Figures

Legend

- Site Boundary
- Lot Boundaries

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED LANDGATE 2017
- OTHER DATA SOURCED LANDGATE 2018
- AERIAL PHOTOGRAPHY SOURCED LANDGATE 2018
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0 80 160 240
Meters
1:7,500 @ A4
N

LOCALITY MAP

PROJECT ID	DATE
3850	05/06/2020

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
LF	LZ	KL	0

CBH Group
CBH Kwinana Fertiliser Expansion
Lot 108 Rockingham Beach Road

Water Management Strategy (WMS)

Figure 1
Site Location

K:\Projects\10. WAM\3850 CBH Kwinana Fertiliser Expansion\3850 F01 Site Location.mxd

Legend

- Site Boundary
- Lot Boundaries
- Indicative Underground Pipeline Route

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
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- OTHER DATA SOURCED LANDGATE 2018
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LOCALITY MAP

PROJECT ID	DATE
3646	02/07/2020

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
LF	AW	KC	0

CHB Kwinana Fertiliser Import Facility
Rockingham Beach Road

Water Management Strategy (WMS)

Figure 2
Site Layout

K:\Projects\9.0 APP\3646 Kwinana Fertiliser Shed\3646 EMP\3646 EMP F02 Site Layout.mxd

Legend

- Site Boundary
- Lot Boundaries
- Contours 1m interval

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED LANDGATE 2017
- OTHER DATA SOURCED LANDGATE 2018
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LOCALITY MAP

PROJECT ID	DATE
3850	10/07/2020

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
LF	LZ	KL	0

CBH Group,
CBH Kwinana Fertiliser Expansion

Water Management Strategy (WMS)

Figure 3
Topography

K:\Projects\10. WAM\3850 CBH Kwinana Fertiliser Expansion\3850 F03 Topography.mxd

Legend

- Site Boundary
- Lot Boundaries

Soil Land System

- 211Qu: Coastal dunes, of the Swan Coastal Plain, with calcareous deep sands and yellow sands. Coastal scrub.

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED LANDGATE 2017
- OTHER DATA SOURCED LANDGATE 2018
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LOCALITY MAP

PROJECT ID	DATE
3850	10/07/2020

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
LF	LZ	KL	0

CBH Group,
CBH Kwinana Fertiliser Expansion

Water Management Strategy (WMS)

Figure 4
Regional Soil Type

K:\Projects\10. WAM\3850 CBH Kwinana Fertiliser Expansion\3850 F04 Regional Soil Type.mxd

Legend

- Site Boundary
- Lot Boundaries
- DWER Groundwater Contours Max
- Groundwater Well Locations

Win site 61410035

- DWER Monitoring Bore

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED LANDGATE 2017
- OTHER DATA SOURCED LANDGATE 2018
- AERIAL PHOTOGRAPHY SOURCED LANDGATE 2018 (© Western Australian Land Information Authority 2018)

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LOCALITY MAP

PROJECT ID	DATE
3850	10/07/2020

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
LF	LZ	KL	0

CBH Group,
CBH Kwinana Fertiliser Expansion

Water Management Strategy (WMS)

Figure 5
Groundwater Levels

K:\Projects\10. WAM\3850 CBH Kwinana Fertiliser Expansion\3850 F05 Groundwater Levels.mxd

Legend

- Site Boundary
- Lot Boundaries
- Site Layout

Stormwater Catchments

- Access Road
- Eastern Catchment
- Northern Catchment
- Western Catchment
- North Roof
- South Roof

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED LANDGATE 2017
- OTHER DATA SOURCED LANDGATE 2018
- AERIAL PHOTOGRAPHY SOURCED LANDGATE 2018
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LOCALITY MAP

PROJECT ID	DATE
3850	10/07/2020

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
LF	LZ	KL	0

CBH Group,
CBH Kwinana Fertiliser Expansion

Water Management Strategy (WMS)

Figure 6
Stormwater Catchment Plan

K:\Projects\10. WAM\3850 CBH Kwinana Fertiliser Expansion\3850 F06 Stormwater Catchment Plan.mxd

Legend

- Site Boundary
- Site Layout
- Evaporation Pond
- Underground Storage
- Wash Bay to Evaporation Pond
- Soakwell
- Biofiltration Swale
- Direction of Swale Flow
- 1% AEP Event

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED LANDGATE 2017
- OTHER DATA SOURCED LANDGATE 2018
- AERIAL PHOTOGRAPHY SOURCED LANDGATE 2018
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LOCALITY MAP

PROJECT ID	DATE
3850	10/07/2020

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
LF	KL	KL	0

CBH Group,
CBH Kwinana Fertiliser Expansion

Water Management Strategy (WMS)

Figure 7
15mm and 10% AEP Event Plan

Legend

- Site Boundary
- Site Layout
- Evaporation Pond
- Underground Storage
- Wash Bay to Evaporation Pond
- Soakwell
- Drainage Swale
- Direction of Swale Flow 10% AEP and 1% AEP Event

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED LANDGATE 2017
- OTHER DATA SOURCED LANDGATE 2018
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LOCALITY MAP

PROJECT ID	DATE
3850	10/07/2020

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
LF	LZ	KL	0

CBH Group,
CBH Kwinana Fertiliser Expansion

Water Management Strategy (WMS)

Figure 8
10% AEP and 1% AEP Event Plan

K:\Projects\10. WAM\3850 CBH Kwinana Fertiliser Expansion\3850 F08 1% AEP Event Plan.mxd

Appendices

Appendix A
Geotechnical Report

Report on

GEOTECHNICAL STUDY
PROPOSED CBH FERTILISER FACILITY
LOT 108 – VOLUME 2953, FOLIO 177
ROCKINGHAM BEACH ROAD, ROCKINGHAM

Submitted to:
Cooperative Bulk Handling (CBH) Ltd
c/- ACOR Consultants (WA) Pty Ltd
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J2001016 001 R Rev3

20 July 2020

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TABLES

TABLES (ATTACHED)

FIGURE

APPENDICES

1. INTRODUCTION

This report presents the outcomes of the geotechnical study conducted by Galt Geotechnics (Galt) for the proposed Cooperative Bulk Handling (CBH) Ltd fertiliser facility on part of Lot 108 (Lot 108 on Deposited Plan 400167, the whole of the Land in Certificate of Title Volume 2953 Folio 177) Rockingham Beach Road, Rockingham ("the site"). The location of the site relative to the surrounding area is shown on Figure 1.

This report has been revised in response to CBH review and supersedes our previous report referenced J2001016 001 R Rev2 dated 16 May 2020.

2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The site is located on the south-western part of Lot 108 and covers a plan area of about 6.5 hectares. The existing CBH Kwinana Grain Terminal is located on the adjacent site to the southwest.

The proposed facility site is generally covered in thick scrub and small trees with a few narrow sandy access tracks. A crushed limestone access track extends from Rockingham Beach Road along the south-west boundary. There is also an unsealed gravel hardstand at the southern corner that has evidently been used as a laydown.

Historical aerial imagery (dating back to 1953) shows that the site has not been previously developed.

The facility is understood to comprise:

- Granular fertiliser shed (240 m x 85 m, 80,000 tonne capacity).
- Liquid Urea Ammonium Nitrate (UAN) Fertiliser storage tanks (3 x 30 m diameter, 20 m high tanks – 16,000 tonnes each).
- Weighbridge and road truck loading facility for Liquid UAN and dry granular fertiliser products.
- Administration office.
- Internal pavement and access roads.
- Outside the main fertiliser storage facility, a 250 mm nominal diameter (ND) steel pipeline will be routed on the Kwinana grain terminal (KGT) jetty to the ship unloading berth. The pipe will be converted to 250 mm ND high density polyethylene (HDPE) for an underground section extending from the Kwinana Beach Road crossing to the UAN storage tanks. Pipes installed around the tanks will be of steel construction.

Note that the layout of the facility is in the concept stage of planning and is subject to change. The current concept plan (provided on 8/5/20) is presented in Appendix A.

3. OBJECTIVES

The specified objectives for the study were generally as follows:

- assess the subsurface soil, rock and groundwater conditions;
- provide a site classification(s) in accordance with AS 2870-2011 "Residential Slabs and Footings";
- assess the appropriate site subsoil class for the site in accordance with AS 1170.4-2007;
- provide allowable bearing pressures and settlement estimates for shallow foundations;
- provide a subgrade California bearing ratio (CBR) value for pavement thickness design by others.
- recommend appropriate site preparation procedures including compaction and fill criteria;
- advise on the trafficability of the site during earthworks and any precautionary measures that may need to be considered;
- provide recommendations for excavations and slopes;

- provide recommendations and geotechnical design parameters for earth retaining structures;
- provide advice for on-site disposal of storm-water by infiltration using soakwells; and
- provide dewatering advice.

4. FIELDWORK

The fieldwork was conducted over the period of 6 to 13 March and on 18 March 2020 and comprised:

- A walkover and inspection of the site, including:
  - Recording of general site features.
  - Noting access constraints and requirements for vegetation clearing.
- Clearing vegetation to form access tracks where required.
- Clearing test locations of services using an accredited service locator.
- Excavation of test pits at 4 locations (TP01 to TP04) to a depth of 2.0 m in each instance.
- Cone penetration tests (CPTs) at 18 locations (CPT01 to CPT18) to depths ranging from 4.2 m to 25.5 m.
- Drilling of boreholes at 4 locations (BH01 to BH04) to a depth of 12.45 m in each instance.
- Standard penetration tests (SPTs) at 1.5 m depth intervals in the soils within the boreholes.
- Installation of groundwater monitoring wells in the boreholes (MW01 to MW04) to depths ranging from 4.1 m to 5.5 m.
- Installation of a 32 mm nominal diameter PVC standpipe in CPT03-MW08 to the base of the hole (4.2 m).
- Infiltration tests at 4 locations (IT01 to IT04) at depths ranging from 0.8 m to 0.92 m.
- Slug permeability tests in 2 of the groundwater monitoring wells (BH01-MW01 & BH03-MW03).
- Soil electrical resistivity tests at 3 locations (R01 to R03).
- Collection of soil samples for geotechnical and chemical laboratory tests.
- Surveying of all test locations.

Note: The fieldwork included investigation for an alternate development site (north-east part of Lot 108) and environmental investigation. Due to this, the test numbering is not sequential.

General

The fieldwork was generally conducted in accordance with AS1726 (2017) "Geotechnical Site Investigations".

Test locations were generally selected by a senior geotechnical engineer from Galt. Test pits, borehole and groundwater monitoring well locations were selected in consultant with the project environmental consultant.

A geotechnical engineer from Galt positioned the tests using a handheld GPS accurate to about 5 m in the horizontal plane and relative to surrounding site features and services. After completion of the tests, the locations and elevations were recorded using a differential GPS accurate to about 100 mm in the horizontal and vertical planes.

The test locations are shown on Figure 1. A summary of the tests are provided in Table A1 at the end of the text. Photographs of the site are presented in Appendix B.

Test Pits

Test pits were excavated using an 8 tonne JCB 3CX tractor mounted backhoe equipped with a 0.45 m wide rock bucket. The backhoe was supplied and operated by ANH Contracting. Test pit reports are presented in Appendix C, along with a method of soil description and a list of explanatory notes and abbreviations used in the reports.

Cone Penetration Tests

Cone penetration tests (CPTs) were conducted using a 22 tonne track-truck combination CPT rig and a 7 tonne tracked CPT rig supplied and operated by Probedrill Pty Ltd. The testing was conducted in accordance with AS1289.6.5.1 (1999). A 32 mm slotted PVC standpipe was installed in CPT03 to a depth of 4.2 m and was finished with gatic cover.

The CPT results are presented in Appendix D, including a method of interpretation proposed by Robertson et al (1986).

Boreholes

Boreholes were drilled using a Comacchio GEO305 tracked mounted drill rig using air coring methods. Standard penetration tests were performed at 1.5 m depth intervals in the soils. The drill rig was supplied and operated by Proline Drilling.

Boreholes reports are presented in Appendix E along with a method of soil description and a list of explanatory notes and abbreviations used in the reports. Core photographs are included with each report.

Groundwater Monitoring Well Installation

Groundwater monitoring wells were installed in each borehole after completion.

The wells comprise 50 mm PVC standpipes extending to depths of 4.1 m and 5.5 m with a 3.0 m slotted section at the base of each well. The borehole below the standpipe was allowed to collapse prior to installation. Gravel pack was placed around the slotted sections, followed by a bentonite seal that is typically 1.0 m thick. The remainder of the borehole around the standpipe was backfilled to ground level using drill cuttings and backfill (i.e. on-site soils). The standpipe was finished with a steel monument cover, excluding BH01/MW01 which was provided with a steel gatic cover.

Groundwater Monitoring Well Construction Reports are presented with the borehole reports in Appendix E.

Infiltration Tests (shallow)

Infiltration testing was undertaken at relatively shallow depths (less than 1 m below ground) using the 'inverse auger hole' method described by Cocks[1]. The test results are presented in Appendix F and are summarised in Table 1.

Table 1: Summary of Infiltration Test Results

Test No.	Test Depth (m)	Minimum Unsaturated Permeability, k (m/day)		
		Test 1	Test 2	Test 3
IT03	0.82	8.6	5.4	-
IT04	0.90	3.2	2.0	-
IT05	0.76	4.2	3.9	4.0
IT06	0.90	5.7	3.6	3.5

[1] Cocks, G (2007), "Disposal of Stormwater Runoff by Soakage in Perth Western Australia", Journal and News of the Australian Geomechanics Society, Volume 42 No. 3, pp 101-114

Slug Permeability Tests (deep)

Falling head and rising head permeability tests were carried out in the groundwater monitoring wells using the slug testing method. This involves lowering and withdrawing a slug (32 mm diameter and 1 m long cement filled PVC pipe) from below the groundwater table. During the tests, the water pressure is recorded using a "Rugged Troll" water pressure monitor manufactured by In-situ Inc. Data was downloaded to a laptop computer and reviewed after each test.

We have assessed the aquifer permeability at the standpipe location using the computer software Aqtesolv (version 4.50.002) by HydroSOLVE, Inc. The Bouwer and Rice method of analysis was adopted in our calculations. The report of the permeability assessment is presented in Appendix G and is summarised in Table 2.

Table 2: Summary of Slug Permeability Test Results

Test Location	Test Type	Average Permeability, k (m/sec)		
		Test 1	Test 2	Test 3
BH01-MW01	Falling head	8.42×10^{-5}	9.41×10^{-5}	-
	Rising head	2.36×10^{-4}	1.67×10^{-4}	1.26×10^{-4}
BH03-MW03	Falling head	2.50×10^{-4}	1.12×10^{-4}	1.44×10^{-4}
	Rising head	1.90×10^{-4}	2.18×10^{-4}	1.57×10^{-4}

Soil Electrical Resistivity Tests

Soil electrical resistivity tests were performed in accordance with ASTM G57-06, "Standard Test Method for Field Measurement of Soil Resistivity Using the Wenner Four-Electrode Method".

The testing was carried out using a Metrel Smartec MI 3123, set to measure specific earth resistance. The soil resistivity is reported in kΩ.m. The tests were conducted at electrode spacings 'a' of 1 m, 2 m, 3 m and 6 m with a straight and orthogonal traverse at each location. The results of the resistivity tests are presented in Table 3.

Table 3: Soil Electrical Resistivity Test Results

Test Name	a spacing (m)	Resistivity kΩ.m	
		Straight	Orthogonal
R1	1	-	12.5
	2	6.56	7.17
	3	5.05	5.85
	6	1.17	2.59
R2	1	27.8	-
	2	20.5	3.14
	3	11.2	2.71
	6	-	1.06
R3	1	5.06	8.67
	2	13.3	2.81
	3	3.43	2.56
	6	0.725	0.760

Note: The reported resistivities are the minimum recorded from 3 tests at each location. The resistivity did not vary more than 0.3% across the 3 tests at any given location.

5. LABORATORY TESTING

5.1 Geotechnical

Geotechnical laboratory testing of soil samples was undertaken by Western Geotechnical Laboratory Services (WGLS) in their NATA accredited laboratory and comprised determination of:

- particle size distribution on 5 samples;
- Atterberg limits and linear shrinkage on 5 samples;
- dry density-moisture content relationship using Modified compactive effort on 3 samples; and
- 4 day-soaked California bearing ratio (CBR) on 3 samples.

Laboratory results along with the test methods followed are presented in Appendix D and are summarised in Table 4.

Table 4: Summary of Laboratory Test Results

Test Name	Sample Depth (m)	Soil Description AS1726 (2017)	% Gravel	% Sand	% Fines	LL (%)	PI (%)	LS (%)	MMDD (t/m^3)	OMC (%)	CBR (%)	CBR Swell (%)
TP01	0.5	SAND (SP-SM)	7	88	5	NO	NP	0.0	1.61	15.0	30	0.0
TP02	0.5	SAND (SP)	-	97	3	NO	NP	0.0	1.61	18.5	50	0.0
TP04	0.5	SAND (SP)	-	96	4	NO	NP	0.0	1.57	18.5	45	0.0
BH04	1.5 – 3.0	SAND (SP-SM)	-	95	5	NO	NP	0.0	-	-	-	-
BH04	4.5 – 7.5	SAND (SP-SM)	-	91	9	NO	NP	1.0	-	-	-	-

LL – Liquid Limit **PI**: – Plasticity Index **LS** – Linear Shrinkage **NP** – non-plastic

MMDD – modified maximum dry density **OMC –** optimum moisture content **NO –** Not obtainable

CBR – California bearing ratio**,** target density ratio - 95% MMDD, 9 kg surcharge, 4 day soak

5.2 Chemical

Chemical laboratory testing was carried out by Envirolab Services (WA) Pty Ltd in their NATA accredited laboratory. The testing comprised determination of pH, chloride content and sulphate content on 3 representative soil samples.

The results of the testing are presented in Appendix H and summarised in Table 5.

Table 5: Summary of Chemical Laboratory Test Results

Test Location	Sample Depth (m)	pH	Chloride Content (mg/kg)	Sulphate Content (mg/kg)
TP01	0.5	9.2	< 10	< 10
BH04	0.5-3.0	9.4	43	92
BH04	4.5-7.5	9.0	45	490

6. SITE CONDITIONS

6.1 Geology

The Rockingham sheet of the 1:50,000 scale Environmental Geology series map indicates that the area is underlain by calcareous sand.

The findings of the investigation are generally consistent with the geological mapping. The subsurface profile broadly comprises a variable thickness of inferred sand fill over deep calcareous sands and inferred limestone.

6.2 Subsurface Conditions

The typical subsurface profile can be described as follows:

- FILL/TOPSOIL: Organic SAND: fine to medium grained, sub-angular to sub-rounded, grey to brown, trace fines, trace roots and root fibres, dry, loose, present from ground surface and extending to depths ranging from 0.2 m to 0.6 m; overlying

- FILL: SAND/ SAND (SP): fine to medium grained, sub-angular to sub-rounded, typically pale yellow to white, typically trace fines, trace weakly cemented gravel, cobble and boulder sized limestone fragments, dry, typically medium dense with isolated loose to medium dense zones, extending to depths of about 1.5 m;

- SAND (SP): fine to coarse grained, sub-angular to sub-rounded, becoming yellow to pale brown, trace shell fragments, moist becoming wet, medium dense to dense, extending to depths ranging from 3.0 m to 4.5 m; overlying

- SAND (SP-SM): fine to medium grained, sub-angular to sub-rounded, grey to dark grey, with non-plastic fines, trace shell fragments, wet, medium dense to dense, wet, extending to a depth of 12.45 m; overlying

- Inferred SAND: medium dense to dense to a depth of 21.5 m with isolated loose to medium dense lenses/zones, extending to a depth of 21 m; overlying

- Inferred Silty SAND to Clayey SILT: very loose to soft, extending to the maximum investigated depth of 25.5 m; overlying

- Inferred LIMESTONE[3]

Notes:
1. Soil descriptions below 12.45 m are inferred from CPT data only
2. Refer to the test reports in the Appendices for further details of the soil types and stratigraphy at each test location.
3. No samples of rock were recovered (CPT only)

6.3 Groundwater

The Perth Groundwater Atlas (1997) shows the maximum groundwater level to be around RL 1.0 m to RL 1.75 m AHD. We note the groundwater levels at the site are likely to be influenced by tidal variations.

During our investigation (3 to 5 March 2020), groundwater was recorded at the following locations, depths and elevations:

Table 6: Summary of Groundwater Measurements

Test Location	Depth of Groundwater(m)	Approximate Groundwater Elevation (m AHD)
BH01-MW01	3.5	RL 0.55
BH02-MW02	3.1	RL 0.53
BH03-MW03	3.1	RL 0.47
BH04-MW04	3.5	RL – 0.22

We note that groundwater levels are likely to rise during the winter months. Given the groundwater measurements were taken near the end of summer, we expect the groundwater levels may rise by about 1 m in the winter months.

7. GEOTECHNICAL ASSESSMENT

7.1 Site Classification

We have assessed the site classification for the site in accordance with AS2870 (2011) "Residential Slabs and Footings". We consider that a site classification of "Class A" is appropriate provided that the site preparation guidelines in Section 7.4 are followed.

Note: Footing and slab details in accordance with AS2870 (2011) are limited to single to double storey residential structures supported on shallow foundation with a maximum bearing pressure of 100 kPa. This must be taken into account by the structural designers.

7.2 Site Subsoil Class

We consider that a site subsoil class of "Ce" is appropriate for the site in accordance with AS1170.4 "Earthquake Design Actions in Australia".

7.3 Soil Corrosivity

Representative samples of the in-situ soils were collected to assess the soil corrosivity and aggressiveness towards buried steel and concrete. Note that we have not assessed the corrosivity of the groundwater.

The results of the chemical testing in Table 7 have been assessed in accordance with the exposure classifications used for steel and concrete piles (AS2159 – 2009) and for buried concrete structures (AS3600 – 2009).

Table 7: Exposure Classifications

Test Name	Depth (m)	pH	Chloride (ppm)[1]	Sulphate[2] (ppm)[1]	Typical Soil Electrical Resistivity kΩ.m	Exposure Classification (AS2159 -2009)		Exposure Classification (AS3600-2009)
						Concrete	Steel	Concrete
TP01	0.5	9.2	< 10	< 10	3.0 – 27	Mild	NA	A2
BH04	1.5 – 3.0	9.4	43	92	2.5 – 20	Mild	NA	A2
BH04	4.5 – 7.5	9.0	45	490	0.7 – 11	Mild	NA	A2

Notes:
1. Chloride and sulphate test results reported as mg/kg which is the equivalent of ppm
2. NA – non-aggressive
3. Exposure classifications from AS3600-2009 should be interpreted with the detailed notes presented on page 56 of the standard

7.4 Site Preparation

The following site preparation must be followed where infrastructure is proposed, including on-ground slabs, shallow footings (including rafts), retaining walls and pavements.

- Remove vegetation and topsoil from the site, including grubbing out roots. In general, there appears to be a relatively thick mat of organic soil and roots that covers most of the site. We expect that a topsoil strip of about 0.3 m is required along with further raking of roots. Localised excavation of deeper roots may be required where mature trees are present. Holes formed by the excavation of roots must be compacted at the base and re-instated in controlled layers with approved compacted sand fill.
- Dewater where required to facilitate safe excavations and compaction. The groundwater table must be lowered to at least 1 m below the base of any excavation.
- Excavate where required using safely battered slopes in accordance with Section 7.8. Stockpile excavated material for later reuse as structural fill (refer to Section 7.7) or dispose off site.
- Moisture condition and compact the exposed ground to a minimum required density in Section 7.6 to a minimum depth of 0.9 m.
- Place and compact approved fill (refer to Section 7.7) in layers no greater than 0.3 m loose thickness. Each layer must be placed and compacted to achieve the minimum required density in Section 7.6.
- Excavate to the underside of footings and slabs and compact the exposed bases. The minimum required density in Section 7.6 must be achieved to a minimum depth of 0.9 m.

7.5 Pipe Installations

We note that a 250 mm diameter steel/HDPE pipe will be installed from the existing Kwinana Grain Terminal Jetty to the north-west, along Rockingham Beach Road and along the south-west site boundary to the liquid fertiliser tanks. We assume that:

- The majority of the alignment will be installed by way of conventional open excavations.
- The pipe will be installed using trenchless methods below Rockingham Beach Road.

We have not been provided the proposed pipe invert depths/elevations.

We note that:

- Excavations for the pipe and launch/receival pits should be readily achieved using safely battered slopes and conventional earthmoving equipment as per Section 7.8.

- Dewatering in accordance with Section 7.9 may be required to lower the groundwater at least 1.0 m below the installation depths.
- Pipe installations must be backfilled in accordance with the pipe manufacturer's recommendations.
- The in-situ sand is considered generally suitable for re-instating the trenches.

We must be consulted for further advice if the above assumptions are incorrect.

7.6 Compaction

The in-situ sand or site derived sand fill must be compacted using suitable compaction equipment to achieve a dry density ratio (DDR) of at least 95% modified maximum dry density (MMDD) as determined in accordance with AS 1289.5.2.1 at a moisture content within 2% of optimum moisture content (OMC).

Where sand is used as fill and the Perth sand penetrometer (PSP) is used for compaction control, the following PSP blow counts may be assumed to correlate to the required dry density ratio of 95% MMDD:

- 0.15 m to 0.45 m: 11 blows
- 0.45 m to 0.75 m: 13 blows
- 0.75 m to 1.05 m: 15 blows (or 0.75 m to 0.9 m: 8 blows).

Note: PSP blow counts in Calcareous sands are much higher at 95% MMDD than in the typical silica sands around the Perth metropolitan area.

If difficulties are experienced in achieving the required blow count, an on-site PSP calibration should be undertaken to determine the site-specific blow count correlating to the required dry density ratio.

Over-excavation and replacement of loose materials must be done where the minimum dry density ratio cannot be achieved.

Fill must be placed in horizontal layers of not greater than 0.3 m loose thickness. Each layer must be compacted by suitable compaction equipment, and carefully controlled to ensure even compaction over the full area and depth of each layer.

Testing Frequency

After compaction, verify that the required level of compaction has been achieved by testing at the base of excavation and through the full depth of any fill and to a minimum depth of 0.9 m below foundations:

- on each lift of fill on a 30 m grid.
- at each spread location;
- at 10 m centres along strip footings, including retaining wall footings; and
- at 15 m centres below on-ground slabs and pavements.

Compaction Vibrations

Care will need to be taken when compacting in the vicinity of existing structures. This is particularly important if vibratory compaction is being carried out. Tynan (1973)[2] provides assistance with the selection of compaction equipment for use adjacent to structures. Of particular concern are the existing buildings to the north and west.

[2] Tynan (1973) Ground Vibration and Damage Effects on Buildings, Australia Road Research Board, Special Report No. 11.

7.7 Approved Fill

Imported granular fill must comply with the material requirements as stated in AS3798 (2007), "Guidelines on Earthworks for Commercial and Residential Developments".

We consider the in-situ sand and sand fill at the site is generally suitable for re-use as inert structural fill and as trench backfill for the pipe installations.

Our infiltration tests indicate that the upper soils have a variably low permeability, particularly in isolated soils with higher fines content (SAND/Silty SAND). We therefore recommend that any site derived fill materials used around drainage structures are reviewed by a geotechnical engineer prior to use to ensure the correct permeability assumptions are made.

The in-situ topsoil (Organic SAND) in its current state is not considered suitable for re-use as structural fill. Topsoil screening and blending with clean sand may be considered for re-use as structural fill subject to trials and further advice. Without treatment, the topsoil may only be re-used in non-structural/landscaped areas of the site or be disposed of off site.

Any organic rich sand or sand containing significant proportions of fines (material less than 0.075 mm in size) must not be used as structural sand fill.

Where doubt exists, a geotechnical engineer must be engaged to inspect and approve the use of potential fill materials.

7.8 Excavation and Slopes

Test pits were excavated using an 8 tonne tractor mounted JCB 3CX backhoe equipped with a 0.45 m wide rock bucket. The target depth of 2 m was achieved in each instance.

We note that dewatering may be required to facilitate excavations below the groundwater table (refer to Section 7.9).

We consider that excavations (above the groundwater table) at the site will be readily achieved to a depth of about 3 m using conventional equipment (i.e. with a 10 tonne or larger excavator). The possible presence of obstructions such as buried soak wells, footings or redundant services must also be taken into account when selecting earthmoving equipment.

Excavations in sand are particularly prone to instability unless support is provided. Care must be exercised in such excavations and appropriate safety measures adopted where necessary. Where possible, excavations must be battered at slopes no steeper than 1V:2H for temporary slopes and 1V:3H for permanent slopes where the base of the slope is at least 1 m above the groundwater. Even at these slopes angles, erosion and rilling may occur. No surcharges (such as plant and stockpiles) are permitted in the vicinity of the crest of unsupported excavations.

A geotechnical engineer must be consulted where there is any doubt regarding the stability or safety of unsupported excavations.

7.9 Groundwater and Dewatering

7.9.1 General

The requirement for dewatering will depend on the elevations of footings, ground slabs and underground installations.

We note that:

- The depth of groundwater measured at the test locations varied from about 3.1 m to 3.5 m with interpolated groundwater elevations varying from RL - 0.22 m to RL 0.56 m AHD.
- The maximum historical groundwater elevation below the site, shown in the Perth Groundwater Atlas (1997), is about RL 1.0 m to RL 1.75 m AHD which is about 1.5 m to 4 m below the current ground levels (determined by our survey of test locations on 18 March 2020).

Our experience has shown that compaction can be difficult when groundwater is within 1 m of ground surface. The groundwater must therefore be lowered at least 1 m below the underside any proposed excavation, footing or slab. If dewatering is required, we expect it could be achieved using a system of spears commonly used in the sands of the Perth metropolitan area.

We note that it would be a distinct advantage to construct during the summer months when the groundwater level can be expected to be at its lowest level. In this way, dewatering may be significantly reduced or eliminated. A variation in groundwater level of about 1 m may be expected in the course of a given year.

7.9.2 Permeability Assessment

We have assessed the aquifer permeability in the monitoring wells at BH01-MW01 and BH03-MW03. Based on our testing and calculations, we have determined saturated permeabilities in the range of 1.12×10^{-4} to 9.41×10^{-5}m/s.

The flow rates applicable to any dewatering required will depend on the depth to which groundwater is required to be lowered and the permeability of the *in situ* soils. The flow rates should be assessed considering the permeability values provided above and that:

- The groundwater table is likely to be higher during the winter months (probably in the order of 1 m). We recommend that further monitoring and testing in the wells is conducted during the winter months.
- The permeability of the upper soils (likely fill materials) is lower than the cleaner sands (i.e. sand with low fines content) at depth.

7.10 Retaining Structures and Thrust Blocks

Retaining wall structures may be designed in accordance with AS4678 (2002) “Earth Retaining Structures”. We further note that thrust blocks will likely be required for the proposed pipe installation.

We consider the following design parameters in Table 8 are appropriate for the retaining walls and thrust blocks. We must be consulted if design parameters below 12 m depth are required.

Table 8: Retaining Wall Design Parameters

Soil Type	Typical Depth Range (m)	γ (t/m³)	ϕ (°)	K_o	Wall interface friction angle			
					δ = 0°		δ = 15°	
					K_a	K_p	K_a	K_p
Loose to medium dense in-situ sand/sand fill	0 – 1.5	15	33	0.46	0.29	3.39	0.26	6.1
Medium dense to dense in-situ sand	2 – 12	16	34	0.43	0.28	3.54	0.28	6.47
Compacted sand fill	-	16	36	0.41	0.26	3.85	0.23	7.3

Notes: γ – Bulk density ϕ – Soil Friction Angle
K_o – Coefficient of Static Earth Pressure K_a - Coefficient of Active Earth Pressure
K_p - Coefficient of Passive Earth Pressure

1. Earth pressure coefficients are provided for conditions of zero friction between the wall and the soil and with a medium value for wall friction between concrete and soil.
2. A level surface behind the wall has been assumed (i.e. β = 0).
3. The retaining wall designer should make an independent assessment of the parameters appropriate to the construction method used, including alternative values of wall friction.
4. The design parameters provided are not unique to the specified depth range. It is the responsibility of the retaining wall designer to select the appropriate soil parameters for the retaining walls

Compaction plant can augment the lateral earth pressure acting on retaining walls. Hand operated compaction equipment is recommended within 2 m of any retaining walls to minimise compaction pressures.

It is important to note that some ground movement will occur behind any soil retaining system, including gravity retaining walls. Retaining walls can move and rotate under imposed soil loading resulting in settlement behind the wall.

7.11 Footings

7.11.1 Shallow Footings

7.11.1.1 Settlement Considerations

The settlements of any structure will depend upon a number of factors including the applied pressures, footing size base preparation and the stiffness of the underlying ground. The estimates of settlement provided assume that the site preparation measures detailed in Section 7.4 have been carried out. The estimated settlements are for the working bearing pressure values shown. Differential settlements of up to half of the total estimated settlement values are likely between footings of similar sizes and loads. About 70% of the settlements are expected to occur during construction.

Research by Hillman et al (1999)[3] on tank settlements on calcareous soils in the Kwinana industrial area indicates that:

- There is a significant reduction in soil stiffness once calcareous soils are loaded beyond a threshold stress.
- Significant secondary settlements occur due to the ongoing crushing of calcareous particles over time.
- The stiffness of very loose/soft calcareous soil is significantly lower than typical correlations used for Perth sands.

[3] Hillman, M. O., Cocks, G. C., Syzmakowski, J. K., Tank Settlements on Calcareous Soils, Kwinana, Western Australia, Proceedings, 8th Australia New Zealand Conference of Geomechanics, Hobart

Based on our experience with similar developments, we expect that significant secondary settlements will occur over the lifetime of a number of the structures in the proposed development. These secondary settlements include:

- Creep settlements: settlement that occurs as a result of constant load conditions over time; and
- Cyclic settlements: settlement that occurs as a result of repetitive loading and unloading foundations (i.e. storage tanks)

The estimated settlements provided in the following tables are presented to the nearest 5 to 10 mm. This degree of accuracy reflects the variation in foundation conditions occurring across the site.

7.11.2 General

The following allowable bearing pressures and estimated primary settlements may apply to general structures located within the proposed development area provided that the site preparation procedures in Section 7.4 are followed.

Table 9 and Table 10 below give allowable bearing pressures and estimated settlements for various sizes of pad footings and strip footings at minimum embedment depths of 0.5 m and 1.0 m.

We recommend allowance is made for secondary settlements as follows:

- Secondary creep settlement – Additional 50% of the estimated primary settlements
- Secondary settlement from cyclic loads – Additional 60% of the estimated primary settlements.

Table 9: Pad Footing Allowable Bearing Pressures and Estimated Primary Settlements

Footing Embedment (m)	Minimum Footing Dimension (m)	Allowable Bearing Pressure (kPa)	Estimated Total Settlement (mm)
0.5	0.5	160	< 5
	1.0	190	5 – 10
	1.5	210	10 – 15
	2.0	230	15 – 25
	3.0	250	30 – 40
1.0	0.5	180	< 5
	1.0	250	5 – 10
	2.0	250	15 – 25
	3.0	250	25 – 35
	4.0	250	40 – 50

Table 10: Strip Footing Allowable Bearing Pressures and Estimated Primary Settlements

Footing Embedment (m)	Minimum Footing Width (m)	Allowable Bearing Pressure (kPa)	Estimated Total Settlement (mm)
0.5	0.5	140	5 – 10
	1.0	170	10 – 15
	1.5	200	25 – 35
	2.0	200	40 – 50
1.0	0.5	160	5 – 10
	1.0	200	15 – 20
	1.5	200	25 – 35
	2.0	200	40 – 50

Allowable bearing pressures for footings of intermediate plan dimensions to those tabulated can be interpolated. Footings that have a plan dimension either smaller or larger than those covered by the tables above will need to be considered individually along with other embedment depths. Footings carrying significant eccentric loading, such as below retaining walls, must be assessed separately. An allowable working bearing pressure of 250 kPa for pad footings and 200kPa for strip footings is considered to be an upper limit at this site to limit total and differential settlements.

7.11.3 Liquid Storage Tank Foundations

We note that ring beams are currently proposed as foundation support for the liquid fertiliser tanks. We understand that:

- There will be 3 tanks located side by side in a line with a proposed spacing of 5 m between each tank.
- Each tank is about 30 m in diameter.
- The maximum load of each tank is 16,000 tonnes.

Based on the above, we have conducted preliminary settlement calculations for a uniformly distributed load over a circular area of 30 m in diameter with a bearing pressure of 225 kPa.

We note that:

- The maximum initial settlement near the centre of an isolated tank is likely to be in the order of 500 mm.
- The initial edge settlements near adjacent tanks are also likely to be in the order of 500 mm due to significant interaction of the loads (this depends on the distance between the edges of adjacent tanks).
- Creep settlements of about 50% of initial settlements are likely due to ongoing crushing of the calcareous sands.
- Cyclic settlements of about 60% of the initial settlements are likely due to the cycling loading of the tanks.
- Total settlements in the order of 1,100 mm can be expected for isolated tank foundations.

We expect that the estimated settlements are likely to be too high for the tanks.

We therefore recommend that the following alternative options are considered for supporting the tanks:

Preloading

Preloading may be considered to cause a significant proportion of the primary settlement to occur prior to construction. This would generally require construction of fill embankments in the order of 10 m to 12 m in height extending at least 2 m beyond the edges of any tank foundations. The magnitude of the settlement would depend on the duration of the load applied and would need to be monitored. We expect that the settlements will occur relatively quickly (in weeks) compared to surcharging of soft clayey soils (months to years).

Ground Improvement using Rigid Inclusions

We note that rigid inclusions may be considered to reduce the settlement below the tanks. Rigid inclusions are unreinforced grout / concrete columns that are typically installed in weak/highly compressible soils in order to reduce settlements. Loads from the tanks are distributed to the soil and rigid inclusions via a load transfer platform (LTP) or rigid foundation.

We note that the rigid inclusions must extend to the rock below the compressible layer. These would therefore be in the order of 25 m long.

We can provide further advice regarding this option if required.

Piles

Piles may be considered to limit the total and differential settlements.

We note that subsurface profile broadly comprises a medium dense to dense profile of calcareous sand/sand fill over very loose sand and limestone at depth. The very loose sand is typically 3.5 m to 4 m thick and at depths ranging from 21 m to 25.5 m directly above the (inferred) limestone.

We consider that any piles that are used to support the liquid storage tanks will need to extend through the very loose/soft silty sand to clayey silt into competent in-situ limestone.

Note: If this solution is adopted, borehole drilling is required to sample and assess the characteristics of the in-situ limestone. This limestone can have significant variations in cementation and strength over short plan distances. We can provide a proposal for such investigation if required.

7.12 Pavement Subgrades

Based on the subsurface conditions and the laboratory test results, we consider that a pavement subgrade design California bearing ratio (CBR) of 15% is appropriate for flexible and rigid pavement design. This assumes that the subgrade is prepared in accordance with our site preparation guidelines in Section 7.4.

7.13 Stormwater Disposal

The infiltration test results (refer to Table 1) indicate that the permeability of the in-situ soils to a depth of about 1.0 m ranges from 2.0 m/day to 5.4 m/day. We note that:

- The upper 1.5 m of soils is expected to comprise fill materials.
- The test results are somewhat influenced by a thick layer (~0.3 m) of organic topsoil sand.
- The permeability of the soils is variable and is lower than typical calcareous sands (as shown by the deeper slug test results – refer to Table 2 for results).

The Perth Groundwater Atlas indicates that the maximum historical groundwater level is around RL 1 m to RL 1.75 m AHD.

We recommend adoption of an average minimum permeability design value of no more than 2 m/day for soak-wells installed within the in-situ sand This assumes that soak wells are located at least 0.5 m above the maximum groundwater table (i.e. above RL 2.25 m AHD).

Soak wells should be placed outside a line of 1V:2H extending below the edge of the nearest footing subject to local council regulations. Discharge from soak wells has been known to promote densification of loose sandy soils, leading to settlements of footings and slabs. Soak wells should be carefully wrapped with geotextile to prevent migration of sand and fines into the soak well.

8. CLOSURE

We draw your attention to Appendix I of this report, "Understanding Your Report". The information provided within is intended to inform you as to what your realistic expectations of this report should be. Guidance is also provided on how to minimize risks associated with groundworks for this project. This information is provided not to reduce the level of responsibility accepted by Galt, but to ensure that all parties who rely on this report are aware of the responsibilities each assumes in so doing.

GALT GEOTECHNICS PTY LTD

Harry Chambers

Geotechnical Engineer

Rick Piovesan CPEng

Geotechnical Engineer

O:\Jobs\2020\J2001016 - Acor SI Rockingham Beach Rd Rockingham\03 Correspondence\J2001016 001 Rev3.docx

Table

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Table A1: Summary of Tests

Test Reference	Coordinates (MGA94, Zone 50)		Elevation (m AHD)	Test Depth (m)	Depth of Groundwater (m)	Reason for Termination	Stratigraphy
	Easting (m)	Northing (m)					
TP01	382717	6430463	3.50	2.0	NE	Target depth	TOPSOIL: Organic SAND over SAND
TP02	382772	6430538	3.43	2.0	NE	Target depth	TOPSOIL: Organic SAND over SAND
TP03	382810	6430389	3.53	2.0	NE	Target depth	TOPSOIL: Organic SAND over SAND
TP04	382897	6430518	3.64	2.1	NE	Target depth	TOPSOIL: Organic SAND over SAND
BH01/MW01	382793	6430345	4.05	12.45	3.5	Target depth	FILL: Sandy GRAVEL over FILL: SAND over SAND
BH02/MW02	382880	6430449	3.63	12.45	3.1	Target depth	TOPSOIL: Organic SAND over SAND
BH03/MW03	382785	6430621	3.57	12.45	3.1	Target depth	SAND
BH04/MW04	382691	6430481	3.28	12.45	3.5	Target depth	TOPSOIL: Organic SAND over SAND
CPT01	382339	6430269	4.33	4.2	DT 3.7	Target depth	SAND
CPT02	382462	6430382	4.20	4.2	DT 3.8	Target depth	SAND
CPT03/MW08	382576	6430438	3.67	4.2	DT 2.8	Target depth	SAND
CPT04	382718	6430331	3.72	1.0	DT 0.9	Refusal	SAND
CPT04A	382718	6430331	3.72	4.2	DT 2.5	Target depth	SAND
CPT05	382694	6430412	4.26	12.2	DT 3.1	Target depth	SAND
CPT06	382834	6430615	3.57	12.2	DT 1.7	Target depth	SAND
CPT07	382920	6430505	3.65	12.2	DT 0.5	Target depth	SAND
CPT08	382807	6430346	4.05	12.2	DT 3.1	Target depth	SAND
CPT09	382740	6430423	3.72	8.2	DT 3.1	Target depth	SAND
CPT10	382765	6430514	3.33	0.8	DT 0.3	Refusal	SAND
CPT10A	382765	6430514	3.33	25.5	DT 2.5	Refusal	SAND over Silty SAND
CPT11	382814	6430483	3.65	8.2	Not recorded	Target depth	SAND
CPT12	382916	6430601	3.39	1.25	NE	Refusal	SAND
CPT12A	382916	6430601	3.39	1.2	NE	Refusal	SAND
CPT13	382945	6430577	3.21	8.2	DT 0.4	Target depth	SAND
CPT14	382863	6430525	3.23	8.2	DT 2.0	Target depth	SAND
CPT15	382862	6430445	3.61	8.2	DT 2.2	Target depth	SAND

Test Reference	Coordinates (MGA94, Zone 50)		Elevation (m AHD)	Test Depth (m)	Depth of Groundwater (m)	Reason for Termination	Stratigraphy
	Easting (m)	Northing (m)					
CPT16	382788	6430403	4.14	0.45	DT 0.4	Refusal	SAND
CPT17	382986	6430636	3.50	12.2	DT 0.8	Target depth	SAND
CPT18	382885	6430671	3.11	8.2	DT 2.0	Target depth	SAND
IT01	383038	6430871	2.88	0.8	NE	Target depth	SAND/Silty SAND
IT02	383072	6430717	3.36	0.92	NE	Target depth	SAND
IT03	382968	6430562	3.31	0.82	NE	Target depth	SAND
IT04	382839	6430436	5.08	0.9	NE	Target depth	SAND
R01	382969	6430553	3.33	-	-	-	-
R02	382767	6430549	3.21	-	-	-	-
R03	382727	6430410	4.32	-	-	-	-

Notes:
1. We infer that a variable thickness of fill materials is present in the upper 1.5 m at test location.
2. DT 3.7 – Dry to 3.7 m
3. Refusal – CPT refusal was generally due to inclination/high tip resistance

Figure

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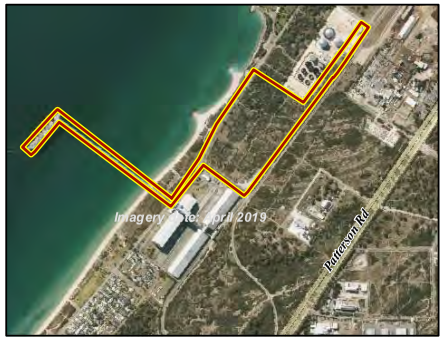

Legend

- Site Boundary
- Borehole / Groundwater Monitoring Well
- Cone Penetration Test
- Cone Penetration Test / Monitoring Well
- Infiltration Test
- Resistivity Test
- Test Pit

N

0 40 80 120 160 200
Meters

NOTES

Aerial Imagery and Cadastre sourced from Landgate/SLIP

SCALE	1:2,500 (A3)
DRAWN	CED
DATE DRAWN	20/07/2020
CHECKED	HWC
DATE CHECKED	20/07/2020
PROJECTION	GDA 1994 MGA Zone 50

Galt Geotechnics Pty Ltd
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Osborne Park WA 6017

CLIENT	**ACOR CONSULTANTS**
PROJECT	PROPOSED FERTILISER FACILITY
LOCATION	LOT 108 - VOLUME 3953 FOLIO 177 ROCKINGHAM
TITLE	SITE & LOCATION PLAN
Job No	J2001016
Fig No	FIGURE 1
Rev	**A**

Appendix A: Concept Plan

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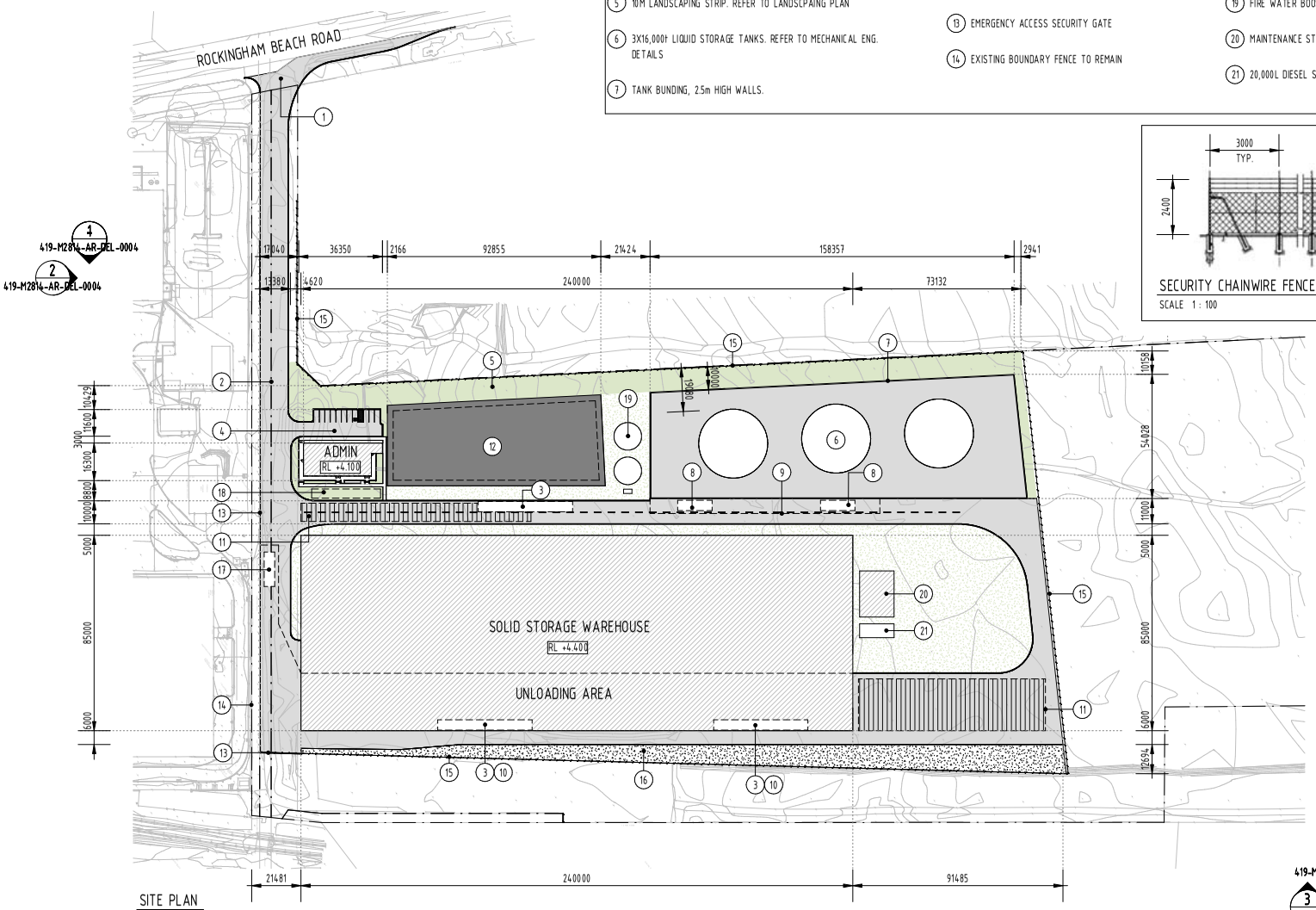
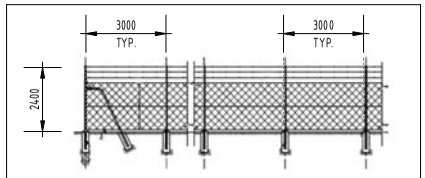
NOTES

1. CROSSOVER TO LOCAL AUTHORITY REQUIREMENTS REFER TO CIVIL ENG. DETAILS
2. 7M WIDE AUTOMATED SWING GATES
3. AUTOMATED WEIGHBRIDGE
4. FOR CARPARK REFER TO LOCALISED SITE PLAN
5. 10M LANDSCAPING STRIP. REFER TO LANDSCPAING PLAN
6. 3X16,000t LIQUID STORAGE TANKS. REFER TO MECHANICAL ENG. DETAILS
7. TANK BUNDING, 2.5m HIGH WALLS.
8. UAN LOADING POINT
9. AWNING TO UAN LOADING AREA
10. COVERED LOADING AREA - SOLIDS
11. UNDERGROUND STORMWATER INFILTRATION SYSTEM
12. EVAPORATION POND, SIZE TO BE CONFIRMED
13. EMERGENCY ACCESS SECURITY GATE
14. EXISTING BOUNDARY FENCE TO REMAIN
15. PROPOSED SECURITY CHAINWIRE FENCE TO BOUNDARY 2.1M HIGH
16. STORMWATER SWALE. REFER TO CIVIL ENGINEERS DETAILS
17. WHEEL WASH. 15M LONG
18. SEPTIC SYSTEM AREA
19. FIRE WATER BOOSTER PUMPS & BUFFER TANKS
20. MAINTENANCE STORE
21. 20,000L DIESEL STORAGE TANK



SITE PLAN
SCALE 1 : 1000



SECURITY CHAINWIRE FENCE DETAIL
SCALE 1 : 100

LEGEND

- BITUMEN PAVEMENT. REFER TO CIVIL ENGINEERS DETAILS
- CONCRETE FOOTPATHS. REFER TO ENGINEERS DETAILS
- LANDSCAPED AREA. REFER TO LANDSCAPING PLAN FOR DETAILS
- STORMWATER SWALE. REFER TO CIVIL ENGINEERS DETAILS
- CADASTRAL BOUNDARY LINE
- PROPOSED FENCING. REFER TO NOTES
- PROPOSED FENCING. REFER TO NOTES

AREAS

ADMINISTRATION BUILDING	444 m²
SOLID STORAGE WAREHOUSE	20400 m²
EVAPORATION POND	3507 m²
UAN LIQUID STORAGE	8061 m²
TOTAL	32412 m²

PARKING SCHEDULE

DISABLED BAY		
2/2400mm x 5400m	SHARED BAY W/ BOLLARD TO COMPLY W/ AS2890.6	1
STANDARD BAY		
2400mm x 5400mm		10
TOTAL		11

PRELIMINARY ISSUE
DO NOT USE FOR CONSTRUCTION
DATE - 27.07.20

1:100 @A1 1:200 @A3 — 0 1 2 3 4 5 6 7 8 9 10 m
1:1000 @A1 1:2000 @A3 — 0 10 20 30 40 50 60 70 80 90 100 m

REF	DRAWING No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	BY	CHK'D	APP'D
			E	29.07.20	ISSUED FOR INFORMATION	NM		
			D	27.07.20	ISSUED FOR INFORMATION	NM		
			C	26.06.20	ISSUED FOR INFORMATION	NM		
			B	16.06.20	ISSUED FOR INFORMATION	NM		
			A	02.06.20	ISSUED FOR INFORMATION	NM		

ACOR CONSULTANTS (WA) Pty Ltd
ENGINEERS
MANAGERS
INFRASTRUCTURE
PLANNERS
Level 1, Suite 101
Fremantle WA 6160
JOB No.

SCALE: As indicated
SHEET: A1
PROJECT
CONTRACT No.

DRAWN	N.MCDONALD	02.06.20
CHECKED	J.MARTIN	25.06.20
DESIGNED	N.MCDONALD	02.06.20
DESIGN APPR		
PROJECT APPR		

TITLE
KWINANA TERMINAL
FERTILISER STORAGE FACILITY
SCHEMATIC DESIGN
SITE PLAN

DRG No. 419-M2814-AR-DLP-0002
SHEET 2 OF 14
REV. E

Appendix B: Photographs

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Photograph 1: Unsealed hardstand at the southern corner of the site

Photograph 2: Stockpiles of crushed limestone and igneous rock at the southern corner

Photograph 3: Open area of the site to the south-west

Photograph 4: Typical access track and surrounding vegetation

Photograph 5: Previously cleared uneven ground near the centre of the site

Photograph 6: Typical household rubbish on some parts of the site

Photograph 7: Typical air core drill rig setup

Photograph 8: Typical soil profile exposed in test pit

Appendix C: Test Pit Reports

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ABN: 64 625 054 729

METHOD OF SOIL DESCRIPTION
BOREHOLE AND TEST PIT REPORTS

GRAPHIC LOG & SOIL CLASSIFICATION SYMBOLS

Graphic	USCS	Soil Name
		FILL (various types)
		COBBLES / BOULDERS
	GP	GRAVEL (poorly graded)
	GW	GRAVEL (well graded)
	GC	Clayey GRAVEL
	GM	Silty GRAVEL
	SP	SAND (poorly graded)
	SW	SAND (well graded)
	SC	Clayey SAND

Graphic	USCS	Soil Name
	SM	Silty SAND
	ML	SILT (low liquid limit)
	MH	SILT (high liquid limit)
	CL	CLAY (low plasticity)
	CI	CLAY (medium plasticity)
	CH	CLAY (high plasticity)
	OL	Organic SILT (low liquid limit)
	OH	Organic SILT (high liquid limit)
	Pt	PEAT

NOTE: Dual classification given for soils with a fines content between 5% and 12%.

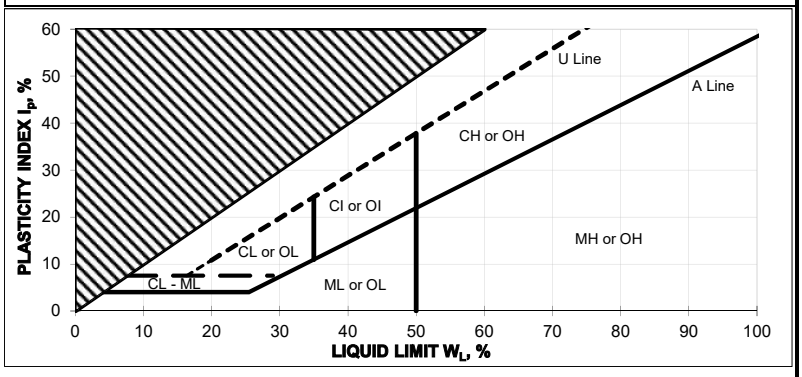
SOIL CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil descriptions are based on AS1726-2017. Material properties are assessed in the field by visual/tactile methods in combination with field and laboratory testing techniques (where used).

NOTE: AS 1726-2017 defines a fine grained soil where the total dry mass of fine fractions (<0.075 mm particle size) exceeds 35%.

