundwater Field Sheet

Project and Bore Installation Details			
Bore / Standpipe ID:	**BH2**		
Project Name:	Land Capability Assessment		
Project Number:	73895		
Site Location:	Vineyard Precinct		
Bore Easting:	300622.5	Northing:	6275939.1
Installation Date:	28/03/2014		
GW Level (during drilling):	3.5 m bgl		
Well Depth:	6.0 m bgl		
Screened Interval:	3.0 m bgl		
Contaminants/Comments:	N/A		
Bore Development Details			
Date/Time:	31/03/2014		
Purged By:	M.West		
GW Level (pre-purge):	1.40 m bgl		
GW Level (post-purge):	5.90 m bgl		
PSH observed:	~~Yes~~ / No (interface/visual).		
Observed Well Depth:	5.70 m bgl		
Estimated Bore Volume:	34 L		
Total Volume Purged:	25l - dry L		
Equipment:	12v Submersible Pump		
Micropurge and Sampling Details			
Date/Time:	10/04/2014		
Sampled By:	M.West		
Weather Conditions:	Cloudy		
GW Level (pre-purge):	1.27 m bgl		
GW Level (post sample):	1.68 m bgl		
PSH observed:	~~Yes~~ / No (interface/visual).		
Observed Well Depth:	6.03 m bgl		
Estimated Bore Volume:	28 L		
Total Volume Purged:	3 L		
Equipment:	Geopump		

Water Quality Parameters

Time (am)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Redox (mV)	Salinity (ppt)
Stabilisation Criteria (3 readings)	***0.1° C***	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10 mV**	**+/- 10 ppt**
10.06	21.7	4.6	33,679	6.37	107.6	21.23
10.08	21.8	1.39	34,114	6.23	100.8	21.45
10.10	21.7	0.86	34,149	6.19	99.8	21.48
10.12	21.7	0.68	34,148	6.18	95.9	21.47
10.13	21.6	0.58	34,148	6.18	95.4	21.47
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			

Sample Details

Sampling Depth (rationale):	5 m bgl,
Sample Appearance (e.g. colour, siltiness, odour):	Clear, slighty silty
Sample ID:	BH2
QA/QC Samples:	N/A
Sampling Containers and filtration:	1L glass, 2x 40mL glass vials (HCl) , 1x500ml plastic, 1x200ml plastic (H2SO4), 1x 100mL plastic (HNO3 (filtered)).
Comments / Observations:	N/A

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Groundwater Field Sheet

Project and Bore Installation Details			
Bore / Standpipe ID:	**BH3**		
Project Name:	Land Capability Assessment		
Project Number:	73895		
Site Location:	Vineyard Precinct		
Bore Easting:	301262	Northing:	6275407
Installation Date:	28/03/2014		
GW Level (during drilling):	5.6 m bgl		
Well Depth:	6.0 m bgl		
Screened Interval:	3.0 m bgl		
Contaminants/Comments:	N/A		
Bore Development Details			
Date/Time:	31/03/2014		
Purged By:	M.West		
GW Level (pre-purge):	0.76 m bgl		
GW Level (post-purge):	5.83 m bgl		
PSH observed:	~~Yes~~ / No (interface/visual).		
Observed Well Depth:	6 m bgl		
Estimated Bore Volume:	35 L		
Total Volume Purged:	25l - dry L		
Equipment:	12v Submersible Pump		
Micropurge and Sampling Details			
Date/Time:	10/04/2014		
Sampled By:	M.West		
Weather Conditions:	Cloudy		
GW Level (pre-purge):	0.8 m bgl		
GW Level (post sample):	1.45 m bgl		
PSH observed:	~~Yes~~ / No (interface/visual).		
Observed Well Depth:	5.85 m bgl		
Estimated Bore Volume:	42 L		
Total Volume Purged:	2 L		
Equipment:	Geopump		

Water Quality Parameters

Time (am)	Temp (^{o}C)	DO (mg/L)	EC (µS/cm)	pH	Redox (mV)	Salinity (ppt)
Stabilisation Criteria (3 readings)	***0.1^{o}C***	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10 mV**	**+/- 10 ppt**
8.34	19.7	3.53	26,042	5.57	99.01	15.84
8.36	19.7	3.30	25,718	5.57	99.30	15.6
8.37	19.7	3.08	25,534	5.57	99.70	15.53
8.39	19.6	3.00	25,390	5.57	99.30	15.52
8.40	19.6	2.95	25,428	5.58	99.10	15.52
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			

Sample Details

Sampling Depth (rationale):	4.5 m bgl,
Sample Appearance (e.g. colour, siltiness, odour):	Clear
Sample ID:	BH3
QA/QC Samples:	N/A
Sampling Containers and filtration:	1L glass, 2x 40mL glass vials (HCl) , 1x500ml plastic, 1x200ml plastic (H2SO4), 1x 100mL plastic (HNO3 (filtered)).
Comments / Observations:	N/A