PARTICLE SIZE		
Soil Name		**Particle Size (mm)**
BOULDERS		>200
COBBLES		63 to 200
GRAVEL	Coarse	19 to 63
	Medium	6.7 to 19
	Fine	2.3 to 6.7
SAND	Coarse	0.6 to 2.36
	Medium	0.21 to 0.6
	Fine	0.075 to 0.21
FINES	SILT	0.002 to 0.075
	CLAY	<0.002

PLASTICITY - MODIFIED CASAGRANDE CHART - AS1726-2017



RESISTANCE TO EXCAVATION		
Symbol	**Term**	**Description**
VE	Very easy	All resistances are relative to the selected method of excavation
E	Easy	
F	Firm	
H	Hard	
VH	Very hard	

MOISTURE CONDITION	
Symbol	**Term**
D	Dry
M	Moist
W	Wet

CEMENTATION	
Cementation	**Description**
Weakly cemented	Soil may be easily disaggregated by hand in air or water
Moderately cemented	Effort is required to disaggregate the soil by hand in air or water

CONSISTENCY		
Symbol	**Term**	**Undrained Shear Strength (kPa)**
VS	Very Soft	0 to 12
S	Soft	12 to 25
F	Firm	25 to 50
St	Stiff	50 to 100
VSt	Very Stiff	100 to 200
H	Hard	>200

ORGANIC SOILS	
Material	**Organic Content % of dry mass**
Inorganic soil	<2%
Organic soil	2% to 25%
Peat	>25%

DENSITY		
Symbol	**Term**	**Density Index (%)**
VL	Very Loose	<15
L	Loose	15 to 35
MD	Medium Dense	35 to 65
D	Dense	65 to 85
VD	Very Dense	>85

EXPLANATORY NOTES TO BE READ WITH BOREHOLE AND TEST PIT REPORTS

METHOD OF DRILLING OR EXCAVATION

AC	Air Core	E	Excavator	PQ3	PQ3 Core Barrel
AD/T	Auger Drilling with TC-Bit	EH	Excavator with Hammer	PT	Push Tube
AD/V	Auger Drilling with V-Bit	HA	Hand Auger	R	Ripper
AT	Air Track	HMLC	HMLC Core Barrel	RR	Rock Roller
B	Bulldozer Blade	HQ3	HQ3 Core Barrel	SON	Sonic Rig
BH	Backhoe Bucket	N	Natural Exposure	SPT	Driven SPT
CT	Cable Tool	NMLC	NMLC Core Barrel	WB	Washbore
DT	Diatube	PP	Push Probe	X	Existing Excavation

SUPPORT

T	Timbering

PENETRATION EFFORT (RELATIVE TO THE EQUIPMENT USED)

VE	Very Easy	E	Easy	F	Firm
H	Hard	VH	Very Hard		

WATER

►	Water Inflow	▼	Water Level
◄	Water Loss (complete)		
◁	Water Loss (partial)		

SAMPLING AND TESTING

B	Bulk Disturbed Sample	P	Piston Sample
BLK	Block Sample	PBT	Plate Bearing Test
C	Core Sample	U	Undisturbed Push-in Sample
CBR	CBR Mould Sample		U50: 50 mm diameter
D	Small Disturbed Sample	SPT	Standard Penetration Test
ES	Environmental Soil Sample		Example: 3, 4, 5 N=9
EW	Environmental Water Sample		3,4,5: Blows per 150 mm
G	Gas Sample		N=9: Blows per 300 mm after
HP	Hand Penetrometer		150 mm seating interval
LB	Large Bulk Disturbed Sample	VS	Vane Shear; P = Peak
M	Mazier Type Sample		R = Remoulded (kPa)
MC	Moisture Content Sample	W	Water Sample

ROCK CORE RECOVERY

TCR = Total Core Recovery (%) $\frac{CRL}{TCL} \times 100$

RQD = Rock Quality Designation (%) $\frac{ALC \geq 100}{TCL} \times 100$

TCL	Length of Core Run
CRL	Length of Core Recovered
ALC>100	Total Length of Axial Lengths of Core Greater than 100 mm Long

TEST PIT: TP01

Job Number:	J2001016	**Easting:**	382716.7 m	**Contractor:**	ANH Contracting	**Date:**	05/03/2020
Client:	Cooperative Bulk Handling (CBH) Ltd	**Northing:**	6430462.8 m	**Machine:**	JCB3CX	**Logged:**	PF
Project:	Proposed Fertiliser Facility	**Datum:**	MGA94 Zone 50	**Operator:**	Neil	**Checked Date:**	26/03/2020
Location:	Part of Lot 108 Rockingham Beach Road, Rockingham	**Surface RL:**	3.5 m AHD	**Bucket:**	450 mm rock	**Checked By:**	HWC

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL CLASS	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
BH	F		0.0	3.50				SP	TOPSOIL: Organic SAND, fine to medium grained, sub-angular to sub-rounded, brown, trace roots and root fibres			Possible fill - unknown depth
				3.10								
	F		0.5		B(TP01-1)			SP-SM	SAND: fine to medium grained, sub-angular to sub-rounded, pale yellow, with non-plastic fines, trace gravel, cobble and boulder size limestone fragments, angular, weakly cemented	D		
	E		1.0									
			1.5						Becoming yellow			
			2.0	1.50					Hole terminated at 2.00 m Target depth Groundwater not encountered			
			2.5									

Sketch & Other Observations

Comments:

See Explanatory Notes and Method of Soil Description sheets for details of abbreviations and basis of descriptions

TEST PIT: TP02

Sheet 1 OF 1

Job Number:	J2001016	**Easting:**	382771.6 m	**Contractor:**	ANH Contracting	**Date:**	05/03/2020
Client:	Cooperative Bulk Handling (CBH) Ltd	**Northing:**	6430538.0 m	**Machine:**	JCB3CX	**Logged:**	PF
Project:	Proposed Fertiliser Facility	**Datum:**	MGA94 Zone 50	**Operator:**	Neil	**Checked Date:**	26/03/2020
Location:	Part of Lot 108 Rockingham Beach Road, Rockingham	**Surface RL:**	3.4 m AHD	**Bucket:**	450 mm rock	**Checked By:**	HWC

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL CLASS	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
BH	E		0.0	3.43				SP	TOPSOIL: Organic SAND, fine to medium grained, sub-angular to sub-rounded, grey, trace roots and root fibres, trace fines			Possible fill - unknown depth
				3.03	B(TP02-1)				SAND: fine to medium grained, sub-angular to sub-rounded, trace fines, trace roots to 0.8 m depth, grey becoming pale yellow to white			
			0.5									
			1.0						with weakly to moderately cemented, gravel and cobble sized limestone fragments	D		
			1.5					SP				
			2.0	1.43					Hole terminated at 2.00 m Target depth Groundwater not encountered			
			2.5									

Sketch & Other Observations

Comments:

See Explanatory Notes and Method of Soil Description sheets for details of abbreviations and basis of descriptions

TEST PIT: TP03

Sheet 1 OF 1

Job Number:	J2001016	**Easting:**	382810.1 m	**Contractor:**	ANH Contracting	**Date:**	05/03/2020
Client:	Cooperative Bulk Handling (CBH) Ltd	**Northing:**	6430389.0 m	**Machine:**	JCB3CX	**Logged:**	PF
Project:	Proposed Fertiliser Facility	**Datum:**	MGA94 Zone 50	**Operator:**	Neil	**Checked Date:**	26/03/2020
Location:	Part of Lot 108 Rockingham Beach Road, Rockingham	**Surface RL:**	3.5 m AHD	**Bucket:**	450 mm rock	**Checked By:**	HWC

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL CLASS	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
BH	E		0.0	3.53				SP	TOPSOIL: Organic SAND, fine to medium grained, sub-angular to sub-rounded, grey to brown, trace gravel, trace fines, trace roots and root fibres	D		Possible fill - unknown depth
			0.5	2.93				SP	SAND: fine to medium grained, sub-angular to sub-rounded, pale yellow to white, trace fines, trace gravel sized limestone fragments			
			1.0						with weakly to moderately cemented, gravel and cobble sized limestone fragments			
			1.5									
			2.0	1.53					Hole terminated at 2.00 m Target depth Groundwater not encountered			
			2.5									

Sketch & Other Observations

Comments:

See Explanatory Notes and Method of Soil Description sheets for details of abbreviations and basis of descriptions

TEST PIT: TP04

Job Number:	J2001016	**Easting:**	382897.2 m	**Contractor:**	ANH Contracting	**Date:**	05/03/2020
Client:	Cooperative Bulk Handling (CBH) Ltd	**Northing:**	6430518.5 m	**Machine:**	JCB3CX	**Logged:**	PF
Project:	Proposed Fertiliser Facility	**Datum:**	MGA94 Zone 50	**Operator:**	Neil	**Checked Date:**	26/03/2020
Location:	Part of Lot 108 Rockingham Beach Road, Rockingham	**Surface RL:**	3.6 m AHD	**Bucket:**	450 mm rock	**Checked By:**	HWC

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL CLASS	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
BH	E		0.0	3.64				SP	TOPSOIL: Organic SAND, fine to medium grained, sub-angular to sub-rounded, brown becoming grey, trace roots and root fibres	D		Possible fill - unknown depth
			0.5		B(TP04-1)							
				2.94				SP	SAND: fine to medium grained, sub-angular to sub-rounded, pale yellow, trace fines, trace moderately cemented, gravel and cobble sized fragments of limestone			
			1.0									
	F		1.5						becoming yellow, no gravel			
	E		2.0									
				1.54					Hole terminated at 2.10 m Target depth Groundwater not encountered			
			2.5									

Sketch & Other Observations

Comments:

See Explanatory Notes and Method of Soil Description sheets for details of abbreviations and basis of descriptions

TEST PIT: TP09

Sheet 1 OF 1

Job Number:	J2001016	**Easting:**	382914.3 m	**Contractor:**	ANH Contracting	**Date:**	05/03/2020
Client:	Cooperative Bulk Handling (CBH) Ltd	**Northing:**	6430598.9 m	**Machine:**	JCB3CX	**Logged:**	PF
Project:	Proposed Fertiliser Facility	**Datum:**	MGA94 Zone 50	**Operator:**	Neil	**Checked Date:**	26/03/2020
Location:	Part of Lot 108 Rockingham Beach Road, Rockingham	**Surface RL:**	3.4 m AHD	**Bucket:**	450 mm rock	**Checked By:**	HWC

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL CLASS	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
BH	E		0.0	3.39				SP	TOPSOIL: Organic SAND, fine to medium grained, sub-angular to sub-rounded, brown, trace fines, trace roots and roots fibres			Possible fill - unknown depth
				3.09					SAND: fine to medium grained, sub-angular to sub-rounded, pale yellow to white, trace fines			
			0.5		B(TP09-1)							
			1.0					SP	trace weakly cemented gravel and cobble sized limestone fragments	D		
			1.5						becoming yellow			
			2.0	1.39					Hole terminated at 2.00 m Target depth Groundwater not encountered			
			2.5									

Sketch & Other Observations

Comments:

See Explanatory Notes and Method of Soil Description sheets for details of abbreviations and basis of descriptions

Appendix D: Cone Penetration Test Results

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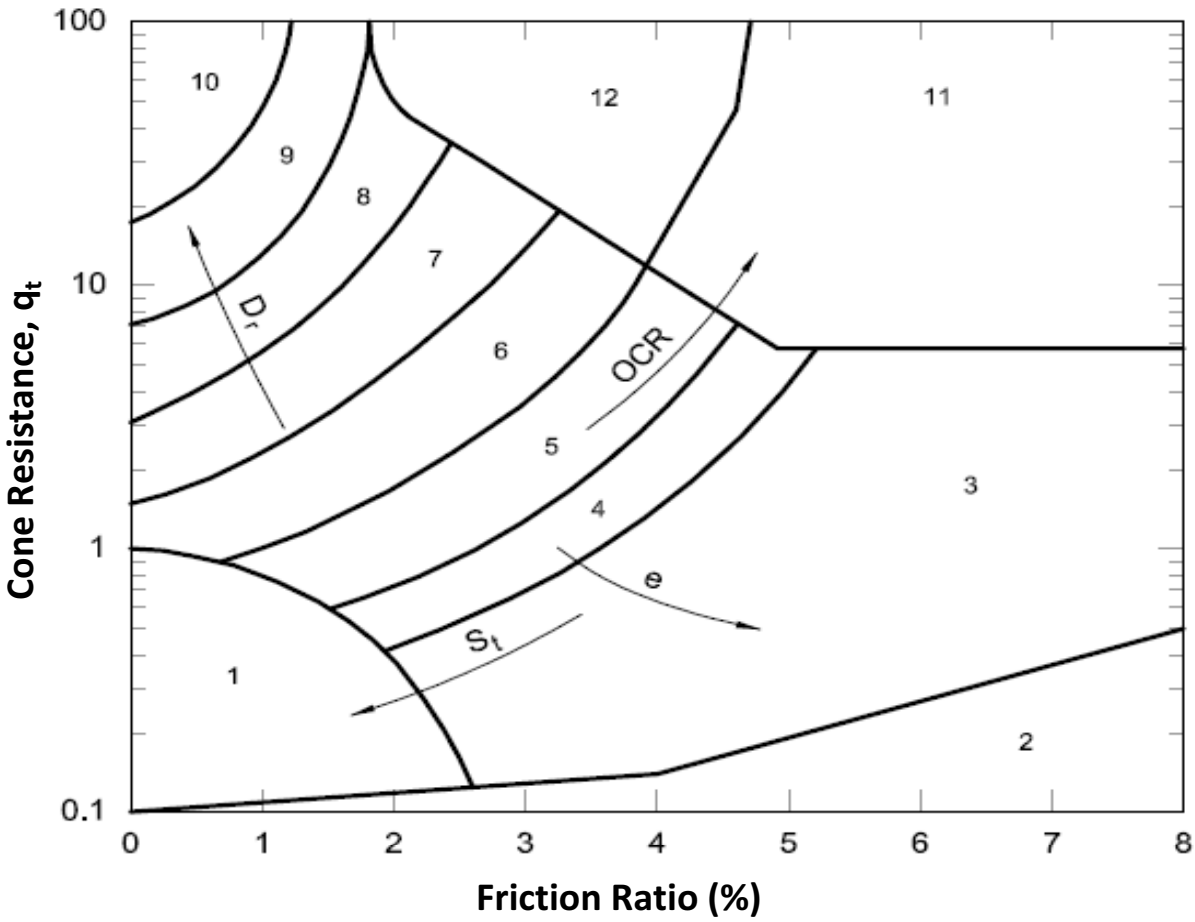


DEFINITIONS

q_t : Cone tip resistance corrected for pore water pressure
S_t : Sensitivity
e : Void ratio
D_r : Relative density
OCR : Overconsolidation ratio
OC : Overconsolidated

SOIL BEHAVIOUR TYPE ZONES

1. Sensitive fine grained
2. Organic material
3. Clay
4. Silty clay to clay
5. Clayey silt to silty clay
6. Sandy silt to clayey silt
7. Silty sand to sandy silt
8. Sand to silty sand
9. Sand
10. Gravelly sand to sand
11. Very stiff fine grained material (OC/cemented)
12. Sand to clayey sand (OC/cemented)

NOTES

A. Some overlap in type zones is expected
B. Local correlations are preferred and may indicate soil type boundaries that are different from those shown above

Reference: Robertson, P.K., Campanella, R.G., Gillespie, D. and Grieg, J. (1986) "Use of Piezometer Cone Data". Proceedings of the ASCE Speciality Conference In Situ '86: Use of In Situ Tests in Geotechnical Engineering, Blacksburg, pp 1263-80, American Society of Civil Engineers (ASCE)

Galt GEOTECHNICS

CONE PENETRATION TESTING (CPT) SOIL TYPE INTERPRETATION

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CPT 01

CLIENT: Cooperative Bulk Handling (CBH) Ltd

Job No.: J2001016

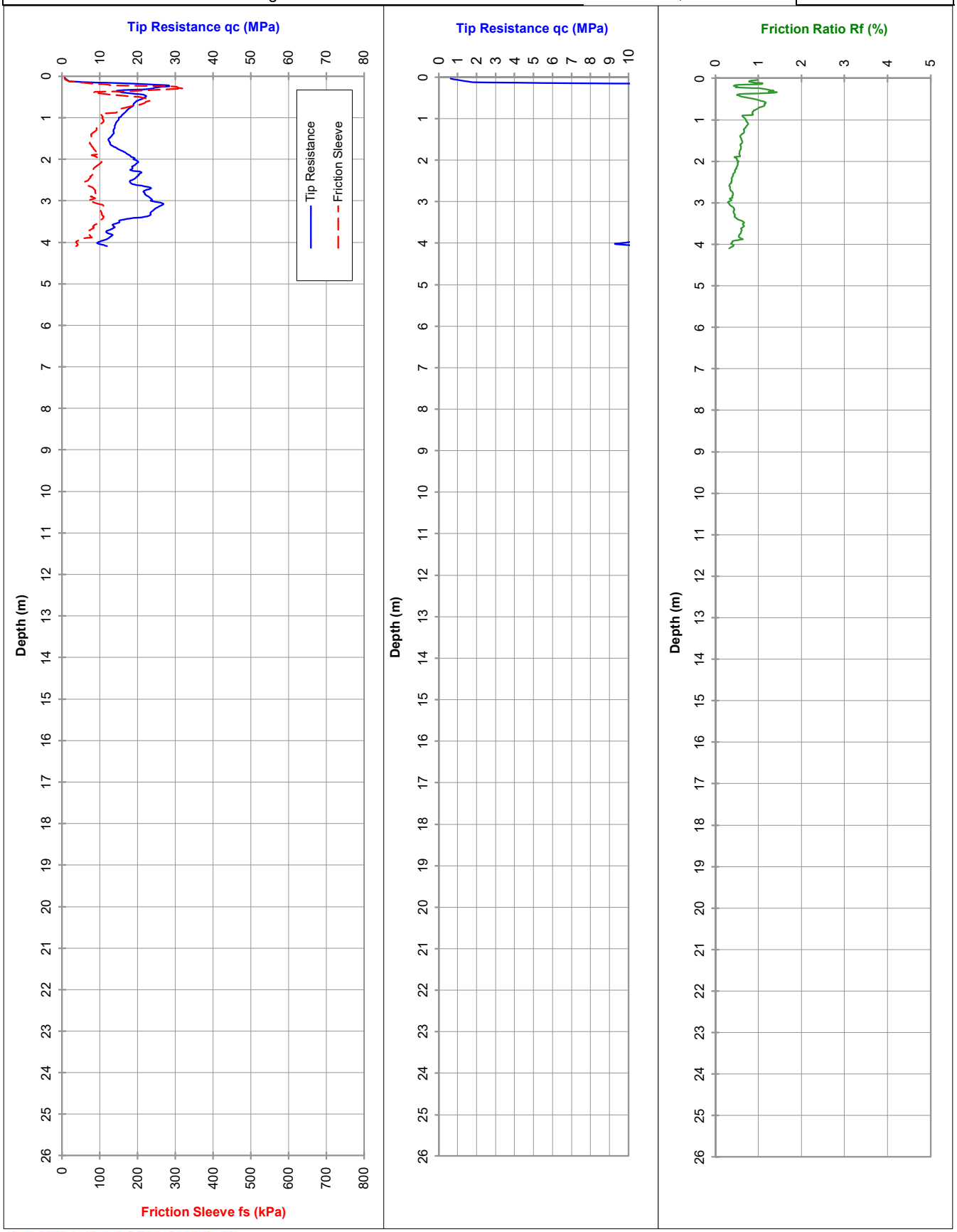
PROJECT: Proposed Fertiliser Facility

RL (m): 4.33

LOCATION: Part of Lot 1304 Rockingham Beach Rd

Co-ords: 382339.03mE, 6430268.97mN

18-Mar-20



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 3.7

Dummy probe to (m):

Refusal:

Cone I.D.: EC28

File: GL1315TT

Rig Type: 7/22 Tonne Track Truck

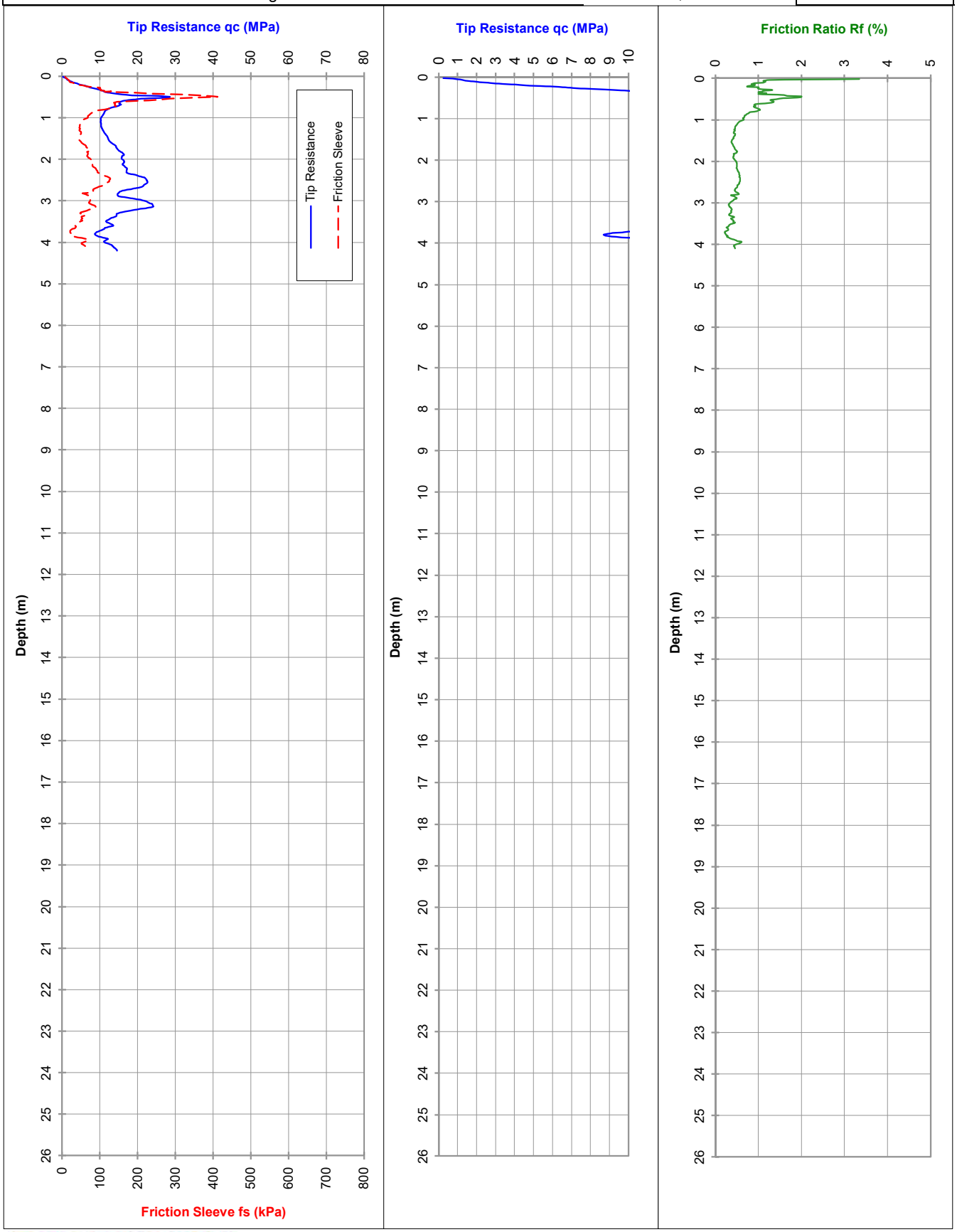
ELECTRIC FRICTION-CONE PENETROMETER

CLIENT:	Cooperative Bulk Handling (CBH) Ltd	Job No.:	J2001016
PROJECT:	Proposed Fertiliser Facility	RL (m):	4.2
LOCATION:	Part of Lot 1304 Rockingham Beach Rd	Co-ords:	382462.42mE, 6430381.8mN

Probe I.D

CPT 02

18-Mar-20



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 3.8

Dummy probe to (m):

Refusal:

Cone I.D.: EC28

File: GL1314TT

Rig Type: 7/22 Tonne Track Truck

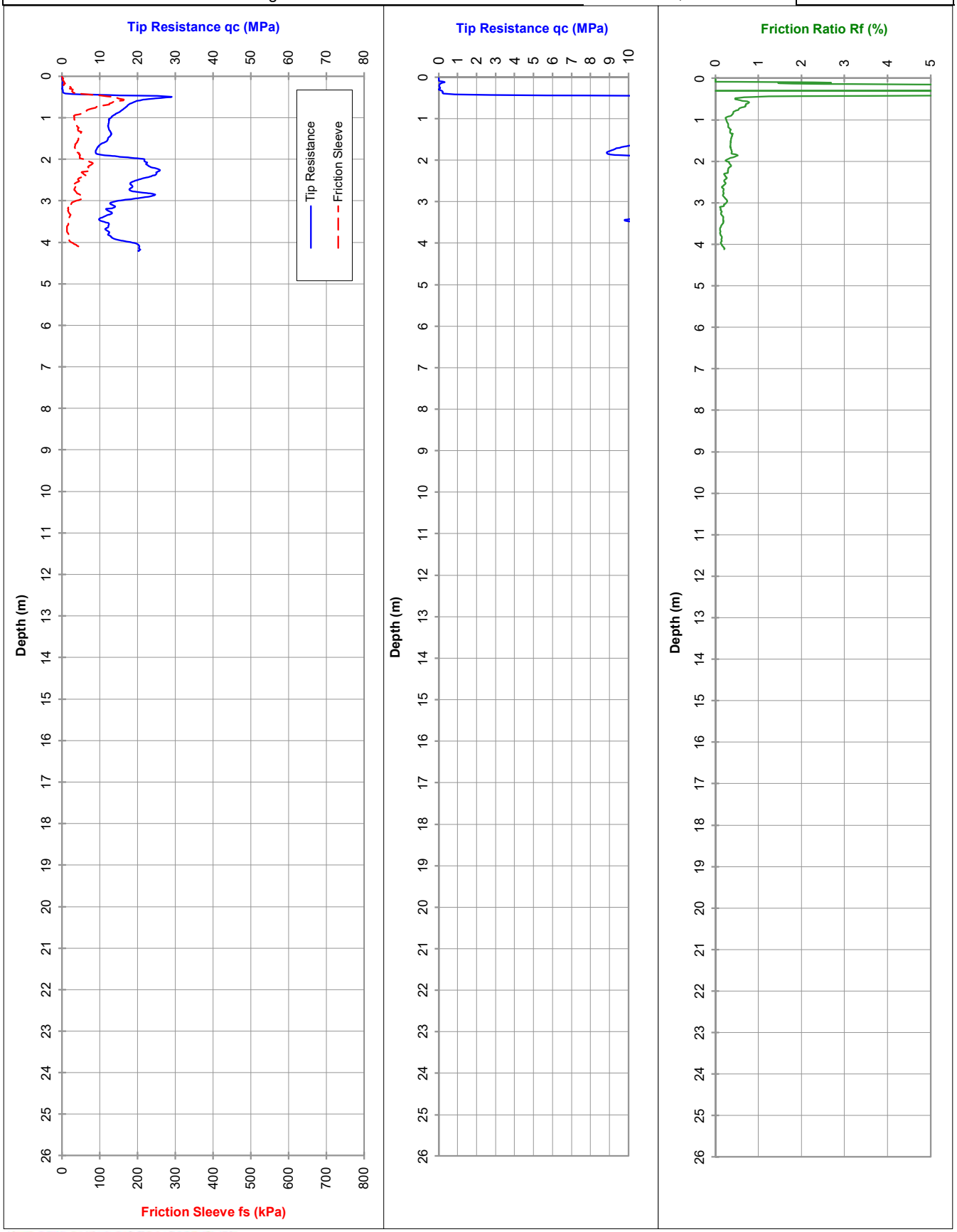
ELECTRIC FRICTION-CONE PENETROMETER

CLIENT:	Cooperative Bulk Handling (CBH) Ltd	Job No.:	J2001016
PROJECT:	Proposed Fertiliser Facility	RL (m):	3.67
LOCATION:	Part of Lot 1304 Rockingham Beach Rd	Co-ords:	382576.04mE, 6430437.75mN

Probe I.D

CPT 03

05-Mar-20



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 2.8

Dummy probe to (m): 0.42

32mm Standpipe Installed to (m): 4.2

Refusal:

Cone I.D.: EC28

File: GL1306TT

Rig Type: 7/22 Tonne Track Truck

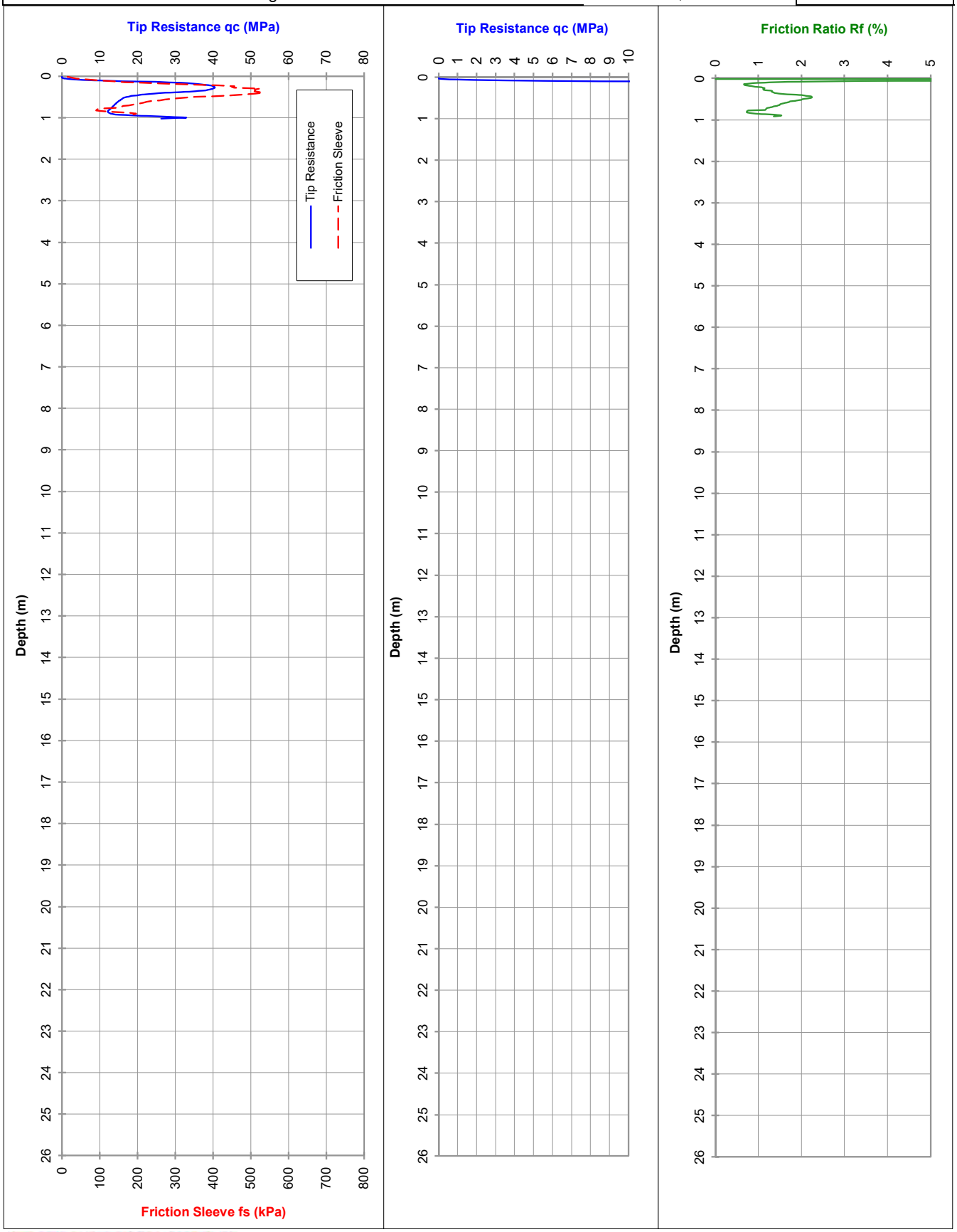
ELECTRIC FRICTION-CONE PENETROMETER

CLIENT:	Cooperative Bulk Handling (CBH) Ltd	Job No.:	J2001016
PROJECT:	Proposed Fertiliser Facility	RL (m):	3.72
LOCATION:	Part of Lot 1304 Rockingham Beach Rd	Co-ords:	382718.47mE, 6430330.5mN

Probe I.D

CPT04

04-Mar-20



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 0.9

Dummy probe to (m): 0.4

Refusal: Inclination

Cone I.D.: EC31

File: GL1292TT

Rig Type: 7/22 Tonne Track Truck

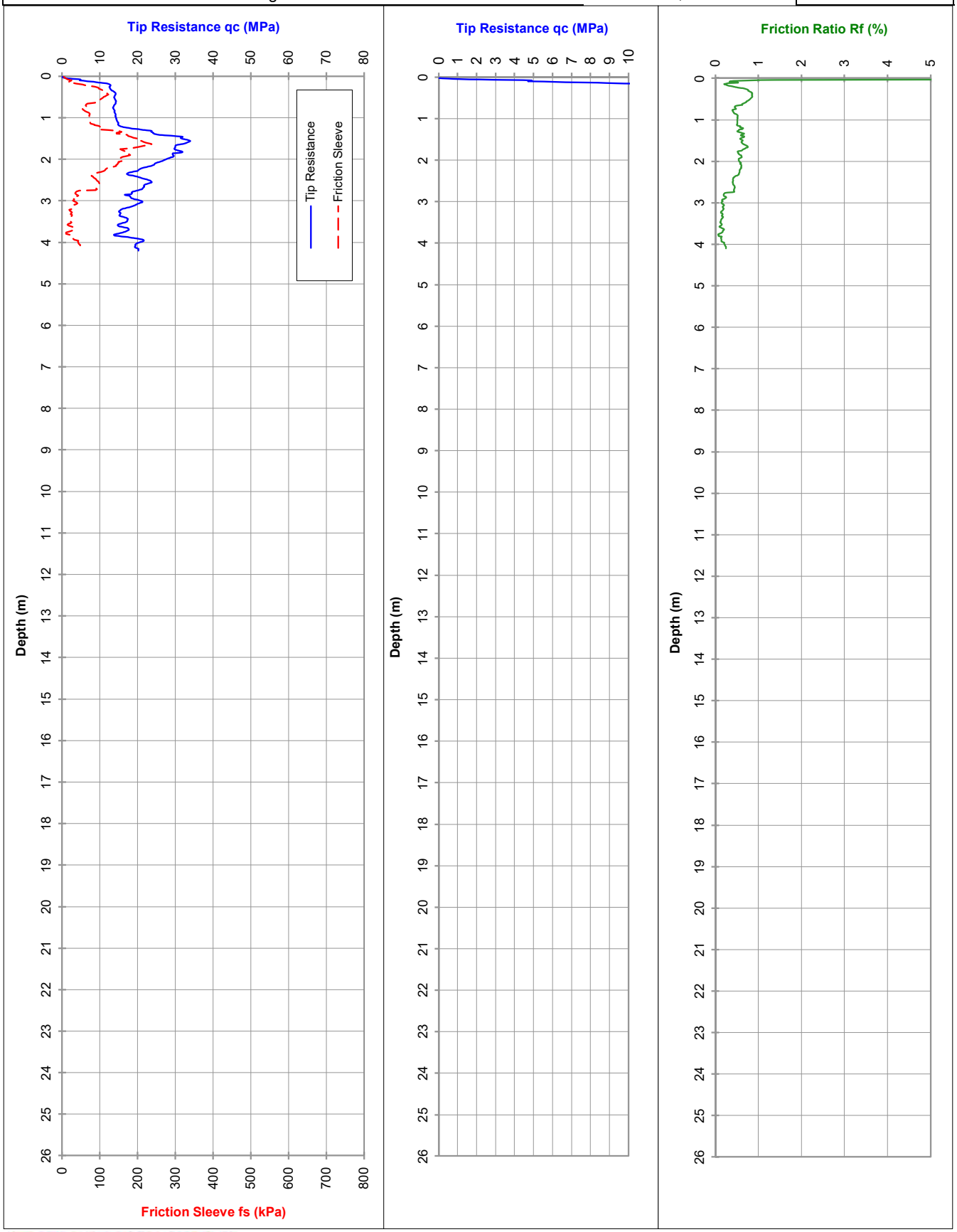
ELECTRIC FRICTION-CONE PENETROMETER

CLIENT:	Cooperative Bulk Handling (CBH) Ltd	Job No.:	J2001016
PROJECT:	Proposed Fertiliser Facility	RL (m):	3.72
LOCATION:	Part of Lot 1304 Rockingham Beach Rd	Co-ords:	382718.47mE, 6430330.5mN

Probe I.D

CPT04a

04-Mar-20



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 2.5

Dummy probe to (m):

Refusal:

Cone I.D.: EC31

File: GL1293TT

Rig Type: 7/22 Tonne Track Truck

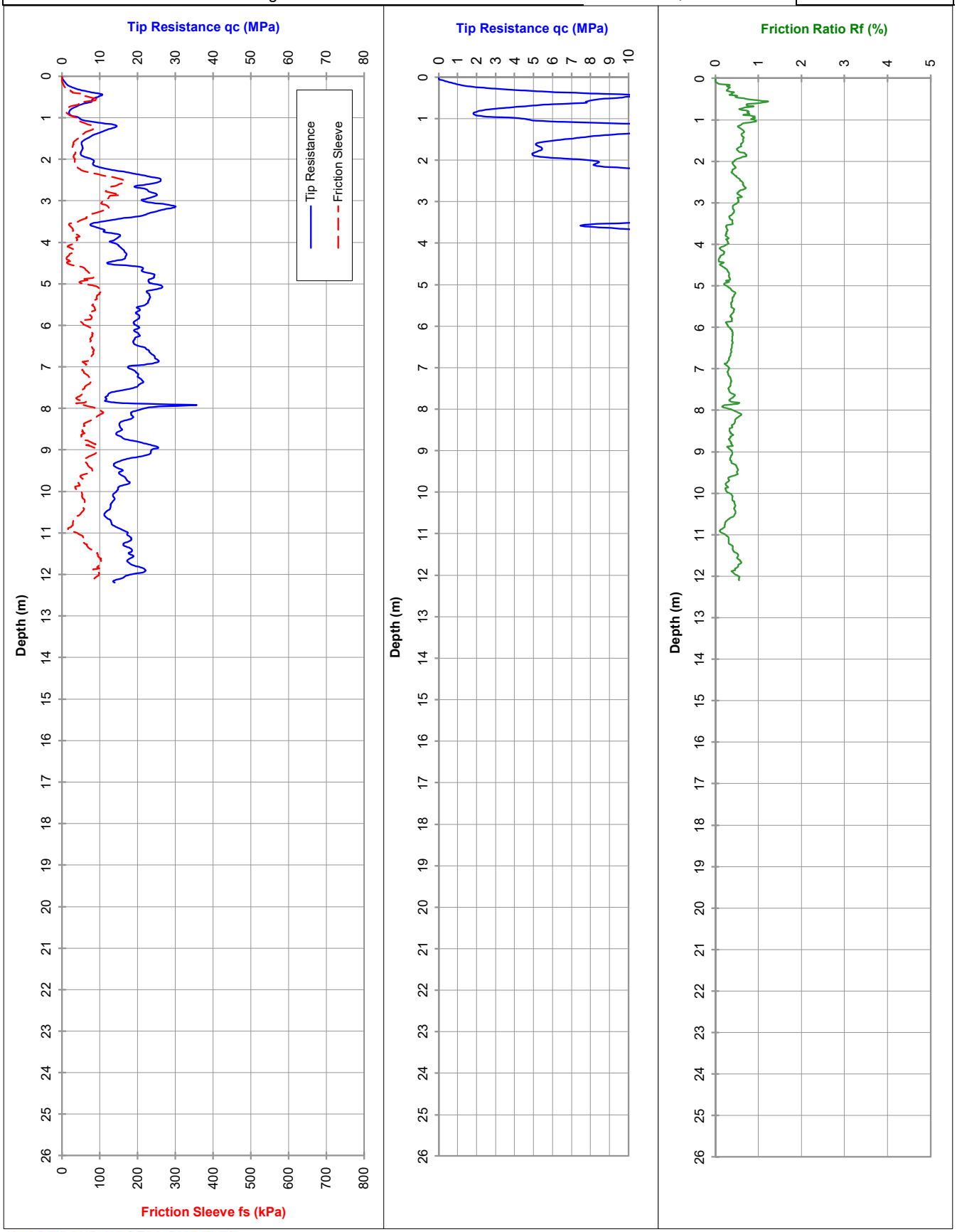
ELECTRIC FRICTION-CONE PENETROMETER

CLIENT:	Cooperative Bulk Handling (CBH) Ltd	Job No.:	J2001016
PROJECT:	Proposed Fertiliser Facility	RL (m):	4.26
LOCATION:	Part of Lot 1304 Rockingham Beach Rd	Co-ords:	382693.98mE, 6430411.97mN

Probe I.D

CPT05

04-Mar-20



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 3.1

Dummy probe to (m):

Refusal:

Cone I.D.: EC31

File: GL1294TT

Rig Type: 7/22 Tonne Track Truck

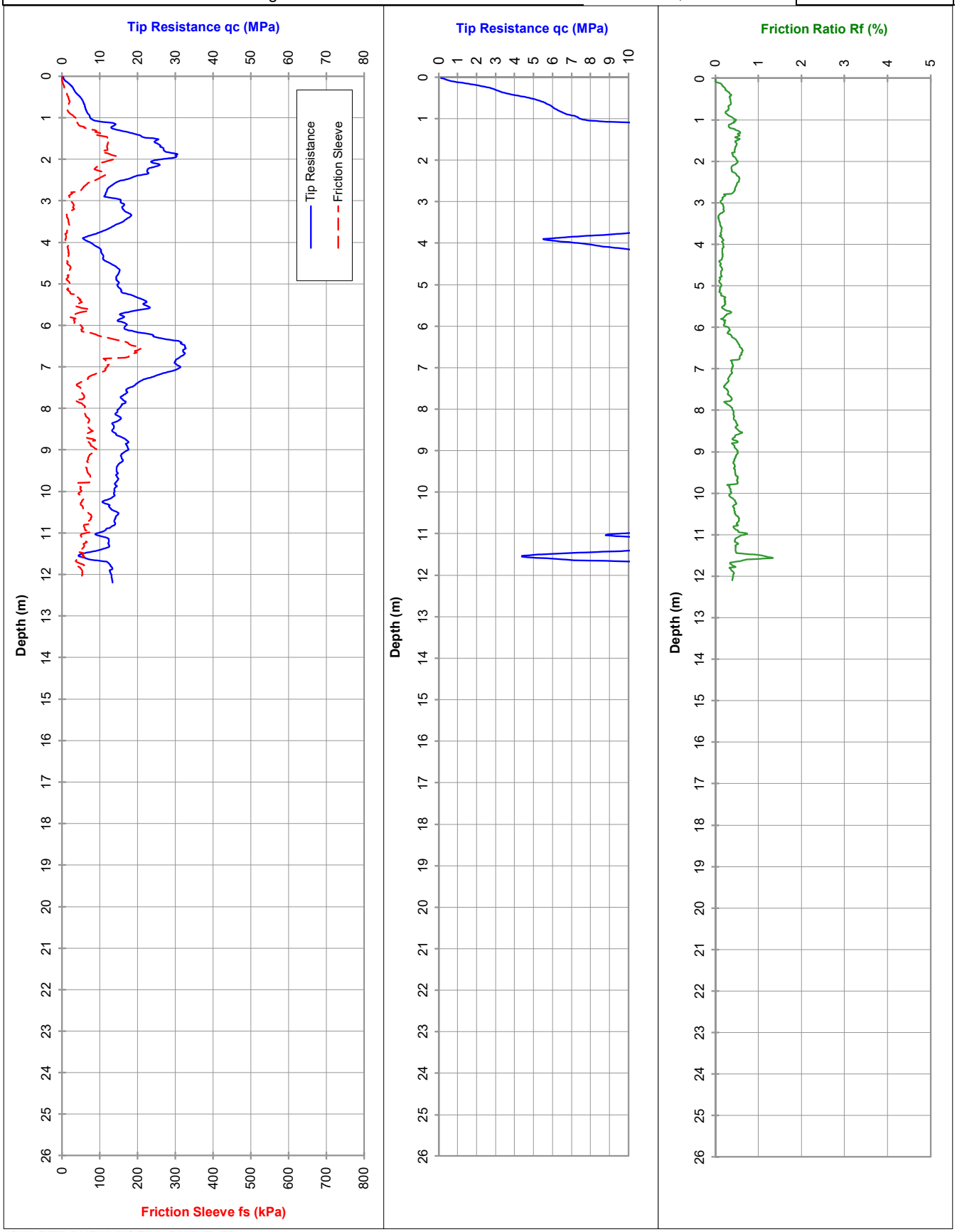
ELECTRIC FRICTION-CONE PENETROMETER

CLIENT:	Cooperative Bulk Handling (CBH) Ltd	Job No.:	J2001016
PROJECT:	Proposed Fertiliser Facility	RL (m):	3.57
LOCATION:	Part of Lot 1304 Rockingham Beach Rd	Co-ords:	382834.46mE, 6430615.18mN

Probe I.D

CPT 06

04-Mar-20



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 1.7

Dummy probe to (m):

Refusal:

Cone I.D.: EC31

File: GL1295TT

Rig Type: 7/22 Tonne Track Truck

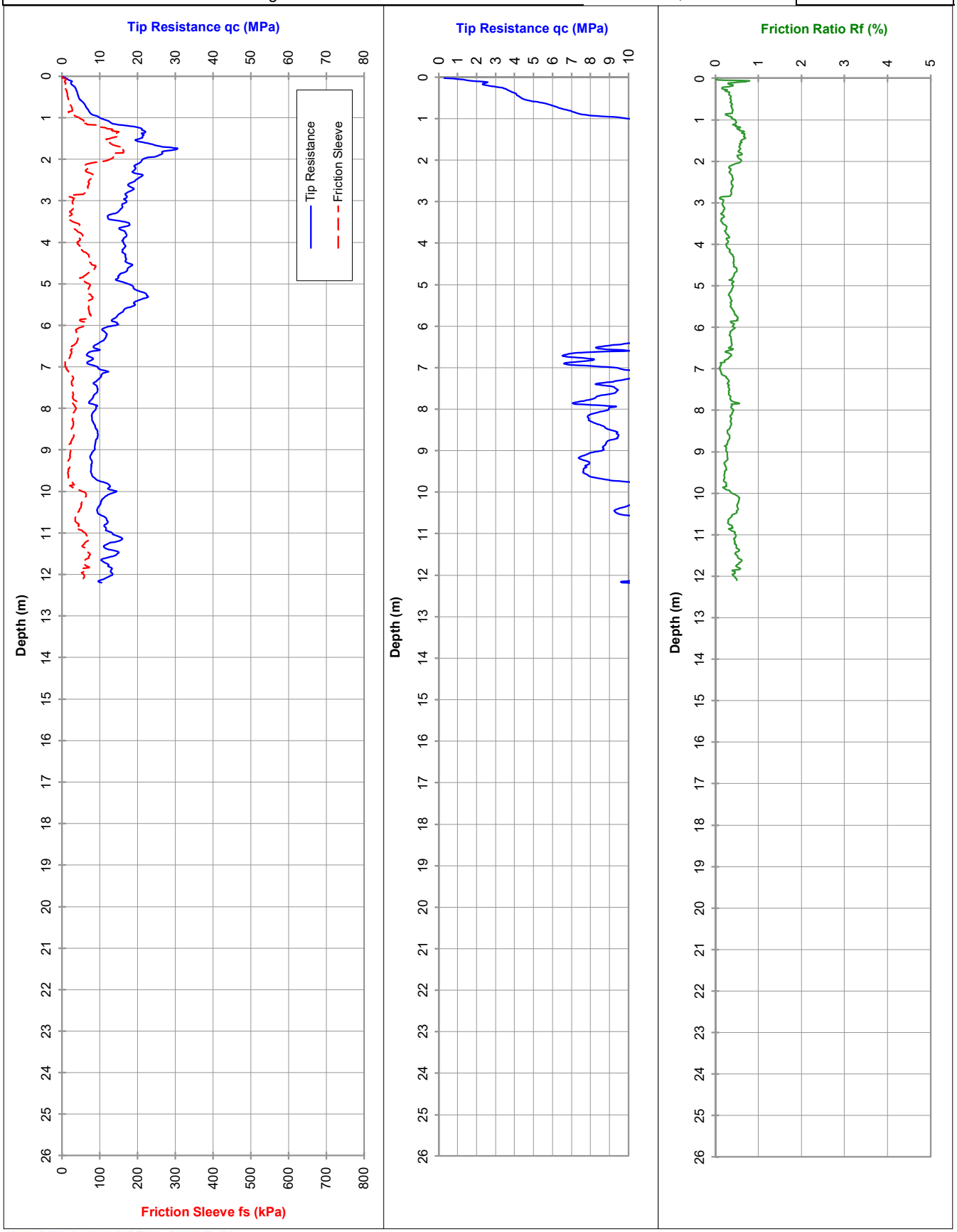
ELECTRIC FRICTION-CONE PENETROMETER

CLIENT:	Cooperative Bulk Handling (CBH) Ltd	Job No.:	J2001016
PROJECT:	Proposed Fertiliser Facility	RL (m):	3.65
LOCATION:	Part of Lot 1304 Rockingham Beach Rd	Co-ords:	382919.96mE, 6430504.86mN

Probe I.D

CPT07

03-Mar-20



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 0.5

Dummy probe to (m):

Refusal:

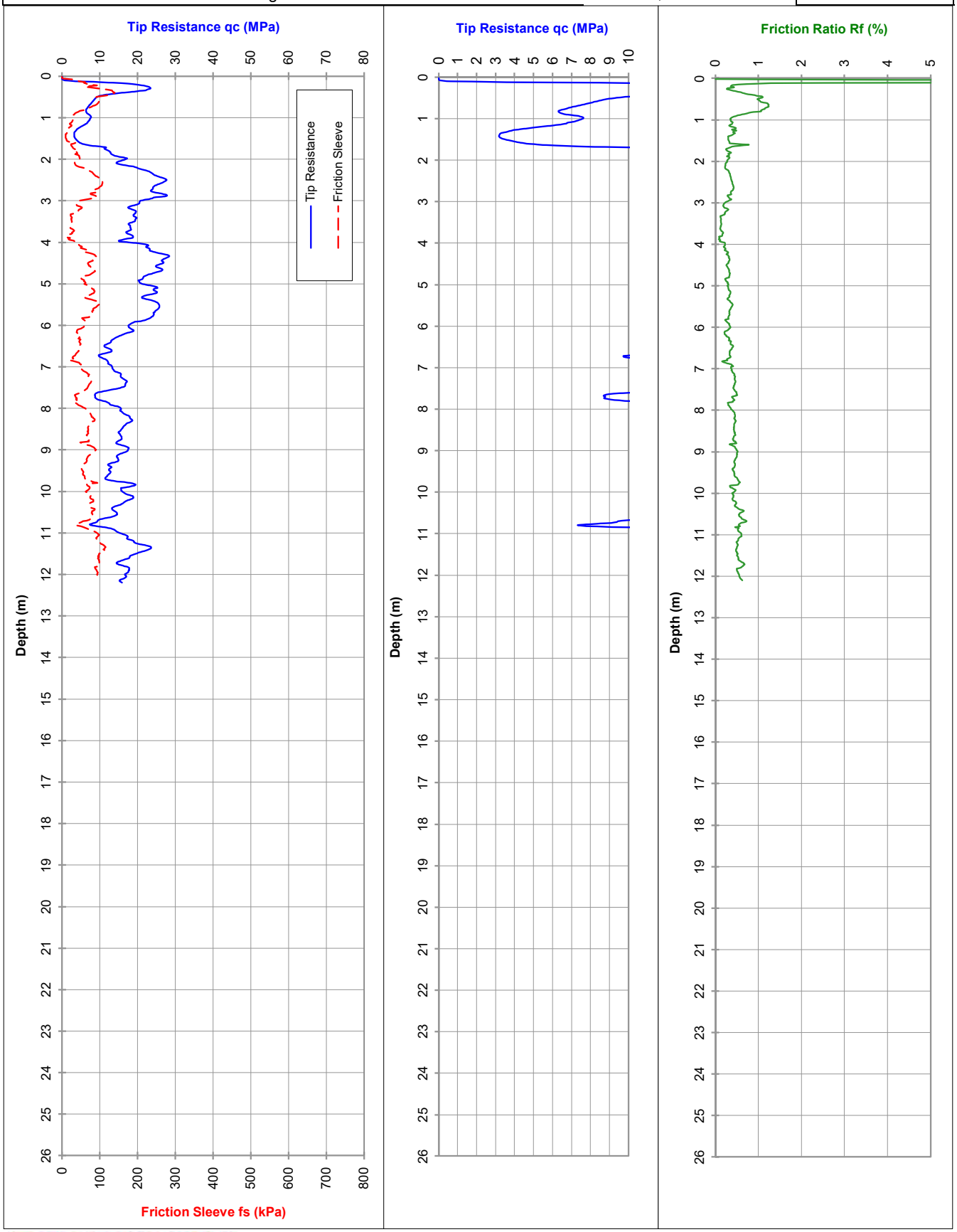
Cone I.D.: EC31

File: GL1280TT

Rig Type: 7/22 Tonne Track Truck

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: Cooperative Bulk Handling (CBH) Ltd	Job No.: J2001016	Probe I.D
PROJECT: Proposed Fertiliser Facility	RL (m): 4.05	**CPT08**
LOCATION: Part of Lot 1304 Rockingham Beach Rd	Co-ords: 382807mE, 6430345.6mN	04-Mar-20



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 3.1

Dummy probe to (m): 0.3

Refusal:

Cone I.D.: EC31

File: GL1291TT

Rig Type: 7/22 Tonne Track Truck

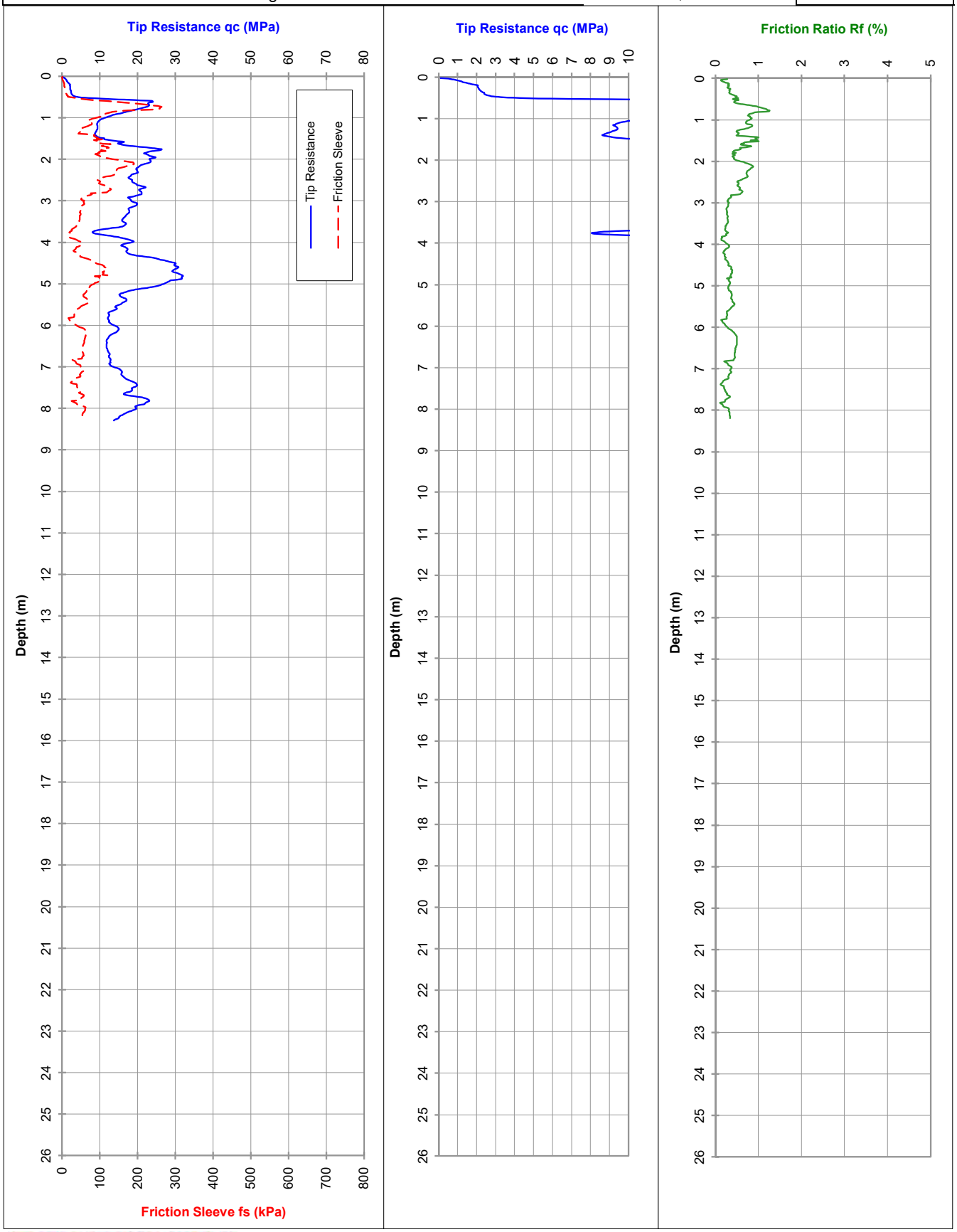
ELECTRIC FRICTION-CONE PENETROMETER

CLIENT:	Cooperative Bulk Handling (CBH) Ltd	Job No.:	J2001016
PROJECT:	Proposed Fertiliser Facility	RL (m):	3.72
LOCATION:	Part of Lot 1304 Rockingham Beach Rd	Co-ords:	382739.74mE, 6430423.36mN

Probe I.D

CPT09

03-Mar-20



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 1.3

Dummy probe to (m):

Refusal:

Cone I.D.: EC31

File: GL1288TT

Rig Type: 7/22 Tonne Track Truck

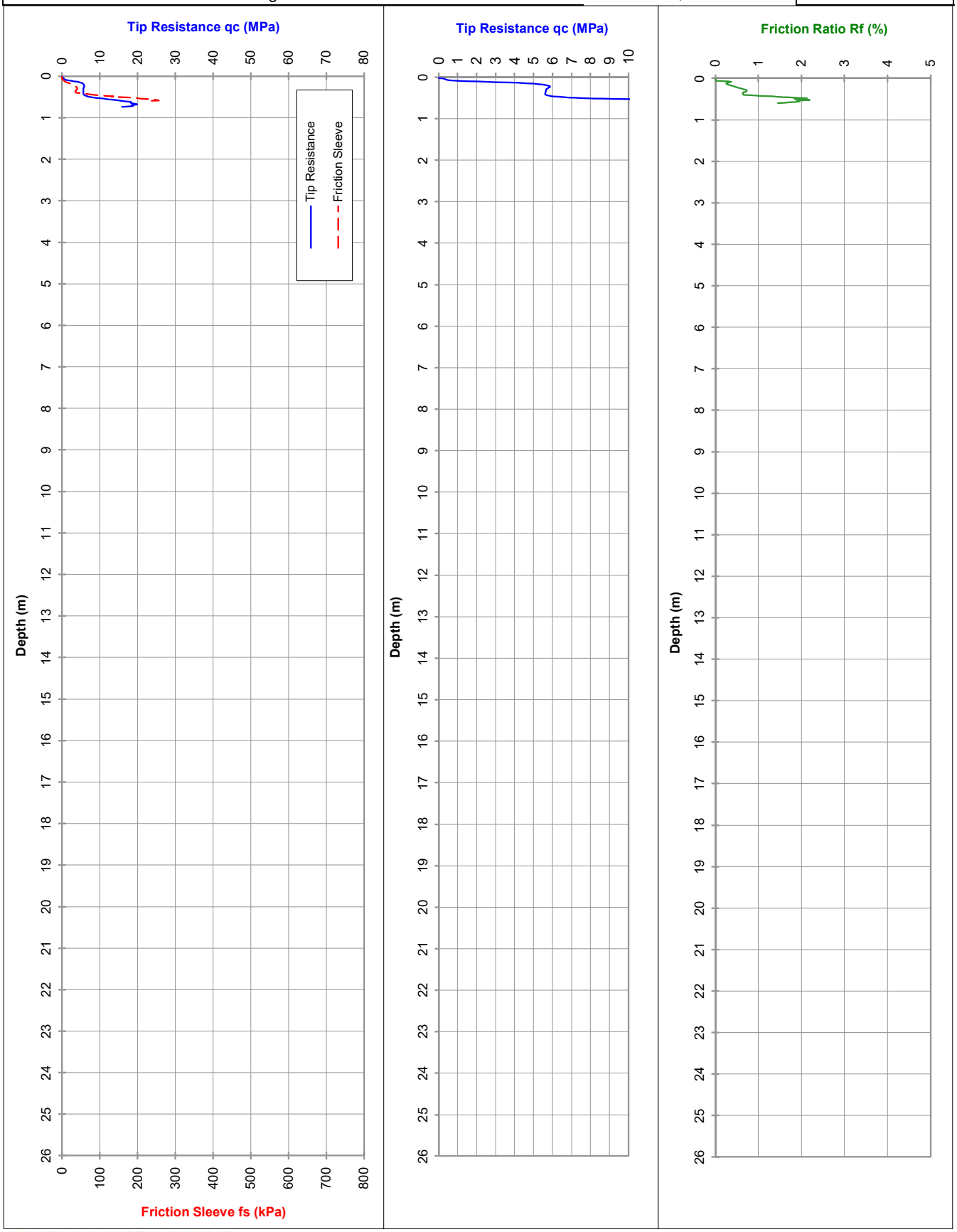
ELECTRIC FRICTION-CONE PENETROMETER

CLIENT:	Cooperative Bulk Handling (CBH) Ltd	Job No.:	J2001016
PROJECT:	Proposed Fertiliser Facility	RL (m):	3.33
LOCATION:	Part of Lot 1304 Rockingham Beach Rd	Co-ords:	382764.86mE, 6430514.09mN

Probe I.D

CPT 10

04-Mar-20



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 0.3

Dummy probe to (m):

Refusal: Inclination

Cone I.D.: EC31

File: GL1297TT

Rig Type: 7/22 Tonne Track Truck

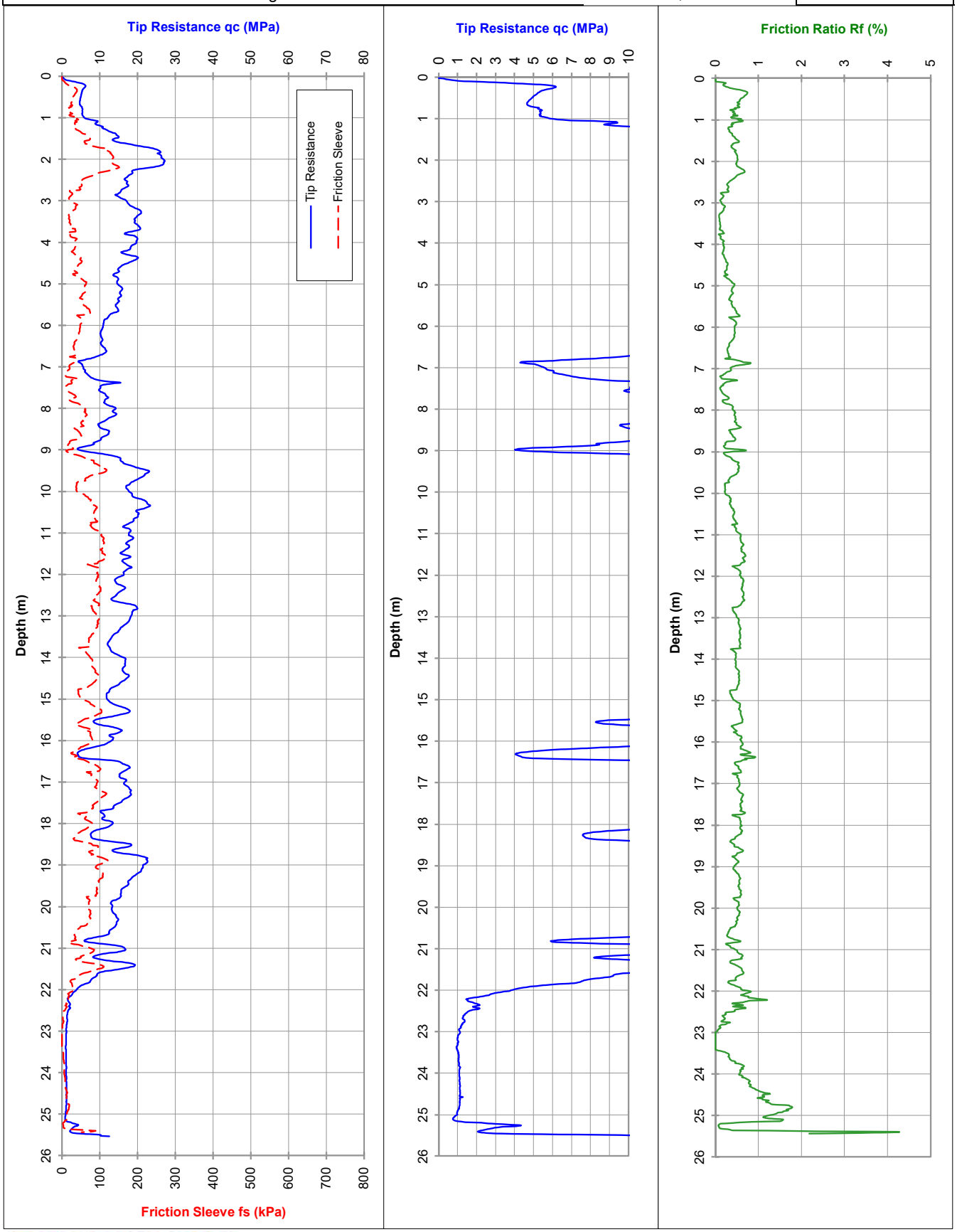
ELECTRIC FRICTION-CONE PENETROMETER

CLIENT:	Cooperative Bulk Handling (CBH) Ltd	Job No.:	J2001016
PROJECT:	Proposed Fertiliser Facility	RL (m):	3.33
LOCATION:	Part of Lot 1304 Rockingham Beach Rd	Co-ords:	382764.86mE, 6430514.09mN

Probe I.D

CPT 10A

04-Mar-20



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 2.5

Dummy probe to (m):

Refusal: Inclination

Cone I.D.: EC31

File: GL1298TT

Rig Type: 7/22 Tonne Track Truck

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CPT 11

04-Mar-20

CLIENT: Cooperative Bulk Handling (CBH) Ltd

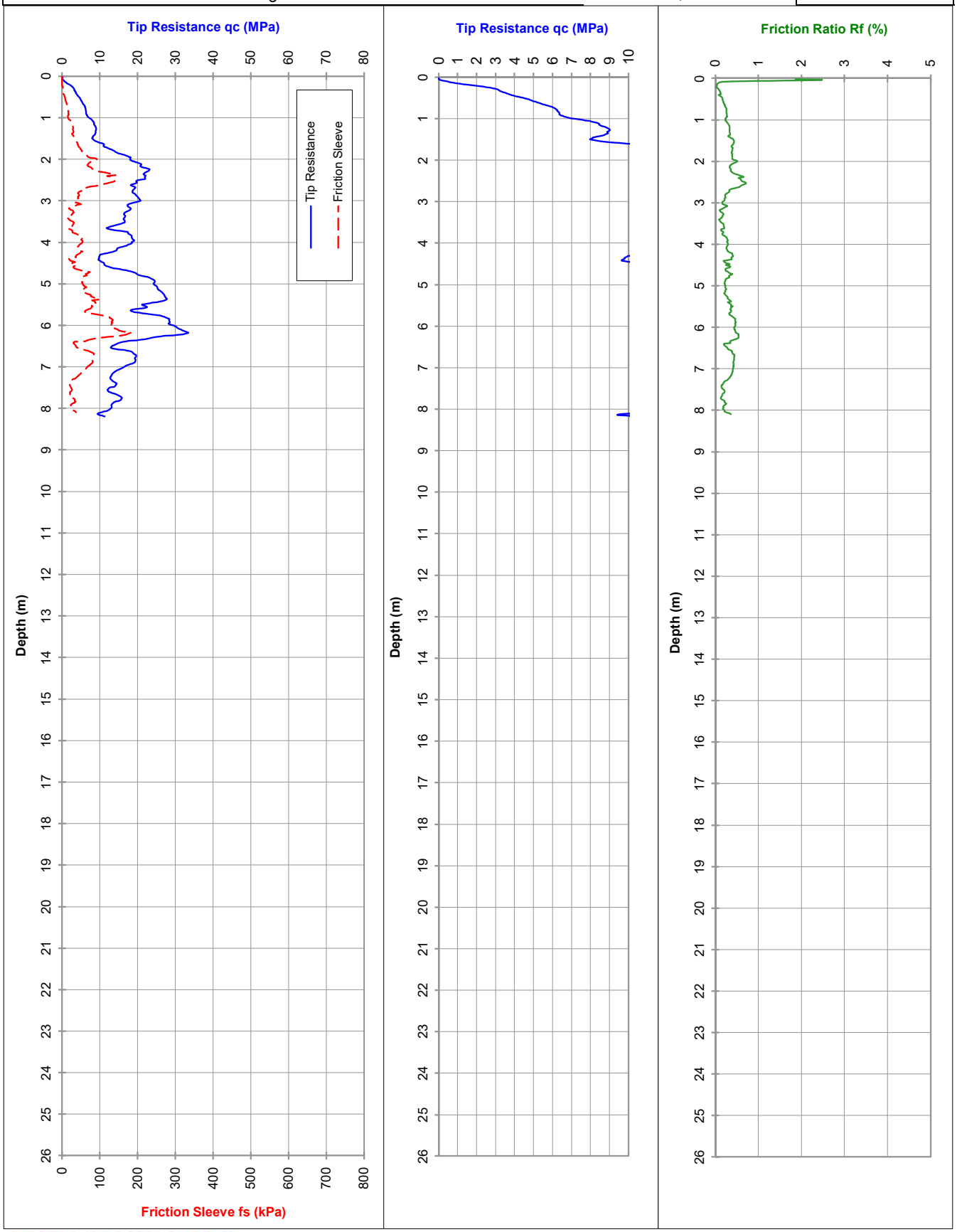
Job No.: J2001016

PROJECT: Proposed Fertiliser Facility

RL (m): 3.65

LOCATION: Part of Lot 1304 Rockingham Beach Rd

Co-ords: 382814.16mE, 6430482.95mN



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): -

Dummy probe to (m):

Refusal:

Cone I.D.: EC31

File: GL1299T

Rig Type: 7/22 Tonne Track Truck

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CPT 12

04-Mar-20

CLIENT: Cooperative Bulk Handling (CBH) Ltd

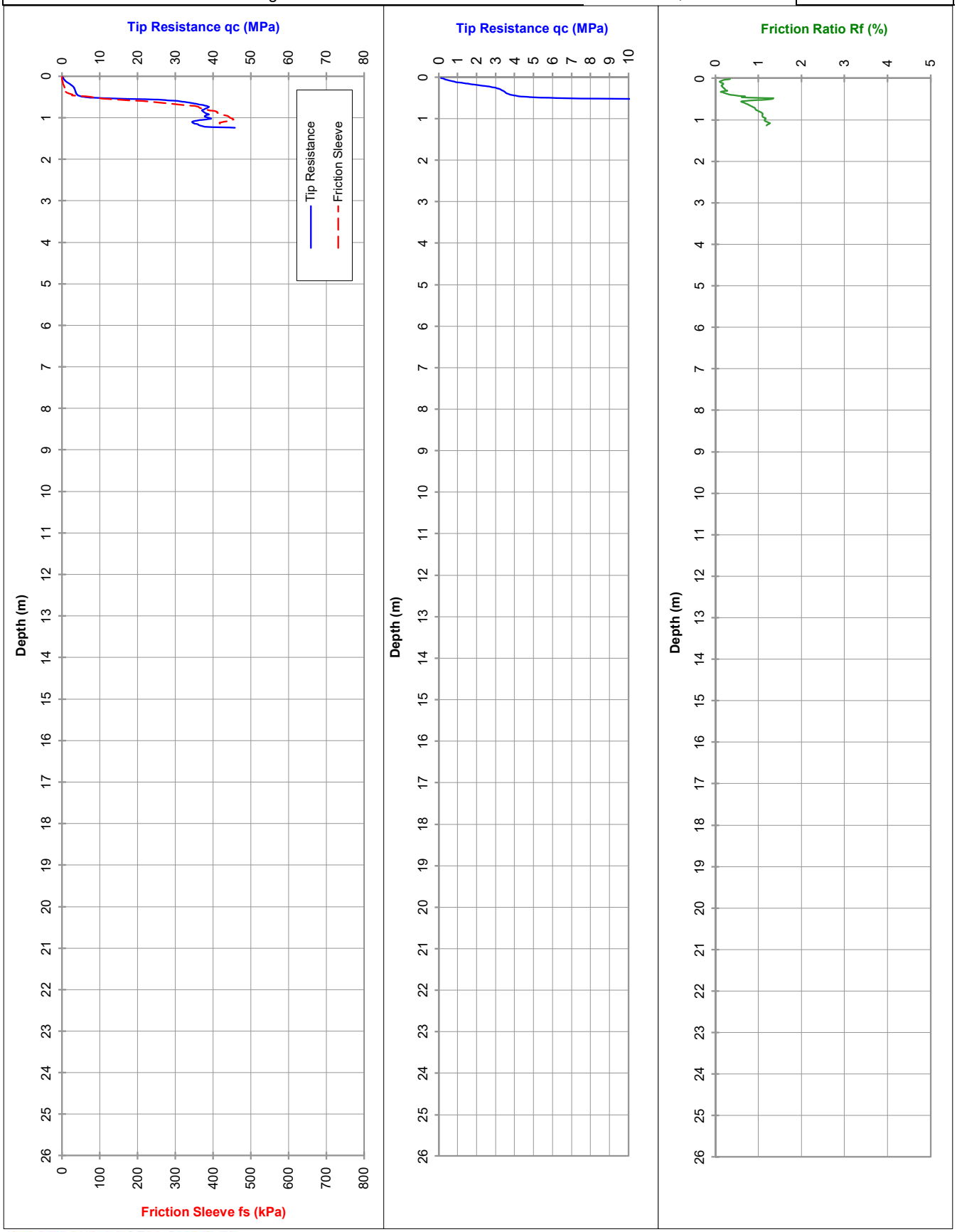
Job No.: J2001016

PROJECT: Proposed Fertiliser Facility

RL (m): 3.39

LOCATION: Part of Lot 1304 Rockingham Beach Rd

Co-ords: 382916.25mE, 6430600.93mN



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): -

Dummy probe to (m):

Refusal: 45 MPa

Cone I.D.: EC31

File: GL1301T

Rig Type: 7/22 Tonne Track Truck

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CPT 12A

04-Mar-20

CLIENT: Cooperative Bulk Handling (CBH) Ltd

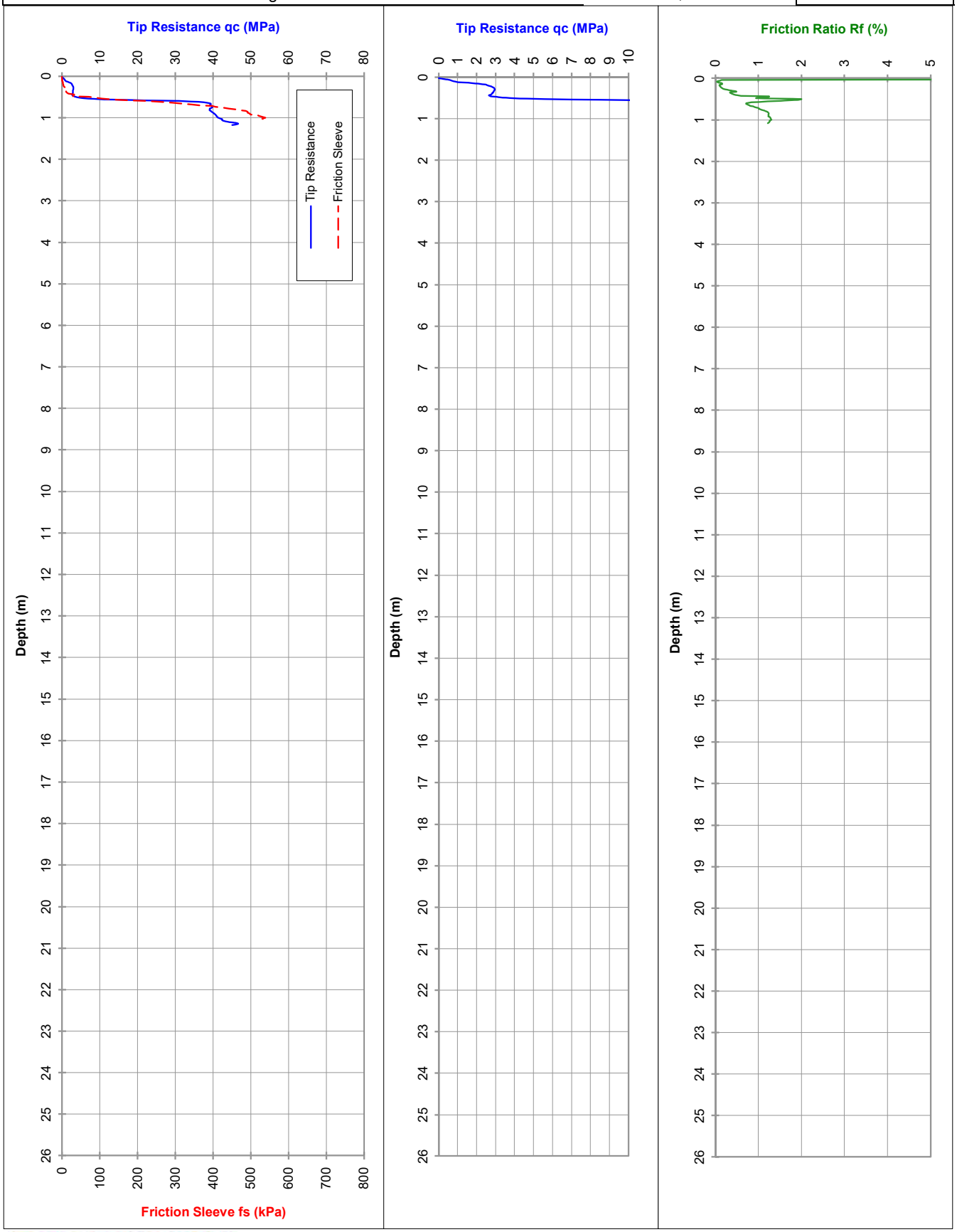
Job No.: J2001016

PROJECT: Proposed Fertiliser Facility

RL (m): 3.39

LOCATION: Part of Lot 1304 Rockingham Beach Rd

Co-ords: 382916.25mE, 6430600.93mN



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): -

Dummy probe to (m):

Refusal: 45 MPa

Cone I.D.: EC31

File: GL1302T

Rig Type: 7/22 Tonne Track Truck

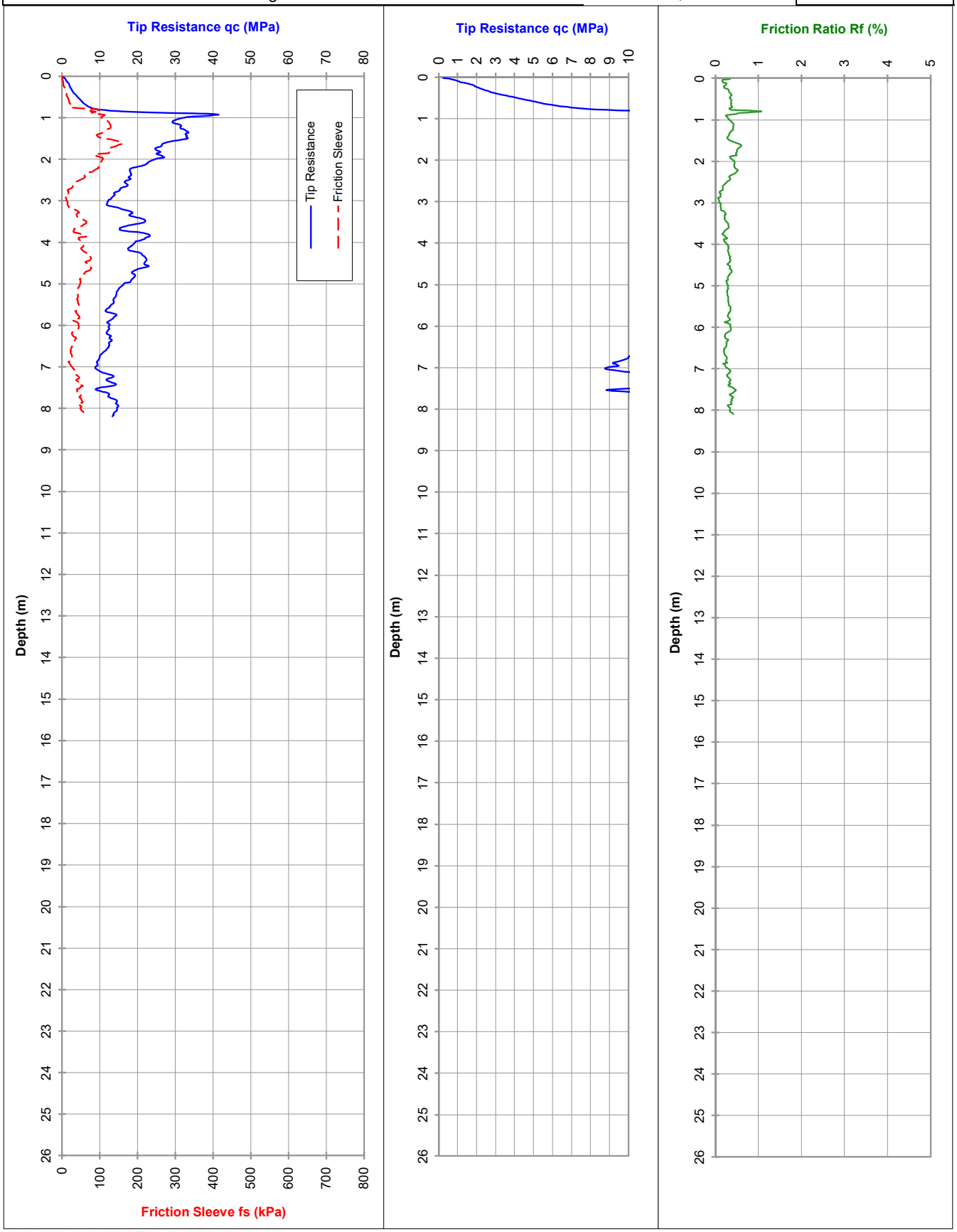
ELECTRIC FRICTION-CONE PENETROMETER

CLIENT:	Cooperative Bulk Handling (CBH) Ltd	Job No.:	J2001016
PROJECT:	Proposed Fertiliser Facility	RL (m):	3.21
LOCATION:	Part of Lot 1304 Rockingham Beach Rd	Co-ords:	382945.14mE, 6430577.42mN

Probe I.D

CPT13

03-Mar-20



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 0.4

Dummy probe to (m):

Refusal:

Cone I.D.: EC31

File: GL1282TT

Rig Type: 7/22 Tonne Track Truck

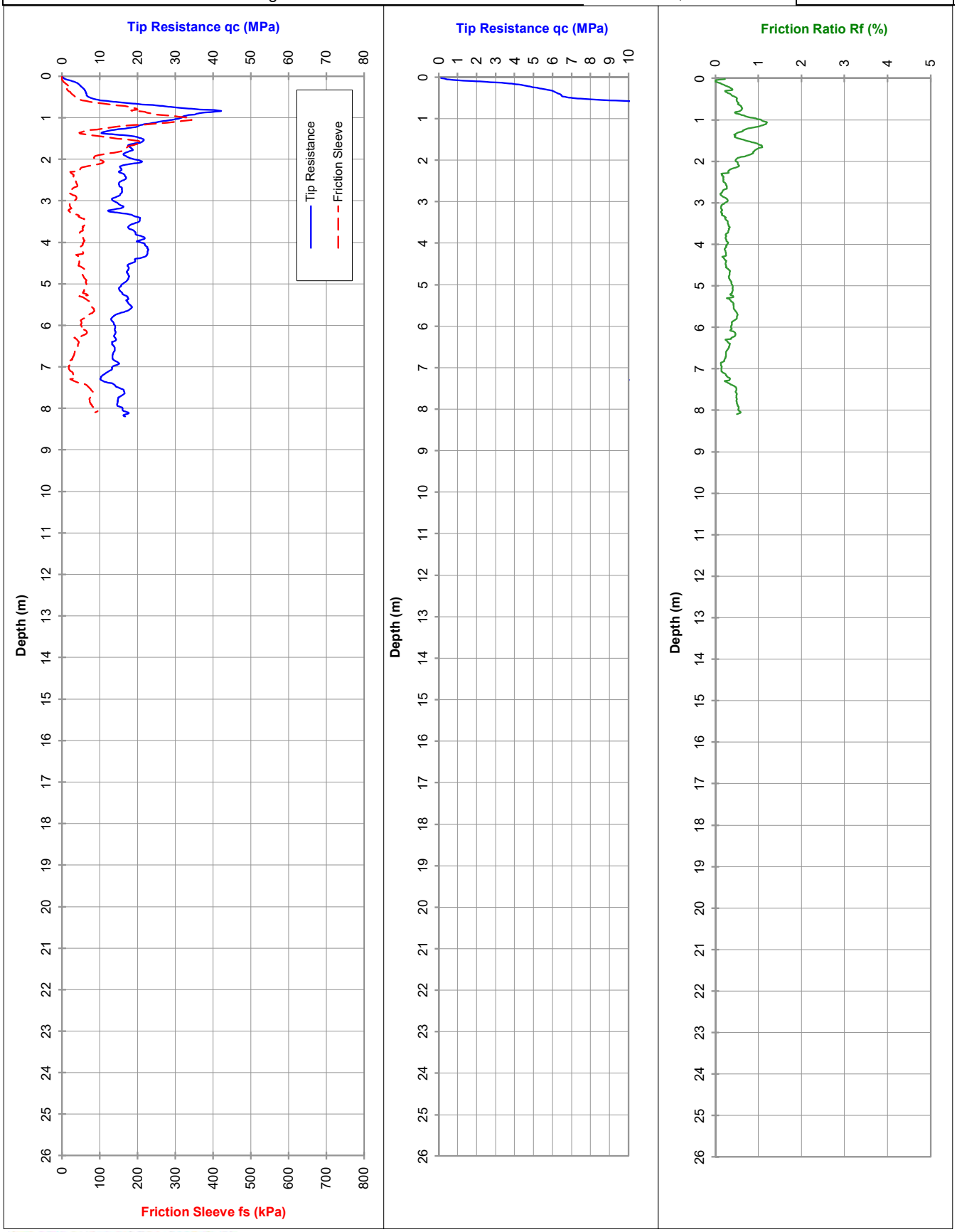
ELECTRIC FRICTION-CONE PENETROMETER

CLIENT:	Cooperative Bulk Handling (CBH) Ltd	Job No.:	J2001016
PROJECT:	Proposed Fertiliser Facility	RL (m):	3.23
LOCATION:	Part of Lot 1304 Rockingham Beach Rd	Co-ords:	382863.06mE, 6430525.42mN

Probe I.D

CPT 14

04-Mar-20



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 2.0

Dummy probe to (m):

Refusal:

Cone I.D.: EC31

File: GL1300T

Rig Type: 7/22 Tonne Track Truck

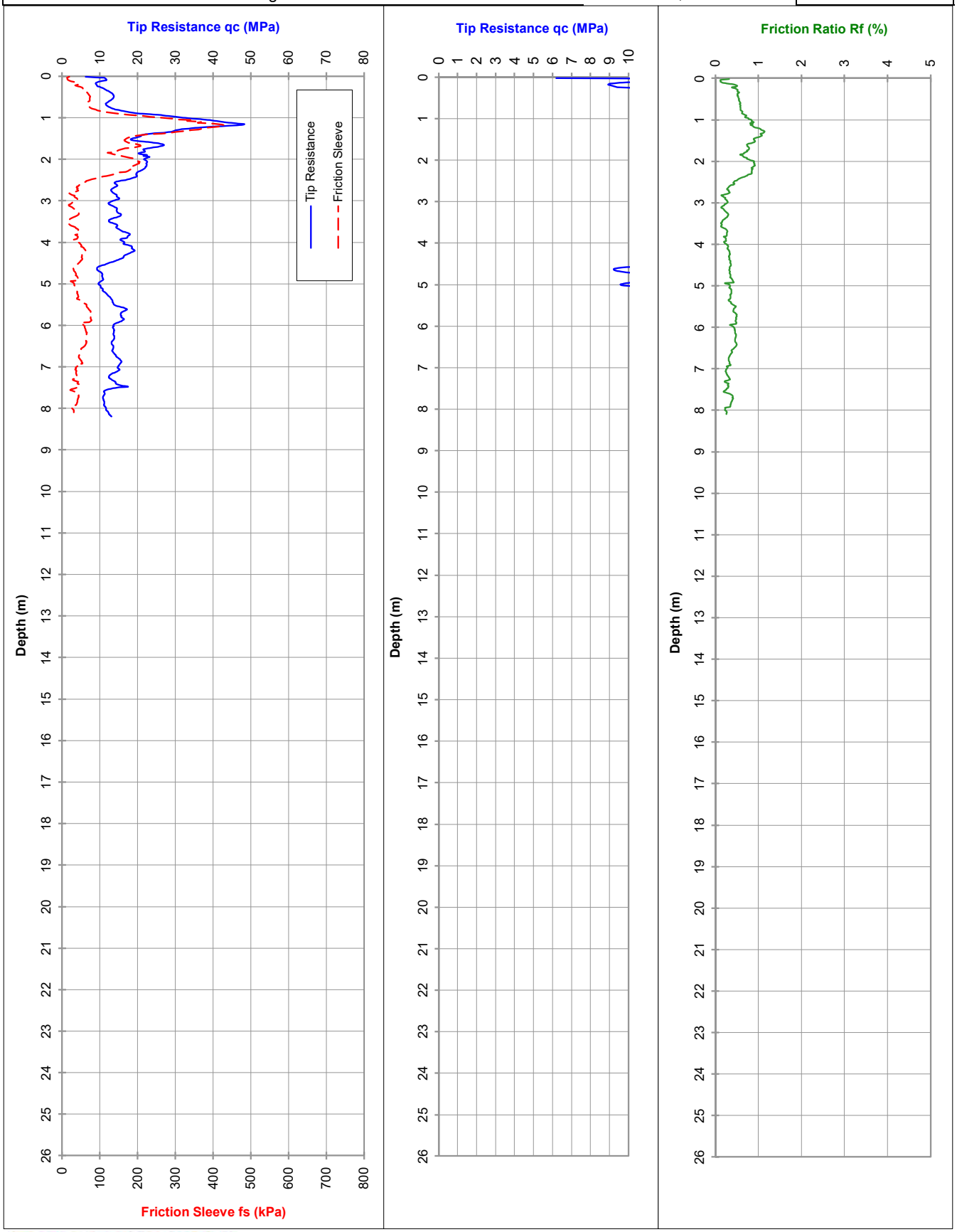
ELECTRIC FRICTION-CONE PENETROMETER

CLIENT:	Cooperative Bulk Handling (CBH) Ltd	Job No.:	J2001016
PROJECT:	Proposed Fertiliser Facility	RL (m):	3.61
LOCATION:	Part of Lot 1304 Rockingham Beach Rd	Co-ords:	382862.48mE, 6430445.23mN

Probe I.D

CPT15

04-Mar-20



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 2.2

Dummy probe to (m):

Refusal:

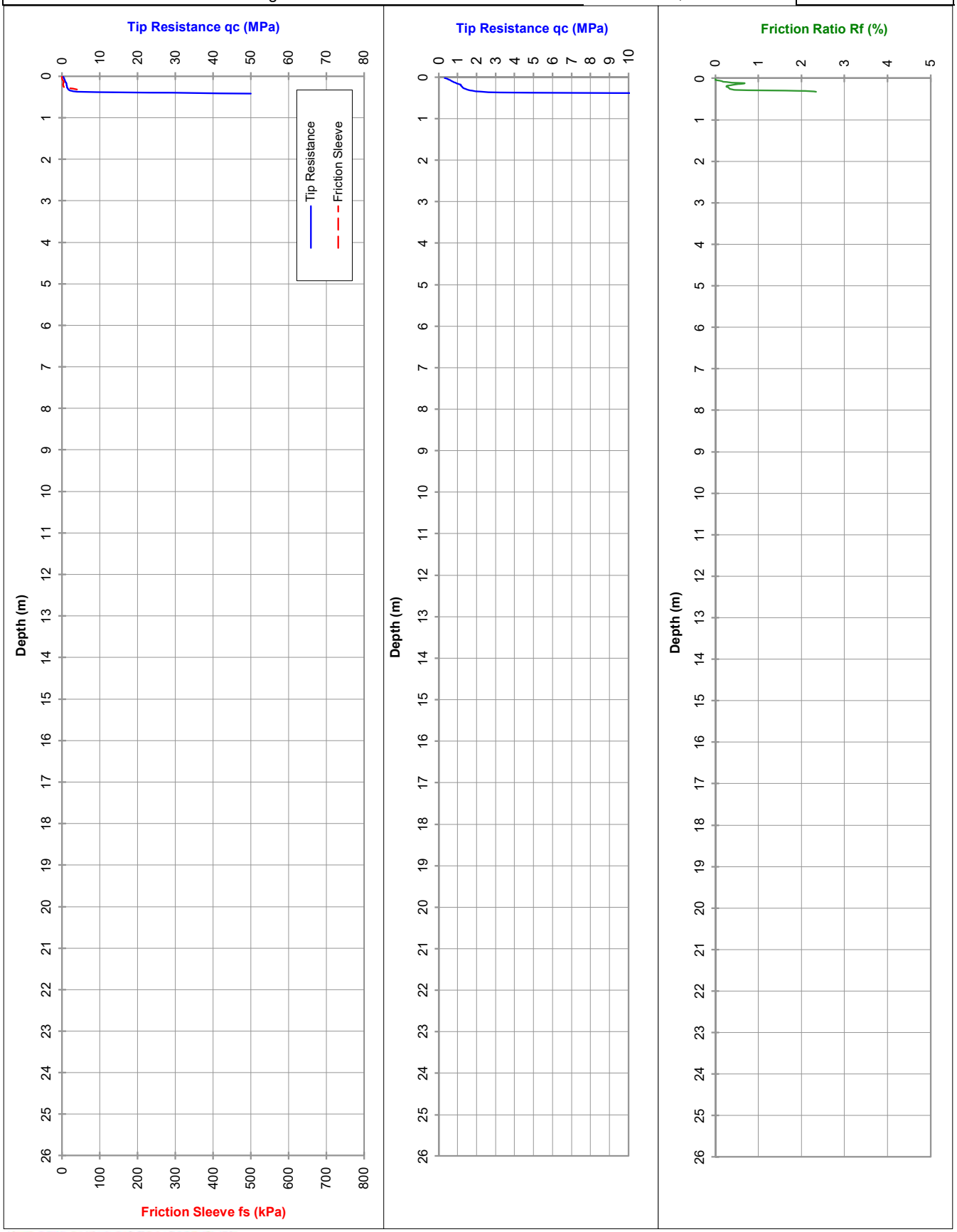
Cone I.D.: EC31

File: GL1290TT

Rig Type: 7/22 Tonne Track Truck

ELECTRIC FRICTION-CONE PENETROMETER

CLIENT: Cooperative Bulk Handling (CBH) Ltd	Job No.: J2001016	Probe I.D
PROJECT: Proposed Fertiliser Facility	RL (m): 4.14	**CPT16**
LOCATION: Part of Lot 1304 Rockingham Beach Rd	Co-ords: 382787.98mE, 6430402.89mN	03-Mar-20



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 0.4

Dummy probe to (m):

Refusal: 50 MPa

Cone I.D.: EC31

File: GL1289TT

Rig Type: 7/22 Tonne Track Truck

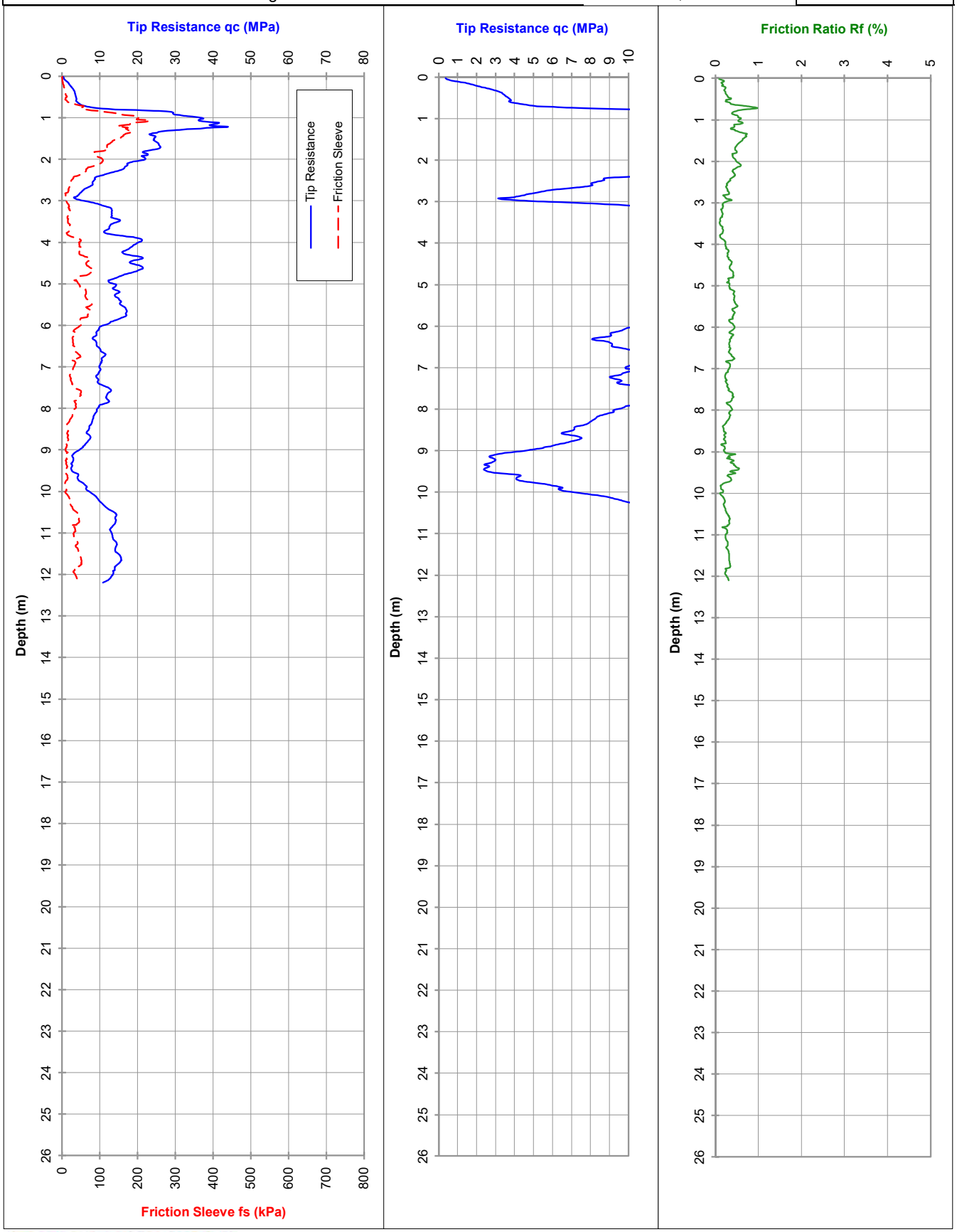
ELECTRIC FRICTION-CONE PENETROMETER

CLIENT:	Cooperative Bulk Handling (CBH) Ltd	Job No.:	J2001016
PROJECT:	Proposed Fertiliser Facility	RL (m):	3.5
LOCATION:	Part of Lot 1304 Rockingham Beach Rd	Co-ords:	382985.87mE,6430636.08mN

Probe I.D

CPT17

03-Mar-20



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 0.8

Dummy probe to (m):

Refusal:

Cone I.D.: EC31

File: GL1281TT

Rig Type: 7/22 Tonne Track Truck

ELECTRIC FRICTION-CONE PENETROMETER

Probe I.D

CPT 18

04-Mar-20

CLIENT: Cooperative Bulk Handling (CBH) Ltd

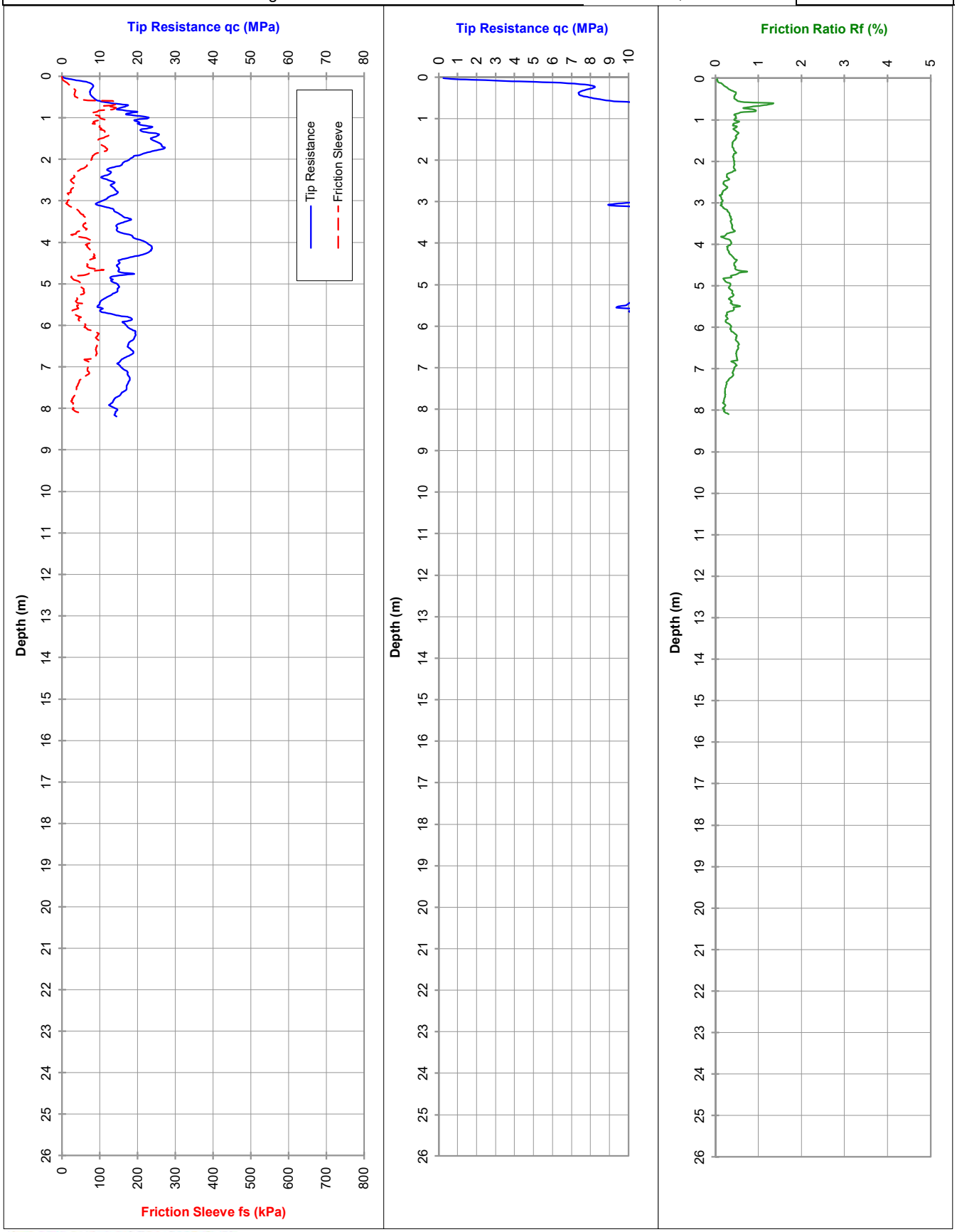
Job No.: J2001016

PROJECT: Proposed Fertiliser Facility

RL (m): 3.11

LOCATION: Part of Lot 1304 Rockingham Beach Rd

Co-ords: 382885.43mE, 6430670.78mN



PROBEDRILL GEOTECHNICAL SURVEY

Tested in accordance with AS 1289.6.5.1-1999 and IRTP 2001 for friction reducer

Approx. water (m): Dry to 2.0

Dummy probe to (m):

Refusal:

Cone I.D.: EC31

File: GL1296TT

Rig Type: 7/22 Tonne Track Truck

Appendix E: Borehole and Well Construction Reports

www.galtgeo.com.au
50 Edward Street OSBORNE PARK WA 6017
ABN: 64 625 054 729

METHOD OF SOIL DESCRIPTION
BOREHOLE AND TEST PIT REPORTS

GRAPHIC LOG & SOIL CLASSIFICATION SYMBOLS

Graphic	USCS	Soil Name
		FILL (various types)
		COBBLES / BOULDERS
	GP	GRAVEL (poorly graded)
	GW	GRAVEL (well graded)
	GC	Clayey GRAVEL
	GM	Silty GRAVEL
	SP	SAND (poorly graded)
	SW	SAND (well graded)
	SC	Clayey SAND

Graphic	USCS	Soil Name
	SM	Silty SAND
	ML	SILT (low liquid limit)
	MH	SILT (high liquid limit)
	CL	CLAY (low plasticity)
	CI	CLAY (medium plasticity)
	CH	CLAY (high plasticity)
	OL	Organic SILT (low liquid limit)
	OH	Organic SILT (high liquid limit)
	Pt	PEAT

NOTE: Dual classification given for soils with a fines content between 5% and 12%.

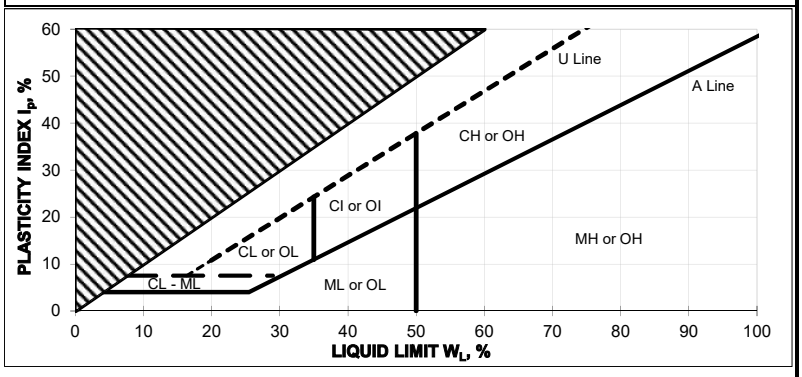
SOIL CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil descriptions are based on AS1726-2017. Material properties are assessed in the field by visual/tactile methods in combination with field and laboratory testing techniques (where used).

NOTE: AS 1726-2017 defines a fine grained soil where the total dry mass of fine fractions (<0.075 mm particle size) exceeds 35%.