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Groundwater Field Sheet

Project and Bore Installation Details			
Bore / Standpipe ID:	**BH4**		
Project Name:	Land Capability Assessment		
Project Number:	73895		
Site Location:	Vineyard Precinct		
Bore Easting:	301813.4	Northing:	6275311
Installation Date:	27/03/2014		
GW Level (during drilling):	- m bgl		
Well Depth:	6.0 m bgl		
Screened Interval:	3.0 m bgl		
Contaminants/Comments:	N/A		
Bore Development Details			
Date/Time:	31/03/2014		
Purged By:	M.West		
GW Level (pre-purge):	2.35 m bgl		
GW Level (post-purge):	5.95 m bgl		
PSH observed:	~~Yes~~ / No (interface/visual).		
Observed Well Depth:	6.05 m bgl		
Estimated Bore Volume:	22 L		
Total Volume Purged:	22 L		
Equipment:	12v Submersible Pump		
Micropurge and Sampling Details			
Date/Time:	10/04/2014		
Sampled By:	M.West		
Weather Conditions:	Cloudy		
GW Level (pre-purge):	2.2 m bgl		
GW Level (post sample):	3.4 m bgl		
PSH observed:	~~Yes~~ / No (interface/visual).		
Observed Well Depth:	6.02 m bgl		
Estimated Bore Volume:	24 L		
Total Volume Purged:	2.2 L		
Equipment:	Geopump		

Water Quality Parameters

Time (am)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Redox (mV)	Salinity (ppt)
Stabilisation Criteria (3 readings)	***0.1° C***	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10 mV**	**+/- 10 ppt**
9.23	20.00	4.31	2,750	7.46	102.8	1.39
9.26	19.90	2.44	2,368	7.38	104.8	1.22
9.27	19.90	1.91	2,341	7.35	104	1.22
9.29	19.80	1.41	2,506	7.34	102.8	1.54
9.31	19.70	1.50	2,600	7.33	102.2	1.73
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			

Sample Details

Sampling Depth (rationale):	4 m bgl,
Sample Appearance (e.g. colour, siltiness, odour):	Clear
Sample ID:	BH4
QA/QC Samples:	N/A
Sampling Containers and filtration:	1L glass, 2x 40mL glass vials (HCl) , 1x500ml plastic, 1x200ml plastic (H2SO4), 1x 100mL plastic (HNO3 (filtered)).
Comments / Observations:	N/A

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Groundwater Field Sheet

Project and Bore Installation Details			
Bore / Standpipe ID:	**BH5**		
Project Name:	Land Capability Assessment		
Project Number:	73895		
Site Location:	Vineyard Precinct		
Bore Easting:	302933.3	Northing:	6273992.2
Installation Date:	27/03/2014		
GW Level (during drilling):	4.0 m bgl		
Well Depth:	6.0 m bgl		
Screened Interval:	3.0 m bgl		
Contaminants/Comments:	N/A		
Bore Development Details			
Date/Time:	31/03/2014		
Purged By:	M.West		
GW Level (pre-purge):	1.9 m bgl		
GW Level (post-purge):	4.57 m bgl		
PSH observed:	~~Yes~~ / No (interface/visual).		
Observed Well Depth:	5.16 m bgl		
Estimated Bore Volume:	22 L		
Total Volume Purged:	22-dry L		
Equipment:	12v Submersible Pump		
Micropurge and Sampling Details			
Date/Time:	10/04/2014		
Sampled By:	M.West		
Weather Conditions:	Cloudy		
GW Level (pre-purge):	1.81 m bgl		
GW Level (post sample):	1.85 m bgl		
PSH observed:	~~Yes~~ / No (interface/visual).		
Observed Well Depth:	5.97 m bgl		
Estimated Bore Volume:	35 L		
Total Volume Purged:	2.2 L		
Equipment:	Geopump		

Water Quality Parameters

Time (am)	Temp (°C)	DO (mg/L)	EC (µS/cm)	pH	Redox (mV)	Salinity (ppt)
Stabilisation Criteria (3 readings)	***0.1°C***	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10 mV**	**+/- 10 ppt**
7.49	22.2	5.48	21,723	5.92	91.7	13.08
7.51	22.3	2.00	21,827	5.90	95.2	13.13
7.53	22.3	1.49	21,830	5.88	113.5	13.13
7.55	22.4	1.23	21,823	5.87	134.7	13.14
7.56	22.4	1.02	21,822	5.86	160.0	13.13
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS			

Sample Details

Sampling Depth (rationale):	4.5 m bgl,
Sample Appearance (e.g. colour, siltiness, odour):	slightly silty
Sample ID:	BH4.5
QA/QC Samples:	BD1A/10414
Sampling Containers and filtration:	1L glass, 2x 40mL glass vials (HCl) , 1x500ml plastic, 1x200ml plastic (H2SO4), 1x 100mL plastic (HNO3 (filtered)).
Comments / Observations:	N/A