PARTICLE SIZE		
Soil Name		**Particle Size (mm)**
BOULDERS		>200
COBBLES		63 to 200
GRAVEL	Coarse	19 to 63
	Medium	6.7 to 19
	Fine	2.3 to 6.7
SAND	Coarse	0.6 to 2.36
	Medium	0.21 to 0.6
	Fine	0.075 to 0.21
FINES	SILT	0.002 to 0.075
	CLAY	<0.002

PLASTICITY - MODIFIED CASAGRANDE CHART - AS1726-2017



RESISTANCE TO EXCAVATION		
Symbol	**Term**	**Description**
VE	Very easy	All resistances are relative to the selected method of excavation
E	Easy	
F	Firm	
H	Hard	
VH	Very hard	

MOISTURE CONDITION	
Symbol	**Term**
D	Dry
M	Moist
W	Wet

CEMENTATION	
Cementation	**Description**
Weakly cemented	Soil may be easily disaggregated by hand in air or water
Moderately cemented	Effort is required to disaggregate the soil by hand in air or water

CONSISTENCY		
Symbol	**Term**	**Undrained Shear Strength (kPa)**
VS	Very Soft	0 to 12
S	Soft	12 to 25
F	Firm	25 to 50
St	Stiff	50 to 100
VSt	Very Stiff	100 to 200
H	Hard	>200

ORGANIC SOILS	
Material	**Organic Content % of dry mass**
Inorganic soil	<2%
Organic soil	2% to 25%
Peat	>25%

DENSITY		
Symbol	**Term**	**Density Index (%)**
VL	Very Loose	<15
L	Loose	15 to 35
MD	Medium Dense	35 to 65
D	Dense	65 to 85
VD	Very Dense	>85

EXPLANATORY NOTES TO BE READ WITH BOREHOLE AND TEST PIT REPORTS

METHOD OF DRILLING OR EXCAVATION

AC	Air Core	E	Excavator	PQ3	PQ3 Core Barrel
AD/T	Auger Drilling with TC-Bit	EH	Excavator with Hammer	PT	Push Tube
AD/V	Auger Drilling with V-Bit	HA	Hand Auger	R	Ripper
AT	Air Track	HMLC	HMLC Core Barrel	RR	Rock Roller
B	Bulldozer Blade	HQ3	HQ3 Core Barrel	SON	Sonic Rig
BH	Backhoe Bucket	N	Natural Exposure	SPT	Driven SPT
CT	Cable Tool	NMLC	NMLC Core Barrel	WB	Washbore
DT	Diatube	PP	Push Probe	X	Existing Excavation

SUPPORT

T	Timbering

PENETRATION EFFORT (RELATIVE TO THE EQUIPMENT USED)

VE	Very Easy	E	Easy	F	Firm
H	Hard	VH	Very Hard		

WATER

►	Water Inflow	▼	Water Level
◄	Water Loss (complete)		
◁	Water Loss (partial)		

SAMPLING AND TESTING

B	Bulk Disturbed Sample	P	Piston Sample
BLK	Block Sample	PBT	Plate Bearing Test
C	Core Sample	U	Undisturbed Push-in Sample
CBR	CBR Mould Sample		U50: 50 mm diameter
D	Small Disturbed Sample	SPT	Standard Penetration Test
ES	Environmental Soil Sample		Example: 3, 4, 5 N=9
EW	Environmental Water Sample		3,4,5: Blows per 150 mm
G	Gas Sample		N=9: Blows per 300 mm after
HP	Hand Penetrometer		150 mm seating interval
LB	Large Bulk Disturbed Sample	VS	Vane Shear; P = Peak
M	Mazier Type Sample		R = Remoulded (kPa)
MC	Moisture Content Sample	W	Water Sample

ROCK CORE RECOVERY

TCR = Total Core Recovery (%) $\frac{CRL}{TCL} \times 100$

RQD = Rock Quality Designation (%) $\frac{ALC \geq 100}{TCL} \times 100$

TCL	Length of Core Run
CRL	Length of Core Recovered
ALC>100	Total Length of Axial Lengths of Core Greater than 100 mm Long

BOREHOLE: BH01

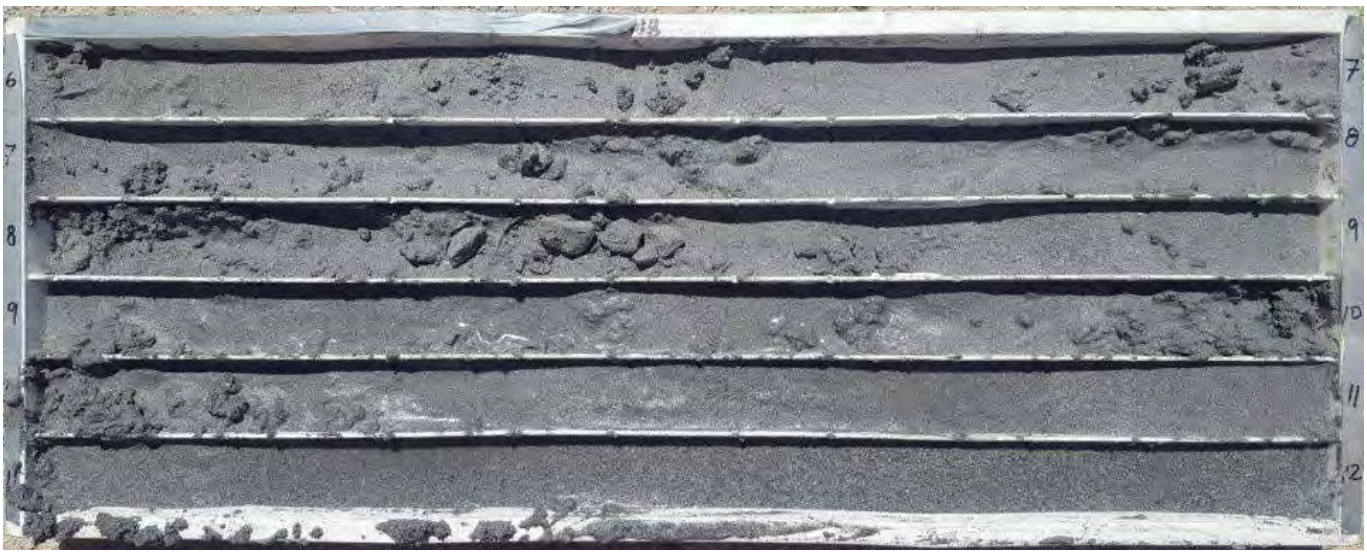
Job Number:	J2001016	**Easting:**	382792.7 m	**Contractor:**	Proline Drilling	**Date:**	03/03/2020
Client:	Cooperative Bulk Handling (CBH) Ltd	**Northing:**	6430345.3 m	**Drill Rig:**	Commachio	**Logged:**	PF
Project:	Proposed Fertiliser Facility	**Datum:**	MGA94 Zone 50	Geo305		**Checked Date:**	26/03/2020
Location:	Part of Lot 108 Rockingham Beach Road, Rockingham	**Surface RL:**	4.1 m AHD	**Inclination:**	-90°	**Checked By:**	HWC

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL CLASS	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AC		03/03/20	0	4.05				GP	FILL: Sandy GRAVEL, medium to coarse grained, sub-angular to sub-rounded, grey and white, sand, fine to medium grained, sub-angular to sub-rounded, with fines	D		
				3.85				SP	FILL: SAND, fine to medium grained, sub-angular to sub-rounded, grey/brown, with medium to coarse grained gravel, trace fines			
				3.35				SP	FILL: SAND, fine to medium grained, sub-angular to sub-rounded, grey, trace fines			
				2.85	SPT 1.5-1.95 m 5/10/7 N=17			SP	SAND: fine to coarse grained, sub-angular to sub-rounded, pale brown, trace fines, trace shell fragments	M	MD	
			2		SPT 3.0-3.45 m 6/8/8 N=16							
				0.30					SAND: fine to coarse grained, sub-angular to sub-rounded, dark grey, with non-plastic fines			
			4		SPT 4.5-4.95 m 10/14/17 N=31				fine to medium grained, trace shell fragments			
			6		SPT 6.0-6.45 m 7/13/16 N=29						MD - D	
					SPT 7.5-7.95 m 8/11/14 N=25			SP-SM	with weakly cemented coarse gravel recovered	W		
			8		SPT 9.0-9.45 m 5/9/13 N=22						MD	
			10		SPT 10.5-10.95 m 6/6/8 N=14							
			12		SPT 12.0-12.45 m 3/5/6 N=11						L - MD	
				-8.40					Hole terminated at 12.45 m Target depth Groundwater encountered at 3.5 m			

Comments:

See Explanatory Notes and Method of Soil Description sheets for details of abbreviations and basis of descriptions

BH01 Depth Range: 0.00 - 6.00 m



BH01 Depth Range: 6.00 - 12.00 m

Galt GEOTECHNICS AND ENVIRONMENTAL	TITLE: Cooperative Bulk Handling (CBH) Ltd Part of Lot 108 Rockingham Beach Road, Rockingham Proposed Fertiliser Facility Core Photo - BH01	DRAWN: CED	DATE: 30/03/2020
		CHECKED: HWC	DATE: 30/03/2020
		SCALE: Not To Scale	A4
		PROJECT No: J2001016	FIGURE No: 1/1

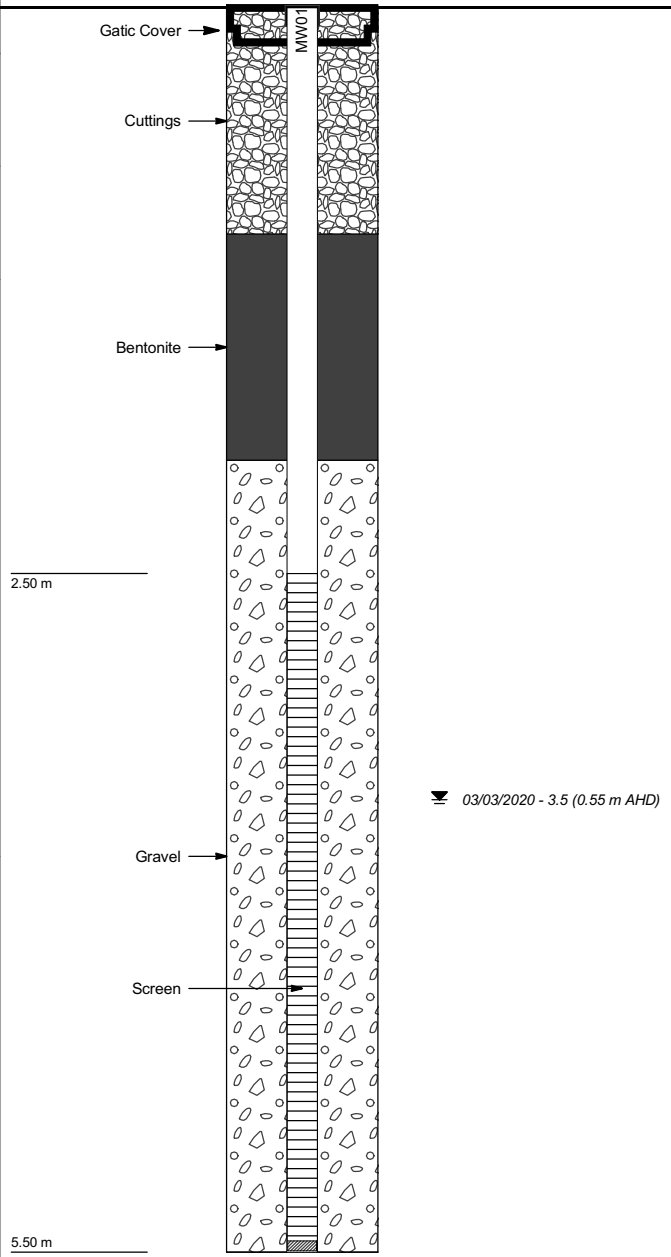
GROUNDWATER MONITORING BORE: MW01

Job Number:	J2001016	**Easting:**	382792.7 m	**Contractor:**	Proline Drilling	**Date:**	03/03/2020
Client:	Cooperative Bulk Handling (CBH) Ltd	**Northing:**	6430345.3 m	**Drill Rig:**	Commachio	**Logged:**	PF
Project:	Proposed Fertiliser Facility	**Datum:**	MGA94 Zone 50	Geo305		**Checked Date:**	26/03/2020
Location:	Part of Lot 108 Rockingham Beach Road, Rockingham	**Surface RL:**	4.1 m AHD	**Inclination:**	-90°	**Checked By:**	HWC

Method	Ground Water	Depth (m)	Elevation (m AHD)	Graphic Log	Soil / Rock Description
AC	▽	1	4		FILL: Sandy GRAVEL, medium to coarse grained, sub-angular to sub-rounded, grey and white, sand, fine to medium grained, sub-angular to sub-rounded, with fines
					FILL: SAND, fine to medium grained, sub-angular to sub-rounded, grey/brown, with medium to coarse grained gravel, trace fines
			3		FILL: SAND, fine to medium grained, sub-angular to sub-rounded, grey, trace fines
		2	2		SAND: fine to coarse grained, sub-angular to sub-rounded, pale brown, trace fines, trace shell fragments
		3	1		
		4	0		SAND: fine to coarse grained, sub-angular to sub-rounded, dark grey, with non-plastic fines
		5	-1		fine to medium grained, trace shell fragments
		6	-2		

WELL INSTALLATION DETAILS

ID:	MW01	**Stick Up & RL:**	0.00 m 4.05 m AHD
Type:	Standpipe	**Tip Depth & RL:**	5.50 m -1.45 m AHD
Installation Date:	03/03/2020	**Static Water Level:**	3.50 m 0.55 m AHD



Comments:

See Explanatory Notes and Method of Soil Description sheets for details of abbreviations and basis of descriptions

GROUNDWATER MONITORING BORE: MW01

Job Number:	J2001016	**Easting:**	382792.7 m	**Contractor:**	Proline Drilling	**Date:**	03/03/2020
Client:	Cooperative Bulk Handling (CBH) Ltd	**Northing:**	6430345.3 m	**Drill Rig:**	Commachio	**Logged:**	PF
Project:	Proposed Fertiliser Facility	**Datum:**	MGA94 Zone 50	Geo305		**Checked Date:**	26/03/2020
Location:	Part of Lot 108 Rockingham Beach Road, Rockingham	**Surface RL:**	4.1 m AHD	**Inclination:**	-90°	**Checked By:**	HWC

Method	Ground Water	Depth (m)	Elevation (m AHD)	Graphic Log	Soil / Rock Description
AC		8	-3		
			-4		with weakly cemented coarse gravel recovered
		9	-5		
		10	-6		
		11	-7		
		12	-8		
		13	-9		Hole terminated at 12.45 m Target depth Groundwater encountered at 3.5 m

WELL INSTALLATION DETAILS

ID:	MW01	**Stick Up & RL:**	0.00 m 4.05 m AHD
Type:	Standpipe	**Tip Depth & RL:**	5.50 m -1.45 m AHD
Installation Date:	03/03/2020	**Static Water Level:**	3.50 m 0.55 m AHD

Comments:

See Explanatory Notes and Method of Soil Description sheets for details of abbreviations and basis of descriptions

BOREHOLE: BH02

Job Number:	J2001016	**Easting:**	382879.9 m	**Contractor:**	Proline Drilling	**Date:**	03/03/2020
Client:	Cooperative Bulk Handling (CBH) Ltd	**Northing:**	6430449.0 m	**Drill Rig:**	Commachio	**Logged:**	PF
Project:	Proposed Fertiliser Facility	**Datum:**	MGA94 Zone 50	Geo305		**Checked Date:**	26/03/2020
Location:	Part of Lot 108 Rockingham Beach Road, Rockingham	**Surface RL:**	3.6 m AHD	**Inclination:**	-90°	**Checked By:**	HWC

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL CLASS	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AC		03/03/20	0	3.63					TOPSOIL: Organic SAND, fine to medium grained, sub-angular to sub-rounded, brown, trace fines, trace organics, shell fragments observed			
				3.43					SAND: fine to medium grained, sub-angular to sub-rounded, pale brown, trace fines, trace shell fragments, with trace weakly cemented, coarse gravel sized fragments of limestone at 1.2 m			
					SPT 1.5-1.95 m 9/11/15 N=26			SP		D	MD	
			2									
					SPT 3.0-3.45 m 5/5/6 N=11							
			4	-0.37					dark grey, with non-plastic fines			
					SPT 4.5-4.95 m 6/8/10 N=18						L - MD	
			6		SPT 6.0-6.45 m 5/6/6 N=12							
					SPT 7.5-7.95 m 6/9/12 N=21					W	MD	
			8					SP-SM				
					SPT 9.0-9.45 m 4/5/6 N=11							
			10								L - MD	
					SPT 10.5-10.95 m 6/6/7 N=13							
			12		SPT 12.0-12.45 m 2/6/12 N=18							
				-8.82					Hole terminated at 12.45 m Target depth Groundwater encountered at 3.1 m			

Comments:

See Explanatory Notes and Method of Soil Description sheets for details of abbreviations and basis of descriptions

BH02 Depth Range: 0.00 - 6.00 m

BH02 Depth Range: 6.00 - 12.00 m

Galt GEOTECHNICS AND ENVIRONMENTAL	TITLE: Cooperative Bulk Handling (CBH) Ltd Part of Lot 108 Rockingham Beach Road, Rockingham Proposed Fertiliser Facility Core Photo - BH02	DRAWN: CED	DATE: 30/03/2020
		CHECKED: HWC	DATE: 30/03/2020
		SCALE: Not To Scale	A4
		PROJECT No: J2001016	FIGURE No: 1/1

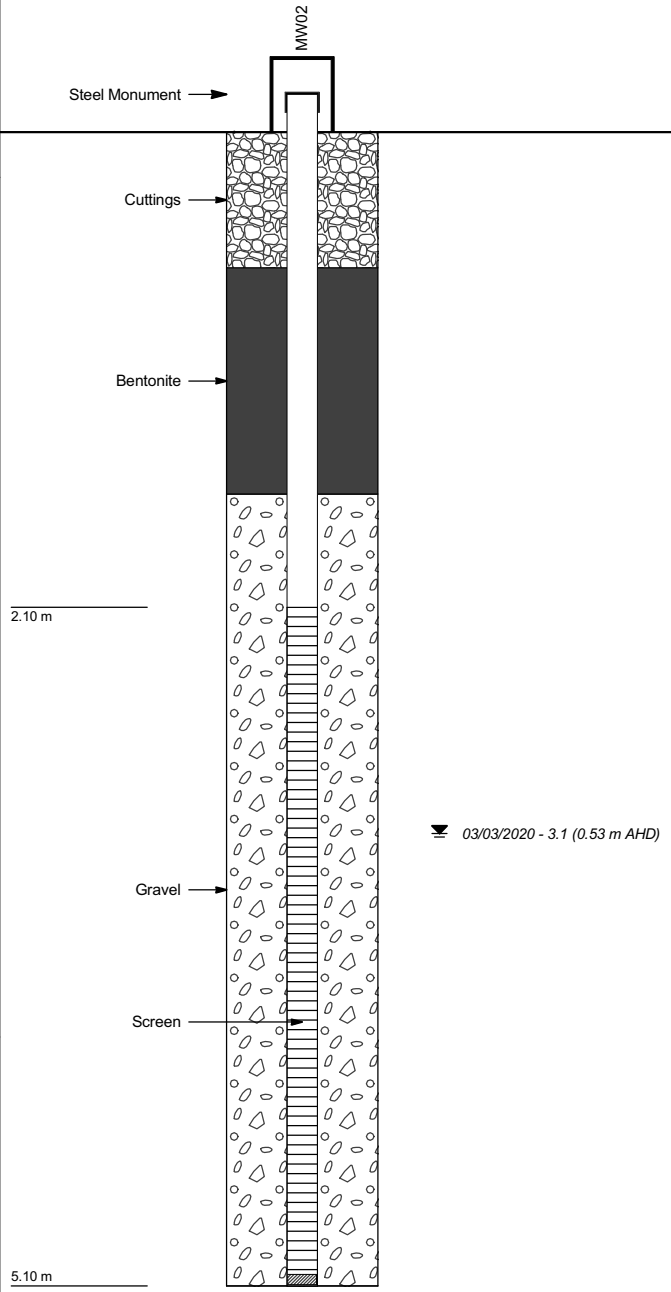
GROUNDWATER MONITORING BORE: MW02

Job Number:	J2001016	**Easting:**	382879.9 m	**Contractor:**	Proline Drilling	**Date:**	03/03/2020
Client:	Cooperative Bulk Handling (CBH) Ltd	**Northing:**	6430449.0 m	**Drill Rig:**	Commachio	**Logged:**	PF
Project:	Proposed Fertiliser Facility	**Datum:**	MGA94 Zone 50	Geo305		**Checked Date:**	26/03/2020
Location:	Part of Lot 108 Rockingham Beach Road, Rockingham	**Surface RL:**	3.6 m AHD	**Inclination:**	-90°	**Checked By:**	HWC

Method	Ground Water	Depth (m)	Elevation (m AHD)	Graphic Log	Soil / Rock Description
AC	▽	0	4		TOPSOIL: Organic SAND, fine to medium grained, sub-angular to sub-rounded, brown, trace fines, trace organics, shell fragments observed
		1	3		SAND: fine to medium grained, sub-angular to sub-rounded, pale brown, trace fines, trace shell fragments, with trace weakly cemented, coarse gravel sized fragments of limestone at 1.2 m
		2	2		
		3	1		
		4	0		dark grey, with non-plastic fines
		5	-1		
		6	-2		

WELL INSTALLATION DETAILS

ID:	MW02	**Stick Up & RL:**	0.63 m 4.26 m AHD
Type:	Standpipe	**Tip Depth & RL:**	5.10 m -1.47 m AHD
Installation Date:	03/03/2020	**Static Water Level:**	3.10 m 0.53 m AHD



Comments:

See Explanatory Notes and Method of Soil Description sheets for details of abbreviations and basis of descriptions

GROUNDWATER MONITORING BORE: MW02

Job Number:	J2001016	**Easting:**	382879.9 m	**Contractor:**	Proline Drilling	**Date:**	03/03/2020
Client:	Cooperative Bulk Handling (CBH) Ltd	**Northing:**	6430449.0 m	**Drill Rig:**	Commachio	**Logged:**	PF
Project:	Proposed Fertiliser Facility	**Datum:**	MGA94 Zone 50	Geo305		**Checked Date:**	26/03/2020
Location:	Part of Lot 108 Rockingham Beach Road, Rockingham	**Surface RL:**	3.6 m AHD	**Inclination:**	-90°	**Checked By:**	HWC

Method	Ground Water	Depth (m)	Elevation (m AHD)	Graphic Log	Soil / Rock Description
AC		7	-3		
		8	-4		
		9	-5		
		10	-6		
		11	-7		
		12	-8		
		13	-9		Hole terminated at 12.45 m Target depth Groundwater encountered at 3.1 m

WELL INSTALLATION DETAILS

ID:	MW02	**Stick Up & RL:**	0.63 m 4.26 m AHD
Type:	Standpipe	**Tip Depth & RL:**	5.10 m -1.47 m AHD
Installation Date:	03/03/2020	**Static Water Level:**	3.10 m 0.53 m AHD

Comments:

See Explanatory Notes and Method of Soil Description sheets for details of abbreviations and basis of descriptions

BOREHOLE: BH03

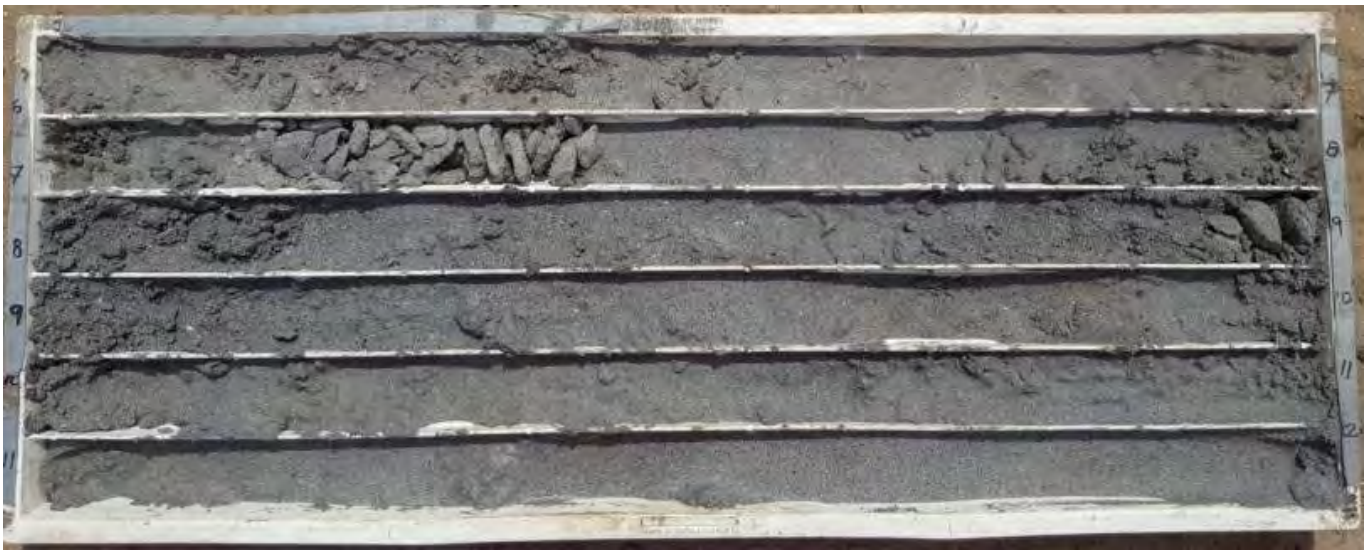
Job Number:	J2001016	**Easting:**	382784.6 m	**Contractor:**	Proline Drilling	**Date:**	05/03/2020
Client:	Cooperative Bulk Handling (CBH) Ltd	**Northing:**	6430621.3 m	**Drill Rig:**	Commachio	**Logged:**	PF
Project:	Proposed Fertiliser Facility	**Datum:**	MGA94 Zone 50	Geo305		**Checked Date:**	26/03/2020
Location:	Part of Lot 108 Rockingham Beach Road, Rockingham	**Surface RL:**	3.6 m AHD	**Inclination:**	-90°	**Checked By:**	HWC

Drilling				Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres) / *DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL CLASS	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AC		05/03/20	0 — 3.57				SP	SAND: fine to medium grained, sub-angular to sub-rounded, pale brown, trace fines, trace roots, trace shell fragments, possible fill			
			2.07	SPT 1.5-1.95 m 8/10/11 N=21				with medium to coarse grained, gravel sized fragments of limestone	D		
			2					SAND: fine to coarse grained, sub-angular to sub-rounded, pale brown, with shell fragments, trace fines			
				SPT 3.0-3.45 m 5/5/6 N=11			SP				
			4								
			-0.93	SPT 4.5-4.95 m 6/8/9 N=17				fine to medium grained, dark grey, with non-plastic fines			
			6	SPT 6.0-6.45 m 10/6/10 N=16						MD	
				SPT 7.5-7.95 m 6/11/9 N=20				isolated zone (0.1m to 0.2 m thick) with coarse gravel sized fragments of weakly cemented sand	D		
			8				SP-SM				
				SPT 9.0-9.45 m 6/9/13 N=22				Pocket of weakly cemented sands, coarse grained, gravel sized, angular to sub-rounded			
			10								
				SPT 10.5-10.95 m 9/11/13 N=24							
			12	SPT 12.0-12.45 m 6/9/12 N=21							
			-8.88					Hole terminated at 12.45 m Target depth Groundwater encountered at 3.1 m			

Comments:

See Explanatory Notes and Method of Soil Description sheets for details of abbreviations and basis of descriptions

BH03 Depth Range: 0.00 - 6.00 m



BH03 Depth Range: 6.00 - 12.00 m

Galt GEOTECHNICS AND ENVIRONMENTAL	TITLE: Cooperative Bulk Handling (CBH) Ltd Part of Lot 108 Rockingham Beach Road, Rockingham Proposed Fertiliser Facility Core Photo - BH03	DRAWN: CED / DATE: 30/03/2020 CHECKED: HWC / DATE: 30/03/2020 SCALE: Not To Scale / A4 PROJECT No: J2001016 / FIGURE No: 1/1	

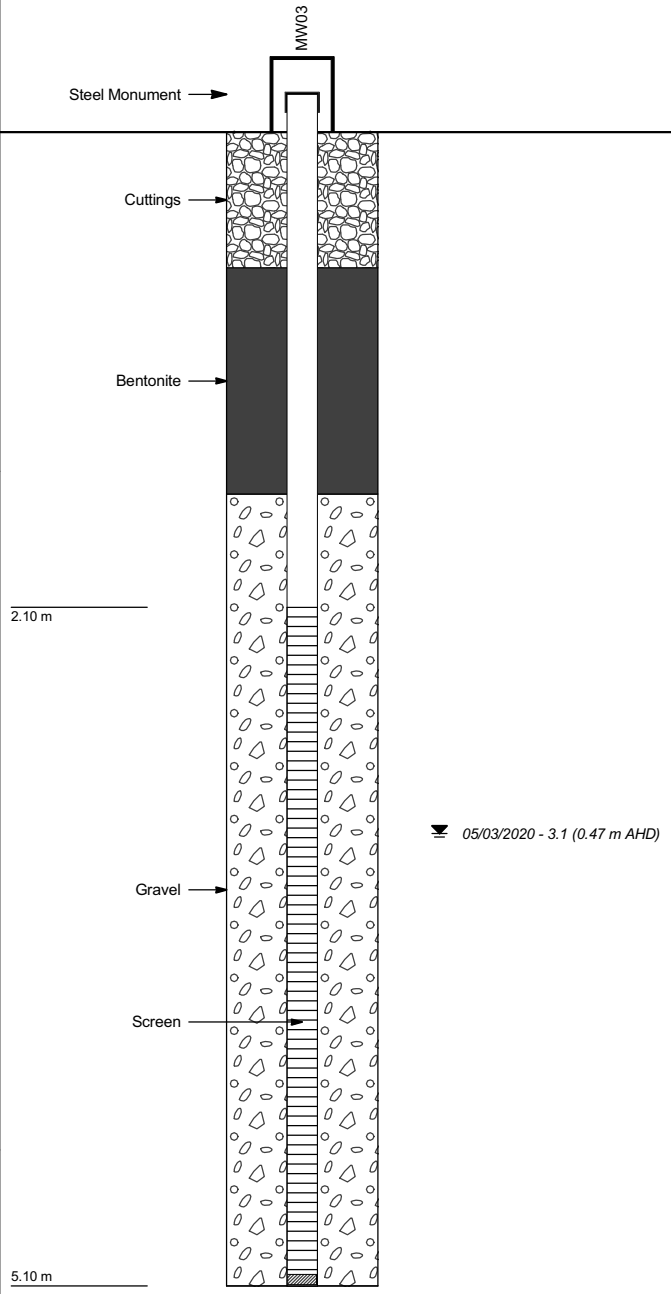
GROUNDWATER MONITORING BORE: MW03

Job Number:	J2001016	**Easting:**	382784.6 m	**Contractor:**	Proline Drilling	**Date:**	05/03/2020
Client:	Cooperative Bulk Handling (CBH) Ltd	**Northing:**	6430621.3 m	**Drill Rig:**	Commachio	**Logged:**	PF
Project:	Proposed Fertiliser Facility	**Datum:**	MGA94 Zone 50	Geo305		**Checked Date:**	26/03/2020
Location:	Part of Lot 108 Rockingham Beach Road, Rockingham	**Surface RL:**	3.6 m AHD	**Inclination:**	-90°	**Checked By:**	HWC

Method	Ground Water	Depth (m)	Elevation (m AHD)	Graphic Log	Soil / Rock Description
		0	4		
AC	▽	0	3		SAND: fine to medium grained, sub-angular to sub-rounded, pale brown, trace fines, trace roots, trace shell fragments, possible fill
		1			with medium to coarse grained, gravel sized fragments of limestone
		2	2		SAND: fine to coarse grained, sub-angular to sub-rounded, pale brown, with shell fragments, trace fines
		3	1		
		4	0		
		5	-1		fine to medium grained, dark grey, with non-plastic fines
		6	-2		

WELL INSTALLATION DETAILS

ID:	MW03	**Stick Up & RL:**	0.58 m 4.15 m AHD
Type:	Standpipe	**Tip Depth & RL:**	5.10 m -1.53 m AHD
Installation Date:	05/03/2020	**Static Water Level:**	3.10 m 0.47 m AHD



Comments:

See Explanatory Notes and Method of Soil Description sheets for details of abbreviations and basis of descriptions

GROUNDWATER MONITORING BORE: MW03

Job Number:	J2001016	**Easting:**	382784.6 m	**Contractor:**	Proline Drilling	**Date:**	05/03/2020
Client:	Cooperative Bulk Handling (CBH) Ltd	**Northing:**	6430621.3 m	**Drill Rig:**	Commachio	**Logged:**	PF
Project:	Proposed Fertiliser Facility	**Datum:**	MGA94 Zone 50	Geo305		**Checked Date:**	26/03/2020
Location:	Part of Lot 108 Rockingham Beach Road, Rockingham	**Surface RL:**	3.6 m AHD	**Inclination:**	-90°	**Checked By:**	HWC

Method	Ground Water	Depth (m)	Elevation (m AHD)	Graphic Log	Soil / Rock Description
AC		7	-3		isolated zone (0.1m to 0.2 m thick) with coarse gravel sized fragments of weakly cemented sand
		8	-4		
		9	-5		Pocket of weakly cemented sands, coarse grained, gravel sized, angular to sub-rounded
		10	-6		
		11	-7		
		12	-8		
		13	-9		Hole terminated at 12.45 m Target depth Groundwater encountered at 3.1 m

WELL INSTALLATION DETAILS

ID:	MW03	**Stick Up & RL:**	0.58 m 4.15 m AHD
Type:	Standpipe	**Tip Depth & RL:**	5.10 m -1.53 m AHD
Installation Date:	05/03/2020	**Static Water Level:**	3.10 m 0.47 m AHD

Comments:

See Explanatory Notes and Method of Soil Description sheets for details of abbreviations and basis of descriptions

BOREHOLE: BH04

Job Number:	J2001016	**Easting:**	382690.6 m	**Contractor:**	Proline Drilling	**Date:**	05/03/2020
Client:	Cooperative Bulk Handling (CBH) Ltd	**Northing:**	6430481.3 m	**Drill Rig:**	Commachio	**Logged:**	PF
Project:	Proposed Fertiliser Facility	**Datum:**	MGA94 Zone 50	Geo305		**Checked Date:**	26/03/2020
Location:	Part of Lot 108 Rockingham Beach Road, Rockingham	**Surface RL:**	3.3 m AHD	**Inclination:**	-90°	**Checked By:**	HWC

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL CLASS	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AC		03/03/20	0	3.28				SP	TOPSOIL: Organic SAND, fine to medium grained, sub-angular to sub-rounded, grey, trace fines, trace rock, trace rootlets, possible fill	D	MD	
				3.13					SAND: fine to coarse grained, sub-angular to sub-rounded, pale brown, trace fines, with shell fragments, possible fill			
			2		SPT 1.5-1.95 m 7/8/10 N=18			SP		M		
				0.28	SPT 3.0-3.45 m 7/11/12 N=23				fine to medium grained, sub-angular to sub-rounded, dark grey, with non-plastic fines, trace shell fragments			
			4		SPT 4.5-4.95 m 8/11/12 N=23				isolated zone (0.1 m to 0.2 m thick) with coarse gravel sized fragments of weakly cemented sand			
			6		SPT 6.0-6.45 m 5/7/9 N=16							
					SPT 7.5-7.95 m 6/6/11 N=17			SP	isolated zone (0.1 m to 0.2 m thick) with coarse gravel sized fragments of weakly cemented sand	W		
			8		SPT 9.0-9.45 m 7/9/10 N=19							
			10		SPT 10.5-10.95 m 6/8/11 N=19							
			12		SPT 12.0-12.45 m 4/9/11 N=20							
				-9.17					Hole terminated at 12.45 m Target depth Groundwater encountered at 2.9 m			

Comments:

See Explanatory Notes and Method of Soil Description sheets for details of abbreviations and basis of descriptions

BH04 Depth Range: 0.00 - 6.00 m

BH04 Depth Range: 6.00 - 12.00 m

Galt GEOTECHNICS AND ENVIRONMENTAL

TITLE

Cooperative Bulk Handling (CBH) Ltd
Part of Lot 108 Rockingham Beach Road, Rockingham
Proposed Fertiliser Facility
Core Photo - BH04

DRAWN	CED	DATE	30/03/2020
CHECKED	HWC	DATE	30/03/2020
SCALE	Not To Scale		A4
PROJECT No	J2001016	FIGURE No	1/1

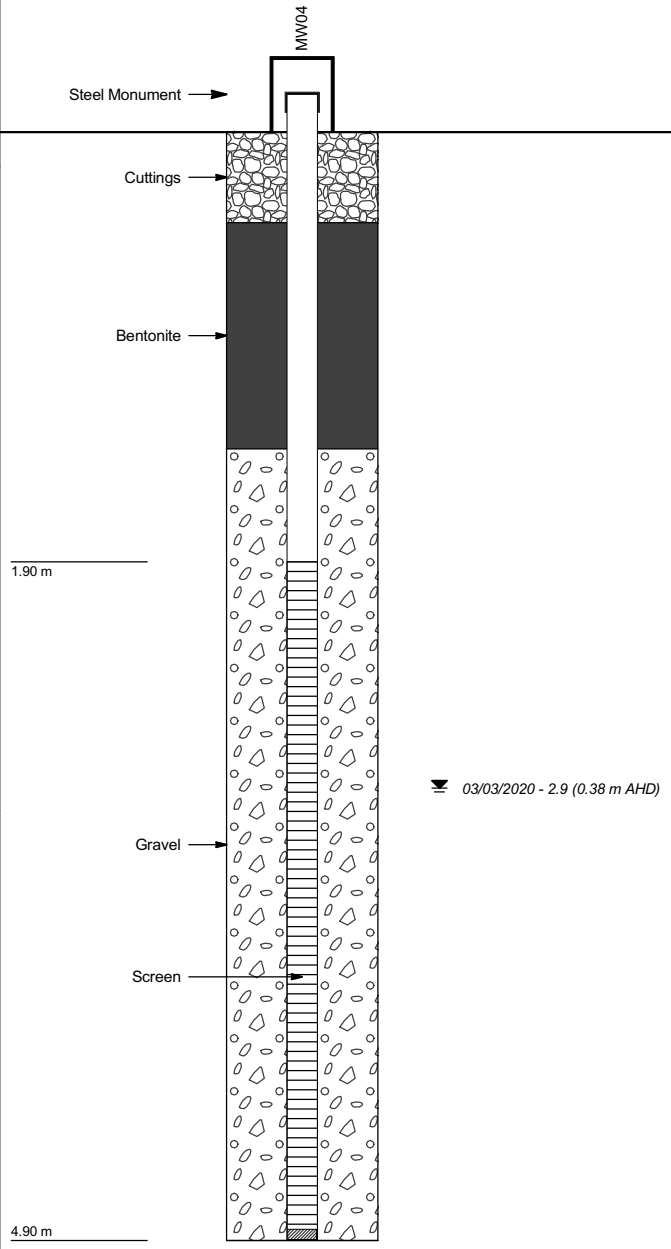
GROUNDWATER MONITORING BORE: MW04

Job Number:	J2001016	**Easting:**	382690.6 m	**Contractor:**	Proline Drilling	**Date:**	05/03/2020
Client:	Cooperative Bulk Handling (CBH) Ltd	**Northing:**	6430481.3 m	**Drill Rig:**	Commachio	**Logged:**	PF
Project:	Proposed Fertiliser Facility	**Datum:**	MGA94 Zone 50	Geo305		**Checked Date:**	26/03/2020
Location:	Part of Lot 108 Rockingham Beach Road, Rockingham	**Surface RL:**	3.3 m AHD	**Inclination:**	-90°	**Checked By:**	HWC

Method	Ground Water	Depth (m)	Elevation (m AHD)	Graphic Log	Soil / Rock Description
AC		0	3		TOPSOIL: Organic SAND, fine to medium grained, sub-angular to sub-rounded, grey, trace fines, trace rock, trace rootlets, possible fill
		1	2		SAND: fine to coarse grained, sub-angular to sub-rounded, pale brown, trace fines, with shell fragments, possible fill
		2	1		
		3	0		fine to medium grained, sub-angular to sub-rounded, dark grey, with non-plastic fines, trace shell fragments
		4	-1		isolated zone (0.1 m to 0.2 m thick) with coarse gravel sized fragments of weakly cemented sand
		5	-2		
		6	-3		

WELL INSTALLATION DETAILS

ID:	MW04	**Stick Up & RL:**	0.66 m 3.94 m AHD
Type:	Standpipe	**Tip Depth & RL:**	4.90 m -1.62 m AHD
Installation Date:	03/03/2020	**Static Water Level:**	2.90 m 0.38 m AHD



Comments:

See Explanatory Notes and Method of Soil Description sheets for details of abbreviations and basis of descriptions

GROUNDWATER MONITORING BORE: MW04

Job Number:	J2001016	**Easting:**	382690.6 m	**Contractor:**	Proline Drilling	**Date:**	05/03/2020
Client:	Cooperative Bulk Handling (CBH) Ltd	**Northing:**	6430481.3 m	**Drill Rig:**	Commachio	**Logged:**	PF
Project:	Proposed Fertiliser Facility	**Datum:**	MGA94 Zone 50	Geo305		**Checked Date:**	26/03/2020
Location:	Part of Lot 108 Rockingham Beach Road, Rockingham	**Surface RL:**	3.3 m AHD	**Inclination:**	-90°	**Checked By:**	HWC

Method	Ground Water	Depth (m)	Elevation (m AHD)	Graphic Log	Soil / Rock Description
AC		7	-4		isolated zone (0.1 m to 0.2 m thick) with coarse gravel sized fragments of weakly cemented sand
		8	-5		
		9	-6		
		10	-7		
		11	-8		
		12	-9		
		13	-10		Hole terminated at 12.45 m Target depth Groundwater encountered at 2.9 m

WELL INSTALLATION DETAILS

ID:	MW04	**Stick Up & RL:**	0.66 m 3.94 m AHD
Type:	Standpipe	**Tip Depth & RL:**	4.90 m -1.62 m AHD
Installation Date:	03/03/2020	**Static Water Level:**	2.90 m 0.38 m AHD

Comments:

See Explanatory Notes and Method of Soil Description sheets for details of abbreviations and basis of descriptions

Appendix F: Infiltration Test Results

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50 Edward Street OSBORNE PARK WA 6017
ABN: 64 625 054 729

Permeability Calculation - Inverse Auger Hole Method

Galt Geotechnics

Job No:	J2001016
Client:	CBH
Project:	Fertiliser Facility
Location:	Rockingham
Calc by:	HWC
BH Name:	IT03
Test Depth:	0.82 m

Spreadsheet author:	ORW	17-Oct-09

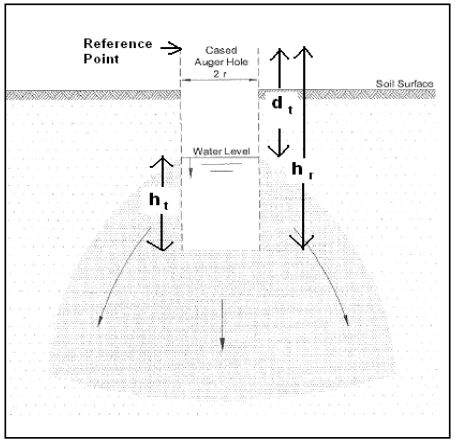
$$K = 1.15r\,\frac{\log_{10}(h_0 + \frac{1}{2}r) - \log_{10}(h_t + \frac{1}{2}r)}{t - t_0}$$

REFERENCE: Cocks, G. *Disposal of Stormwater Runoff by Soakage in Perth Western Australia*, Journal and News of the Australian Geomechanics Society, Volume 42 No 3 September 2007, pp101-114

Spreadsheet Legend

	Required input
	Calculated field
	Comment field
	Field not used
	Fixed field

Parameter	Description	Value	Units
K	Permeability		m/s
r	radius of test hole	0.03	m
t	time since start of measurement		s
h_r	reference point height above base	0.92	m
d_t	depth from reference point to water at time t		m
h_t	Water column height at time t		m
h_0	h_t at t=0		m



Test 1

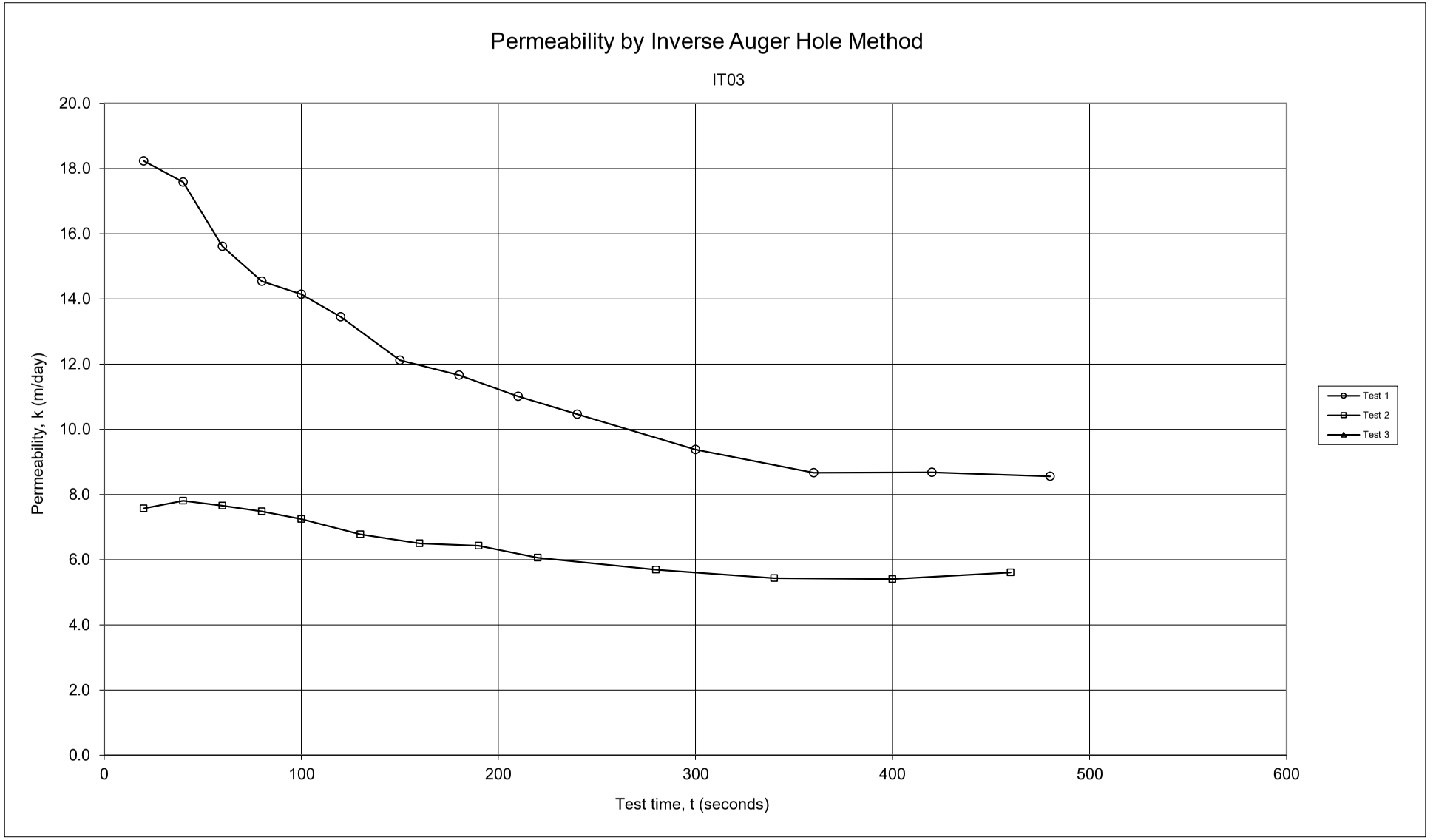
t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.1	0.82		
20	0.305	0.615	2.1E-04	18.2
40	0.45	0.47	2.0E-04	17.6
60	0.53	0.39	1.8E-04	15.6
80	0.595	0.325	1.7E-04	14.5
100	0.655	0.265	1.6E-04	14.1
120	0.695	0.225	1.6E-04	13.5
150	0.73	0.19	1.4E-04	12.1
180	0.77	0.15	1.3E-04	11.7
210	0.795	0.125	1.3E-04	11.0
240	0.815	0.105	1.2E-04	10.5
300	0.84	0.08	1.1E-04	9.4
360	0.86	0.06	1.0E-04	8.7
420	0.885	0.035	1.0E-04	8.7
480	0.9	0.02	9.9E-05	8.6
		AVERAGE	1.4E-04	12.4

Test 2

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.165	0.755		
20	0.25	0.67	8.8E-05	7.6
40	0.33	0.59	9.0E-05	7.8
60	0.395	0.525	8.9E-05	7.7
80	0.45	0.47	8.7E-05	7.5
100	0.495	0.425	8.4E-05	7.2
130	0.545	0.375	7.8E-05	6.8
160	0.59	0.33	7.5E-05	6.5
190	0.635	0.285	7.4E-05	6.4
220	0.66	0.26	7.0E-05	6.1
280	0.71	0.21	6.6E-05	5.7
340	0.75	0.17	6.3E-05	5.4
400	0.79	0.13	6.3E-05	5.4
460	0.83	0.09	6.5E-05	5.6
		AVERAGE	7.6E-05	6.6

Test 3

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
		AVERAGE	#DIV/0!	#DIV/0!


Permeability by Inverse Auger Hole Method
IT03
Permeability, k (m/day)
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0
100
200
300
400
500
600
Test time, t (seconds)
Test 1
Test 2
Test 3

Permeability Calculation - Inverse Auger Hole Method

Galt Geotechnics

Job No:	J2001016
Client:	CBH
Project:	Fertiliser Facility
Location:	Rockingham
Calc by:	HWC
BH Name:	IT04
Test Depth:	0.90 m

Spreadsheet author:	ORW	17-Oct-09

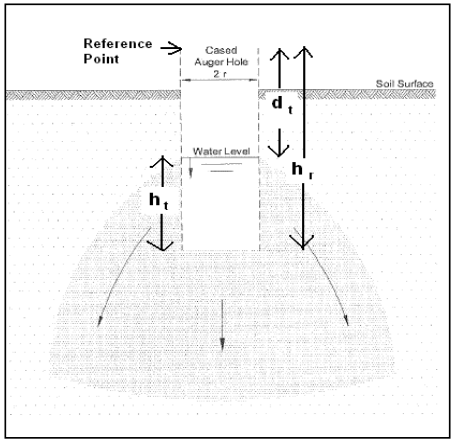
$$K = 1.15r \frac{\log_{10}(h_0 + \frac{1}{2}r) - \log_{10}(h_t + \frac{1}{2}r)}{t - t_0}$$

REFERENCE: Cocks, G. *Disposal of Stormwater Runoff by Soakage in Perth Western Australia*, Journal and News of the Australian Geomechanics Society, Volume 42 No 3 September 2007, pp101-114

Spreadsheet Legend

	Required input
	Calculated field
	Comment field
X	Field not used
	Fixed field

Parameter	Description	Value	Units
K	Permeability	X	m/s
r	radius of test hole	0.045	m
t	time since start of measurement	X	s
h_r	reference point height above base	1.16	m
d_t	depth from reference point to water at time t	X	m
h_t	Water column height at time t	X	m
h_0	h_t at t=0	X	m



Test 1

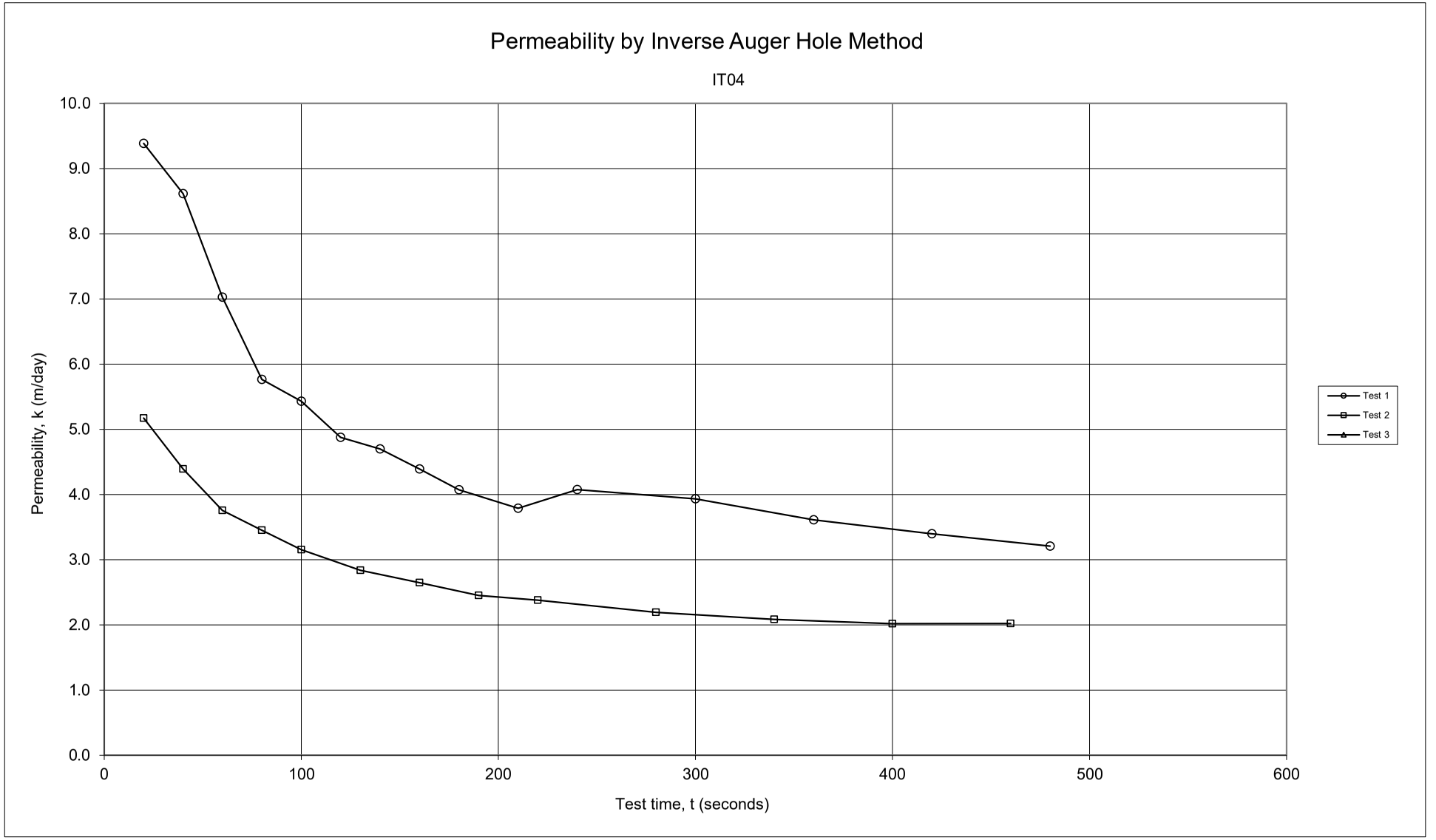
t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.26	0.9	X	X
20	0.345	0.815	1.1E-04	9.4
40	0.41	0.75	1.0E-04	8.6
60	0.44	0.72	8.1E-05	7.0
80	0.455	0.705	6.7E-05	5.8
100	0.485	0.675	6.3E-05	5.4
120	0.5	0.66	5.6E-05	4.9
140	0.525	0.635	5.4E-05	4.7
160	0.54	0.62	5.1E-05	4.4
180	0.55	0.61	4.7E-05	4.1
210	0.57	0.59	4.4E-05	3.8
240	0.625	0.535	4.7E-05	4.1
300	0.68	0.48	4.6E-05	3.9
360	0.71	0.45	4.2E-05	3.6
420	0.74	0.42	3.9E-05	3.4
480	0.765	0.395	3.7E-05	3.2
		AVERAGE	5.9E-05	5.1

Test 2

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.315	0.845	X	X
20	0.36	0.8	6.0E-05	5.2
40	0.39	0.77	5.1E-05	4.4
60	0.41	0.75	4.3E-05	3.8
80	0.43	0.73	4.0E-05	3.5
100	0.445	0.715	3.6E-05	3.2
130	0.465	0.695	3.3E-05	2.8
160	0.485	0.675	3.1E-05	2.6
190	0.5	0.66	2.8E-05	2.5
220	0.52	0.64	2.8E-05	2.4
280	0.55	0.61	2.5E-05	2.2
340	0.58	0.58	2.4E-05	2.1
400	0.61	0.55	2.3E-05	2.0
460	0.645	0.515	2.3E-05	2.0
		AVERAGE	3.4E-05	3.0

Test 3

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
			X	X
		AVERAGE	#DIV/0!	#DIV/0!


Permeability by Inverse Auger Hole Method
IT04
Permeability, k (m/day)
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
0
100
200
300
400
500
600
Test time, t (seconds)
Test 1
Test 2
Test 3

Permeability Calculation - Inverse Auger Hole Method

Galt Geotechnics

Job No:	J2001016
Client:	CBH
Project:	Fertiliser Facility
Location:	Rockingham
Calc by:	HWC
BH Name:	IT05
Test Depth:	0.76 m

Spreadsheet author:	ORW	17-Oct-09

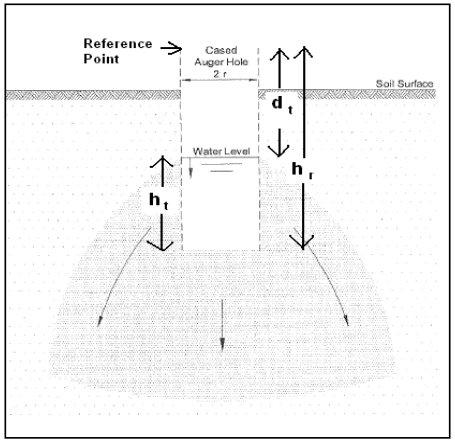
$$K = 1.15r\,\frac{\log_{10}(h_0 + \frac{1}{2}r) - \log_{10}(h_t + \frac{1}{2}r)}{t - t_0}$$

REFERENCE: Cocks, G. *Disposal of Stormwater Runoff by Soakage in Perth Western Australia*, Journal and News of the Australian Geomechanics Society, Volume 42 No 3 September 2007, pp101-114

Spreadsheet Legend

	Required input
	Calculated field
	Comment field
	Field not used
	Fixed field

Parameter	Description	Value	Units
K	Permeability		m/s
r	radius of test hole	0.045	m
t	time since start of measurement		s
h_r	reference point height above base	1.16	m
d_t	depth from reference point to water at time t		m
h_t	Water column height at time t		m
h_0	h_t at t=0		m



Test 1

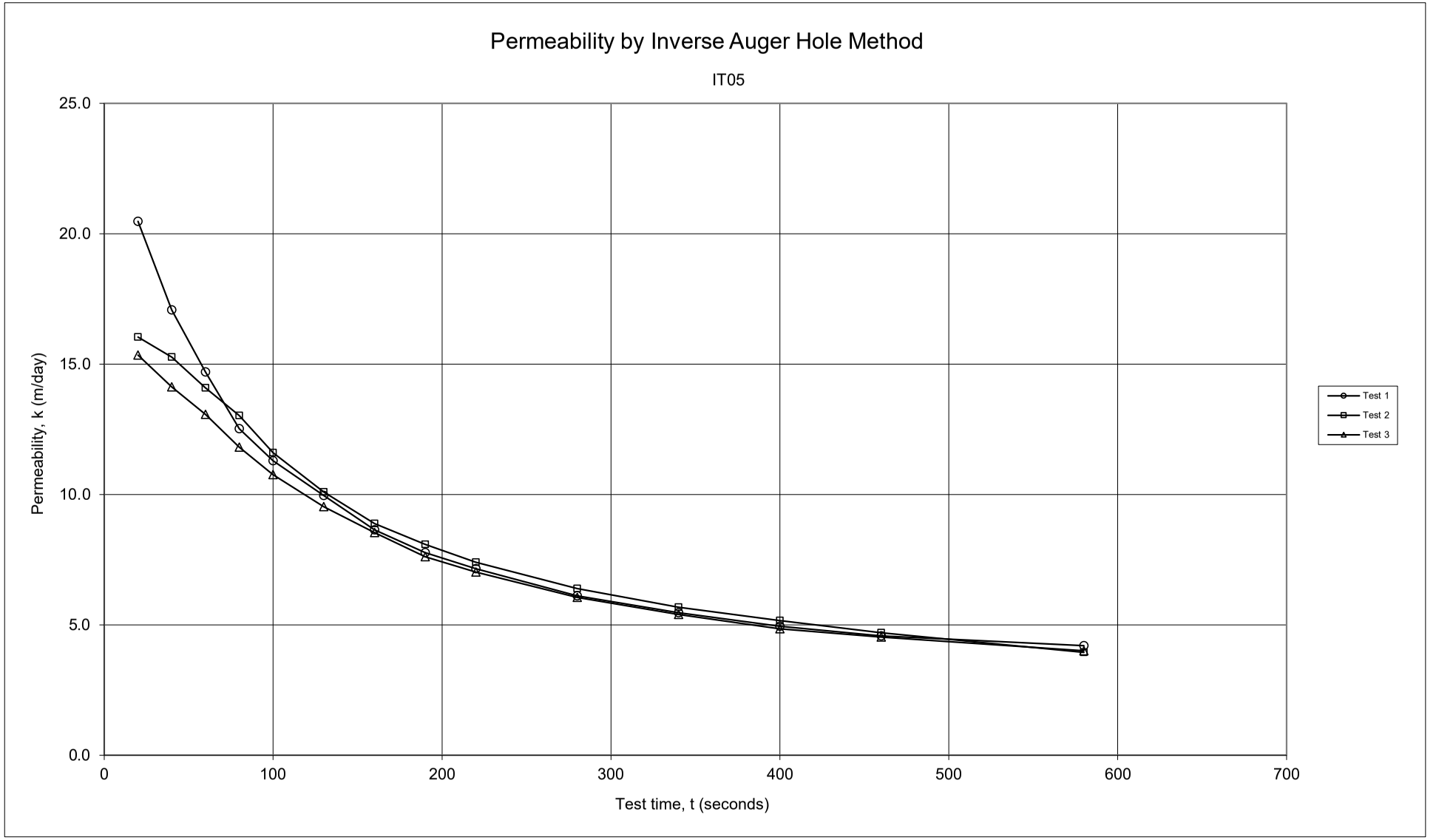
t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.525	0.635		
20	0.65	0.51	2.4E-04	20.5
40	0.72	0.44	2.0E-04	17.1
60	0.765	0.395	1.7E-04	14.7
80	0.79	0.37	1.4E-04	12.5
100	0.815	0.345	1.3E-04	11.3
130	0.845	0.315	1.2E-04	10.0
160	0.86	0.3	1.0E-04	8.6
190	0.875	0.285	9.0E-05	7.8
220	0.89	0.27	8.3E-05	7.1
280	0.91	0.25	7.1E-05	6.1
340	0.93	0.23	6.3E-05	5.5
400	0.945	0.215	5.7E-05	4.9
460	0.96	0.2	5.3E-05	4.6
580	0.995	0.165	4.9E-05	4.2
		AVERAGE	1.1E-04	9.6

Test 2

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.46	0.7		
20	0.57	0.59	1.9E-04	16.0
40	0.655	0.505	1.8E-04	15.3
60	0.715	0.445	1.6E-04	14.1
80	0.76	0.4	1.5E-04	13.0
100	0.785	0.375	1.3E-04	11.6
130	0.815	0.345	1.2E-04	10.1
160	0.835	0.325	1.0E-04	8.9
190	0.855	0.305	9.4E-05	8.1
220	0.87	0.29	8.6E-05	7.4
280	0.895	0.265	7.4E-05	6.4
340	0.915	0.245	6.6E-05	5.7
400	0.933	0.227	6.0E-05	5.2
460	0.945	0.215	5.4E-05	4.7
580	0.96	0.2	4.6E-05	3.9
		AVERAGE	1.1E-04	9.3

Test 3

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.43	0.73		
20	0.54	0.62	1.8E-04	15.3
40	0.62	0.54	1.6E-04	14.1
60	0.68	0.48	1.5E-04	13.1
80	0.72	0.44	1.4E-04	11.8
100	0.75	0.41	1.2E-04	10.8
130	0.785	0.375	1.1E-04	9.5
160	0.81	0.35	9.9E-05	8.5
190	0.825	0.335	8.8E-05	7.6
220	0.843	0.317	8.1E-05	7.0
280	0.868	0.292	7.0E-05	6.1
340	0.89	0.27	6.2E-05	5.4
400	0.905	0.255	5.6E-05	4.8
460	0.925	0.235	5.2E-05	4.5
580	0.955	0.205	4.6E-05	4.0
		AVERAGE	1.0E-04	8.8


Permeability by Inverse Auger Hole Method
IT05
Permeability, k (m/day)
25.0
20.0
15.0
10.0
5.0
0.0
0
100
200
300
400
500
600
700
Test time, t (seconds)
Test 1
Test 2
Test 3

Permeability Calculation - Inverse Auger Hole Method

Galt Geotechnics

Job No:	J2001016
Client:	CBH
Project:	Fertiliser Facility
Location:	Rockingham
Calc by:	HWC
BH Name:	IT06
Test Depth:	0.90 m

Spreadsheet author:	ORW	17-Oct-09

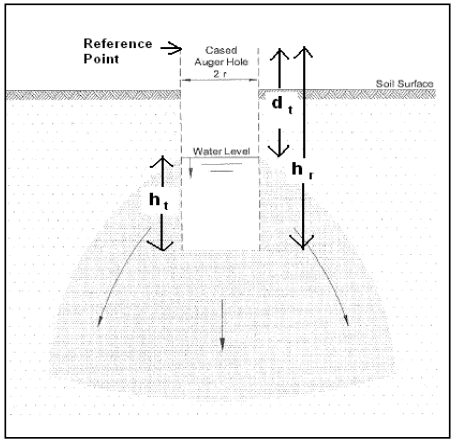
$$K = 1.15r \frac{\log_{10}(h_0 + \frac{1}{2}r) - \log_{10}(h_t + \frac{1}{2}r)}{t - t_0}$$

REFERENCE: Cocks, G. *Disposal of Stormwater Runoff by Soakage in Perth Western Australia*, Journal and News of the Australian Geomechanics Society, Volume 42 No 3 September 2007, pp101-114

Spreadsheet Legend

	Required input
	Calculated field
	Comment field
X	Field not used
	Fixed field

Parameter	Description	Value	Units
K	Permeability	X	m/s
r	radius of test hole	0.045	m
t	time since start of measurement	X	s
h_r	reference point height above base	1.16	m
d_t	depth from reference point to water at time t	X	m
h_t	Water column height at time t	X	m
h_0	h_t at t=0	X	m



Test 1

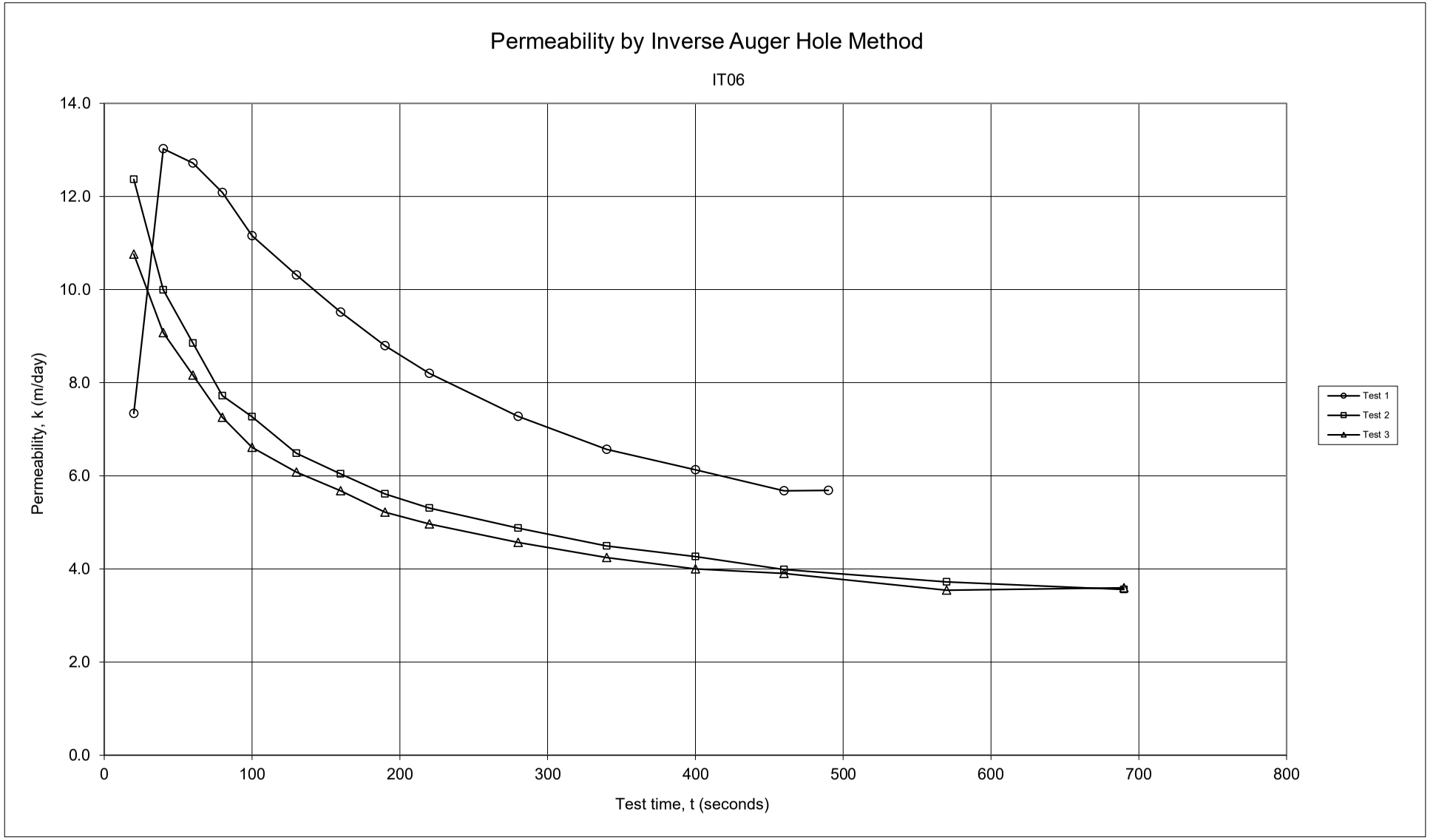
t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.29	0.87	X	X
20	0.355	0.805	8.5E-05	7.3
40	0.5	0.66	1.5E-04	13.0
60	0.58	0.58	1.5E-04	12.7
80	0.64	0.52	1.4E-04	12.1
100	0.68	0.48	1.3E-04	11.2
130	0.735	0.425	1.2E-04	10.3
160	0.775	0.385	1.1E-04	9.5
190	0.805	0.355	1.0E-04	8.8
220	0.83	0.33	9.5E-05	8.2
280	0.87	0.29	8.4E-05	7.3
340	0.9	0.26	7.6E-05	6.6
400	0.93	0.23	7.1E-05	6.1
460	0.95	0.21	6.6E-05	5.7
490	0.97	0.19	6.6E-05	5.7
		AVERAGE	1.0E-04	8.9

Test 2

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.43	0.73	X	X
20	0.52	0.64	1.4E-04	12.4
40	0.57	0.59	1.2E-04	10.0
60	0.61	0.55	1.0E-04	8.8
80	0.635	0.525	8.9E-05	7.7
100	0.665	0.495	8.4E-05	7.3
130	0.695	0.465	7.5E-05	6.5
160	0.725	0.435	7.0E-05	6.0
190	0.748	0.412	6.5E-05	5.6
220	0.77	0.39	6.1E-05	5.3
280	0.81	0.35	5.6E-05	4.9
340	0.84	0.32	5.2E-05	4.5
400	0.87	0.29	4.9E-05	4.3
460	0.89	0.27	4.6E-05	4.0
570	0.93	0.23	4.3E-05	3.7
690	0.97	0.19	4.1E-05	3.6
		AVERAGE	7.3E-05	6.3

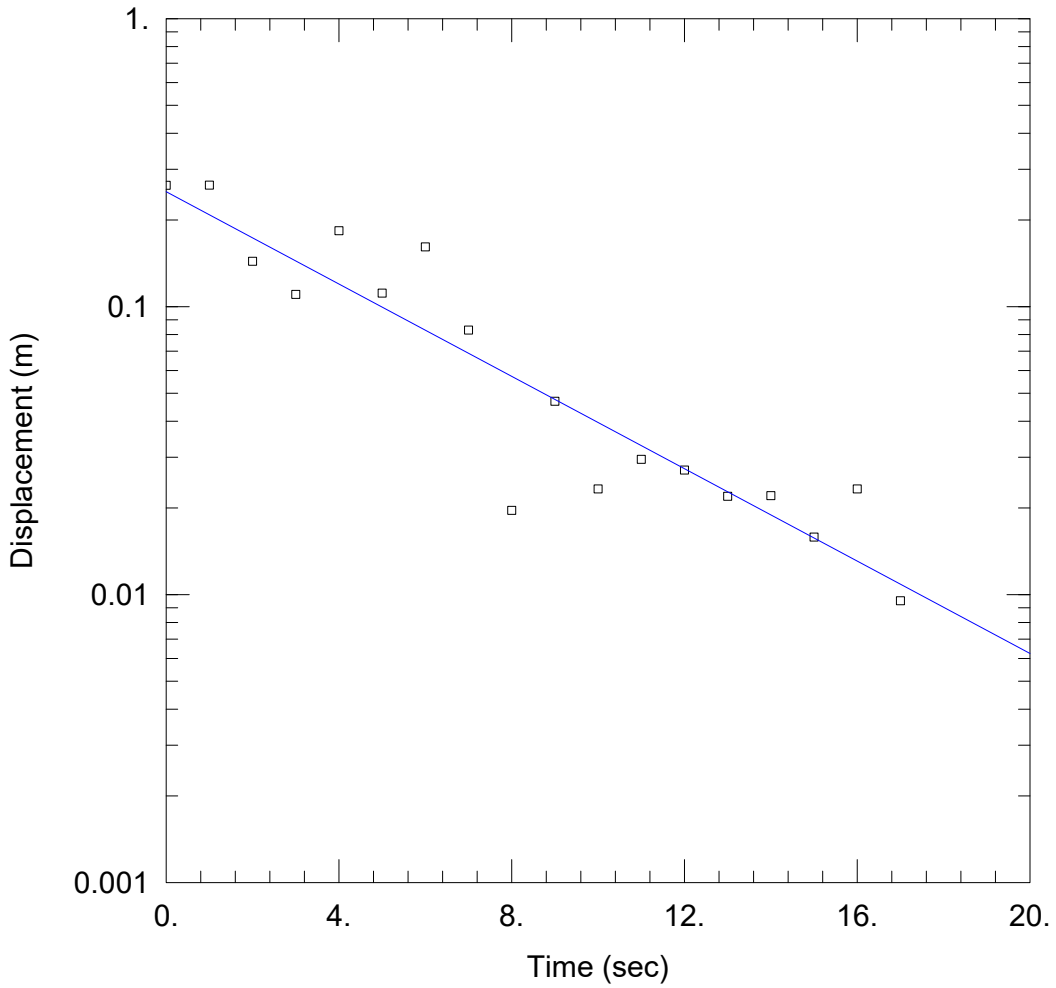
Test 3

t (s)	d_w (m)	h_t (m)	K (m/s)	K (m/day)
0	0.42	0.74	X	X
20	0.5	0.66	1.2E-04	10.8
40	0.55	0.61	1.1E-04	9.1
60	0.59	0.57	9.4E-05	8.2
80	0.617	0.543	8.4E-05	7.3
100	0.64	0.52	7.7E-05	6.6
130	0.675	0.485	7.0E-05	6.1
160	0.705	0.455	6.6E-05	5.7
190	0.725	0.435	6.0E-05	5.2
220	0.748	0.412	5.7E-05	5.0
280	0.788	0.372	5.3E-05	4.6
340	0.82	0.34	4.9E-05	4.2
400	0.848	0.312	4.6E-05	4.0
460	0.88	0.28	4.5E-05	3.9
570	0.913	0.247	4.1E-05	3.5
690	0.97	0.19	4.2E-05	3.6
		AVERAGE	6.8E-05	5.8


Permeability by Inverse Auger Hole Method
IT06
Permeability, k (m/day)
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0
100
200
300
400
500
600
700
800
Test time, t (seconds)
Test 1
Test 2
Test 3

Appendix G: Slug Permeability Test Results

www.galtgeo.com.au
50 Edward Street OSBORNE PARK WA 6017
ABN: 64 625 054 729



FALLING HEAD TEST 1

Data Set: O:\...\BH01-MW01 FH01.aqt
Date: 03/27/20 Time: 15:21:41

PROJECT INFORMATION

Company: Galt
Client: CBH
Project: J2001016
Location: Rockingham
Test Well: BH01-MW01
Test Date: 18-3-20

AQUIFER DATA

Saturated Thickness: 26. m Anisotropy Ratio (Kz/Kr): 1.

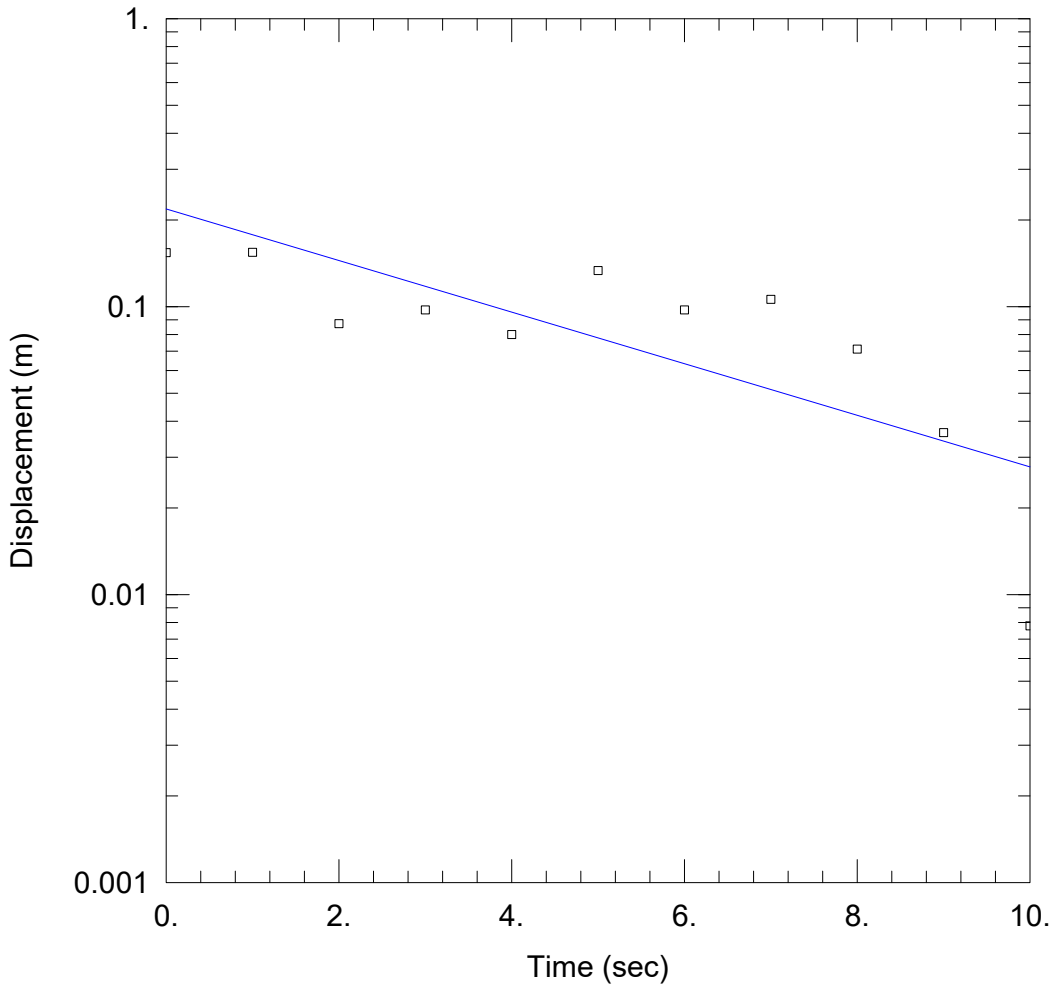
WELL DATA (BH01-MW01)

Initial Displacement: 0.264 m
Total Well Penetration Depth: 1.96 m
Casing Radius: 0.025 m
Static Water Column Height: 1.96 m
Screen Length: 1.96 m
Well Radius: 0.025 m
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 8.424E-5 m/sec y0 = 0.2508 m



FALLING HEAD TEST 2

Data Set: O:\...\BH01-MW01 FH02.aqt
Date: 03/27/20 Time: 15:28:44

PROJECT INFORMATION

Company: Galt
Client: CBH
Project: J2001016
Location: Rockingham
Test Well: BH01-MW01
Test Date: 18-3-20

AQUIFER DATA

Saturated Thickness: 26. m Anisotropy Ratio (Kz/Kr): 1.

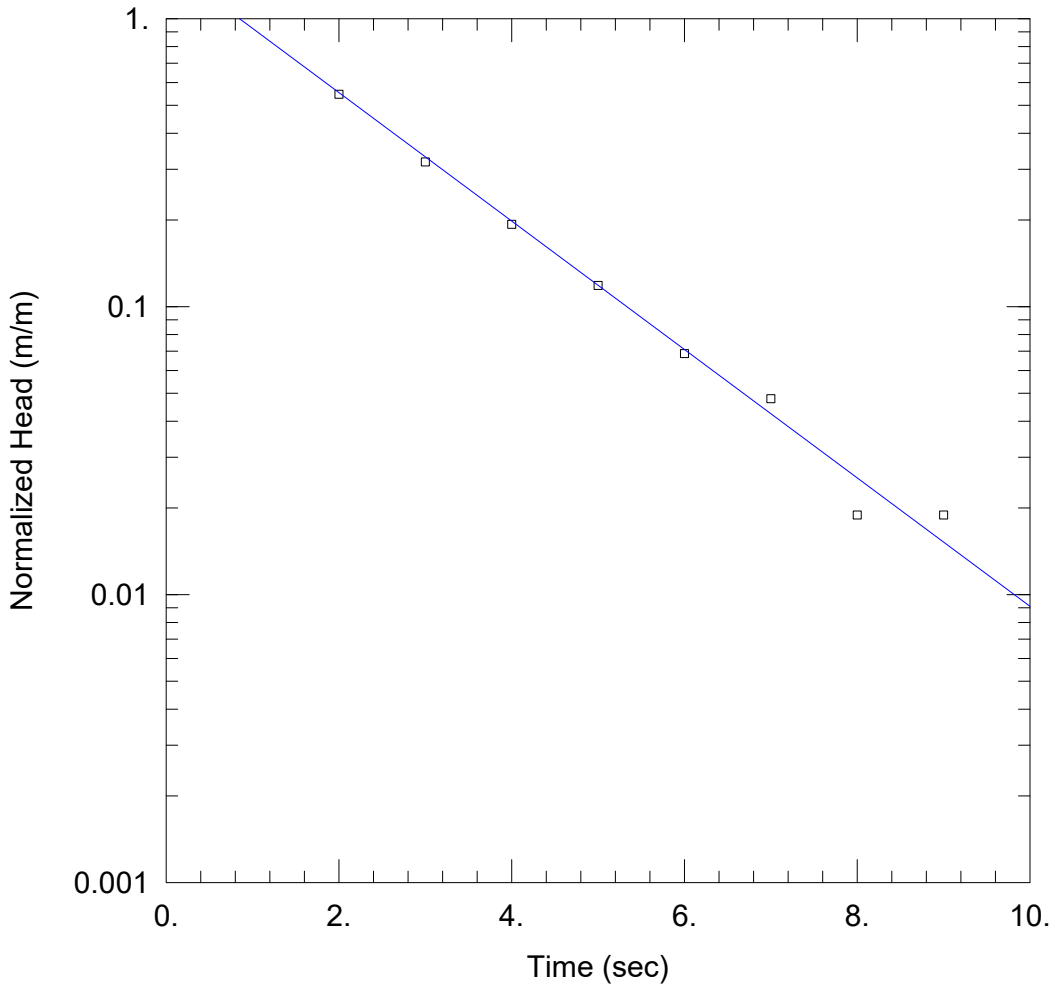
WELL DATA (BH01-MW01)

Initial Displacement: 0.154 m
Total Well Penetration Depth: 1.96 m
Casing Radius: 0.025 m
Static Water Column Height: 1.96 m
Screen Length: 1.96 m
Well Radius: 0.025 m
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 9.408E-5 m/sec y0 = 0.2184 m



RISING HEAD TEST 1

Data Set:
Date: 03/27/20 Time: 15:09:37

PROJECT INFORMATION

Company: Galt
Client: CBH
Project: J2001016
Location: Rockingham
Test Well: BH01-MW01
Test Date: 18-3-20

AQUIFER DATA

Saturated Thickness: 26. m Anisotropy Ratio (Kz/Kr): 1.

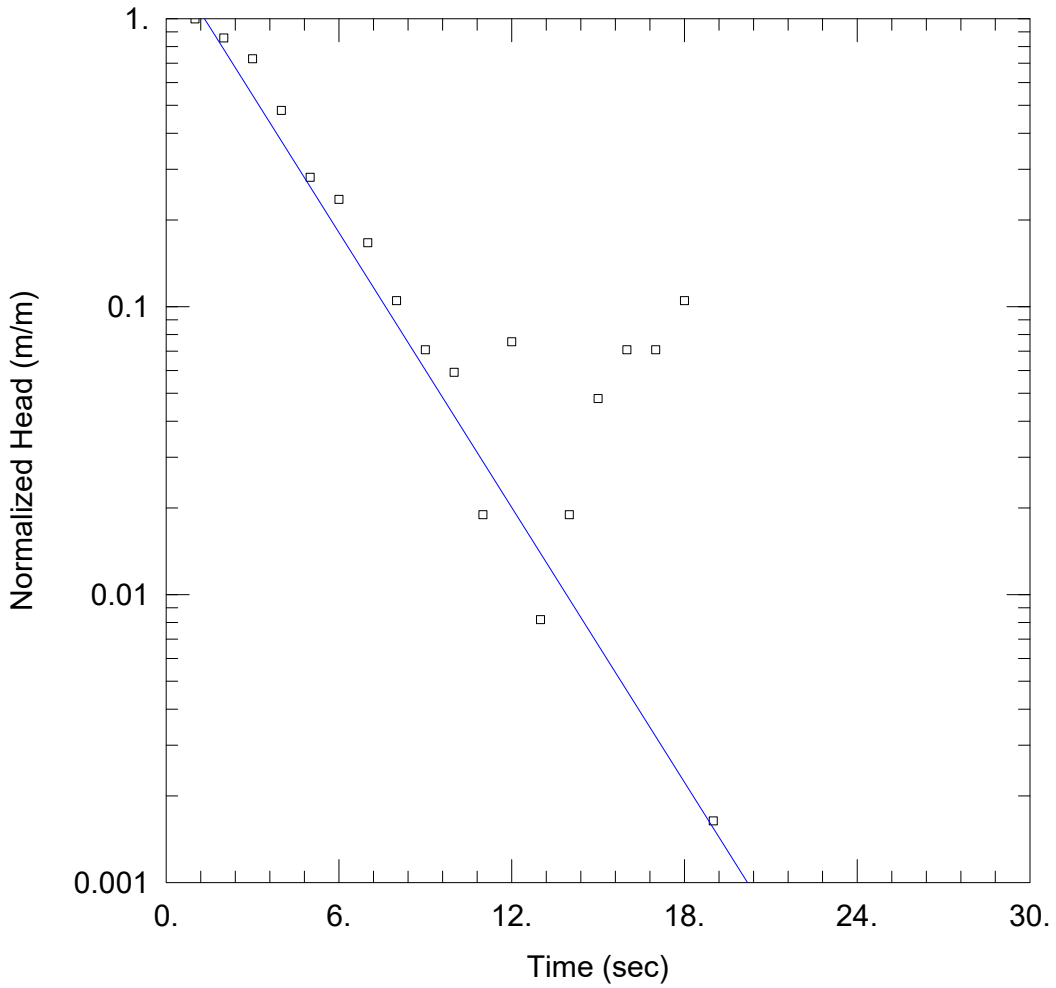
WELL DATA (BH01-MW01)

Initial Displacement: -0.299 m
Total Well Penetration Depth: 1.94 m
Casing Radius: 0.025 m
Static Water Column Height: 1.94 m
Screen Length: 1.94 m
Well Radius: 0.025 m
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.000236 m/sec y0 = -0.4623 m



RISING HEAD TEST 2

Data Set: O:\...\BH01-MW01 RH02.aqt
Date: 03/27/20 Time: 15:24:56

PROJECT INFORMATION

Company: Galt
Client: CBH
Project: J2001016
Location: Rockingham
Test Well: BH01-MW01
Test Date: 18-3-20

AQUIFER DATA

Saturated Thickness: 26. m Anisotropy Ratio (Kz/Kr): 1.

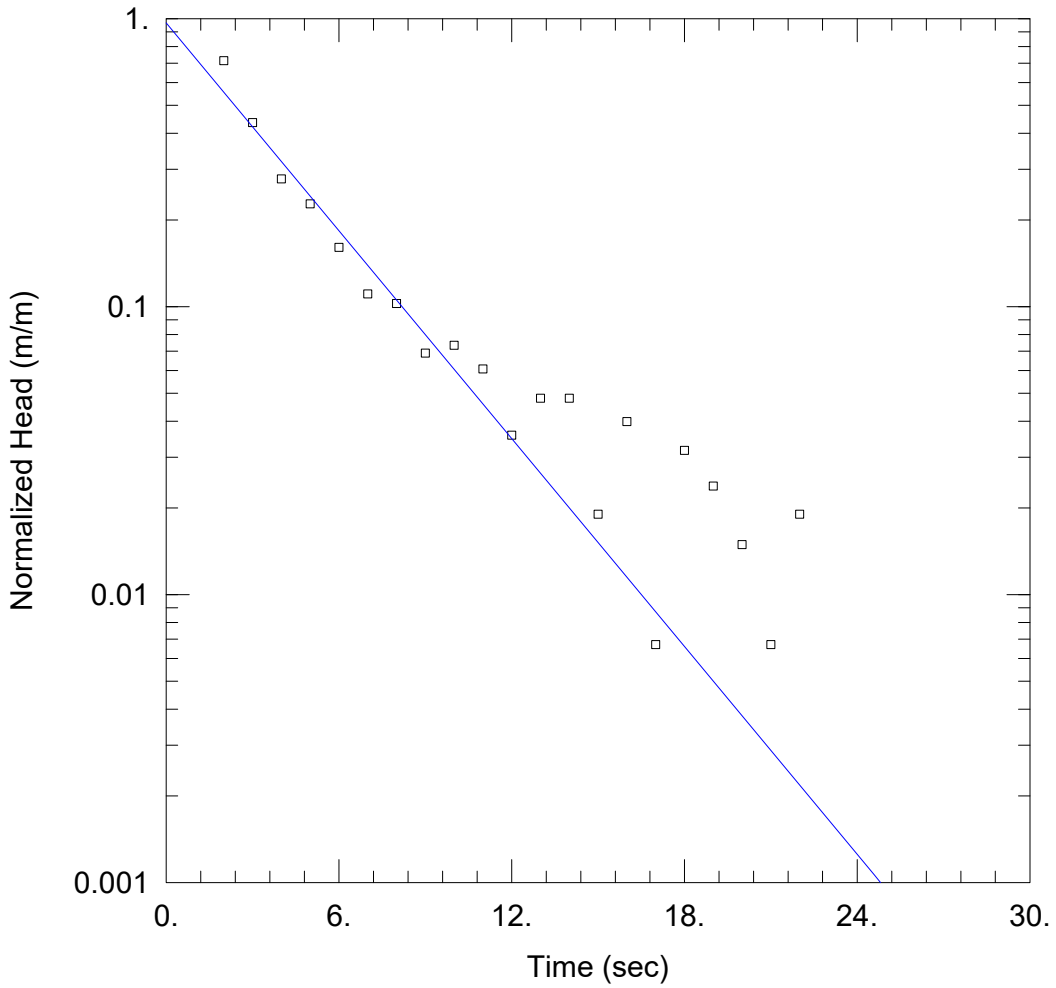
WELL DATA (BH01-MW01)

Initial Displacement: -0.218 m
Total Well Penetration Depth: 1.96 m
Casing Radius: 0.025 m
Static Water Column Height: 1.96 m
Screen Length: 1.96 m
Well Radius: 0.025 m
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0001671 m/sec y0 = -0.3548 m



RISING HEAD TEST 3

Data Set: O:\...\BH01-MW01 RH03.aqt
Date: 03/27/20 Time: 15:31:20

PROJECT INFORMATION

Company: Galt
Client: CBH
Project: J2001016
Location: Rockingham
Test Well: BH01-MW01
Test Date: 18-3-20

AQUIFER DATA

Saturated Thickness: 26. m Anisotropy Ratio (Kz/Kr): 1.

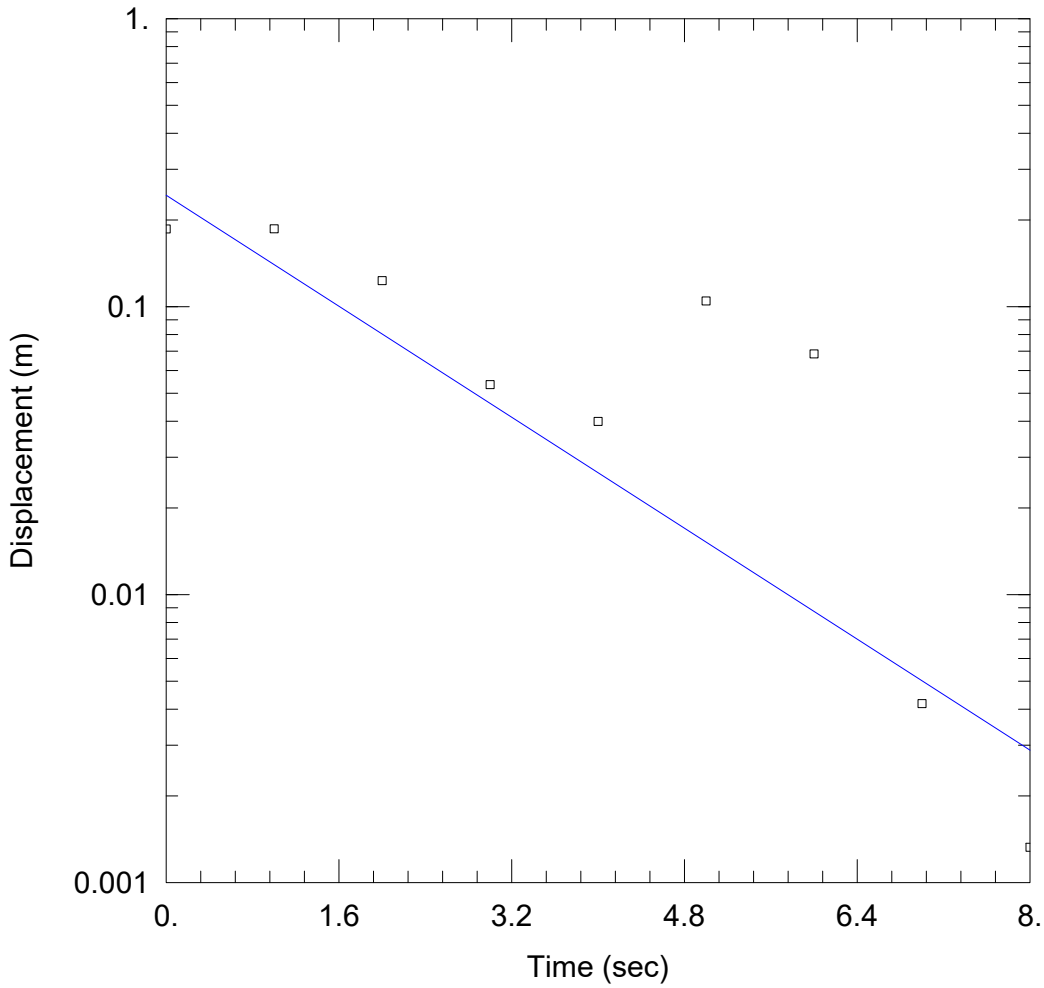
WELL DATA (BH01-MW01)

Initial Displacement: -0.298 m
Total Well Penetration Depth: 1.96 m
Casing Radius: 0.025 m
Static Water Column Height: 1.96 m
Screen Length: 1.96 m
Well Radius: 0.025 m
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0001264 m/sec y0 = -0.2882 m



FALLING HEAD TEST 1

Data Set: O:\...\BH03-MW03 FH01.aqt
Date: 03/27/20 Time: 15:34:52

PROJECT INFORMATION

Company: Galt
Client: CBH
Project: J2001016
Location: Rockingham
Test Well: BH03-MW03
Test Date: 18-3-20

AQUIFER DATA

Saturated Thickness: 26. m Anisotropy Ratio (Kz/Kr): 1.

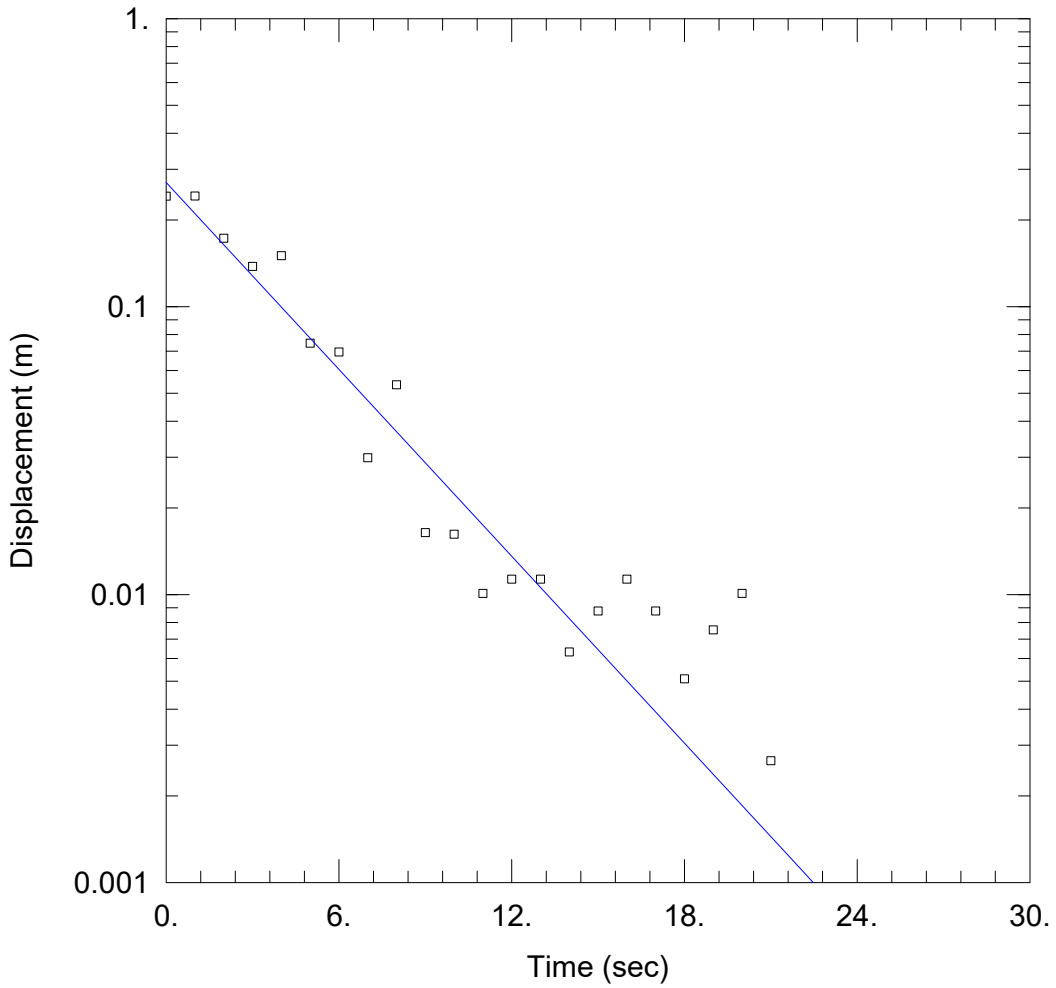
WELL DATA (BH03-MW03)

Initial Displacement: 0.186 m
Total Well Penetration Depth: 2. m
Casing Radius: 0.025 m
Static Water Column Height: 2. m
Screen Length: 2. m
Well Radius: 0.025 m
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0002495 m/sec y0 = 0.2437 m



FALLING HEAD TEST 2

Data Set: O:\...\BH03-MW03 FH02.aqt
Date: 03/27/20 Time: 15:45:49

PROJECT INFORMATION

Company: Galt
Client: CBH
Project: J2001016
Location: Rockingham
Test Well: BH03-MW03
Test Date: 18-3-20

AQUIFER DATA

Saturated Thickness: 26. m Anisotropy Ratio (Kz/Kr): 1.

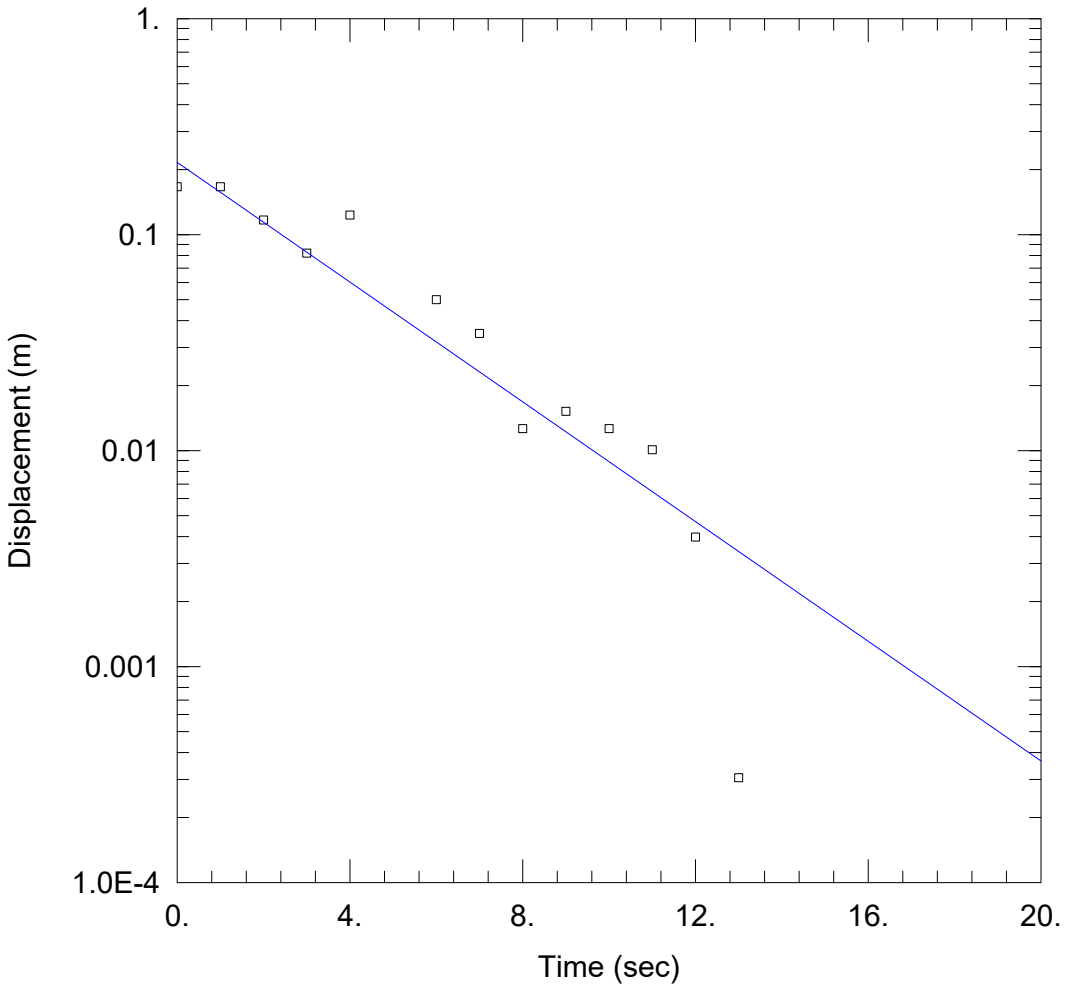
WELL DATA (BH03-MW03)

Initial Displacement: 0.242 m
Total Well Penetration Depth: 2. m
Casing Radius: 0.025 m
Static Water Column Height: 2. m
Screen Length: 2. m
Well Radius: 0.025 m
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.000112 m/sec y0 = 0.2699 m



FALLING HEAD TEST 3

Data Set: O:\...\BH03-MW03 FH03.aqt
Date: 03/27/20 Time: 15:47:41

PROJECT INFORMATION

Company: Galt
Client: CBH
Project: J2001016
Location: Rockingham
Test Well: BH03-MW03
Test Date: 18-3-20

AQUIFER DATA

Saturated Thickness: 26. m Anisotropy Ratio (Kz/Kr): 1.

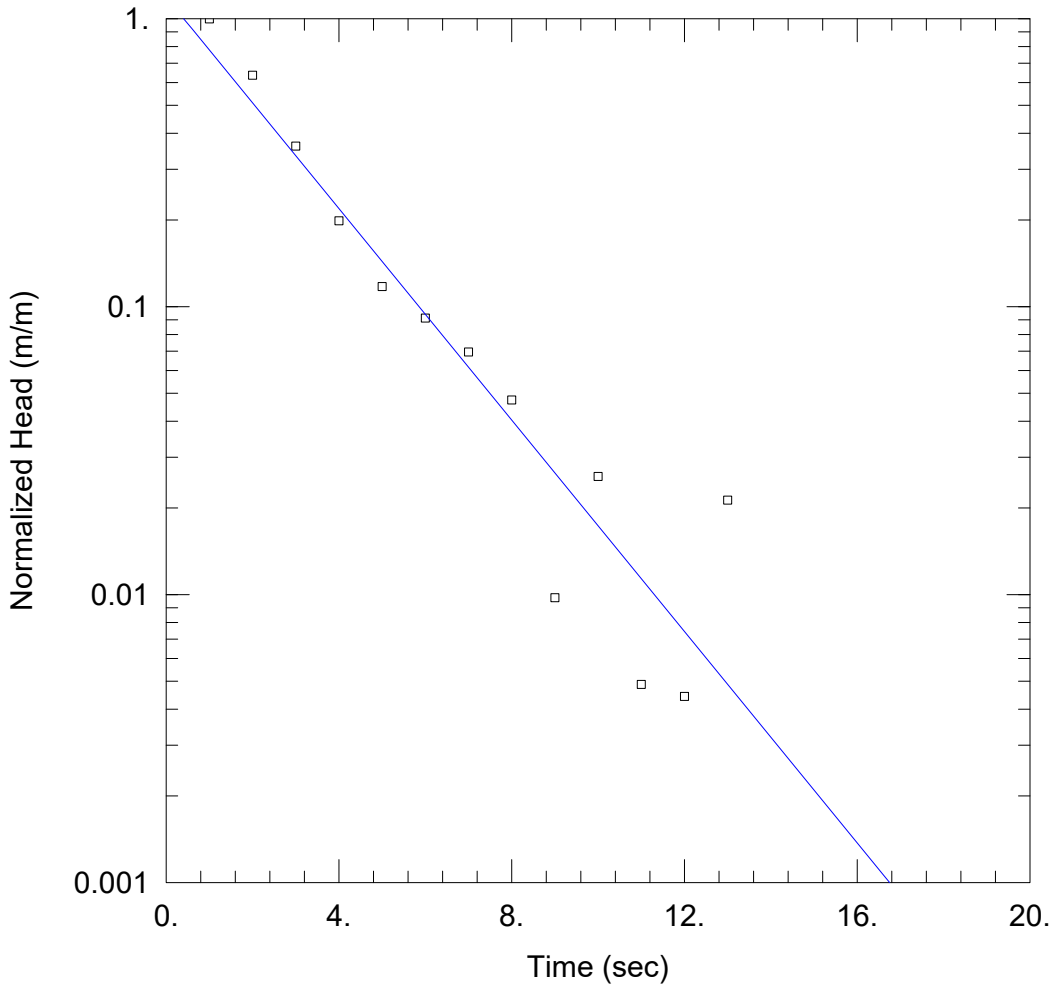
WELL DATA (BH03-MW03)

Initial Displacement: 0.1667 m
Total Well Penetration Depth: 2. m
Casing Radius: 0.025 m
Static Water Column Height: 2. m
Screen Length: 2. m
Well Radius: 0.025 m
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0001435 m/sec y0 = 0.216 m



RISING HEAD TEST 1

Data Set: O:\...\BH03-MW03 RH01.aqt
Date: 03/27/20 Time: 15:36:57

PROJECT INFORMATION

Company: Galt
Client: CBH
Project: J2001016
Location: Rockingham
Test Well: BH03-MW03
Test Date: 18-3-20

AQUIFER DATA

Saturated Thickness: 26. m Anisotropy Ratio (Kz/Kr): 1.

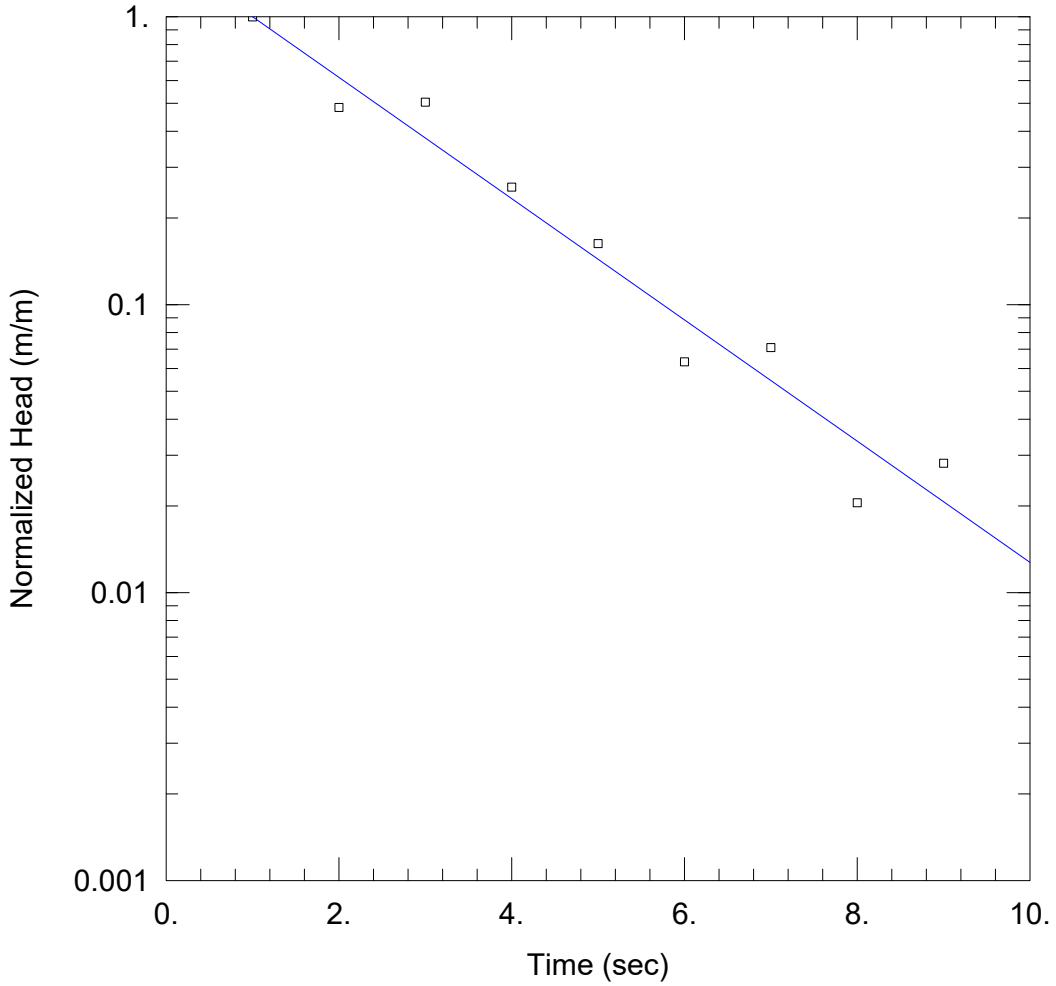
WELL DATA (BH03-MW03)

Initial Displacement: -0.23 m
Total Well Penetration Depth: 2. m
Casing Radius: 0.025 m
Static Water Column Height: 2. m
Screen Length: 2. m
Well Radius: 0.025 m
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0001901 m/sec y0 = -0.2731 m



RISING HEAD TEST 2

Data Set: O:\...\BH03-MW03 RH02.aqt
Date: 03/27/20 Time: 15:49:15

PROJECT INFORMATION

Company: Galt
Client: CBH
Project: J2001016
Location: Rockingham
Test Well: BH03-MW03
Test Date: 18-3-20

AQUIFER DATA

Saturated Thickness: 26. m Anisotropy Ratio (Kz/Kr): 1.

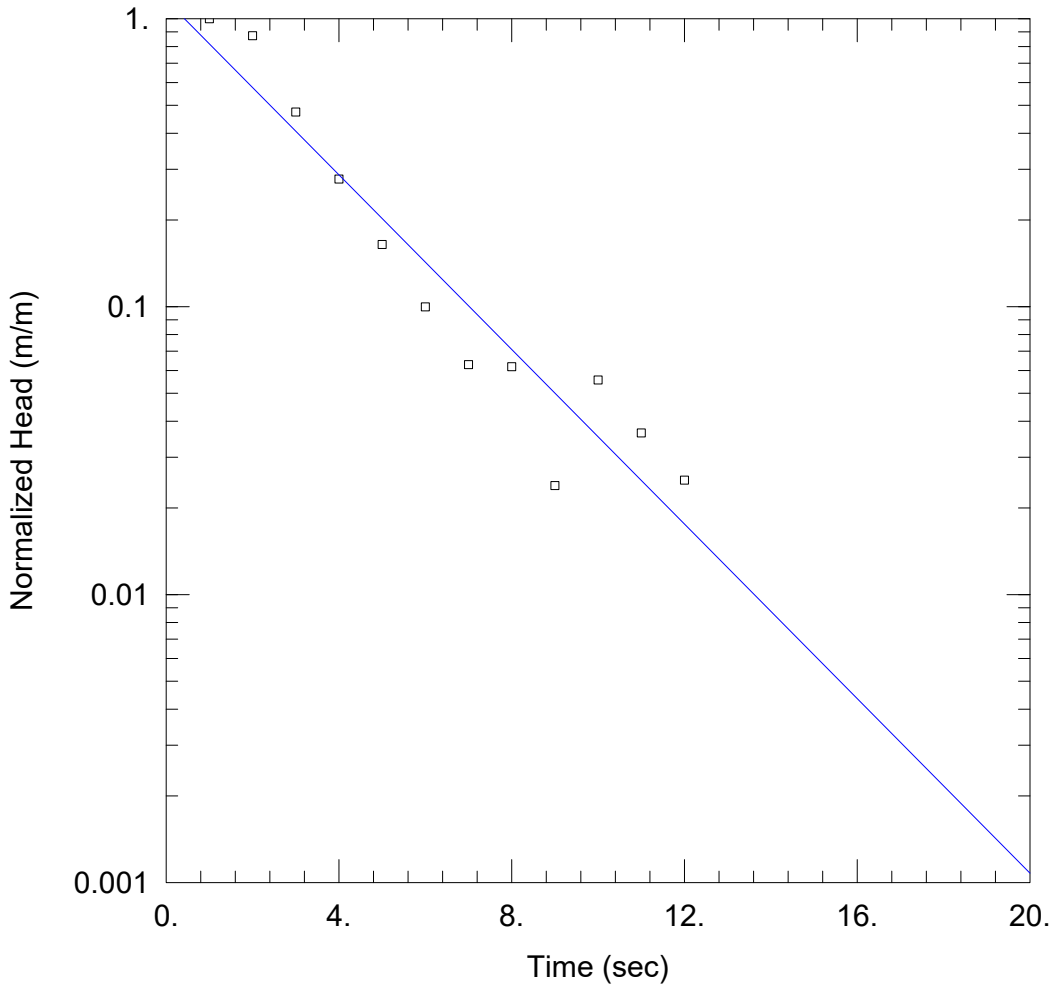
WELL DATA (BH03-MW03)

Initial Displacement: -0.174 m
Total Well Penetration Depth: 2. m
Casing Radius: 0.025 m
Static Water Column Height: 2. m
Screen Length: 2. m
Well Radius: 0.025 m
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0002181 m/sec y0 = -0.2825 m



RISING HEAD TEST 3

Data Set: O:\...\BH03-MW03 RH03.aqt
Date: 03/27/20 Time: 15:50:59

PROJECT INFORMATION

Company: Galt
Client: CBH
Project: J2001016
Location: Rockingham
Test Well: BH03-MW03
Test Date: 18-3-20

AQUIFER DATA

Saturated Thickness: 26. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH03-MW03)

Initial Displacement: -0.196 m
Total Well Penetration Depth: 2. m
Casing Radius: 0.025 m
Static Water Column Height: 2. m
Screen Length: 2. m
Well Radius: 0.025 m
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.000157 m/sec y0 = -0.2272 m

Appendix H: Laboratory Test Results

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50 Edward Street OSBORNE PARK WA 6017
ABN: 64 625 054 729

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

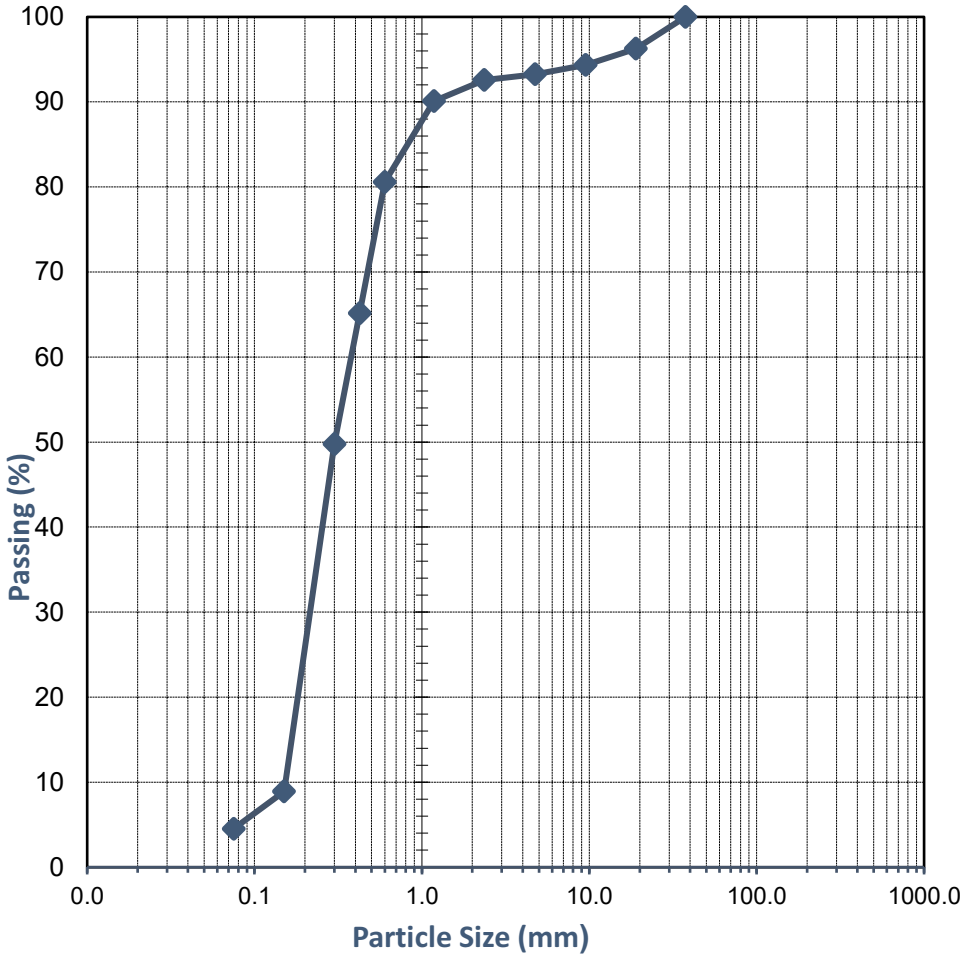
TEST REPORT - AS 1289.3.6.1

Client:	Cooperative Bulk Handling (CBH) Ltd	*Ticket No.*	S961
Client Address:	-	*Report No.*	WG20/4011_1_PSD
Project:	Proposed Fertiliser Facility	*Sample No.*	WG20/4011
Location:	Lot 1304 Rockingham Beach Road, Rockingham	*Date Sampled:*	Not Specifed
Sample Identification:	TP01 0.5m	*Date Tested:*	16-03-2020

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	100
19.0	96
9.5	94
4.75	93
2.36	93
1.18	90
0.600	81
0.425	65
0.300	50
0.150	9
0.075	5



Comments:

Approved Signatory:

Name: Brooke Elliott
Function: Quality Manager
Date: 16-March-2020

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	Cooperative Bulk Handling (CBH) Ltd	*Ticket No.*	S961
Client Address:	-	*Report No.*	WG20/4011_1_PI
Project:	Proposed Fertiliser Facility	*Sample No.*	WG20/4011
Location:	Lot 1304 Rockingham Beach Road, Rockingham	*Date Sampled:*	Not Specified
Sample Identification:	TP01 0.5m	*Date Tested*	14-03-2020

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**Not Obtainable**
AS 1289.3.2.1	**Plastic Limit (%)**	**Non-Plastic**
AS 1289.3.3.1	**Plasticity Index (%)**	**Non-Plastic**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**0.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**125**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Brooke Elliott
Function: Quality Manager
Date: 16-March-2020

NATA WORLD RECOGNISED ACCREDITATION

Accreditation No. 20599
Accredited for compliance with ISO/IEC 17025 - Testing

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.5.2.1

Client:	Cooperative Bulk Handling (CBH) Ltd	*Ticket No.*	S1019
Client Address:	-	*Report No.*	WG20/4462_1_MMDD
Project:	Proposed Fertiliser Facility	*Sample No.*	WG20/4462
Location:	Lot 1304 Rockingham Beach Road, Rockingham	*Date Sampled:*	Not Specified
Sample Identification:	TP01 0.5m	*Date Tested:*	25/03/2020

TEST RESULTS - Modified Maximum Dry Density

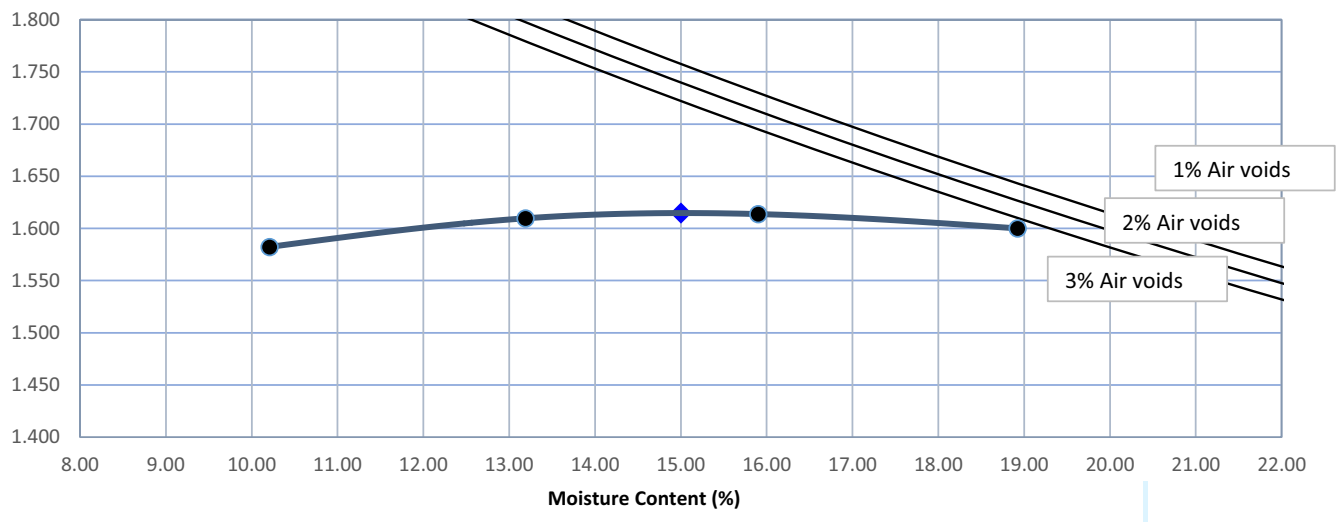
Sampling Method: Sampled by Client, Tested as Received

Sample Curing Time: 24 hours

Method used to Determine Liquid Limit: Visual / Tactile Assessment by Competent Technician

Material + 19.0mm (%): 0 **Material + 37.5mm (%)** -

Moisture Content (%)	10.2	13.2	15.9	18.9	
Dry Density (t/m³)	1.582	1.610	1.614	1.600	



Modified Maximum Dry Density (t/m³) **1.61**

Optimum Moisture Content (%) **15.0**

Comments: *The above air void lines are derived from a calculated apparent particle density of 2.42 t/m³*

Approved Signatory:

Name: Brooke Elliott
Function: Quality Manager
Date: 26/March/2020

NATA WORLD RECOGNISED ACCREDITATION

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.6.1.1

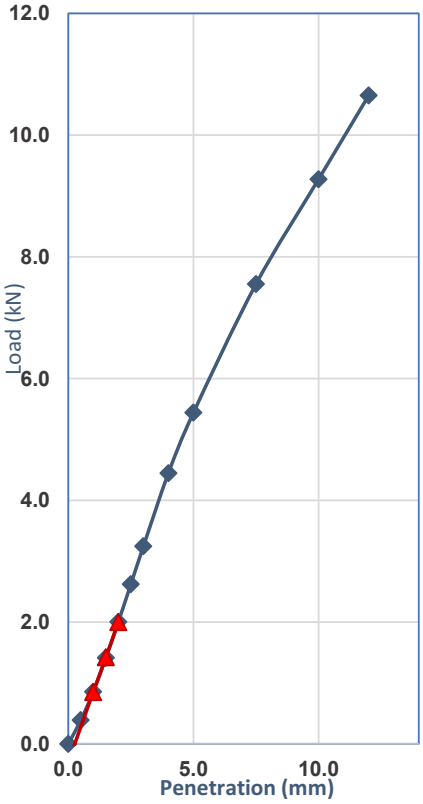
Client:	Cooperative Bulk Handling (CBH) Ltd	*Ticket No.*	S1019
Client Address:	-	*Report No.*	WG20/4462_1_SCBR
Project:	Proposed Fertiliser Facility	*Sample No.*	WG20/4462
Location:	Lot 1304 Rockingham Beach Road, Rockingham	*Date Sampled:*	Not Specified
Sample Identification:	TP01 0.5m	*Date Tested:*	30-03-2020

TEST RESULTS - CALIFORNIA BEARING RATIO

Sample Description: Sand

Sampling Method: Sampled by Client, Tested as Received

Load Penetration Curve



Compaction Details			
Compaction Method	AS 1289.5.2.1	Hammer Type	Modified
Plasticity Determined by	Estimated	Curing Time (Hours)	36.0
% Retained 19.0mm	0	Excluded/Replaced	Excluded
Maximum Dry Density (t/m^3)	1.62	Optimum Moisture (%)	15.0
Target Dry Density Ratio (%)	95	Target Moisture Ratio (%)	100

Specimen Conditions At Compaction			
Dry Density (t/m3)	1.54	Moisture Content (%)	14.7
Density Ratio (%)	95.0	Moisture Ratio (%)	97.5

Specimen Conditions After Soak			
Soaked or Unsoaked	Soaked	Soaking Period (days)	4
Surcharges Applied (kg)	9.00	Measured Swell (%)	0.0
Dry Density (t/m³)	1.54	Dry Density Ratio (%)	95.0
Moisture Content (%)	23.4	Moisture Ratio (%)	156.0

Specimen Conditions After Test			
Top 30mm Moisture (%)	19.7	Remaining Depth (%)	23.9

Correction applied to Penetration: 0.3mm

Determined at a Penetration of: 5.0mm

California Bearing Ratio (CBR): 30%

Comments:

Approved Signatory:

Name: Matt van Herk

Function: General Manager

Date: 31-March-2020

NATA WORLD RECOGNISED ACCREDITATION

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

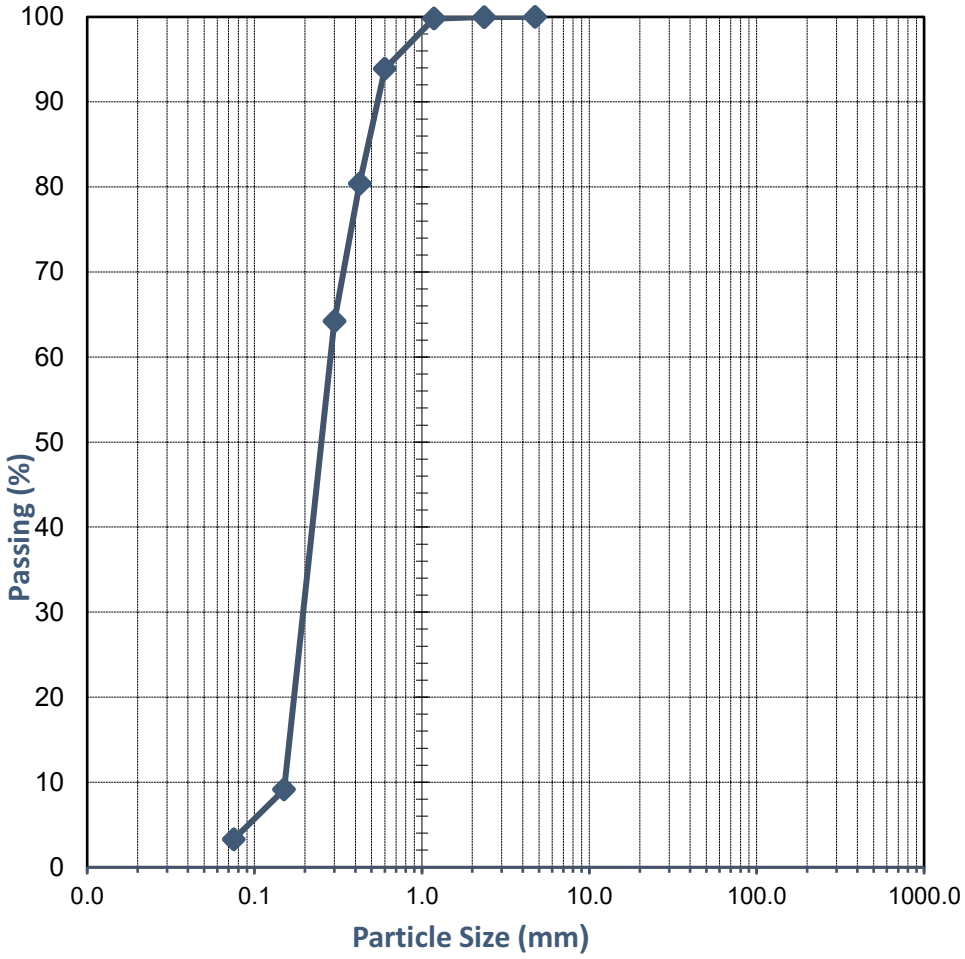
TEST REPORT - AS 1289.3.6.1

Client:	Cooperative Bulk Handling (CBH) Ltd	*Ticket No.*	S961
Client Address:	-	*Report No.*	WG20/4012_1_PSD
Project:	Proposed Fertiliser Facility	*Sample No.*	WG20/4012
Location:	Lot 1304 Rockingham Beach Road, Rockingham	*Date Sampled:*	Not Specifed
Sample Identification:	TP02 0.5m	*Date Tested:*	13-03-2020

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	
4.75	100
2.36	100
1.18	100
0.600	94
0.425	80
0.300	64
0.150	9
0.075	3



Comments:

Approved Signatory:

Name: Brooke Elliott
Function: Quality Manager
Date: 16-March-2020

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TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	Cooperative Bulk Handling (CBH) Ltd	*Ticket No.*	S961
Client Address:	-	*Report No.*	WG20/4012_1_PI
Project:	Proposed Fertiliser Facility	*Sample No.*	WG20/4012
Location:	Lot 1304 Rockingham Beach Road, Rockingham	*Date Sampled:*	Not Specified
Sample Identification:	TP02 0.5m	*Date Tested*	14-03-2020

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50^{o}C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**Not Obtainable**
AS 1289.3.2.1	**Plastic Limit (%)**	**Non-Plastic**
AS 1289.3.3.1	**Plasticity Index (%)**	**Non-Plastic**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**0.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**125**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Brooke Elliott
Function: Quality Manager
Date: 16-March-2020

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.5.2.1

Client:	Cooperative Bulk Handling (CBH) Ltd	*Ticket No.*	S1019
Client Address:	-	*Report No.*	WG20/4463_1_MMDD
Project:	Proposed Fertiliser Facility	*Sample No.*	WG20/4463
Location:	Lot 1304 Rockingham Beach Road, Rockingham	*Date Sampled:*	Not Specified
Sample Identification:	TP02 0.5m	*Date Tested:*	25/03/2020

TEST RESULTS - Modified Maximum Dry Density

Sampling Method: Sampled by Client, Tested as Received

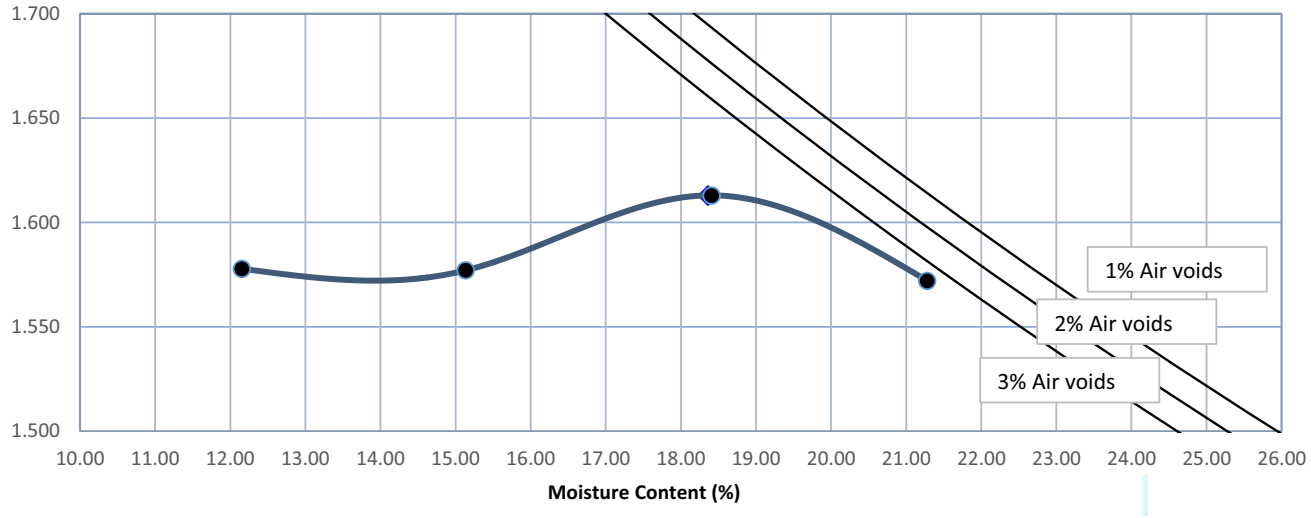
Sample Curing Time: 2 Hours

Method used to Determine Liquid Limit: Visual / Tactile Assessment by Competent Technician

Material + 19.0mm (%): 0 **Material + 37.5mm (%)** -

Moisture Content (%)	**12.2**	**15.1**	**18.4**	**21.3**	
Dry Density (t/m³)	**1.578**	**1.577**	**1.613**	**1.572**	

Dry Density (t/m³)



Modified Maximum Dry Density (t/m³) **1.61**

Optimum Moisture Content (%) **18.5**

Comments: *The above air void lines are derived from a calculated apparent particle density of 2.496 t/m³*

Approved Signatory:

Name: Kirk McConachy
Function: Laboratory Manager
Date: 26/March/2020

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.6.1.1

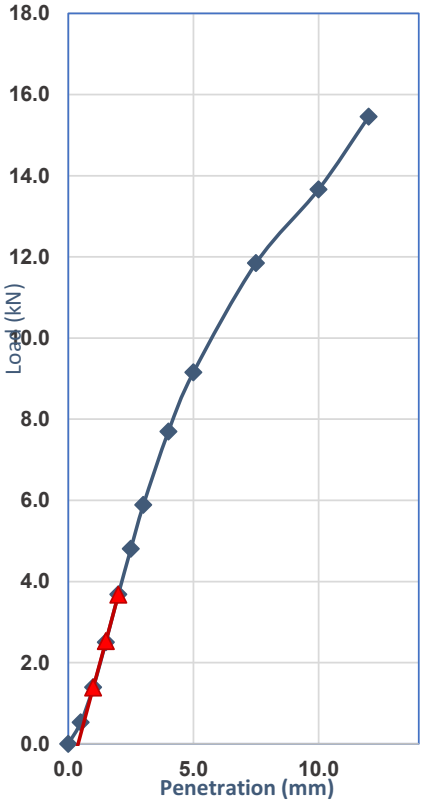
Client:	Cooperative Bulk Handling (CBH) Ltd	*Ticket No.*	S1019
Client Address:	-	*Report No.*	WG20/4463_1_SCBR
Project:	Proposed Fertiliser Facility	*Sample No.*	WG20/4463
Location:	Lot 1304 Rockingham Beach Road, Rockingham	*Date Sampled:*	Not Specified
Sample Identification:	TP02 0.5m	*Date Tested:*	30-03-2020

TEST RESULTS - CALIFORNIA BEARING RATIO

Sample Description: Sand

Sampling Method: Sampled by Client, Tested as Received

Load Penetration Curve



Compaction Details			
Compaction Method	AS 1289.5.2.1	Hammer Type	Modified
Plasticity Determined by	Estimated	Curing Time (Hours)	4.0
% Retained 19.0mm	0	Excluded/Replaced	Excluded
Maximum Dry Density (t/m^3)	1.61	Optimum Moisture (%)	18.5
Target Dry Density Ratio (%)	95	Target Moisture Ratio (%)	100

Specimen Conditions At Compaction			
Dry Density (t/m3)	1.53	Moisture Content (%)	18.3
Density Ratio (%)	95.0	Moisture Ratio (%)	99.5

Specimen Conditions After Soak			
Soaked or Unsoaked	Soaked	Soaking Period (days)	4
Surcharges Applied (kg)	9.00	Measured Swell (%)	0.0
Dry Density (t/m³)	1.53	Dry Density Ratio (%)	95.0
Moisture Content (%)	23.7	Moisture Ratio (%)	129.0

Specimen Conditions After Test			
Top 30mm Moisture (%)	24.2	Remaining Depth (%)	23.4

Correction applied to Penetration: 0.4mm

Determined at a Penetration of: 5.0mm

California Bearing Ratio (CBR): 50%

Comments:

Approved Signatory:

Name: Matt van Herk

Function: General Manager

Date: 31-March-2020

NATA WORLD RECOGNISED ACCREDITATION

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Accredited for compliance with ISO/IEC 17025 - Testing

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

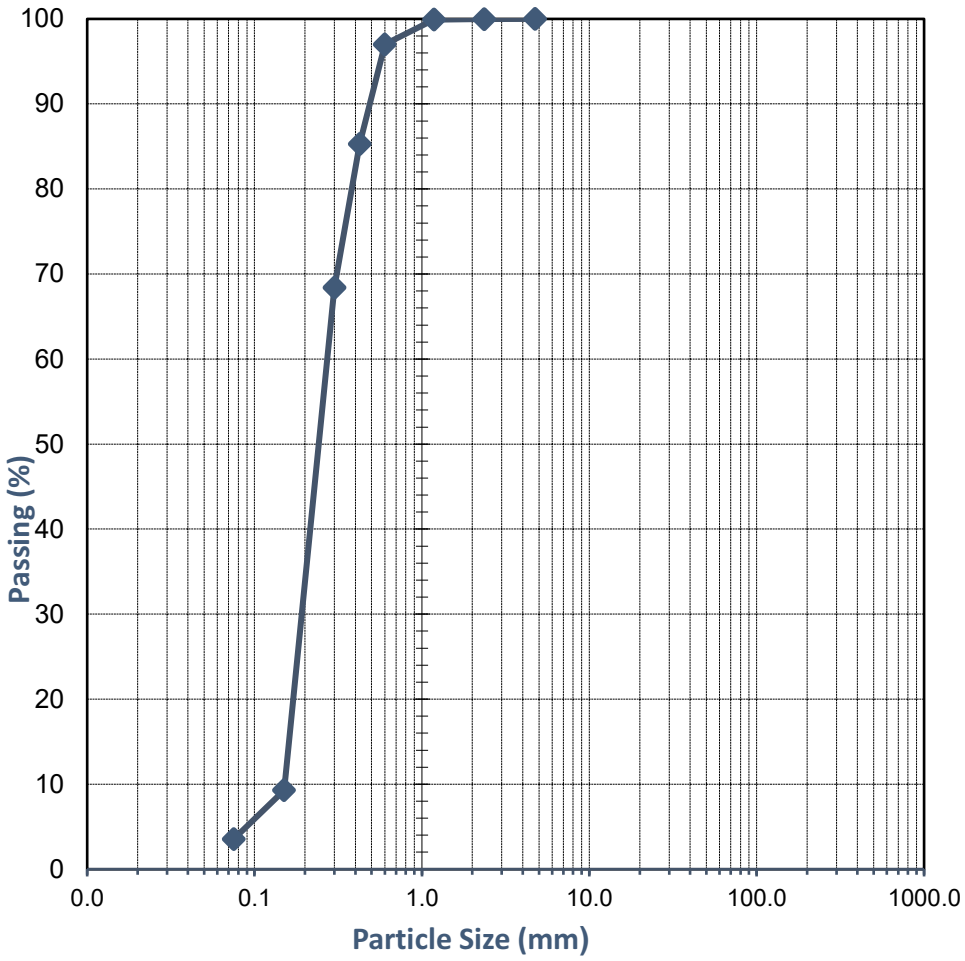
TEST REPORT - AS 1289.3.6.1

Client:	Cooperative Bulk Handling (CBH) Ltd	*Ticket No.*	S961
Client Address:	-	*Report No.*	WG20/4013_1_PSD
Project:	Proposed Fertiliser Facility	*Sample No.*	WG20/4013
Location:	Lot 1304 Rockingham Beach Road, Rockingham	*Date Sampled:*	Not Specifed
Sample Identification:	TP04 0.5m	*Date Tested:*	13-03-2020

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	
4.75	100
2.36	100
1.18	100
0.600	97
0.425	85
0.300	68
0.150	9
0.075	4



Comments:

Approved Signatory:

Name: Brooke Elliott
Function: Quality Manager
Date: 16-March-2020

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	Cooperative Bulk Handling (CBH) Ltd	*Ticket No.*	S961
Client Address:	-	*Report No.*	WG20/4013_1_PI
Project:	Proposed Fertiliser Facility	*Sample No.*	WG20/4013
Location:	Lot 1304 Rockingham Beach Road, Rockingham	*Date Sampled:*	Not Specified
Sample Identification:	TP04 0.5m	*Date Tested*	14-03-2020

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**Not Obtainable**
AS 1289.3.2.1	**Plastic Limit (%)**	**Non-Plastic**
AS 1289.3.3.1	**Plasticity Index (%)**	**Non-Plastic**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**0.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Brooke Elliott
Function: Quality Manager
Date: 16-March-2020

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.5.2.1

Client:	Cooperative Bulk Handling (CBH) Ltd	*Ticket No.*	S1019
Client Address:	-	*Report No.*	WG20/4464_1_MMDD
Project:	Proposed Fertiliser Facility	*Sample No.*	WG20/4464
Location:	Lot 1304 Rockingham Beach Road, Rockingham	*Date Sampled:*	Not Specified
Sample Identification:	TP04 0.5m	*Date Tested:*	25/03/2020

TEST RESULTS - Modified Maximum Dry Density

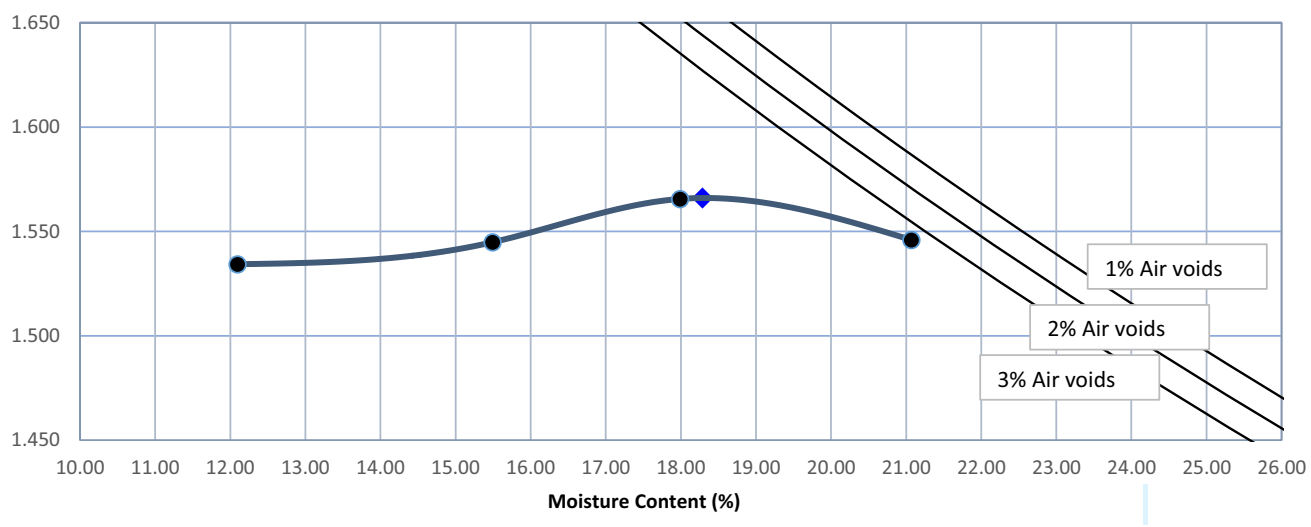
Sampling Method: Sampled by Client, Tested as Received

Sample Curing Time: 2 Hours

Method used to Determine Liquid Limit: Visual / Tactile Assessment by Competent Technician

Material + 19.0mm (%): 0 **Material + 37.5mm (%)** -

Moisture Content (%)	12.1	15.5	18.0	21.1	
Dry Density (t/m³)	1.534	1.545	1.566	1.546	



Modified Maximum Dry Density (t/m³) **1.57**

Optimum Moisture Content (%) **18.5**

Comments: *The above air void lines are derived from a calculated apparent particle density of 2.42 t/m³*

Approved Signatory:

Name: Kirk McConachy
Function: Laboratory Manager
Date: 26/March/2020

NATA WORLD RECOGNISED ACCREDITATION

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WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.6.1.1

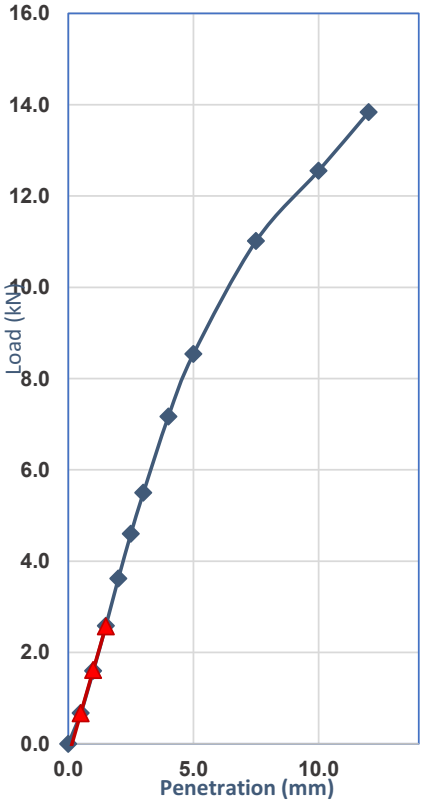
Client:	Cooperative Bulk Handling (CBH) Ltd	*Ticket No.*	S1019
Client Address:	-	*Report No.*	WG20/4464_1_SCBR
Project:	Proposed Fertiliser Facility	*Sample No.*	WG20/4464
Location:	Lot 1304 Rockingham Beach Road, Rockingham	*Date Sampled:*	Not Specified
Sample Identification:	TP04 0.5m	*Date Tested:*	30-03-2020

TEST RESULTS - CALIFORNIA BEARING RATIO

Sample Description: Sand

Sampling Method: Sampled by Client, Tested as Received

Load Penetration Curve



Compaction Details			
Compaction Method	AS 1289.5.2.1	Hammer Type	Modified
Plasticity Determined by	Estimated	Curing Time (Hours)	36.0
% Retained 19.0mm	0	Excluded/Replaced	Excluded
Maximum Dry Density (t/m^3)	1.57	Optimum Moisture (%)	18.5
Target Dry Density Ratio (%)	95	Target Moisture Ratio (%)	100

Specimen Conditions At Compaction			
Dry Density (t/m3)	1.49	Moisture Content (%)	18.1
Density Ratio (%)	95.0	Moisture Ratio (%)	99.0

Specimen Conditions After Soak			
Soaked or Unsoaked	Soaked	Soaking Period (days)	4
Surcharges Applied (kg)	9.00	Measured Swell (%)	0.0
Dry Density (t/m³)	1.49	Dry Density Ratio (%)	95.0
Moisture Content (%)	25.5	Moisture Ratio (%)	139.0

Specimen Conditions After Test			
Top 30mm Moisture (%)	23.8	Remaining Depth (%)	24.9

Correction applied to Penetration: 0.2mm

Determined at a Penetration of: 5.0mm

California Bearing Ratio (CBR): 45%

Comments:

Approved Signatory:

Name: Matt van Herk

Function: General Manager

Date: 31-March-2020

NATA WORLD RECOGNISED ACCREDITATION

Accreditation No. 20599

Accredited for compliance with ISO/IEC 17025 - Testing

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

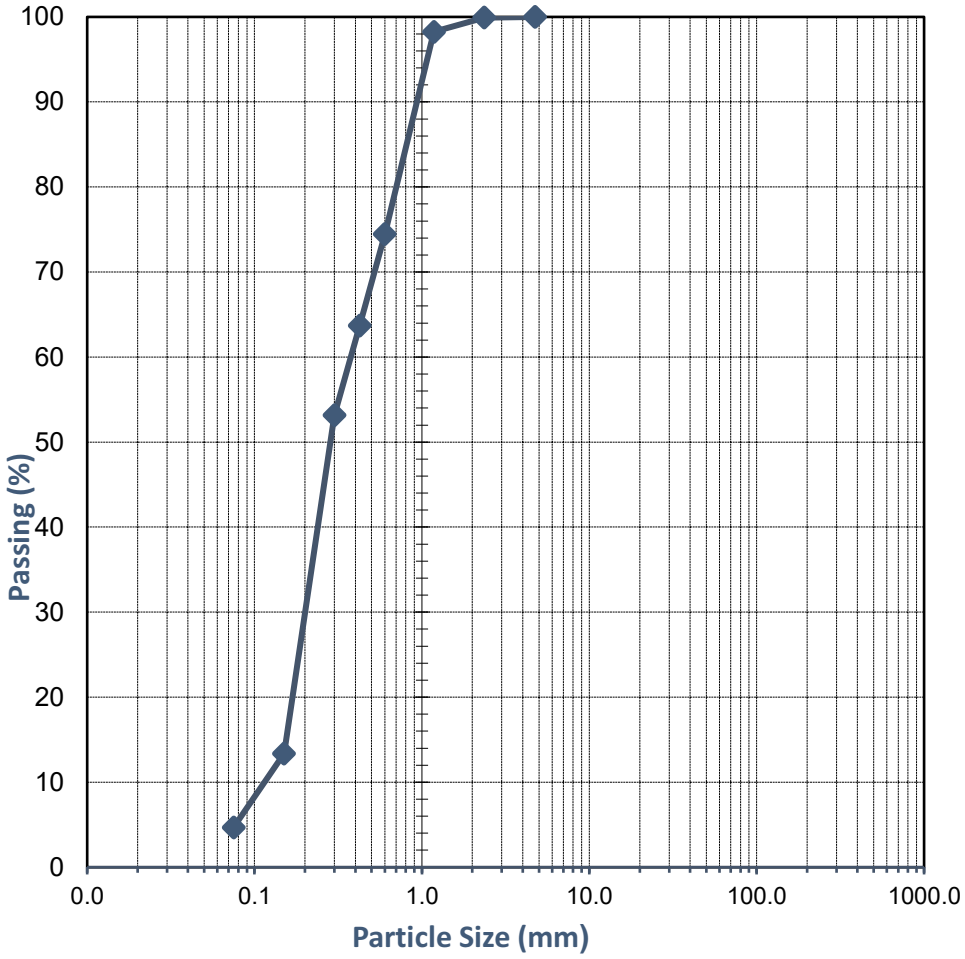
TEST REPORT - AS 1289.3.6.1

Client:	Cooperative Bulk Handling (CBH) Ltd	*Ticket No.*	S961
Client Address:	-	*Report No.*	WG20/4017_1_PSD
Project:	Proposed Fertiliser Facility	*Sample No.*	WG20/4017
Location:	Lot 1304 Rockingham Beach Road, Rockingham	*Date Sampled:*	Not Specifed
Sample Identification:	BH04 / MW04 1.5-3.0m	*Date Tested:*	13-03-2020

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	
4.75	100
2.36	100
1.18	98
0.600	74
0.425	64
0.300	53
0.150	13
0.075	5



Comments:

Approved Signatory:

Name: Brooke Elliott
Function: Quality Manager
Date: 16-March-2020

Accreditation No. 20599
Accredited for compliance with ISO/IEC 17025 - Testing

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	Cooperative Bulk Handling (CBH) Ltd	*Ticket No.*	S961
Client Address:	-	*Report No.*	WG20/4017_1_PI
Project:	Proposed Fertiliser Facility	*Sample No.*	WG20/4017
Location:	Lot 1304 Rockingham Beach Road, Rockingham	*Date Sampled:*	Not Specified
Sample Identification:	BH04 / MW04 1.5-3.0m	*Date Tested*	14-03-2020

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**Not Obtainable**
AS 1289.3.2.1	**Plastic Limit (%)**	**Non-Plastic**
AS 1289.3.3.1	**Plasticity Index (%)**	**Non-Plastic**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**0.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**254**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Brooke Elliott
Function: Quality Manager
Date: 16-March-2020

NATA WORLD RECOGNISED ACCREDITATION

Accreditation No. 20599
Accredited for compliance with ISO/IEC 17025 - Testing

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

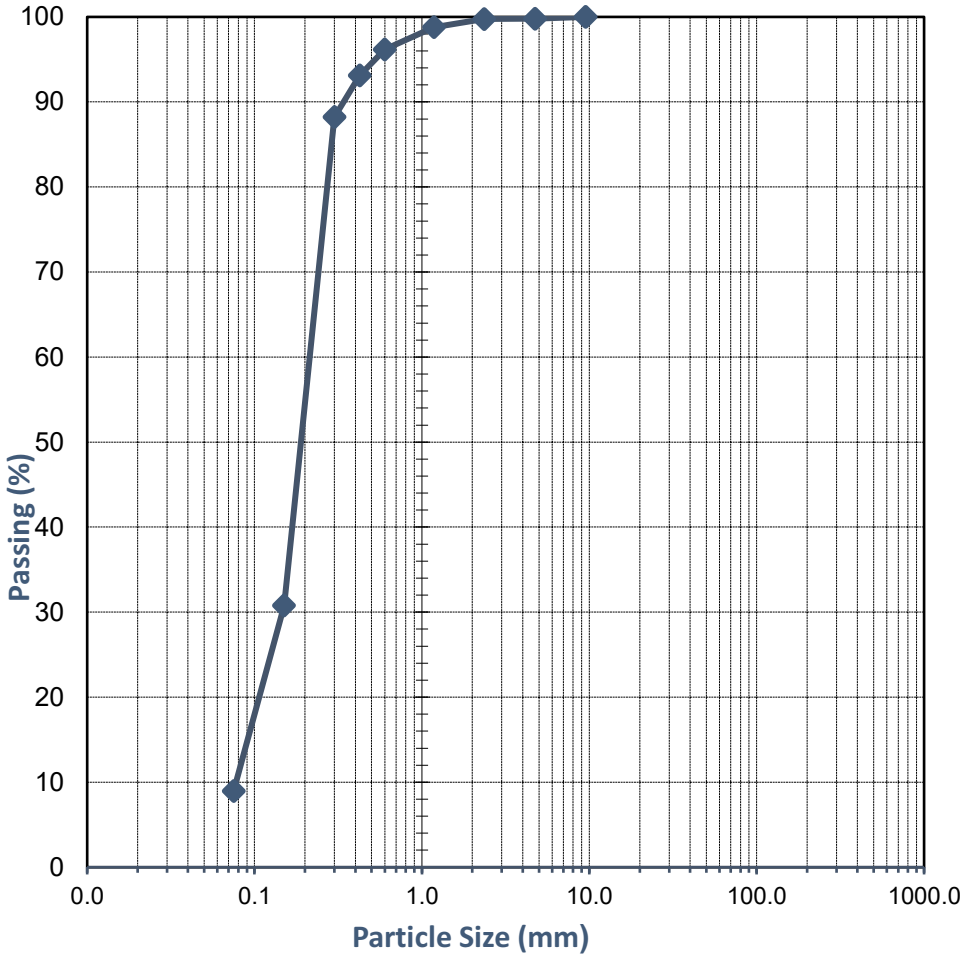
TEST REPORT - AS 1289.3.6.1

Client:	Cooperative Bulk Handling (CBH) Ltd	*Ticket No.*	S961
Client Address:	-	*Report No.*	WG20/4018_1_PSD
Project:	Proposed Fertiliser Facility	*Sample No.*	WG20/4018
Location:	Lot 1304 Rockingham Beach Road, Rockingham	*Date Sampled:*	Not Specifed
Sample Identification:	BH04 / MW04 4.5-7.5m	*Date Tested:*	13-03-2020

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method: Sampled by Client, Tested as Received

Sieve Size (mm)	Percent Passing Sieve (%)
150.0	
100.0	
75.0	
37.5	
19.0	
9.5	100
4.75	100
2.36	100
1.18	99
0.600	96
0.425	93
0.300	88
0.150	31
0.075	9



Comments:

Approved Signatory:

Name: Brooke Elliott
Function: Quality Manager
Date: 16-March-2020

NATA WORLD RECOGNISED ACCREDITATION

Accreditation No. 20599
Accredited for compliance with ISO/IEC 17025 - Testing

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.1, 3.2.1, 3.3.1 & 3.4.1

Client:	Cooperative Bulk Handling (CBH) Ltd	*Ticket No.*	S961
Client Address:	-	*Report No.*	WG20/4018_1_PI
Project:	Proposed Fertiliser Facility	*Sample No.*	WG20/4018
Location:	Lot 1304 Rockingham Beach Road, Rockingham	*Date Sampled:*	Not Specified
Sample Identification:	BH04 / MW04 4.5-7.5m	*Date Tested*	14-03-2020

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:	**Sampled by Client, Tested as Received**
History of Sample:	**Oven Dried <50°C**
Method of Preparation:	**Dry Sieved**

AS 1289.3.1.1	**Liquid Limit (%)**	**Not Obtainable**
AS 1289.3.2.1	**Plastic Limit (%)**	**Non-Plastic**
AS 1289.3.3.1	**Plasticity Index (%)**	**Non-Plastic**
AS 1289.3.4.1	**Linear Shrinkage (%)**	**1.0**
AS 1289.3.4.1	**Length of Mould (mm)**	**250**
AS 1289.3.4.1	**Condition of Dry Specimen:**	**-**

Comments:

Approved Signatory:

Name: Brooke Elliott
Function: Quality Manager
Date: 16-March-2020

NATA WORLD RECOGNISED ACCREDITATION

Accreditation No. 20599
Accredited for compliance with ISO/IEC 17025 - Testing

Envirolab Services (WA) Pty Ltd trading as MPL Laboratories
ABN 53 140 099 207
16-18 Hayden Court Myaree WA 6154
ph 08 9317 2505 fax 08 9317 4163
lab@mpl.com.au
www.mpl.com.au

CERTIFICATE OF ANALYSIS 241670

Client Details

Client	Western Geotechnical & Laboratory Services
Attention	Matt Van Herk
Address	235 Bank Street, Welshpool, WA, 6101

Sample Details

Your Reference	**Proposed Fertiliser Facility**
Number of Samples	3 Soils
Date samples received	11/03/2020
Date completed instructions received	11/03/2020
Location	Lot 1304 Rockingham Beach Rd, Rockingham

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	16/03/2020
Date of Issue	16/03/2020

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Heram Halim, Operations Manager

Authorised By

Michael Kubiak, Laboratory Manager

Miscellaneous Inorg - soil				
Our Reference		241670-1	241670-2	241670-3
Your Reference	UNITS	WG20/4011 TP01	WG20/4017 BH04/MW04	WG20/4018 BH04/MW04
Depth		0.5	1.5-3.0	4.5-7.5
Type of sample		Soil	Soil	Soil
Date prepared	-	13/03/2020	13/03/2020	13/03/2020
Date analysed	-	13/03/2020	13/03/2020	13/03/2020
pH	pH Units	9.2	9.4	9.0
Sulphate	mg/kg	<10	92	490
Chloride	mg/kg	<10	43	45

Method ID	Methodology Summary
INORG-001	pH - Measured using pH meter and electrode base on APHA latest edition, Method 4500-H+. Please note that the results for water analyses may be indicative only, as analysis can be completed outside of the APHA recommended holding times. Soils are reported from a 1:5 water extract unless otherwise specified.
INORG-081	Anions - a range of anions are determined by Ion Chromatography based on APHA latest edition Method 4110-B. Soils and other sample types reported from a water extract unless otherwise specified (standard soil extract ratio 1:5).

QUALITY CONTROL: Miscellaneous Inorg - soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			13/03/2020	1	13/03/2020	13/03/2020		13/03/2020	[NT]
Date analysed	-			13/03/2020	1	13/03/2020	13/03/2020		13/03/2020	[NT]
pH	pH Units		INORG-001	[NT]	1	9.2	9.2	0	102	[NT]
Sulphate	mg/kg	10	INORG-081	<10	1	<10	<10	0	99	[NT]
Chloride	mg/kg	10	INORG-081	<10	1	<10	<10	0	105	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Appendix I: Understanding Your Report

www.galtgeo.com.au
50 Edward Street OSBORNE PARK WA 6017
ABN: 64 625 054 729

UNDERSTANDING YOUR REPORT

GALT FORM PMP11 Rev3

1. EXPECTATIONS OF THE REPORT

This document has been prepared to clarify what is and is not provided in your report. It is intended to inform you of what your realistic expectations of this report should be and how to manage your risks associated with the conditions on site.

Geotechnical engineering and environmental science are less exact than other engineering and scientific disciplines. We include this information to help you understand where our responsibilities begin and end. You should read and understand this information. Please contact us if you do not understand the report or this explanation. We have extensive experience in a wide variety of projects and we can help you to manage your risk.

2. THIS REPORT RELATES TO PROJECT-SPECIFIC CONDITIONS

This report was developed for a unique set of project-specific conditions to meet the needs of the nominated client. It took into account the following:

- the project objectives as we understood them and as described in this report;
- the specific site mentioned in this report; and
- the current and proposed development at the site.

It should not be used for any purpose other than that indicated in the report. You should not rely on this report if any of the following conditions apply:

- the report was not written for you;
- the report was not written for the site specific to your development;
- the report was not written for your project (including a development at the correct site but other than that listed in the report); or
- the report was written before significant changes occurred at the site (such as a development or a change in ground conditions).

You should always inform us of changes in the proposed project (including minor changes) and request an assessment of their impact.

Where we are not informed of developments relevant to your report, we cannot be held responsible or liable for problems that may arise as a consequence.

Where design is to be carried out by others using information provided by us, we recommend that we be involved in the design process by being engaged for consultation with other members of the project team. Furthermore, we recommend that we be able to review work produced by other members of the project team that relies on information provided in our report.

3. SOIL LOGS

Our reports often include logs of intrusive and non-intrusive investigation techniques. These logs are based on our interpretation of field data and laboratory results. The logs should only be read in conjunction with the report they were issued with and should not be re-drawn for inclusion in other documents not prepared by us.

4. THIRD PARTY RELIANCE

We have prepared this report for use by the client. This report must be regarded as confidential to the client and the client's professional advisors. We do not accept any responsibility for contents of this document from any party other than the nominated client. We take no responsibility for any damages suffered by a third party because of any decisions or actions they may make based on this report. Any reliance or decisions made by a third party based on this report are the responsibility of the third party and not of us.

5. CHANGE IN SUBSURFACE CONDITIONS

The recommendations in this report are based on the ground conditions that existed at the time when the study was undertaken. Changes in ground conditions can occur in numerous ways including anthropogenic events (such as construction or contaminating activities on or adjacent to the site) or natural events (such as floods, groundwater fluctuations or earthquakes). We should be consulted prior to use of this report so that we can comment on its reliability. It is important to note that where ground conditions have changed, additional sampling, testing or analysis may be required to fully assess the changed conditions.

6. SUBSURFACE CONDITIONS DURING CONSTRUCTION

Practical constraints mean that we cannot know every minute detail about the subsurface conditions at a particular site. We use professional judgement to form an opinion about the subsurface conditions at the site. Some variation to our evaluated conditions is likely and significant variation is possible. Accordingly, our report should not be considered as final as it is developed from professional judgement and opinion.

The most effective means of dealing with unanticipated ground conditions is to engage us for construction support. We can only finalise our recommendations by observing actual subsurface conditions encountered during construction. We cannot accept liability for a report's recommendations if we cannot observe construction.

7. ENVIRONMENTAL AND GEOTECHNICAL ISSUES

Unless specifically mentioned otherwise in our report, environmental considerations are not addressed in geotechnical reports. Similarly, geotechnical issues are not addressed in environmental reports. The investigation techniques used for geotechnical investigations can differ from those used for environmental investigations. It is the client's responsibility to satisfy themselves that geotechnical and environmental considerations have been taken into account for the site.

Geotechnical advice presented in a Galt Environmental report has been provided by Galt Geotechnics under a sub-contract agreement. Similarly, environmental advice presented in a Galt Geotechnics report has been provided by Galt Environmental under a sub-contract agreement.

Unless specifically noted otherwise, no parties shall draw any inferences about the applicability of the Western Australian state government landfill levy from the contents of this document.

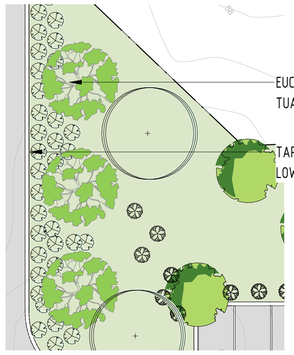
O:\Administration\Standard Forms and Documents\PMP11-Rev3 Understanding your Report.docx

Appendix B
Landscaping Plan

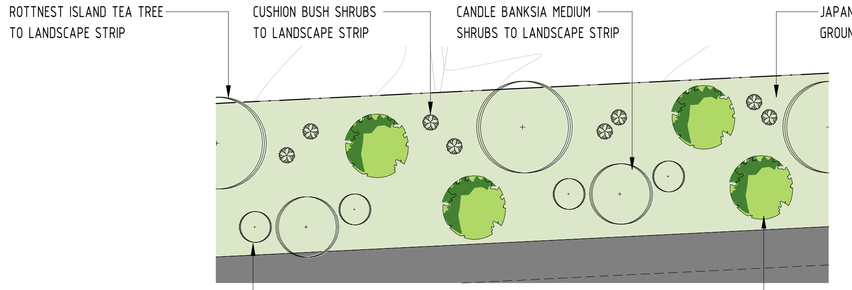
NOTE:
LANDSCAPING TO COMPLY WITH LOCAL SHIRE REQUIREMENTS. SPECIES SELECTION AND LAYOUT IS INDICATIVE. LANDSCAPER TO DETRERMINE APROPRIATE SPECIES AND ARRANGEMENT.

LEGEND

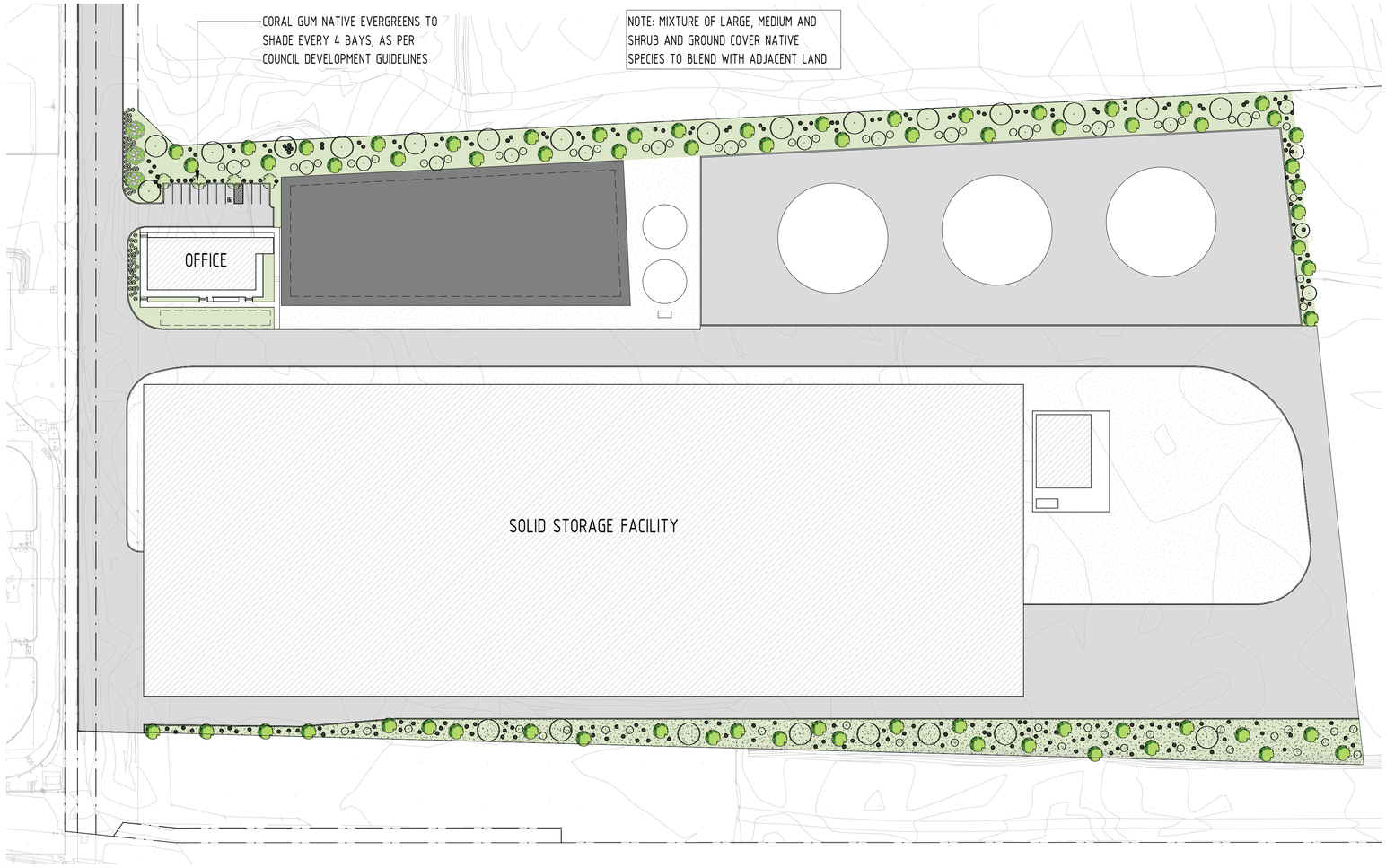
- CANDLE BANKSIA
- COASTAL SALT BUSH
- COASTAL WATTLE
- TUART
  EUCALUPTUS GOMPHOCEPHALA
- SNAKE VINE
- ROTTNEST
  ISLAND TEA TREE
- TAR BUSH
- CORAL GUM
- BULL BANKSIA
- MULCHED AREA (75MM COVER)
- RAINBOW STONE (30MM COVER)



TYPICAL LANDSCAPE TO ENTRANCE
SCALE 1 : 200



TYPICAL 10M LANDSCAPE STRIP
SCALE 1 : 200



LANDSCAPING PLAN
SCALE 1 : 750

CADDSGROUP
ARCHITECTURAL DRAFTING

USE FIGURED DIMENSIONS ONLY DO NOT SCALE FROM DRAWINGS

ALL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS RELATING TO THIS PROJECT & SPECIFICATIONS

ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE BUILDING CODE OF AUSTRALIA

ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS AND REGULATIONS OF ALL LOCAL AUTHORITIES

INSTALLATION OF ALL BUILDING MATERIALS, TO BE INSTALLED IN ACCORDANCE TO MANUFACTURERS RECOMMENDATIONS.

NOTE

ANY EXISTING XANTHORROHOEA PREISSII – GRASS TREES ARE TO BE RETAINED AND PROTECTED IN THEIR CURRENT LOCATIONS AS FAR AS PRACTICABLE. ANY GRASS TREES WHICH WILL BE IMPACTED BY THE PROPOSED DEVELOPMENT LAYOUT SHOULD BE UTILISED AND RELOCATED TO BE SITUATED WITHIN THE PROPOSED LANDSCAPE AREAS.

ALL INFILTRATION SWALES TO HAVE BIOFILTRATION VEGETATION AND AN AMENDED SOIL TREATMENT PROFILE TO SUIT THE DESIGN

PRELIMINARY ISSUE
DO NOT USE FOR CONSTRUCTION
DATE – 04.08.20

1:200 @ A1
1:400 @ A3
0 5000 10000 15000 20000 mm

1:750 @ A1
1:1500 @ A3
0 10 20 30 40 50 60 70 m

CBHGROUP

ACOR CONSULTANTS (WA) Pty Ltd
ENGINEERS
MANAGERS
INFRASTRUCTURE
PLANNERS
Atwell Arcade, Level 1, Suite 101
3 Cantonment Street
Fremantle WA 6160
PH: +61 8 9336 3156
JOB. No.

REF. DRAWING No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	BY	CHK'D	APP'D
		F	02.12.20	UPDATED LANDSCAPING AS PER CLIENT COMMENTS	JM		
		E	04.08.20	ISSUED FOR INFORMATION	NM		
		D	27.07.20	ISSUED FOR INFORMATION	NM		
		C	26.06.20	ISSUED FOR INFORMATION	NM		
		B	16.06.20	ISSUED FOR INFORMATION	NM		
		A	02.06.20	ISSUED FOR INFORMATION	NM		

SCALE: As indicated
SHEET: A1
PROJECT:
CONTRACT No.:

DRAWN	N.MCDONALD	02.06.20
CHECKED	J.MARTIN	25.06.20
DESIGNED	N.MCDONALD	02.06.20
DESIGN APPR		
PROJECT APPR		

TITLE: KWINANA TERMINAL
FERTISLISER STORAGE FACILITY
SCHEMATIC DESIGN
LANDSCAPING PLAN

DRG No.: 419-M2814-AR-DGA-0003
SHEET: 3 OF 15
REV.: F

Appendix C
Water Balance

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
rainfall (mm)	4.6	0.8	39.4	26.4	150.8	48.6	120	125.2	151.6	29	8.8	2.6
Pan Evaporation (mm)	271	252	117.4	112.2	73.6	56.4	60.4	75.2	96.4	152	229.4	276.8
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Runoff into Pond (m3)	23	4	201	135	769	248	612	639	773	148	45	13
Evaporation from Pond (m3)	806	750	349	334	219	168	180	224	287	452	682	823
Net Accumulation from Rain/Evap (m3)	-783	-746	-148	-199	550	80	432	415	486	-304	-638	-810
Irrigation/Truck offsite (m3)	0	0	0	0	0	0	0	0	750	0	0	0
Wash-down water into Pond (m3)	300	300	300	300	300	300	300	300	300	300	300	300
End of Month Pond Capacity (m3)	3000	3000	2848	2747	1897	1517	785	70	34	38	376	886

*2013 rainfall and evaporation data from Garden Island HSF (90 percentile wet season in the last ten year 2010-2019)

Runoff Catchment (m2):	1600
Pond Suface Area (m2):	3500

(A pan factor of 0.85 has been applied)

A design rainfall - 1 in 20 yr 24 hour is 102 mm.
The capacity required to retain this is 520 m3

360 environmental

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people • planet • professional

Schedule of Submissions
Proposed Fertiliser Storage, Blending and Discharge Facility -
Lots 108, 1304, 8003, 4552 and 1585 Rockingham Beach Road, East Rockingham

PUBLIC SCHEDULE OF SUBMISSIONS		
Name	Address	Comment
1. Ms Gloria Stewart	4 Muros Close WARNBRO WA 6169	I wish to Record an objection in the strongest term to this proposal. I'm appalled that this is even been given serious consideration. It's bad enough that we have a grain terminal and it's associated pollution to the local beaches and the associated aesthetic challenges it poses. The proposed storage facility of ammonia nitrate fertiliser at an industrial level not only encroaches on the surrounding ambiance to people living in the northern part of Rockingham beach but there is a risk (as slight as it may be) that if combusted May be explosive. I'm sure the residents of Lebanon never Imagined the explosive potential of a fertiliser storage facility. We have seen the development of further industry on the southern boarder of Kwinana beach which has completely changed the area for the worse. As I ride past Kwinana beach I witness the enormous failure of the construction of the fuel storage facilities that have callapsed like 'tin cans' just opposite the beach. What if they had callapsed with fuel in them!! Who will guarantee a similar potential risk is not going to occur in this case? Enough is enough! We once had a descent buffer from the ugly but necessary industry In Kwinana which provides some comfort to Rockingham resident. Surely we can rely on our own CoR to ensure that buffer remains intact as much as possible. Thank you for the opportunity to comment.
2. Mr Michael & Mrs Lauryn Backshall	193 Kent Street ROCKINGHAM WA 6168	I wish to record an objection in the strongest term to this proposal. I'm appalled that this is even been given serious consideration. It's bad enough that we have a grain terminal and it's associated pollution to the local beaches and the associated aesthetic challenges it poses. The proposed storage facility of ammonia nitrate fertiliser at an industrial level not only encroaches on the surrounding ambiance to people living in the northern part of Rockingham beach but there is a risk (as slight as it may be) that if combusted may be explosive. I'm sure the residents of Lebanon never imagined the explosive potential of a fertiliser storage facility. We have seen the development of further industry on the southern area of Kwinana beach which has completely changed the area for the worse. As I drive past Kwinana beach I witness the enormous failure of the construction of the fuel storage facilities that have callapsed like 'tin cans' just opposite the beach. Who will guarantee a similar potential risk is not going to occur in this case - especially if the containers are full of fertiliser product? Enough is enough! We once had a decent buffer from the ugly but necessary industry in Kwinana Beach that had some comfort to Rockingham residents. Surely we can rely on our own council to ensure that buffer remains intact as much as possible. Thank you for the opportunity to comment.
3. Mr Herbert Teo	7 Brussels Circuit PORT KENNEDY WA 6172	All I have to say is remember Beirut in August this year! 3000 tonnes of ammonium nitrate that went up with a bang blasted Beirut to smithereens. The blast radius of the explosion was over 1.6 kilometres. The explosion's shockwave blew out windows at Beirut International Airport's passenger terminal, about 9km (5 miles) away from the port!! A rough look at Google Maps shows a caravan park, the Naval Memorial Park and even Bunnings Rockingham in the range of the blast radius. Not wanting to be a wet blanket on the development and the creation of jobs in Rockingham, I feel that the City of Rockingham needs to check the safety requirements 1000 (yes, one thousand) per cent before going ahead.

Schedule of Submissions
Proposed Fertiliser Storage, Blending and Discharge Facility -
Lots 108, 1304, 8003, 4552 and 1585 Rockingham Beach Road, East Rockingham

PUBLIC SCHEDULE OF SUBMISSIONS		
Name	Address	Comment
4. Mr Keith McCorriston	11 Dominion Way ROCKINGHAM WA 6168	Ammonia nitrate - a few years ago the Port Authority had an exclusion zone at the CSBP jetty during discharging from ships. This included Kwinana beach. Is the exclusion zone (if any) going to be implemented and are what risks to the general public and those that live within the area? The proposal is far too close to the beaches and public parks etc. Certainly don't support this proposal.
5. Mrs Jodie Nosworthy	16 Ernest Street SAFETY BAY WA 6169	I strongly disagree with the proposal.
6. Mr Thomas Mannion	6 Peninsula Place SAFETY BAY WA 6169	The proposal document on line does not include a risk assessment for storage and handling, this should be identified for the public to understand the potential catastrophic potential of such a facility.
7. Mr Brad Heggs	8 Weld Street ROCKINGHAM WA 6168	I don't think the COR or state government are considering the environmental impacts of what they are allowing will have in the Cockburn sound for the years to come. The amount of spilt grain that floats from the existing facility is an absolute joke! The damage all of the extra ships is having (and is due to get worse) is irreparable. The quality of the water in the Cockburn sound is already poor and it is getting worse by the day. Just take a look at the increase in jellyfish in the sound. Why do you think the fish/crab stocks are struggling but the jellyfish are thriving? It's the acidity and quality of the water. More needs to be done to protect our backyard!
8. Mr Michael Lightfoot	19 Flame Tree Loop BALDIVIS WA 6171	Totally oppose. There is enough dangerous chemical plants that are already operating in this area. Another one will add to the already high pollution as well as adding a possible explosion risk that is far too close to the residents of Rockingham.
9. Mrs Dorothy Nichols	3/131 Esplanade ROCKINGHAM WA 6168	I say no to this plan I feel we have enough chemicals in Rockingham and Kwinana. So o say NO.
10. Mrs Deidre Atkinson Byrne	140A Safety Bay Road SHOALWATER WA 6169	I would prefer to not have further industrial developments happening within the City of Rockingham putting our waterways at risk of contamination.
11. Mr Steven Belohlawek	7 Windarra Way HANNSAN WA 6432	In history there have been several large explosions like the one recently in Lebanon. How is the Rockingham and Kwinana councils ensuring that such an explosion will never happen with all the various fertiliser storage's along the industrial strip?
12. Mr Jarl Andersen	No address provided	Uncannily, the recent ammonium nitrate explosion in Beirut, devastating a huge swathe of that city and adding to the already hopeless social and economic situation of Lebanon, was stored right next to massive grain silos on the harbour front. In all the tragedy and sadness, it was morbidly fascinating to observe how these grain silos point blank withstood the explosion. This solid and liquid fertiliser proposal sits right next to the citadel-like grain silos of Rockingham Grain Terminal. It would be a right mess, not just to the grain terminal, but the entire Rockingham community if it all went up Lebanese style. I am just saying this, to highlight the risk and ask what measures are in place to ensure that a Beirut accident will never happen in Rockingham? The proposal is detailing all sorts of management conditions and of course, bush fire has been taken into account. There is also the question of associated diesel storage along with the refinery nearby. In mining, diesel and ammonium nitrate are mixed for blasting and stringent safety measures are applied to conveyance and storage.

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Proposed Fertiliser Storage, Blending and Discharge Facility -
Lots 108, 1304, 8003, 4552 and 1585 Rockingham Beach Road, East Rockingham

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Name	Address	Comment
12 - cont…		Ammonium nitrate is already being produced, stored and transported in and out of the Kwinana Industrial Strip and no doubt safe handling is paramount. Personally, I am largely confident it is safe and of no nuisance to the community and have no real objection to the proposal.
13. Mr Garry Young	20C Laurie Street KEWDALE WA 6105	I have read through the proposal from CBH thoroughly and now strongly oppose the construction of this facility due to its likely environmental impact. The environmental impact study by 360 Environmental is very thin, apologetic to zoning and highly qualified in its Limitations and likely reflects to the larger extent the business interests of CBH rather than the residents and ratepayers of East Rockingham. An ammonia nitrate facility close to a built up residential and recreational beach areas is high risk given its potential in certain circumstances such as fire to be of extreme danger to the community. The zoning of this area was also put in place at a time prior to the current level of residential development and density now in place. This will be a 24 hour facility, have large multiple heavy tonnage vehicles per day operating 24/7 and there is no doubt that the smell of ammonia will impact on the residential areas of East Rockingham close to the CBH grain terminal. It is critical that an independent environmental study be undertaken through the City of Rockingham representing residents and ratepayers and that a sub committee of the City comprised of the representation of residents/ratepayers and some administrative staff working with the independent consultant to ensure the efficacy and integrity of the same. This proposal is not in the long term interests of Rockingham as a place where people want to live and enjoy retirement as my wife and I intend to do. The current grain terminal has minimal impact with the exception of the rail line but the ammonia storage will take a step to further industrialisation close to a residential area. I wish to also be consulted further. Garry Young Ratepayer
14. Ms Linda Boyd	37 Calume Street HILLMAN WA 6168	Concerns if it's the same chemical and storage of this type of composition being near suburbs that involved a mass explosion recently in Baghdad I think it happened.
15. Ms Patricia O'Marshall	10B Parkin Street ROCKINGHAM WA 6168	In light of the recent explosion of a fertiliser storage facility in Beirut I have concerns about this proposal. Can an assurance be given that this cannot happen in this plant.
16. Mrs Lynette Crack	122 Kendall Boulevard BALDIVIS WA 6171	I am deeply disturbed that this proposal would go ahead. The likelihood for a spill to pollute the ocean is high and not appropriate to be in the area! There is enough pollution in the Kwinana area already!
17. Mr Nathan Thipthorp	52 Exhibition Way COOLOONGUP WA 6168	Absolutely against the development proposal and the accompanying pipeline. If Rockingham is at all looking to the future then it's definitely not time to further impact our natural assets.
18. Ms Sheena Edwards	Unit 12, 59 Rockingham Beach Road ROCKINGHAM WA 6168	Co-operative Bulk Handling Limited proposes to develop a liquid urea ammonium nitrate (UAN) fertiliser and solid fertiliser storage and blending facility on Lot 108. The proposed development also includes the construction of a pipeline between the CBH jetty at the Kwinana Grain Terminal and the proposed liquid urea ammonia nitrate fertiliser storage facility on Lot 108. This proposal sounds like it would be storing something like what led to the Beirut explosion of 2020. As such the Council should reject the proposal without any further consideration.

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19. Mrs Mandy Smith	3 Philip Street SHOALWATER WA 6169	I strongly oppose this proposal. Please Council, reject this proposal. We do not need any more pollution in our waterways. It is a disgrace to see how we are treated with these kids of sites.
20. Mr William Montgomery	1 Bahama Place SAFETY BAY WA 6169	Can the city of Rockingham please stop turning this beautiful area into a dumping zone, I'm paying a fortune in rates to live in this area and you are continually bringing dangerous industry to my door step, if you want Rockingham to look and feel like Collie or Wittenoom then reduce the rates to $600 a year instead of $2000 I want compensation, infact I might even suggest to social media as a class action, bringing jobs is one thing but the damage and impact this could cause is horrendous. And all we will get is I'm sorry. You make money I want to make money so share the purse and reduce our cost of living.
21. Mrs Kathy Dover	2 Governor Road ROCKINGHAM WA 6168	NO WAY!!! Stop thinking about money! Think about people! And the lives that will be taken when it goes up!!! What about the all the people that live in the caravan park? What about the people that visit the caravan park? What about all the people that go and enjoy the parks near by? Go somewhere else!
22. Mr Chris Bennett	13 Walcha Way MULLALOO WA 6027	Absolutely not. It will cause irreparable damage to the sound and put lives and wellbeings at risk
23. Mrs Elena Craig	11 Teraglin Way WARNBRO WA 6169	I am completely shocked you would take a piece of land like this and put something like that there. The outer harbour plans if they go ahead are going do immense damage to the sound and teamed with the environmental damage this will cause and the increased risk of contamination of the local waters I think this is absolutely disgusting.
24. Mrs Dorothy Pye	24 Bates Way WARNBRO WA 6169	I don't think this is a suitable area for fertilizer such as Ammonium Nitrate to be stored or processed due to toxicity if a fire where to take place also this is one of the major processes in many explosives you only have to see what happened in Beirut 2020 Do Rockingham want to risk it????  2020 Beirut explosion - Wikipedia https://en.wikipedia.org/wiki/2020_Beirut_explosions On 4 August 2020, a large amount of ammonium nitrate stored at the port of the city of Beirut, the capital of Lebanon, exploded, causing at least 203 deaths, 6,500 injuries, and US$15 billion in property damage, and leaving an estimated 300,000 people homeless. Ammonium nitrate | WorkSafe.qld.gov.au https://www.worksafe.qld.gov.au/.../ammonium-nitrate Ammonium nitrate may explode due to the following factors: exposure to strong shocks (e.g. from shock waves of nearby explosions); exposure to high temperatures under confinement (e.g. in a closed pipe) a smaller detonation can trigger an explosion in larger quantities stored nearby. Heat, fire and combustion. Ammonium nitrate does not burn.
25. Mr Mostyn Edwards	12/59 Rockingham Beach Road ROCKINGHAM WA 6168	Given the widespread devastation, injury and loss of life caused to the city of Beirut by an explosion in a storage facility holding ammonium nitrate it is astonishing to think anyone would even consider this proposal on a site so close to a residential area.
26. Mr Judd Jones	Kent Street ROCKINGHAM BEACH WA 6168	As an owner of a residence on the northern end of Kent St, I am **extremely concerned** about the risks this proposed solid and liquid fertiliser facility poses to the lives of local residents. Council's first responsibility should be to the safety and welfare of ratepayers. As the whole world saw from the recent death and destruction of Beirut's port and a large portion of the city itself, this ticking time bomb facility should not be within 5km of residential areas.

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Name	Address	Comment
26 - cont…		Council would be negligent in it's duty of care to it's own residents if it approves this facility as the stability of the explosive fertilisers proposed to be stored on this site depend upon maintaining atmospheric conditions that simply cannot be guaranteed long term - despite what the glossy brochure produced by the developer might say. Do not approve this facility in this location.
27. Mr Phillip & Mrs Michele Bird	No address provided	As an owner of a residence on the northern end of Kent St, I am **extremely concerned** about the risks this proposed solid and liquid fertiliser facility poses to the lives of local residents. Council's first responsibility should be to the safety and welfare of ratepayers. As the whole world saw from the recent death and destruction of Beirut's port and a large portion of the city itself, this **ticking time bomb facility** should not be within 5km of residential areas. Council would be negligent in it's duty of care to it's own residents if it approves this facility as the stability of the explosive fertilisers proposed to be stored on this site depend upon maintaining atmospheric conditions that simply cannot be guaranteed long term - despite what the glossy brochure produced by the developer might say. Do not approve this facility in this location.
28. Mr Paul Kinsella	9 Solquest Way COOLOONGUP WA 6168	I am not sure if anyone is adding up the explosive potential of this storage and that of the ammonia storage, hydrogen and ammonia at nickel refinery and the grain silo itself would be a perfect way to knock out the naval base with a single small done carried weapon. let along the population in rockingham. i have worked in KNR. i have seen the explosive and asphyxiation pie chart for storage level in the 1980's , now significantly higher . you cant be serious
29. Mr John Bell	4/144 Lewington Street ROCKINGHAM WA 6168	I object to the proposed development. Liquid Urea Ammonium Nitrate and Solid Fertiliser Storage shouldn't be near a residential area. It's only because of the existing jetty significantly reducing construction costs that this area is being proposed for the storage and blending facility. Residents shouldn't have to constantly live in fear of a potential chemical/explosive disaster or be exposed to ammonia smells polluting the local atmosphere. This will seriously impact the appeal to the local area reducing property prices and tenant occupancy.
30. Ms Dianne Hills	28 Merrimac Loop ROCKINGHAM WA 6168	After reading up to page 52 of the proposals, I find the amount of liquid UAN and solid fertiliser storage to be concerning. Add to that on site 20,000 litres of diesel storage tanks. The safety requirements have been stated but the risks still remain. No amount of compliance of set backs screening or landscaping will change that. As stated this is high risk land use. Next to CBH grain facility, Puma fuel, BHP nickel, Kwinana bulk Jetty and CC Caravan Park. I could not see any mention of the proximity to the Stirling Naval Base, which surprised me. Then residential area. The reason to add more High Risk Industry, seems to be because we already have Industry the same, adjoining. This seem to me to be the wrong way around. The risk to our Cockburn Sound environment to me is too high. The pipeline poses such a risk as well as the flammable hazard of the storage facility. Atmospheric risk is also of concern, I've read low risk in several places, in isolation perhaps. But none of the industries are in isolation, the opposite in fact. Cumulatively they most certainly do pose a risk. How many times have the warnings sirens gone off at the Jetty this year?

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Name	Address	Comment
30 - cont...		The proposed WTE facilities in both Kwinana and Rockingham will add a still higher level of toxic emissions. Transport issues concern me also, 788 trucks/ day! Plus WTE truck load. This will produce more congestion and fuel emissions locally. I moved back to Rockingham in retirement to enjoy the coastal environment and enjoy the sea air. However since returning the air quality has IMO diminished and the prospect of more industry impacting on the residential area concerning. Even the rapid decline of our star attention in Rockingham, the Little Penguins have not escaped our deteriorating marine environment. Stated in a recent Murdoch University study. If you promote Rockingham as a coastal recreational destination for tourists and a great coastal residential area then planning has to reflect that. Adding, extending hazardous, flammable or toxic industry does the residents a disservice.
31. Mr Mark & Mrs Helen DeFriest	2/191 Rockingham Beach Road ROCKINGHAM WA 6168	My wife and I own a town house very close to the proposed facility and feel the need to register our concerns regarding the proposal to build this facility so close to our beach suburban lifestyle. Keeping it simple, these concerns are: **1. Increased traffic on Rockingham Beach Road** Already a busy thoroughfare, on both early mornings and evenings (due to the shift changes at ALCOA, CSBP and several other Kwinana facilities) the extra traffic will impinge on our quiet beach lifestyle. Added to that the new crossover road from the facility to the jetty, across Rockingham Beach Road, will cause traffic jams, not just during the busy times… remembering this proposed facility runs 24/7, unlike CBH. What's next, traffic lights and double glazing of our windows to block out the traffic noise? Surely it would be more sensible to build a road from the facility directly to Patterson Road? **2. Loss of Beach Lifestyle** Construction of the pipeline is certain to increase commercial marine traffic (ships)… turning this area into a port. We chose to live in Rockingham, not the port of Fremantle for this very reason. The only marine traffic we're interested in, is the leisure variety: windsurfing, private fishing boats, kayaks, kite surfers, swimmers and divers… many of them using the beaches north of the CBH jetty as much as south to the Rockingham Foreshore. **3. Danger** We are not happy with the type of industry so close to our beach residential area. We're talking about dangerous and potentially explosive chemicals so close to our family homes. It is important to note that a similar facility (CSPB) is some 2 kilometres from our homes… whereas this new facility would be in our back yard with no acceptable buffer. Liquid and solid urea ammonium nitrate can be quite harmful… and when something goes wrong (as it does with any facility, not just Beirut) we don't want to be on the front line… especially with a northerly wind blowing. Accordingly, we request the Rockingham Council to consider rejecting this flawed proposal, and consider another commercial venture that has a less negative and dangerous impact on our lives and recreation.
32. Ms Dawn Skinner	No address provided	How can you seriously contemplate allowing the proposed development to go ahead? I did not think Rockingham Council would allow a bomb factory quite so close to its residents.

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32 - cont...		It is my understanding the area referred to, and locations adjacent to it, had its housing removed many years ago to ensure a buffer between residents and the local industry sector at Kwinana. Now there is a proposal to install a highly dangerous storage, blending and discharge facility using the same ingredients as used to create Fracture, the industrial explosive, merely metres away from local residents. To be clear I object in the strongest terms to this proposal. Let us learn from the explosive accident at Beirut. I am sure they took precautions and were very careful too….
33. Mr Peter Schofield	No address provided	**<u>Letter 1</u>** (appendum to refuse planning of CBH to locate large storage shed of Ammonium Nitrate.) CBH wants to store a large amount Explosive Mixture of Ammonium Nitrate at Rockingham on Rockingham Beach Road. Below is a list of MAJOR Ammonium Nitrate Explosions since 1920 which shows we have learnt little from History. The Warning should read; Since the year 2000 there have been at least 5 Major explosions of Ammonium Nitrate around the World. Brest France 1947 3000 tonnes Texas City 1947 2960 tonnes Beirut 2020 2750 tonnes Tianjin China 2015 800 tonnes Oppau Germany 1921 450 tonnes Neyshabur Iran 2004 400 tonnes Toulouse France 2001 300 Tonnes West Texas 2013 240 Tonnes <u>So how many Thousands of Tonnes does CBH want to store in Rockingham</u>? It will be significantly bigger than the Beirut Explosion and may I leave a link to the documentary on how much damage was done and how many lives were lost with just 2750 tonnes. <u>So how big would a 10,000 Tonne explosion in Rockingham be?</u> Probably everything from the coast up to the Kwinana freeway will be destroyed. <u>What scale of destruction would be experienced within a 5 km radius of the explosion?</u> The answer is probably thousands would die and tens of thousands would be homeless. The area would be completely obliterated in a one kilometre radius. Every building, bridge or structure within the 1km to 5 km zone will have sustained catastrophic damage and would have to be pulled down and rebuilt. It will damage all infrastructure for ports and shipping and naval bases, with a resulting tsunami probably 6 metres tall, sinking ships and tankers and cargo ships within a 2 kilometre radius. The resulting economic damage to Kwinana and Rockingham would be catastrophic. <u>How many thousands would die from the flying glass from every broken window within the shock wave of 8 kilometres from the site</u>? This is difficult to estimate but many would die from the window damage even at the Rockingham hospital for the staff and patients already at the hospital. Please view the Beirut hospital footage of the blast damaging their windows with window frames and ceilings collapsing on staff.

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33 - cont...		The Solution Is to have a containment located in a rural area 50 km away from urban housing. When it is needed it is railroaded or trucked to a specified port with low numbers of civilians. It is simply not morally, ethically or legally right to house Explosive material of that massive volume within a zone of Commercial premises and Domestic residences given that we have adequate knowledge and experience with large shed storages around the world detonating and killing thousands of people... No caveats of regular checking, or safeguarding measures, or firewalls, or in-house checks by CBH or any other measure enacted, suffices or satisfies the residents such as myself that have a residential house within the blast zone!!! There is only one solution and that is to have the CITY OF ROCKINGHAM refuse the plans by CBH to store Ammonium Nitrate in any form, crystal or liquid in Rockingham. **Letter 2** As the City of Rockingham website has removed the CBH submission material on the day it is to be resubmitted. It is now 4th December 2020 and they extension granted for written submission was stated as 4pm on 4th December which is in a couple of hours time. MY first Formal Written Submission was in late October 2020 and it was received by David Banovic Senior Planning Officer at the City of Rockingham. He said it was too early to formally accept my submission but he could do it when it opens. Emails will evidence this correspondance. He replied about a week later on the 29th October 2020 to say that he will now accept my written submission as the process to accept objections has now opened. I had already asked him to accept my earlier email as a formal opposition to the CBH Entity putting 128000 metric tonnes of Ammonium Nitrate on Rockingham Beach Road site. On that date I asked him to process the opposition that I asked to be formally lodged. I also said the I will write and add more to the Submission by the end date of 4pm 4th of December as laid out on City of Rockingham Website. Here is the additional material I wish to display for the public to read. 13/10/2020 (appendum to refuse planning of CBH to locate large storage shed of Ammonium Nitrate.) CBH wants to store a VERY large amount Explosive Mixture of *Ammonium Nitrate* at Rockingham on Rockingham Beach Road with the equivalent explosive Power of 7 Hiroshima BOMBS going off at once!.. Below is a list of MAJOR Ammonium Nitrate Explosions since 1920 which shows we have learnt little from History. The Warning should read; *Since the year 2000 there have been at least 5 Major explosions of Ammonium Nitrate around the World.* Brest France 1947 3000 tonnes Texas City 1947 2960 tonnes Beirut 2020 2750 tonnes Tianjin China 2015 800 tonnes

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PUBLIC SCHEDULE OF SUBMISSIONS		
Name	Address	Comment
33 - cont...		Oppau Germany 1921 450 tonnes Neyshabur Iran 2004 400 tonnes Toulouse France 2001 300 Tonnes West Texas 2013 240 Tonnes What is ammonium Nitrate used for? Largely this fertiliser is used as an Explosive material. It is so good at denotation because its detonation expansion rate is 3.5km/second. Therefore it is still used to propel military warheads, it is used in huge quantities in the Mining industry to blow up iron ore deposits in the Pilbara and Kimberley, and it has been used by the IRA and the Oklahoma Bomber. So how many Thousands of Tonnes does CBH want to store in Rockingham? CBH want 128000 metric tonnes stored!!!! THIS may be the LARGEST store of Ammonium Nitrate in the WORLD. It will be significantly bigger than the Beirut Explosion and may I leave a link to the documentary on how much damage was done and how many lives were lost with just 2750 tonnes. But this will be 47 times larger... Not twice as large, not 3 times as large, 47 times larger!!! To put the explosive potential into quantifiable and imaginable amounts it is necessary to compare to something that we all understand... THE HIROSHIMA BOMB!!! THE EQUIVALENT NUMBER OF BOMBS THAT THE CBH WISHES TO STORE AT ROCKINGHAM IS 7. 7 ATOMIC BOMBS. 7 HIROSHIMA SIZED ATOMIC BOMBS... SO NOT TWICE AS BIG AS HIROSHIMA, NOT 3 TIMES BIGGER THAN HIROSHIMA, 7 TIMES THE EXPLOSIVE POWER OF HIROSHIMA... So how big would a 128000 metric Tonne explosion in Rockingham be? Probably everything in a 6km radius from the coast to the Kwinana freeway will be vaporized. EVERYTHING FROM NORTHERN PERTH SUBURBS TO SOUTHERN MANDURAH SUBURBS WILL BE COMPLETELY DESTROYED AND FLATTENED. EXPECT EVERY BUILDING OR STRUCTURE WEST OF THE DARLING SCARP TO BE LARGELY UNRECOGNIZABLE. PERTH WILL CEASE TO EXIST!!! What scale of destruction would be experienced within a 15 km radius of the explosion? The answer is probably tens of thousands would die INSTANTLY and MORE THAN A MILLION WOULD BE HOMELESS INSTANTLY. The area would be completely FLATTENED in a ten kilometre radius. Every building, bridge or structure within the 15 km zone will have sustained catastrophic damage and would have to be pulled down and rebuilt. It will damage all infrastructure for ports and shipping and naval bases, with a resulting tsunami probably 50 metres tall, sinking ships and tankers and cargo ships within a 10 kilometre radius. The resulting economic damage Mandurah and Perth would be catastrophic. ROCKINGHAM AND KWINANA WILL CEASE TO BE SEEN ABOVE THE DUST AND DEBRIS ON A FLAT ANDSCAPE. How many Hundreds of thousands would die or be injured from the flying glass from every broken window within the shock wave of 40 kilometres from the site?

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Name	Address	Comment
33 - cont..		This is difficult to estimate but many would die from the window damage even at the PERTH hospitals 38 kms away. The staff and patients already at the hospital would sustain massive damages. Please view the Beirut hospital footage of the blast damaging their windows with window frames and ceilings collapsing on staff. It is possible 1.5 million people would be seriously or fatally injured from exploding glass. Not the shock wave, not buildings collapsing, just from the flying glass lacerating peoples faces and throats and bodies alone there may be half a million people die slowly within the first hour... WHAT IS THE REAL ISSUES National security is the REAL issue. Set a BOMB off using the Ammonium Nitrate and you disable Half of Australia, THE WESTERN HALF. An unprovoked strike from a NATION such as CHINA may COMPLETELY disable the Western half of Australia. We would instantly lose all fuel storage in KWINANA, we would lose all grain storage, we would lose all port facilities, and Power grid, and water and sewage. Then with only two weeks worth of fuel storage in WA we would have all Trucks grind to a halt, meaning all shops and all Power stations would stop, meaning that we would be without any Power, heat, light, water, sewage, hospitals, transport, communication, internet, phone. Darwin Port is in China's hands for 99 years... They could just wait a week for us to be starving then walk right in and take over.... Garden Island naval base would be vaporised so would the Submarine depot at Kwinana as would any Governance, CONTROL and Military capabilities. IT WILL BE OUR PEARL HARBOUR... WE MAY NEVER RECOVER TO BE ABLE TO DEFEND THE EASTERN HALF OF AUSTRALIA... <u>The Solution</u> Is to have a containment located in a rural area 50 km away from RESIDENTIAL housing. When it is needed it is railroaded or trucked to a specified port with low numbers of civilians. THE PROPOSAL IS TO LOCATE THE PORT AND STORAGE HUNDREDS OF KILOMETRES FROM ANY TOWN OR CITY.... NORTH OF CARNARVON POSSIBLY??? It is simply not <u>morally, ethically or legally</u> right to house Explosive material of that massive volume within a zone of Commercial premises and Domestic residences given that we have adequate knowledge and experience with large shed storage's around the world detonating and killing thousands of people OVER AND OVER AND OVER AGAIN... THERE MUST BE INTERNATIONAL CIVIL RIGHTS THAT OPPOSE ANY COUNTRY AND ANY GOVERNMENT FROM LOCATING HAZADOUS EXPLOSIVE MATERIALS NEAR THEIR RESIDENTS... IF NOT LETS CREATE INTERNATIONAL LAW TO MAKE IT IMPOSSIBLE FOR ANY GOVERNMENT TO HAVE CITIZENS VULNERABLE TO EXPLOSIVE ATTACK FROM THEIR OWN STOCKPILES... No caveats of regular checking, or safeguarding measures, or firewalls, or in-house checks by CBH or any other measure enacted, suffices or satisfies the residents such as myself that have a residential house within the VAPORISATION zone!!! There is only one solution and that is to have the CITY OF ROCKINGHAM refuse the plans by CBH to store Ammonium Nitrate in any form, crystal or liquid in Rockingham. May I ask for a written reply to acknowledge my formal refusal for the plans for CBH to build an Ammonium Nitrate storage facility in the CITY OF ROCKINGHAM. I wish to keep on record your reply.

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SERVICING AUTHORITIES SCHEDULE OF SUBMISSIONS		
Name	Address	Comment
1. Ms Kathryn Chick **Dampier Bunbury Pipeline**	PO Box Z5267 PERTH ST GEORGES TERRACE WA 6000	We have no objections to the proposal. Thank you for your referral letter of 26 October 2020 seeking comment on the above proposal. DBP as owners and operators of the Dampier to Bunbury Natural Gas Pipeline (DBNGP) have no objection to the proposed facility as indicated on the plans supplied. Should you have any further inquiries, please do not hesitate to contact me on the number above.
2. Mr Dean Davidson **Fremantle Ports**	1 Cliff Street FREMANTLE WA 6160	Thank you for referring this to us, we have reviewed the proposal and have no comment.
3. Mr Johanthan Roach **Development WA**	40 The Esplanade PERTH WA 6000	Thank you for the email. DevelopmentWA does not have any comments on the proposal. DevelopmentWA is the landowner and the site is leased to the proponent. Prior to the proponent securing access to the site, DevelopmentWA and JTSI must be satisfied with the proposal. DevelopmentWA also needs to sign the DA form as the landowner. Through this process, DevelopmentWA reviews the plans prior to lodgement with the City.
4. Emeritus Professor Kateryna Longley **Cockburn Sound Management Council**	Locked Bag 10 JOONDALUP WA 6027	Thank you for your correspondence dated 26 October 2020 seeking comment from the Cockburn Sound Management Council (CSMC) on Co-operative Bulk Handling Limited's (CBH) proposal to develop a Fertiliser Storage, Blending and Discharge Facility on the abovementioned land. It is noted that CBH is seeking Development Approval for the proposed Fertiliser Storage, Blending and Discharge Facility and that the City of Rockingham and Western Australian Planning Commission will formally consider the development application. Under its Terms of Reference, CSMC is an advisory council to the Minister for Environment and as such, does not have a role in providing advice to decision-making authorities on development proposals in Cockburn Sound. CSMC provides advice and recommendations to the Minister on the environmental management of Cockburn Sound to ensure the protection and maintenance of water quality and associated environmental values for the Cockburn Sound marine area. CSMC appreciates being kept informed of proposed developments that may impact on Cockburn Sound's environmental values. If you have any queries, please contact Tina Runnion, Coordinator Cockburn Sound Management Council on 6364 6668 or by email at tina.runnion@dwer.wa.gov.au.
5. Mr Nick McLachlan **Water Corporation**	PO Box 100 LEEDERVILLE WA 6902	The Water Corporation has no objection to the proposed development. It is noted that the corporation has an existing potable water pipe asset within Rockingham Beach Road and reserve Lot 8003. Given the works proximity to the corporation's asset, in line with the corporations Working Near Assets Technical Guidelines, a damage risk assessment and working near assets approval shall be obtained prior to construction. Please provide the above comments to the landowner, developer and/or their representative.

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Name	Address	Comment
6. Mr Eric Gruber **Department of Mines, Industry Regulation and Safety Resources Safety**	Mineral House 100 Plain Street EAST PERTH WA 6004	A request for comment was received from the City of Rockingham in relation to the above planning application and the proposal to establish a Fertiliser Facility, at the above address. Based on the provided information, the products which are UN3082 are stored in Intermediate Bulk Containers (IBC) and are not classified at Dangerous Goods under SP01. The remainder of the bulk products are not classified as Dangerous Goods. As a result this site would not be considered as requiring a Dangerous Goods Storage Licence. DMIRS constitutes a number of directorates that may still have interest in this site. However as a result of our assessment that the site will not require a Dangerous Goods Storage Licence, it is therefore not tested for distance/buffers under Dangerous Goods legislation or relevant Australian Standards. In relation to assessing the fire risk of the site, I would recommend the use of a fire risk consultant or seek the assistance of the Department of Fire and Emergency Services.
7. Mr Jared Veenendaal Senior Planning Officer **City of Kwinana**	PO Box 21 KWINANA WA 6966	Reference is made to you letter dated 26 October 2020 regarding the abovementioned JDAP application for a Fertiliser Storage, Blending and Discharge Facility. Thank you for the opportunity to provide comment in relation to this application. Following a review of the development plans, the following comments are made: · The proposed development (landside component) is located within the 'Special Industrial' zone under the MRS. · The development site (landside component) is located within Improvement Plan area No.14: *Kwinana – East Rockingham Industrial Area Improvement Plan.* · The subject site is located adjacent to Kwinana Beach Road, which is under the control of Main Roads WA (MRWA)/ It is presumed the application has been referred to MRWA for comment. · The City's Health Team has requested that written notification be provided via email to admin@kwinana.wa.gov.au in the event of any marine spillages resulting from the operations of the proposed development.
8. Mr Brett Dunn **Department of Water**	PO Box 332 MANDURAH WA 6210	Thank you for the above referral, received with correspondence dated 26 October 2020, for the Department of Water and Environmental Regulation (DWER) to consider regarding a proposed fertiliser storage, blending and discharge facility. It should be noted that this development application has been submitted to the Environmental Protection Authority (EPA). Determination is yet to be made upon whether this proposal will be assessed under Part IV of the *Environmental Protection Act 1986* (EP Act). As such, no decision on this planning proposal should be made until the EPA's process is complete. Upon resolution of the EPA's process for determination, the Department wishes to provide the following advice. **Issue** Industry Regulation **Advice** The Department regulates emissions and discharges from the construction and operation of prescribed premises through a works approval and licensing process, under Part V of the EP Act.

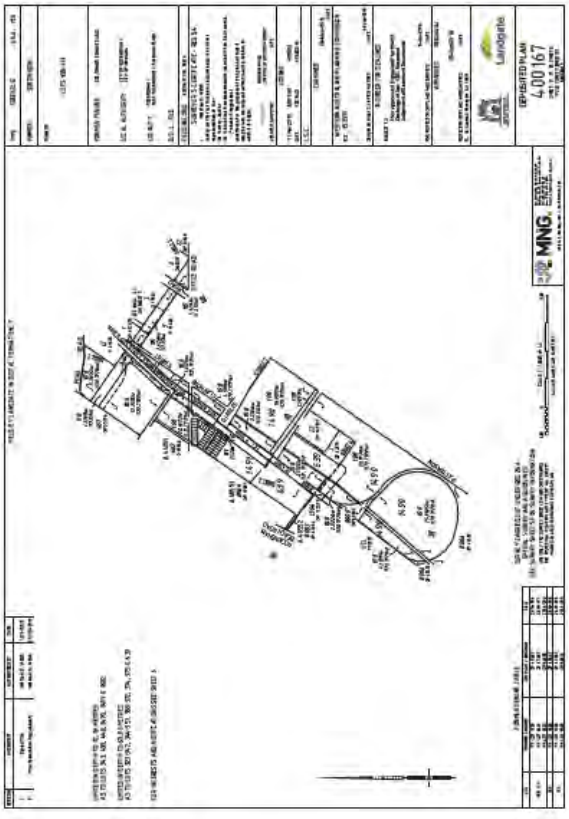
Schedule of Submissions
Proposed Fertiliser Storage, Blending and Discharge Facility -
Lots 108, 1304, 8003, 4552 and 1585 Rockingham Beach Road, East Rockingham

SERVICING AUTHORITIES SCHEDULE OF SUBMISSIONS		
Name	Address	Comment
8 - cont…		The categories of Prescribed premises are outlined in Schedule 1 of the *Environmental Protection Regulations 1987*. The EP Act requires a works approval to be obtained before constructing a prescribed premises and makes it an offence to cause an emission or discharge unless a licence or registration is held for the premises. The provided development application request was reviewed in relation to works approval and licence requirements under Part V Division 3 of the EP Act. Based on the information provided, DWER can advise that the information is consistent with a works approval application submitted to DWER in respect to the following category as per Schedule 1 of the *Environmental Protection Regulations 1987*: 75 Chemical blending or mixing not causing a discharge: premises on which chemicals or chemical products are mixed, blended or packaged in a manner that causes or is likely to cause a discharge of waste into the environment. — more than 5000 tonnes per year The *Environmental Protection Act 1986* requires a works approval to be obtained before constructing prescribed premises and make it an offence to cause an emission or discharge, unless a licence or registration (for operation) is held for the premises. The works approval application was received on 23 September 2020 and is currently under assessment. The application will also need to demonstrate compliance with the general provisions of the EP Act and all relevant regulations including the *Environmental Protection (Noise) Regulations 199, Environmental Protection (Packaged Fertiliser) Regulations 2010 and Environmental Protection (Unauthorised Discharges) Regulations 2004.* **Issue** Native Vegetation Regulation **Advice** Under section 51C of the EP Act, clearing of native vegetation is an offence unless undertaken under the authority of a clearing permit, or the clearing is subject to an exemption. Exemptions for clearing that are a requirement of written law, or authorised under certain statutory processes, are contained in Schedule 6 of the EP Act. Exemptions for low impact routine land management practices outside of environmentally sensitive areas (ESAs) are contained in the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (the Clearing Regulations). Based on the information provided the proposal may be exempt from the requirement for a clearing permit under Schedule 6, Clause 2 of the EP Act, as described in the Departments 'A Guide to the Exemptions and Regulations for Clearing Native Vegetation'. This exemption is dependent upon whether it is determined that the development constitutes a derived proposal from the Rockingham Industrial Zone (Ministerial Statement 863), which was previously referred and assessed under section 38 of Part IV of the EP Act. If this exemption is applicable, any clearing must be in accordance with the implementation agreement or decision.

Schedule of Submissions
Proposed Fertiliser Storage, Blending and Discharge Facility -
Lots 108, 1304, 8003, 4552 and 1585 Rockingham Beach Road, East Rockingham

SERVICING AUTHORITIES SCHEDULE OF SUBMISSIONS		
Name	Address	Comment
8 - cont…		Should the aforementioned exemption not apply to the proposed clearing, a clearing permit will be required. Additional information on how to apply for a clearing permit is available here: https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Fact_sheets/Fact_Sheet_-_how_to_apply.pdf It is the applicant's responsibility to determine compliance with exemptions and therefore whether a clearing permit is required. If further clarification is required please contact DWER's Native Vegetation Regulation section by email (admin.nvp@dwer.wa.gov.au) or by telephone (6364 7098). **Issue** Contaminated Sites **Recommendation** Please refer to correspondence dated 12 November 2020 from the Departments Contaminated Sites Branch attached to this letter. In the event there are modifications to the proposal that may have implications on aspects of environment and/or water management, the Department should be notified to enable the implications to be assessed.
9. Mr Chek Cher **Department of Water and Environmental Regulation Contaminated Sites**	Locked Bag 10 JOONDALUP DC WA 6919	I refer to your letter dated 26 October 2020 to the Department of Water and Environmental Regulation (the department) regarding a Development Assessment Panel (DAP) application by the City of Rockingham for the proposed development of the above-mentioned lots. As per the requirements under section 58(6)(b) of the Contaminated Sites Act 2003 (CS Act), advice is required as to the suitability of the land for the proposed development. The department understands the proposed development is for a liquid ammonia nitrate fertiliser and solid fertiliser storage and blending facility on the western portion of Lot 108, and includes a liquid fertiliser pipeline passing under Lot 1304, Lot 8003, and a portion of Rockingham Beach Road, East Rockingham. Part Lot 108 on Deposited Plan 400167, as shown on certificate of title 2953/177, was classified as possibly contaminated – investigation required under the CS Act on 18 June 2012 and multiple contaminated site memorials (reference numbers L991334, L991335, N301986) were placed on the certificate of title. These memorials cover spatially defined portions of Lot 108, as shown in Deposited Plan 400167 (depicted in Attachment 1). The classification was based on a preliminary site investigation carried out in 2008 which found that potential asbestos-containing material had been removed from the site in 2006. However, information demonstrating that asbestos remediation works were successful has not yet been provided to the department. Lot 108 continues to be managed under the CS Act. The department has acknowledged that the extent of the proposed development area is shown in Figure 1 of the report titled "Development Application CBH Kwinana Fertiliser Expansion Project, Lot 108 Rockingham Beach Road, Lot 1304 Rockingham Beach Road and Lot 8003 on Deposited Plan 47607 East Rockingham, WA" (Planning Solutions, August 2020).

Schedule of Submissions
Proposed Fertiliser Storage, Blending and Discharge Facility -
Lots 108, 1304, 8003, 4552 and 1585 Rockingham Beach Road, East Rockingham

SERVICING AUTHORITIES SCHEDULE OF SUBMISSIONS		
Name	Address	Comment
9 - cont…		Based on this, the department notes that the proposed development area does not extend to portions of Lot 108 where contaminated sites memorials are placed. In addition, there is no information on the department's records to suggest that surrounding classified sites under the CS Act have potentially affected soil or groundwater beneath the proposed development area. Taking the above into consideration, and given that the proposed development does not require a change to a more sensitive land use (e.g. public open space, residential, primary school), the department has no objection to the proposed development of Lots 108, 1304, 8003 Rockingham Beach Road, East Rockingham and a portion of Rockingham Beach Road reserve for commercial/industrial land use and recommends that the approval should not include a contamination condition. However, given the risks associated with the potential disturbance of remnant buried asbestos-containing material, the department recommends that the approval include the following advice note: **Advice** Given the potential disturbance of remnant buried asbestos-containing material during earthworks, the Department of Water and Environmental Regulation recommends that an asbestos management plan be developed and implemented to address the potential risks to site workers. The asbestos management plan should be prepared in accordance with the 'Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2008 (2005)]' (National Occupational Health and Safety Commission, April 2005). 

Schedule of Submissions
Proposed Fertiliser Storage, Blending and Discharge Facility -
Lots 108, 1304, 8003, 4552 and 1585 Rockingham Beach Road, East Rockingham

SERVICING AUTHORITIES SCHEDULE OF SUBMISSIONS		
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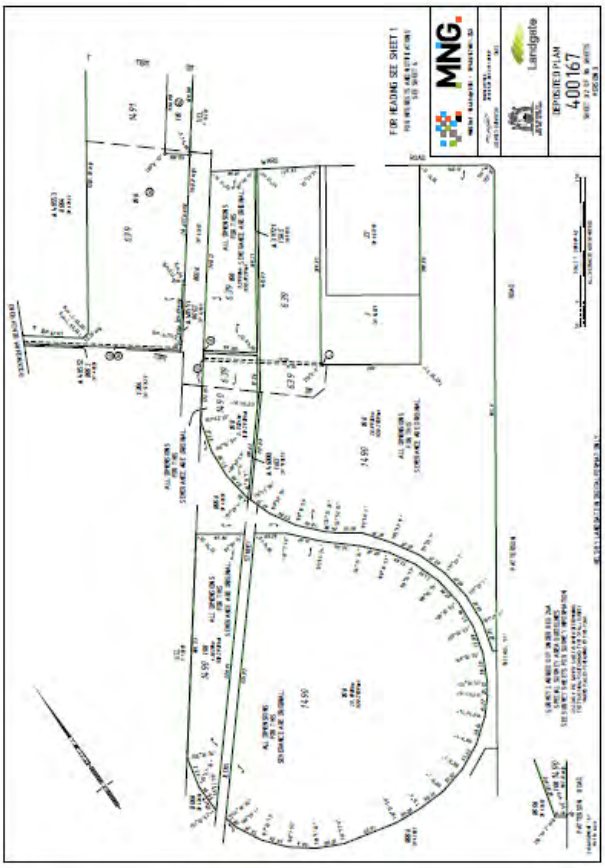
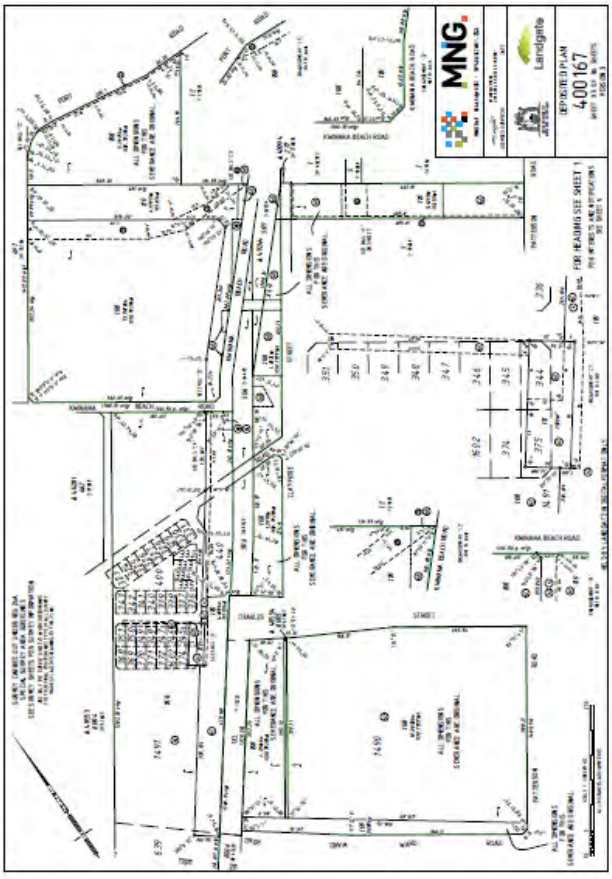
9 - cont…		 

Schedule of Submissions
Proposed Fertiliser Storage, Blending and Discharge Facility -
Lots 108, 1304, 8003, 4552 and 1585 Rockingham Beach Road, East Rockingham

SERVICING AUTHORITIES SCHEDULE OF SUBMISSIONS		
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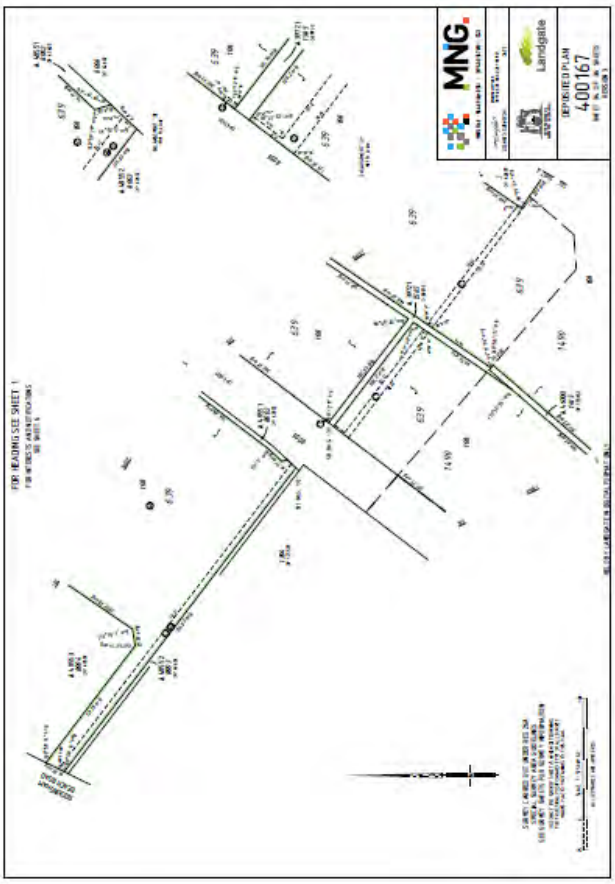
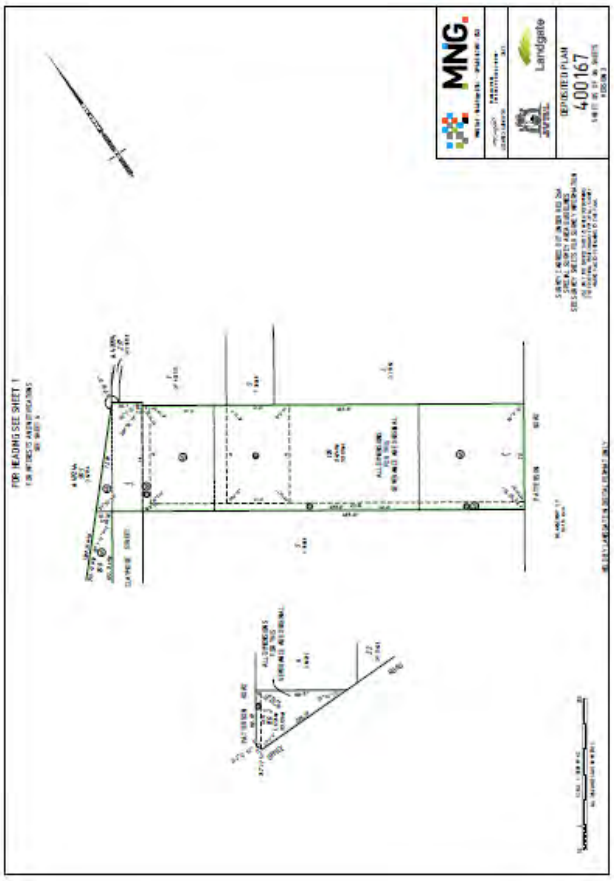
9 - cont…		 

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SERVICING AUTHORITIES SCHEDULE OF SUBMISSIONS		
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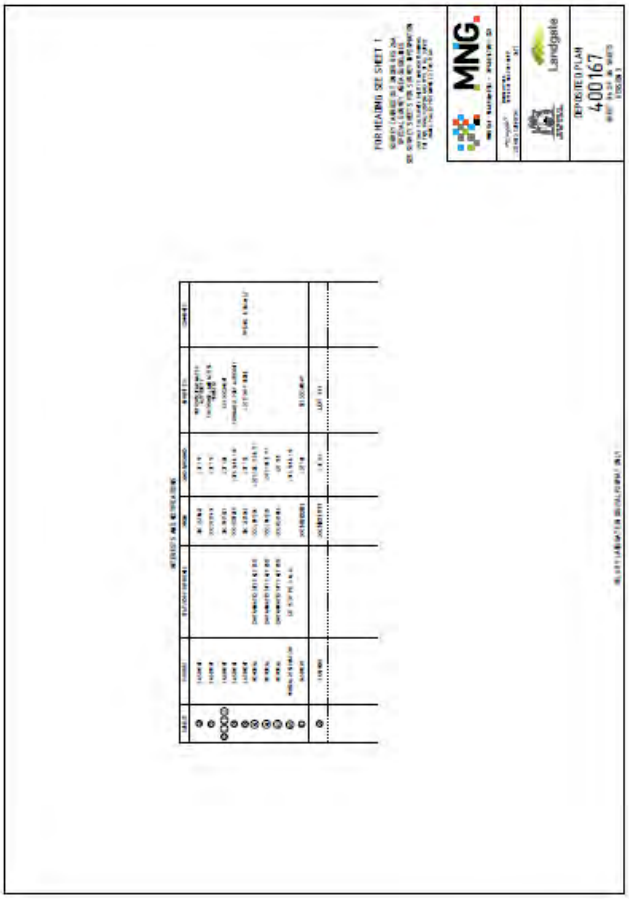
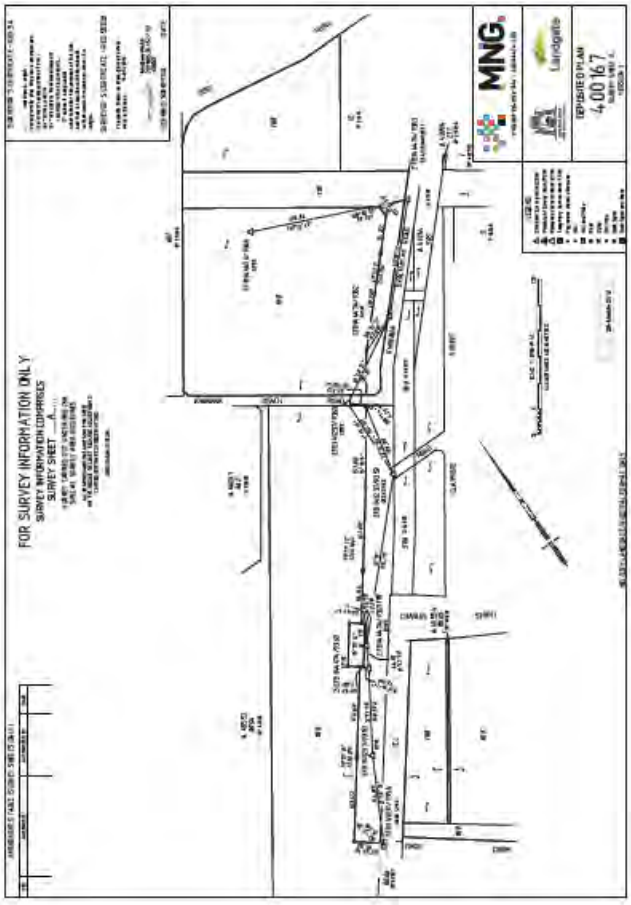
9 - cont…		 

Schedule of Submissions
Proposed Fertiliser Storage, Blending and Discharge Facility -
Lots 108, 1304, 8003, 4552 and 1585 Rockingham Beach Road, East Rockingham

<table>
<tr><th colspan="3">SERVICING AUTHORITIES SCHEDULE OF SUBMISSIONS</th></tr>
<tr><th>Name</th><th>Address</th><th>Comment</th></tr>
<tr><td>10. Mr Lyndon Mutter
Department of Biodiversity, Conservation and Attractions</td><td>Locked Bag 104
BENTLEY DELIVERY CENTRE WA 6983</td><td>In reference to your correspondence dated 26 October 2020, the Parks and Wildlife Service at the Department of Biodiversity, Conservation and Attractions (DBCA) provides the following comments.
Clearing of Native Vegetation
Any proposed clearing of native vegetation associated with the development should be undertaken in accordance with the Environmental Protection Act 1986 (EP Act) and Environmental Protection (Clearing of Native Vegetation) Regulations 2004, and discussed with the Department of Water and Environmental Regulation.</td></tr>
<tr><td>11. Mr Joel Gajic
Department of Fire & Emergency Services</td><td>PO Box P1174
PERTH WA 6844</td><td>I refer to your email dated 26 October 2020 regarding the submission of a Bushfire Management Plan (BMP) (Version 3), prepared by Linfire Consultancy and dated 31 July 2020, for the above development application. The BMP is accompanied by a Bushfire Risk Management Plan ‘Bushfire Risk Management Plan (Flammable Hazards)’ for the above development application.
This advice relates only to State Planning Policy 3.7 Planning in Bushfire Prone Areas (SPP 3.7) and the Guidelines for Planning in Bushfire Prone Areas (Guidelines). It is the responsibility of the proponent to ensure the proposal complies with all other relevant planning policies and building regulations where necessary. This advice does not exempt the applicant/proponent from obtaining necessary approvals that may apply to the proposal including planning, building, health or any other approvals required by a relevant authority under other written laws.
1. Policy Measure 6.5 a) (ii) Preparation of a BAL contour map
<table>
<tr><th>Issue</th><th>Assessment</th><th>Action</th></tr>
<tr><td>BMP Methodology – CBH Grain Jetty and Pipeline</td><td>The BMP has not been prepared in accordance with Appendix 3 of the Guidelines. Notwithstanding that the CBH Grain Jetty is predominantly not in a bushfire prone area the BMP must assess the subject land in its entirety that includes the CBH Grain Jetty and the pipeline.

DFES notes that Section 4.4.2 (page 15) of the Development Application Report ‘CBH Grain Jetty’ has selectively justified exemption from SPP 3.7. Section 5 of Planning Bulletin 111/2016 does not apply to proposals that result in an intensification of development (or land use), results in an increase in the number of residents or employees, or results in an increase in bushfire threat.</td><td>Modification to the BMP is required.</td></tr>
</table></td></tr>
</table>

Schedule of Submissions
Proposed Fertiliser Storage, Blending and Discharge Facility -
Lots 108, 1304, 8003, 4552 and 1585 Rockingham Beach Road, East Rockingham

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<tr><th colspan="3">SERVICING AUTHORITIES SCHEDULE OF SUBMISSIONS</th></tr>
<tr><th>Name</th><th>Address</th><th>Comment</th></tr>
<tr><td>11 - cont…</td><td></td><td>
<table>
<tr><th>Issue</th><th>Assessment</th><th>Action</th></tr>
<tr><td>Management Agreement – Off-site Asset Protection Zone</td><td>Compliance with the Bushfire Protection Criteria relies upon the ability to enter into a 'Maintenance Agreement' to maintain vegetation outside the subject site in accordance with Schedule 1: Standards for Asset Protection Zones contained in the Guidelines.

DFES acknowledges that the BMP recommends that the Development Approval incorporates a condition requiring a Maintenance Agreement between the proponent and the owner of Lot 108. The condition requires an Agreement to be prepared and implemented in relation to maintenance of the off-site vegetation management zone within an undeveloped portion of Lot 108 in perpetuity, or until such a time that the bushfire hazard is permanently removed and the lot is developed to a non-vegetated/ low threat state. DFES notes that Clause 4.6.2 of the Guidelines states: As the BMP is a document that should apply for the life of the development, the decision-maker should require modifications to the document in the event that there are discrepancies, prior to endorsement and/or approval of the planning application being granted. Conditional approval should not be granted prior to the BMP being prepared and endorsed.

Technical evidence and verification should be included in the BMP to qualify the vegetation exclusion can be achieved and that it is enforceable in perpetuity. An endorsed copy of the proposed Maintenance Agreement or written undertaking by the Lot 108 landowner would address this requirement.</td><td>Modification to the BMP is required.</td></tr>
</table>
2. Policy Measure 6.5 c) Compliance with the Bushfire Protection Criteria
<table>
<tr><th>Element</th><th>Assessment</th><th>Action</th></tr>
<tr><td>Location, and Siting & Design</td><td>A1.1 & 2.1 - insufficient information

The BAL ratings cannot be validated, as technical evidence and verification has not been included in the BMP to qualify the vegetation exclusion within Lot 108 can be achieved and that it is enforceable in perpetuity, as per the above table.</td><td>Modification to the BMP is required.</td></tr>
</table>
Recommendation - not supported modifications required
It is critical that the bushfire management measures within the BMP are refined, to ensure they are accurate and can be implemented to reduce the vulnerability of the development to bushfire. The proposed development is not supported for the following reasons:
1. The development design has not demonstrated compliance to –
Element 1: Location, and
Element 2: Siting and Design
2. The BMP has not assessed the CBH Grain Jetty and Pipeline.
</td></tr>
<tr><td>12. Mr San Lissiman
Department of Planning Lands and Heritage</td><td>140 William Street
PERTH WA
6000</td><td>In summary, the Department has no objection to the proposal with comments obtained from our Infrastructure, Planning and Policy division (IPP) included below. Westport has also provided a no objection via the IPP team and internally, the Department's Land Management Metropolitan & Peel division provided a response of 'no comment'.</td></tr>
</table>

Schedule of Submissions
Proposed Fertiliser Storage, Blending and Discharge Facility -
Lots 108, 1304, 8003, 4552 and 1585 Rockingham Beach Road, East Rockingham

SERVICING AUTHORITIES SCHEDULE OF SUBMISSIONS		
Name	Address	Comment
12 - cont…		**Map of Proposal**  **IPP Analysis** · Westport Beacon 4 - Kwinana Rail Loop alternative concept (April 2019 - attached) shows the Kwinana Rail loop proposal. · Westport and the Department of Transport are currently undertaking work to define the land requirements for a new rail corridor and options for MRS Amendment for the Kwinana Rail Loop. · Information to proceed with the MRS amendment has yet to be received. · IPP have confirmed with Westport that this proposal does not appear to be within the possible alignment - as outlined in Westport Beacon 4. Therefore, IPP have no objections to the proposal.
13. Mr Malcolm Somers **Main Roads Western Australia**	PO Box 6202 EAST PERTH WA 6892	In response to your correspondence recievd on 26 October 2020, Main Roads has no objections subject to the following conditions being imposed: <u>Conditions</u> 1. Prior to construction of the below ground liquid fertiliser pipeline, a Deed of Agreement regarding the pipeline crossing the Rockingham Beach Road reserve shall be entered into and executed between CBH Group and Main Roads. The Deed shall be prepared by and be at the cost of the applicant. 2. No earth works shall encroach to the Rockingham Beach road reserve. 3. Stormwater discharge (if any) shall not exceed pre-development discharge to the Rockingham Beach Road reserve. 4. No waste collection is permitted from the Rockingham Beach Road reserve. <u>Advice</u> 1. Main Roads is the responsible authority for the Rockingham Beach Road reserve adjacent to the CBH Kwinana Grain Terminal. Main Roads has provided the applicant with authority to lodge a development application for a below ground liquid fertiliser pipeline crossing the Rockingham Beach Road reserve. This subject to a deed between CBH Group and Main Road in relation to the pipeline being executed prior to construction of the pipeline and this requirement for a deed being a contion of development application approval.

Schedule of Submissions
Proposed Fertiliser Storage, Blending and Discharge Facility -
Lots 108, 1304, 8003, 4552 and 1585 Rockingham Beach Road, East Rockingham

SERVICING AUTHORITIES SCHEDULE OF SUBMISSIONS		
Name	Address	Comment
13 - cont...		2. In relation to Condition 1, the aplicant is required to submit an Application form to undertake works within the road reserve prior to undertaking any works within the roads reserve. Application forms and supporting information about the procedure can be found on the MainRoads website > Technical & Commercial > Working on Roads. Should the City disagree with or resolve not to include as part of its conditional approval any of the above conditions or advice, Main Roads requests an opportunity to meet and discuss the application further, prior to a final determination being made. Main Roads advises that it offers a free of charge pre-lodgement consultation service. Main Roads encourages both the Local Government in liaising with applicants to promote and capitalise on this free advisory service offered by the road authority prior to lodgement of strategic or statutory planning proposals, especially where development plans involve land adjacent to or have the potential to impact on the State road network. Further information on the pre-lodgement consultation process can be found on Main Roads website at mainroads.wa.gov.au > Technical & Commercial> Planning & Development. Main Roads requests a copy of the City's final determination on this proposal to be sent to planninginfo@mainroads.wa.gov.au quoting the file reference above.

Government of Western Australia
Department of Water and Environmental Regulation

Your ref: 20.2020.290.1 – AD20/101159
Our ref: RF1746-03 & PA038002
Enquiries: Brett Dunn, Ph 9550 4202

City of Rockingham
PO Box 2142
Rockingham DC WA 6967

Attention: David Banovic

Dear David

PROPOSED FERTILISER STORAGE, BLENDING & DISCHARGE FACILITY - LOT 108 AND 1304 ROCKINGHAM BEACH ROAD AND LOT 8003 ON DEPOSITED PLAN 47607, LOT 4552 ON DEPOSITED PLAN 220690 AND LOT 1585 ON DEPOSITED PLAN 191087, EAST ROCKINGHAM

Thank you for the above referral, received with correspondence dated 26 October 2020, for the Department of Water and Environmental Regulation (DWER) to consider regarding a proposed fertiliser storage, blending and discharge facility.

It should be noted that this development application has been submitted to the Environmental Protection Authority (EPA). Determination is yet to be made upon whether this proposal will be assessed under Part IV of the *Environmental Protection Act 1986* (EP Act). As such, no decision on this planning proposal should be made until the EPA's process is complete.

Upon resolution of the EPA's process for determination, the Department wishes to provide the following advice.

Issue
Industry Regulation

Advice
The Department regulates emissions and discharges from the construction and operation of prescribed premises through a works approval and licensing process, under Part V of the EP Act.

The categories of Prescribed premises are outlined in Schedule 1 of the *Environmental Protection Regulations 1987*.

The EP Act requires a works approval to be obtained before constructing a prescribed premises and makes it an offence to cause an emission or discharge unless a licence or registration is held for the premises.

Kwinana Peel Region
107 Breakwater Parade Mandurah Ocean Marina Mandurah Western Australia 6210
PO Box 332 Mandurah Western Australia 6210
Telephone: 08 9550 4222 Facsimile: 08 9581 4560
www.dwer.wa.gov.au

The provided development application request was reviewed in relation to works approval and licence requirements under Part V Division 3 of the EP Act.

Based on the information provided, DWER can advise that the information is consistent with a works approval application submitted to DWER in respect to the following category as per Schedule 1 of the *Environmental Protection Regulations 1987*:

75	Chemical blending or mixing not causing a discharge: premises on which chemicals or chemical products are mixed, blended or packaged in a manner that causes or is likely to cause a discharge of waste into the environment	more than 50 tonnes per year

The *Environmental Protection Act 1986* requires a works approval to be obtained before constructing prescribed premises and make it an offence to cause an emission or discharge, unless a licence or registration (for operation) is held for the premises. The works approval application was received on 23 September 2020 and is currently under assessment.

The application will also need to demonstrate compliance with the general provisions of the EP Act and all relevant regulations including the *Environmental Protection (Noise) Regulations 199, Environmental Protection (Packaged Fertiliser) Regulations 2010 and Environmental Protection (Unauthorised Discharges) Regulations 2004.*

Issue
Native Vegetation Regulation

Advice
Under section 51C of the EP Act, clearing of native vegetation is an offence unless undertaken under the authority of a clearing permit, or the clearing is subject to an exemption. Exemptions for clearing that are a requirement of written law, or authorised under certain statutory processes, are contained in Schedule 6 of the EP Act. Exemptions for low impact routine land management practices outside of environmentally sensitive areas (ESAs) are contained in the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (the Clearing Regulations).

Based on the information provided the proposal may be exempt from the requirement for a clearing permit under Schedule 6, Clause 2 of the EP Act, as described in the Departments 'A Guide to the Exemptions and Regulations for Clearing Native Vegetation'. This exemption is dependent upon whether it is determined that the development constitutes a derived proposal from the Rockingham Industrial Zone (Ministerial Statement 863), which was previously referred and assessed under section 38 of Part IV of the EP Act. If this exemption is applicable, any clearing must be in accordance with the implementation agreement or decision.

Should the aforementioned exemption not apply to the proposed clearing, a clearing permit will be required. Additional information on how to apply for a clearing permit is available here:
https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Fact_sheets/Fact_Sheet_-_how_to_apply.pdf

It is the applicant's responsibility to determine compliance with exemptions and therefore whether a clearing permit is required.

If further clarification is required please contact DWER's Native Vegetation Regulation section by email (admin.nvp@dwer.wa.gov.au) or by telephone (6364 7098).

Issue
Contaminated Sites

Recommendation
Please refer to correspondence dated 12 November 2020 from the Departments Contaminated Sites Branch attached to this letter.

In the event there are modifications to the proposal that may have implications on aspects of environment and/or water management, the Department should be notified to enable the implications to be assessed.

Should you require any further information on the comments please contact the undersigned on 9550 4202.

Yours sincerely

Brett Dunn
Program Manager – Planning Advice
Kwinana Peel Region

25 / 11 / 2020

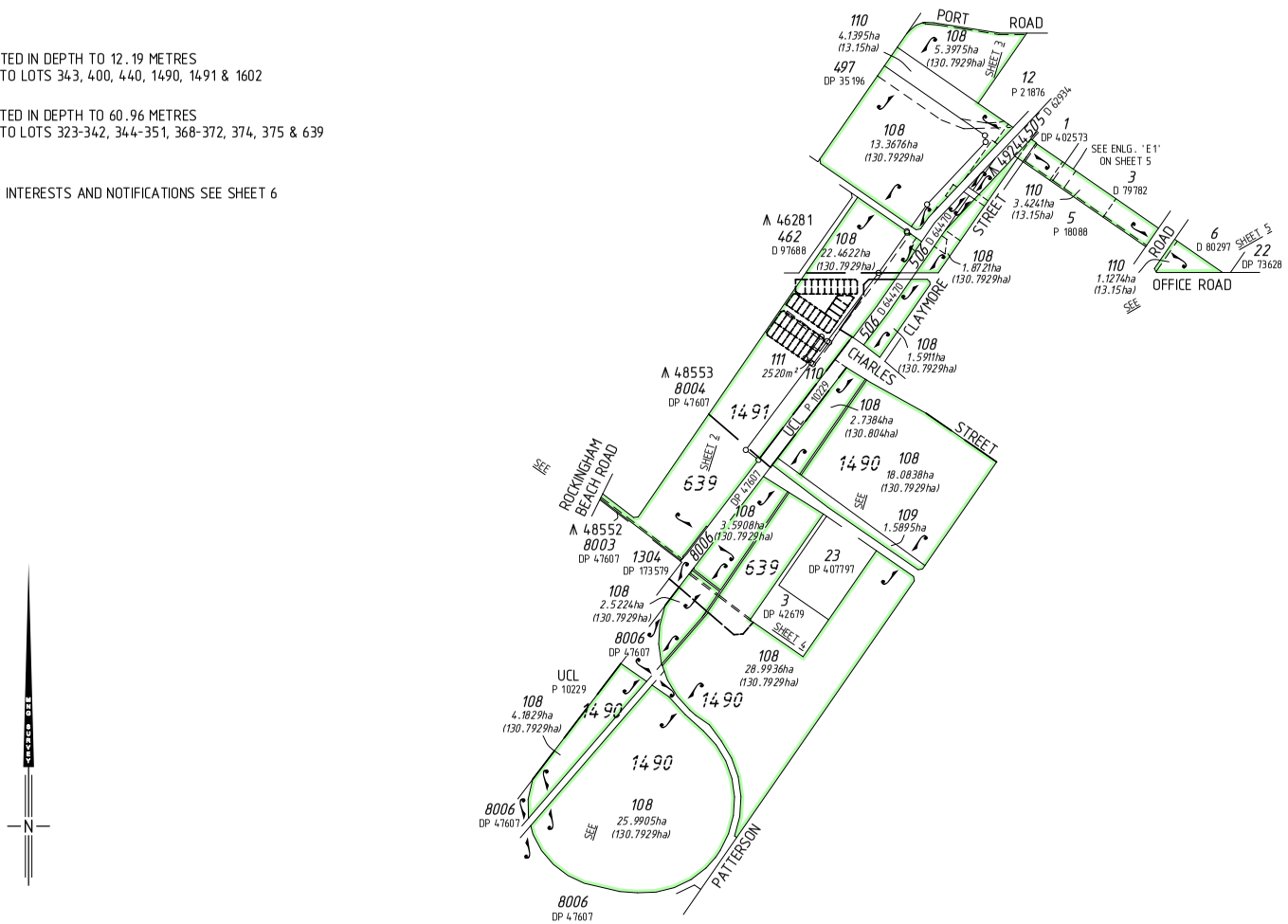
VERSION	AMENDMENT	AUTHORISED BY	DATE
2	Signed Plan	Matthew B. WEBB	12/4/2018
3	Plan Examination Requirements	Matthew B. WEBB	25/05/2018

HELD BY LANDGATE IN DIGITAL FORMAT ONLY

LIMITED IN DEPTH TO 12.19 METRES
AS TO LOTS 343, 400, 440, 1490, 1491 & 1602

LIMITED IN DEPTH TO 60.96 METRES
AS TO LOTS 323-342, 344-351, 368-372, 374, 375 & 639

FOR INTERESTS AND NOTIFICATIONS SEE SHEET 6



TYPE	FREEHOLD	S.S.A.	YES
PURPOSE	SUBDIVISION		
PLAN OF	LOTS 108-111		
FORMER TENURE	SEE FORMER TENURE TABLE		
LOCAL AUTHORITY	CITY OF ROCKINGHAM / CITY OF KWINANA		
LOCALITY	ROCKINGHAM / EAST ROCKINGHAM / KWINANA BEACH		
D.O.L. FILE			
FIELD RECORD	60358, 61543, 96818		

SURVEYOR'S CERTIFICATE - REG 54

I, Matthew B. WEBB
hereby certify that this plan is accurate and is a correct representation of the -
(a) *survey, and/or
(b) *calculations from measurements recorded in the field records,
[* delete if inapplicable]
undertaken for the purposes of this plan and that it complies with the relevant written law(s) in relation to which it is lodged.

Matthew Webb
2018.05.28 09:32:09 +08'00'

LICENSED SURVEYOR DATE

LODGED

11 Apr 2018	$561.00	404524
DATE	FEE PAID	ASSESS No.

I.S.C.

EXAMINED
29-May-2018
DATE

WESTERN AUSTRALIAN PLANNING COMMISSION
FILE 153179
06-Jun-2018
Delegated under S.16 P&D Act 2005 DATE

IN ORDER FOR DEALINGS
SUBJECT TO
Prior Approval of Deposited Plan 66463
Discharge of Sec 136C Easement
Lodgement of Easement Documents

6-Jun-2018
FOR INSPECTOR OF PLANS AND SURVEYS DATE

APPROVED REG26A (4)
28-Jun-2018
INSPECTOR OF PLANS AND SURVEYS (S. 18 Licensed Surveyors Act 1909) DATE

GOVERNMENT OF WESTERN AUSTRALIA
Landgate

FORMER TENURE TABLE

LOT	FORMER TENURE	ON PLAN / DIAGRAM	TITLE
108, 111	Pt LOT 1003	DP 47607	2616-976
	Pt LOT 8001	DP 47607	2616-977
	Pt LOT 9002	DP 68876	2766-290
109	Pt LOT 1003	DP 47607	2616-976
110	Pt LOT 1003	DP 47607	2616-976
	Pt LOT 9002	DP 68876	2766-290

SURVEY CARRIED OUT UNDER REG 26A
SPECIAL SURVEY AREA GUIDELINES
SEE SURVEY SHEETS FOR SURVEY INFORMATION

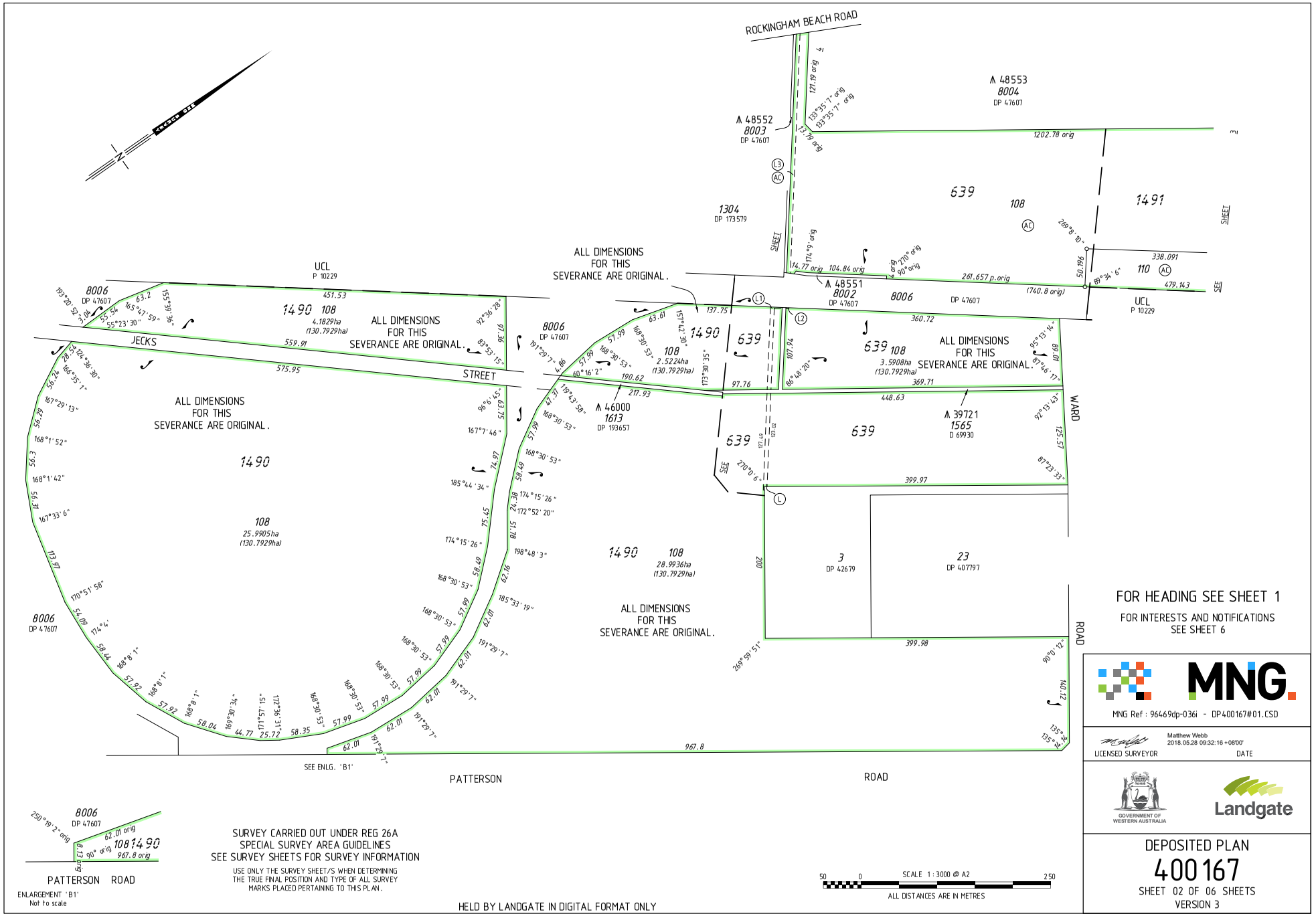
USE ONLY THE SURVEY SHEET/S WHEN DETERMINING THE TRUE FINAL POSITION AND TYPE OF ALL SURVEY MARKS PLACED PERTAINING TO THIS PLAN.

200 0 SCALE 1: 10000 @ A2 800
ALL DISTANCES ARE IN METRES

MNG
MC MULLEN NOLAN GROUP
PO Box 3526, Success W.A. 6964
Tel: (08) 6436 1599
Fax: (08) 6436 1500
Email: info@mngsurvey.com.au

MNG Ref : 96469dp-036i - DP400167#01.CSD

DEPOSITED PLAN
400167
SHEET 01 OF 06 SHEETS
(PLUS SURVEY SHEET(S))
VERSION 3



FOR HEADING SEE SHEET 1

FOR INTERESTS AND NOTIFICATIONS SEE SHEET 6

MNG Ref : 96469dp-036i - DP400167#01.CSD

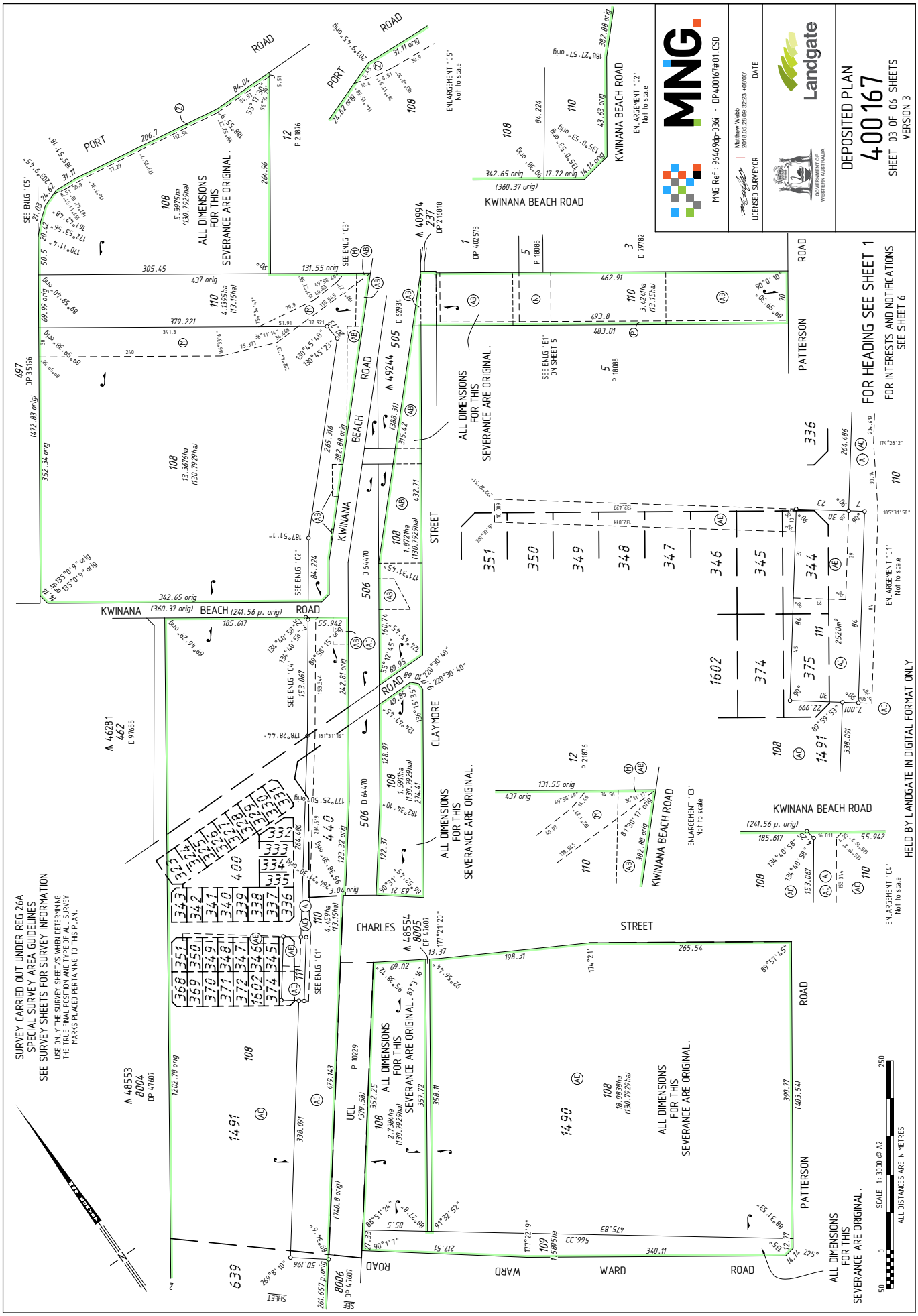
LICENSED SURVEYOR

Matthew Webb
2018.05.28 09:32:16 +08'00'
DATE

GOVERNMENT OF WESTERN AUSTRALIA

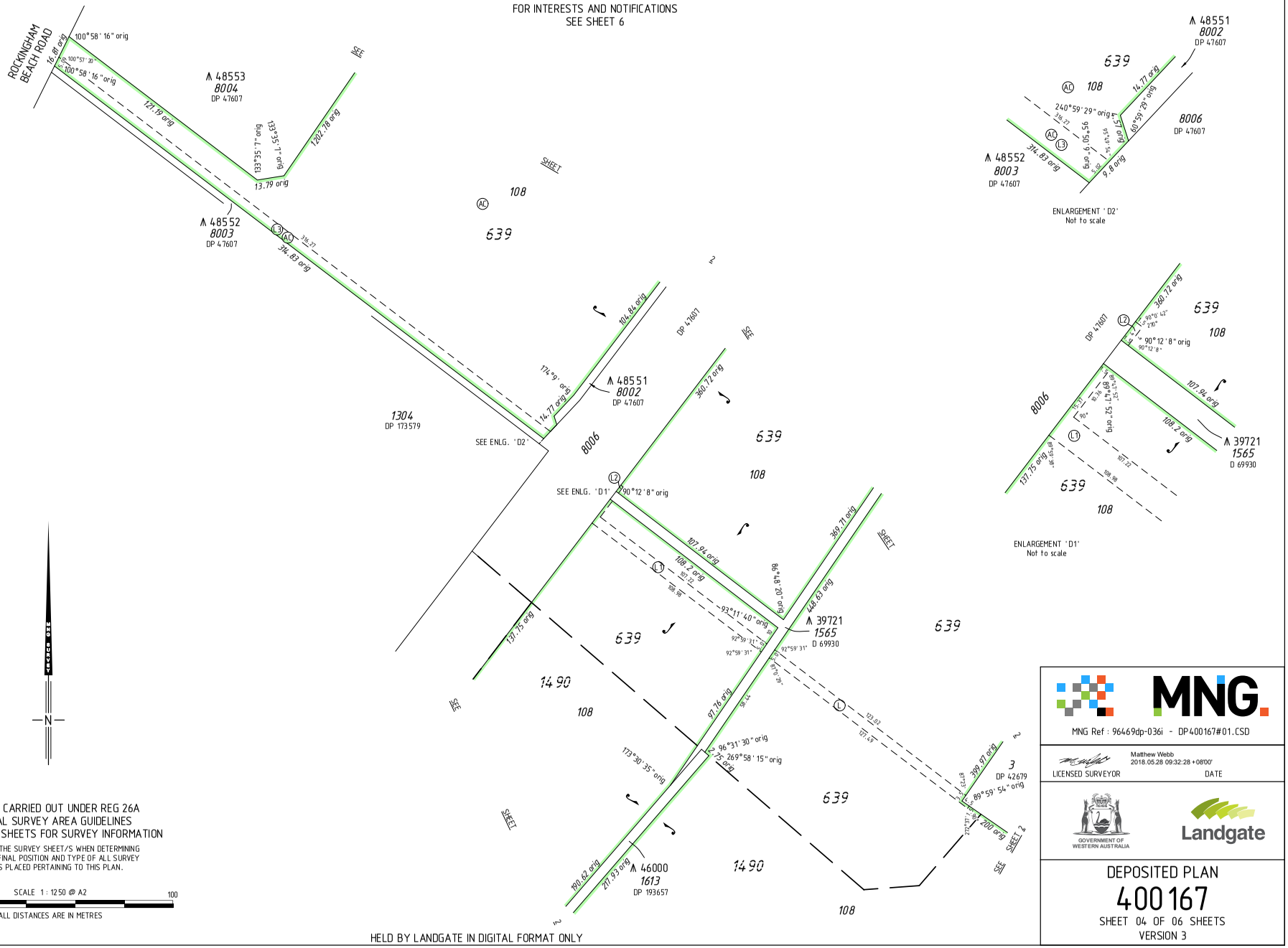
Landgate

DEPOSITED PLAN
400167
SHEET 02 OF 06 SHEETS
VERSION 3



FOR HEADING SEE SHEET 1

FOR INTERESTS AND NOTIFICATIONS
SEE SHEET 6



SURVEY CARRIED OUT UNDER REG 26A
SPECIAL SURVEY AREA GUIDELINES
SEE SURVEY SHEETS FOR SURVEY INFORMATION

USE ONLY THE SURVEY SHEET/S WHEN DETERMINING THE TRUE FINAL POSITION AND TYPE OF ALL SURVEY MARKS PLACED PERTAINING TO THIS PLAN.

25 0 SCALE 1 : 1250 @ A2 100

ALL DISTANCES ARE IN METRES

HELD BY LANDGATE IN DIGITAL FORMAT ONLY

MNG

MNG Ref : 96469dp-036i - DP400167#01.CSD

Matthew Webb
2018.05.28 09:32:28 +08'00'

LICENSED SURVEYOR DATE

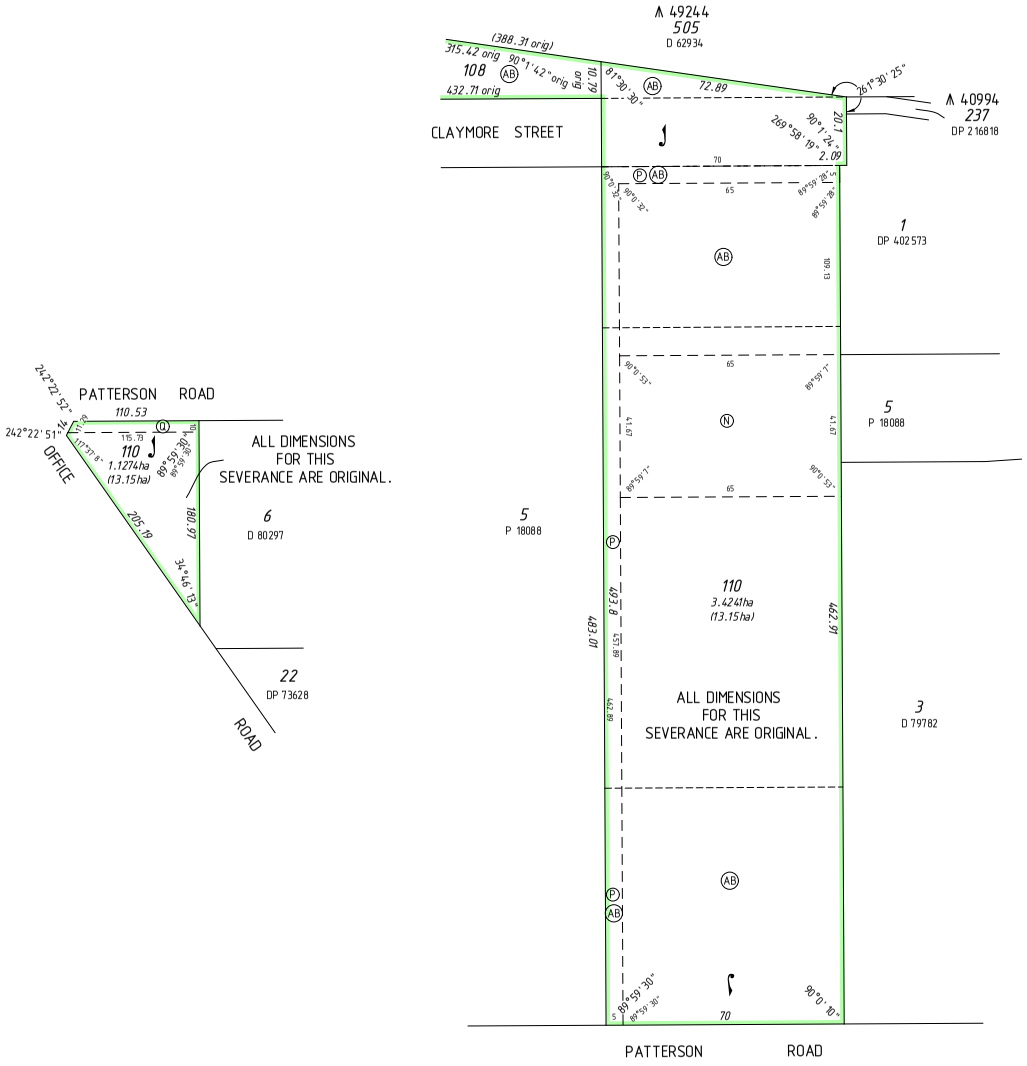
GOVERNMENT OF WESTERN AUSTRALIA

Landgate

DEPOSITED PLAN
400167
SHEET 04 OF 06 SHEETS
VERSION 3

FOR HEADING SEE SHEET 1

FOR INTERESTS AND NOTIFICATIONS
SEE SHEET 6



ENLARGEMENT 'E1'
Not to scale

50 0 SCALE 1:3000 @ A2 250
ALL DISTANCES ARE IN METRES

SURVEY CARRIED OUT UNDER REG 26A
SPECIAL SURVEY AREA GUIDELINES
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HELD BY LANDGATE IN DIGITAL FORMAT ONLY

MNG

MNG Ref : 96469dp-036i - DP400167#01.CSD

LICENSED SURVEYOR

Matthew Webb
2018.05.28 09:32:33 +08'00'
DATE

GOVERNMENT OF WESTERN AUSTRALIA

Landgate

DEPOSITED PLAN
400167
SHEET 05 OF 06 SHEETS
VERSION 3

INTERESTS AND NOTIFICATIONS

SUBJECT	PURPOSE	STATUTORY REFERENCE	ORIGIN	LAND BURDENED	BENEFIT TO	COMMENTS
Q	EASEMENT		DOC C578622	LOT 110	METROPOLITAN WATER AUTHORITY	
P	EASEMENT		DOC D273437	LOT 110	THE DBNGP LAND ACCESS MINISTER	
L L1 L2 L3	EASEMENT		DOC F971027	LOT 108	SEE DOCUMENT	
M	EASEMENT		DOC H509265	LOTS 108 & 110	FREMANTLE PORT AUTHORITY	
N	EASEMENT		DOC L670049	LOT 110	LOT 5 ON P 18088	PIPELINE & RAILWAY
AC	MEMORIAL	CONTAMINATED SITES ACT 2003	DOC L991334	LOTS 108, 110 & 111		
AE	MEMORIAL	CONTAMINATED SITES ACT 2003	DOC L991335	LOTS 108 & 111		
AD	MEMORIAL	CONTAMINATED SITES ACT 2003	DOC N301986	LOT 108		
AB	MINERAL RESERVATION	SEC 15 OF THE P.W.A.		LOTS 108 & 110		
Z	EASEMENT		DOC N915281	LOT 108	SEE DOCUMENT	
A	EASEMENT		DOC N931511	LOT 110	LOT 111	

FOR HEADING SEE SHEET 1

SURVEY CARRIED OUT UNDER REG 26A
SPECIAL SURVEY AREA GUIDELINES
SEE SURVEY SHEETS FOR SURVEY INFORMATION

USE ONLY THE SURVEY SHEET/S WHEN DETERMINING THE TRUE, FINAL POSITION AND TYPE OF ALL SURVEY MARKS PLACED PERTAINING TO THIS PLAN.

MNG

MNG Ref : 96469dp-036i - DP400167#01.CSD

Matthew Webb
2018.05.28 09:32:39 +08'00'

LICENSED SURVEYOR DATE

GOVERNMENT OF WESTERN AUSTRALIA

Landgate

DEPOSITED PLAN
400167
SHEET 06 OF 06 SHEETS
VERSION 3

AMENDMENTS TABLE (SURVEY SHEETS ONLY)

VER.	AMENDMENT	AUTHORISED BY	DATE

FOR SURVEY INFORMATION ONLY

SURVEY INFORMATION COMPRISES
SURVEY SHEET ..... A .....

SURVEY CARRIED OUT UNDER REG 26A
SPECIAL SURVEY AREA GUIDELINES

ALL BEARINGS AND DISTANCES ON THIS SHEET ARE THE RESULT OF LEAST SQUARES ADJUSTMENTS CARRIED OUT ON FIELD OBSERVATIONS

GRID DATUM IS PCG94

SURVEYOR'S CERTIFICATE - REG 54

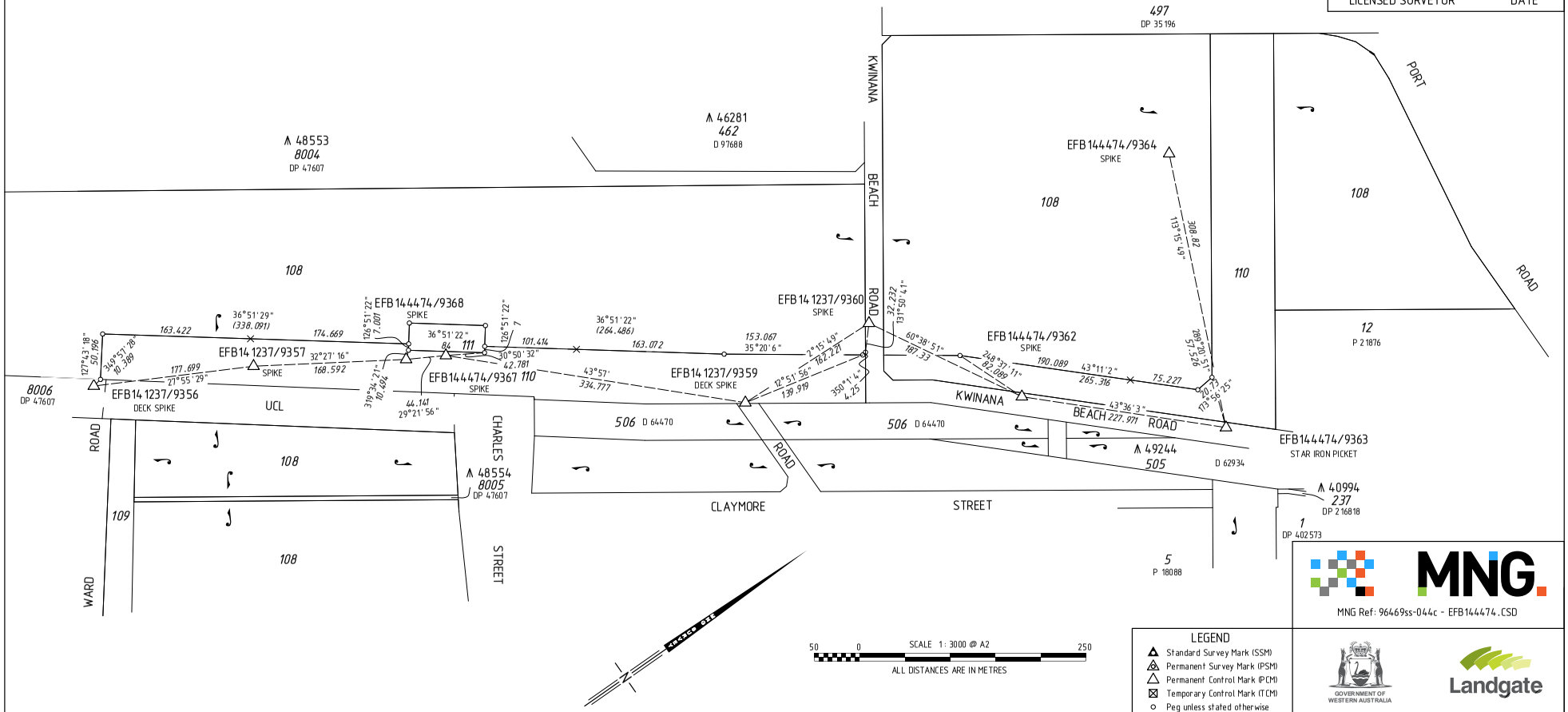
I, Matthew B. WEBB
hereby certify that this plan is accurate and is a correct representation of the -
(a) *survey, and/or
(b) *calculations from measurements recorded in the field records,
[* delete if inapplicable]
undertaken for the purposes of this plan and that it complies with the relevant written law(s) in relation to which it is lodged.

SURVEYOR'S CERTIFICATE - REG 55E(d)

The marks shown on these plans of survey were in place on 18/05/2018

Matthew Webb
2018.05.25 15:27:32 +08'00'

LICENSED SURVEYOR DATE



LEGEND

- Standard Survey Mark (SSM)
- Permanent Survey Mark (PSM)
- Permanent Control Mark (PCM)
- Temporary Control Mark (TCM)
- Peg unless stated otherwise
- Nail
- Nail and Plate
- Rivet
- Spike
- Drill Hole
- Deck Spike
- Deck Spike and Plate

SURVEY SHEET PROCESSED
DATE: 28-March-2019 C.F.S

HELD BY LANDGATE IN DIGITAL FORMAT ONLY

MNG Ref: 96469ss-044c - EFB144474.CSD

GOVERNMENT OF WESTERN AUSTRALIA

Landgate

DEPOSITED PLAN
400167
SURVEY SHEET A
VERSION 1

Government of Western Australia
Department of Water and Environmental Regulation

Your ref: 20.2020.290.1 - AD20/101159
Our ref: DMO11023 and DMO3761
Enquiries: Chek Cher, Ph (08) 6364 7207
Email: chek.cher@dwer.wa.gov.au

Mr David Banovic
Senior Planning Officer
City of Rockingham
PO Box 2142
ROCKINGHAM DC WA 6967

By email: David.Banovic@rockingham.wa.gov.au

Dear Mr Banovic

DEVELOPMENT ASSESSMENT PANEL APPLICATION – LOT 108 1304 ROCKINGHAM BEACH ROAD, LOT 8003 ON DEPOSITED PLAN 47607, LOT 4552 ON DEPOSITED PLAN 220690 AND LOT 1585 ON DEPOSITED PLAN 191087, EAST ROCKINGHAM

I refer to your letter dated 26 October 2020 to the Department of Water and Environmental Regulation (the department) regarding a Development Assessment Panel (DAP) application by the City of Rockingham for the proposed development of the above-mentioned lots.

As per the requirements under section 58(6)(b) of the *Contaminated Sites Act 2003* (CS Act), advice is required as to the suitability of the land for the proposed development. The department understands the proposed development is for a liquid ammonia nitrate fertiliser and solid fertiliser storage and blending facility on the western portion of Lot 108, and includes a liquid fertiliser pipeline passing under Lot 1304, Lot 8003, and a portion of Rockingham Beach Road, East Rockingham.

Part Lot 108 on Deposited Plan 400167, as shown on certificate of title 2953/177, was classified as *possibly contaminated – investigation required* under the CS Act on 18 June 2012 and multiple contaminated site memorials (reference numbers L991334, L991335, N301986) were placed on the certificate of title. These memorials cover spatially defined portions of Lot 108, as shown in Deposited Plan 400167 (depicted in Attachment 1).

The classification was based on a preliminary site investigation carried out in 2008 which found that potential asbestos-containing material had been removed from the site in 2006. However, information demonstrating that asbestos remediation works were successful has not yet been provided to the department. Lot 108 continues to be managed under the CS Act.

Prime House, 8 Davidson Terrace Joondalup Western Australia 6027
Locked Bag 10 Joondalup DC WA 6919
Telephone: 08 6364 7000 Facsimile: 08 6364 7001
www.dwer.wa.gov.au

The department has acknowledged that the extent of the proposed development area is shown in Figure 1 of the report titled *"Development Application CBH Kwinana Fertiliser Expansion Project, Lot 108 Rockingham Beach Road, Lot 1304 Rockingham Beach Road and Lot 8003 on Deposited Plan 47607 East Rockingham, WA"* (Planning Solutions, August 2020). Based on this, the department notes that the proposed development area does not extend to portions of Lot 108 where contaminated sites memorials are placed. In addition, there is no information on the department's records to suggest that surrounding classified sites under the CS Act have potentially affected soil or groundwater beneath the proposed development area.

Taking the above into consideration, and given that the proposed development does not require a change to a more sensitive land use (e.g. public open space, residential, primary school), the department has no objection to the proposed development of Lots 108, 1304, 8003 Rockingham Beach Road, East Rockingham and a portion of Rockingham Beach Road reserve for commercial/industrial land use and recommends that the approval should not include a contamination condition.

However, given the risks associated with the potential disturbance of remnant buried asbestos-containing material, the department recommends that the approval include the following advice note:

Advice

> Given the potential disturbance of remnant buried asbestos-containing material during earthworks, the Department of Water and Environmental Regulation recommends that an asbestos management plan be developed and implemented to address the potential risks to site workers. The asbestos management plan should be prepared in accordance with the 'Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2008 (2005)]' (National Occupational Health and Safety Commission, April 2005).

If you have any further queries, please contact Environmental Officer, Chek Cher, on 6364 7207.

Yours sincerely

Andrew Miller
SENIOR MANAGER
CONTAMINATED SITES
Delegated Officer under section 91
of the *Contaminated Sites Act 2003*
12 / 11 / 2020

Attachment 1: Deposited Plan 400167

mainroads
WESTERN AUSTRALIA

Enquiries: Malcolm Somers on (08) 9323 5876
Our Ref: 20/8227 (D20#1089734)
Your Ref: 28-50219-4

2 December 2020

Chief Executive Officer
City of Rockingham
PO Box 2142
ROCKINGHAM DC WA 6967

Email: david.banovic@rockingham.wa.gov.au

Dear Sir/Madam,

JDAP APPLICATION - PROPOSED FERTILISER STORAGE, BLENDING AND DISCHARGE FACILITY – LOT 108 AND 1304 ROCKINGHAM BEACH ROAD AND LOT 8003 EAST ROCKINGHAM (28-50219-4)

In response to your correspondence received on 26 October 2020, Main Roads has no objections subject to the following conditions being imposed:

Conditions

1. Prior to construction of the below ground liquid fertiliser pipeline, a Deed of Agreement regarding the pipeline crossing the Rockingham Beach Road reserve shall be entered into and executed between CBH Group and Main Roads. The Deed shall be prepared by and be at the cost of the applicant.

2. No earth works shall encroach to the Rockingham Beach road reserve.

3. Stormwater discharge (if any) shall not exceed pre-development discharge to the Rockingham Beach Road reserve.

4. No waste collection is permitted from the Rockingham Beach Road reserve.

Advice

1. Main Roads is the responsible authority for the Rockingham Beach Road reserve adjacent to the CBH Kwinana Grain Terminal. Main Roads has provided the applicant with authority to a lodge a development application for a below ground liquid fertiliser pipeline crossing the Rockingham Beach Road reserve. This is subject to a deed between CBH Group and Main Roads in relation to the pipeline being executed prior to construction of the pipeline and this requirement for a deed being a condition of development application approval.

2. In relation to Condition 1, the applicant is required to submit an Application form to undertake works within the road reserve prior to undertaking any works within the road reserve. Application forms and supporting information about the procedure can be found on the Main Roads website > Technical & Commercial > Working on Roads.

Should the City disagree with or resolve not to include as part of its conditional approval any of the above conditions or advice, Main Roads requests an opportunity to meet and discuss the application further, prior to a final determination being made.

Main Roads advises that it offers a free of charge pre-lodgement consultation service. Main Roads encourages both the Local Government in liaising with applicants to promote and capitalise on this free advisory service offered by the road authority prior to lodgement of strategic or statutory planning proposals, especially where development plans involve land adjacent to or have the potential to impact on the State road network. Further information on the pre-lodgement consultation process can be found on Main Roads website at mainroads.wa.gov.au > Technical & Commercial > Planning & Development

Main Roads requests a copy of the City's final determination on this proposal to be sent to planninginfo@mainroads.wa.gov.au quoting the file reference above.

Yours sincerely

Zeljko Zagorac
Statutory Road Planning Manager

23 November 2020

Your Ref.: AD20/101159

Chief Executive Officer
City of Rockingham
PO Box 2142
Rockingham DC WA 6967

ATTENTION: David Banovic

Dear David

Opportunity to Provide Comment: JDAP Application for a Proposed Fertiliser Storage, Blending & Discharge Facility - Lot 108 and 1304 Rockingham Beach Road and Lot 8003, East Rockingham

Reference is made to you letter dated 26 October 2020 regarding the abovementioned JDAP application for a Fertiliser Storage, Blending and Discharge Facility. Thankyou for the opportunity to provide comment in relation to this application.

Following a review of the development plans, the following comments are made:

- The proposed development (landside component) is located within the 'Special Industrial' zone under the MRS.
- The development site (landside component) is located within Improvement Plan area No.14: *Kwinana – East Rockingham Industrial Area Improvement Plan.*
- The subject site is located adjacent to Kwinana Beach Road, which is under the control of Main Roads WA (MRWA). It is presumed the application has been referred to MRWA for comment.
- The City's Health team has requested that written notification be provided via email to admin@kwinana.wa.gov.au in the event of any marine spillages resulting from the operations of the proposed development.

If you have any queries regarding the above, please contact the undersigned on 9439 0424 or via email: Jared.Veenendaal@Kwinana.wa.gov.au.

Yours sincerely

Jared Veenendaal
Senior Planning Officer

Dampier Bunbury Pipeline

Your Ref: 20.2020.290.1-AD20/101159
Our Ref: LM: Planning Oct 2020
Contact: Neil Parry
Telephone: 08 9223 4944

ABN 78 081 609 289
Level 23, 140 St Georges Tce
Perth WA 6000
Postal Address
PO Box Z5267
Perth St Georges Tce WA 6831
Telephone: +61 8 9223 4300
Facsimile: +61 8 9223 4301

27 October 2020

Mr Michael Parker
Chief Executive Officer
City of Rockingham
PO Box 2142
ROCKINGHAM WA 6967

Attention: David Banovic

Dear Michael

PROPOSED FERTILISER STORAGE, BLENDING & DISCHARGE FACILITY - LOT 108 AND 1304 ROCKINGHAM BEACH ROAD AND LOT 8003 ON DEPOSITED PLAN 47607, LOT 4552 ON DEPOSITED PLAN 220690 AND LOT 1585 ON DEPOSITED PLAN 191087, EAST ROCKINGHAM

Thank you for your referral letter of 26 October 2020 seeking comment on the above proposal.

DBP as owners and operators of the Dampier to Bunbury Natural Gas Pipeline (DBNGP) have no objection to the proposed facility as indicated on the plans supplied.

Should you have any further inquiries, please do not hesitate to contact me on the number above.

Yours sincerely

Neil Parry
Head of Land Management
Dampier Bunbury Pipeline

Our Ref: D18811
Your Ref: 20.2020.290.1 – AD20/101159

David Banovic
City of Rockingham
customer@rockingham.wa.gov.au

Dear Mr Banovic

RE: HIGH RISK LAND USE - LOT 108 AND 1304 ROCKINGHAM BEACH ROAD AND LOT 8003 ON DEPOSITED PLAN 47607, LOT 4552 ON DEPOSITED PLAN 220690 AND LOT 1585 ON DEPOSITED PLAN 191087, EAST ROCKINGHAM - FERTILISER STORAGE, BLENDING & DISCHARGE FACILITY - DEVELOPMENT APPLICATION

I refer to your email dated 26 October 2020 regarding the submission of a Bushfire Management Plan (BMP) (Version 3), prepared by Linfire Consultancy and dated 31 July 2020, for the above development application. The BMP is accompanied by a Bushfire Risk Management Plan 'Bushfire Risk Management Plan (Flammable Hazards)' for the above development application.

This advice relates only to *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP 3.7) and the *Guidelines for Planning in Bushfire Prone Areas* (Guidelines). It is the responsibility of the proponent to ensure the proposal complies with all other relevant planning policies and building regulations where necessary. This advice does not exempt the applicant/proponent from obtaining necessary approvals that may apply to the proposal including planning, building, health or any other approvals required by a relevant authority under other written laws.

1. **Policy Measure 6.5 a) (ii) Preparation of a BAL contour map**

Issue	Assessment	Action
BMP Methodology – CBH Grain Jetty and Pipeline	The BMP has not been prepared in accordance with Appendix 3 of the Guidelines. Notwithstanding that the CBH Grain Jetty is predominantly not in a bushfire prone area the BMP must assess the subject land in its entirety that includes the CBH Grain Jetty and the pipeline. DFES notes that Section 4.4.2 (page 15) of the Development Application Report 'CBH Grain Jetty' has selectively justified exemption from SPP 3.7. Section 5 of Planning Bulletin 111/2016 does not apply to proposals that *result in an intensification of development (or land use), results in an increase in the number of residents or employees, or results in an increase in bushfire threat*.	Modification to the BMP is required.

Issue	Assessment	Action
Management Agreement – Off-site Asset Protection Zone	Compliance with the Bushfire Protection Criteria relies upon the ability to enter into a 'Maintenance Agreement' to maintain vegetation outside the subject site in accordance with Schedule 1: Standards for Asset Protection Zones contained in the Guidelines. DFES acknowledges that the BMP recommends that the Development Approval incorporates a condition requiring a Maintenance Agreement between the proponent and the owner of Lot 108. The condition requires an Agreement to be prepared and implemented in relation to maintenance of the off-site vegetation management zone within an undeveloped portion of Lot 108 in perpetuity, or until such a time that the bushfire hazard is permanently removed and the lot is developed to a non-vegetated/ low threat state. DFES notes that Clause 4.6.2 of the Guidelines states: *As the BMP is a document that should apply for the life of the development, the decision-maker should require modifications to the document in the event that there are discrepancies, prior to endorsement and/or approval of the planning application being granted. Conditional approval should not be granted prior to the BMP being prepared and endorsed.* Technical evidence and verification should be included in the BMP to qualify the vegetation exclusion can be achieved and that it is enforceable in perpetuity. An endorsed copy of the proposed Maintenance Agreement or written undertaking by the Lot 108 landowner would address this requirement.	Modification to the BMP is required.

2. Policy Measure 6.5 c) Compliance with the Bushfire Protection Criteria

Element	Assessment	Action
Location, and Siting & Design	**A1.1 & 2.1 - insufficient information** The BAL ratings cannot be validated, as technical evidence and verification has not been included in the BMP to qualify the vegetation exclusion within Lot 108 can be achieved and that it is enforceable in perpetuity, as per the above table.	Modification to the BMP is required.

Recommendation – not supported modifications required

It is critical that the bushfire management measures within the BMP are refined, to ensure they are accurate and can be implemented to reduce the vulnerability of the development to bushfire. The proposed development is not supported for the following reasons:

1. The development design has not demonstrated compliance to –
   Element 1: Location, and
   Element 2: Siting and Design
2. The BMP has not assessed the CBH Grain Jetty and Pipeline.

If you require further information, please contact Joel Gajic, Senior Land Use Planning Officer on telephone number 9395 9739.

Yours sincerely

Paul Simpson
A/DIRECTOR LAND USE PLANNING

3 December 2020

CC david.banovic@rockingham.wa.gov.au
CC Greg.Delahunty@rockingham.wa.gov.au

Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

PARKS AND WILDLIFE SERVICE

Your ref: 20.2020.290.1 – AD20/101159
Our ref: 46210
Enquiries: Lyndon Mutter
Phone: 9442 0342
Email: lyndon.mutter@dbca.wa.gov.au

Mr David Banovic
Senior Planning Officer
City of Rockingham
PO Box 2142
ROCKINGHAM DC WA 6967

Proposed Fertiliser Storage, Blending & Discharge Facility- Lot No 108 and 1304 Rockingham Beach Road and Lot 8003 on Deposited Plan 47607, Lot 4552 on Deposited Plan 220690 and Lot No 1585 on Deposited Plan 191087, East Rockingham

In reference to your correspondence dated 26 October 2020, the Parks and Wildlife Service at the Department of Biodiversity, Conservation and Attractions (DBCA) provides the following comments.

Clearing of Native Vegetation
Any proposed clearing of native vegetation associated with the development should be undertaken in accordance with the *Environmental Protection Act 1986* (EP Act) and Environmental Protection (Clearing of Native Vegetation) Regulations 2004, and discussed with the Department of Water and Environmental Regulation.

Thank you for the opportunity to provide comment. Should you have any queries regarding the above comments, please contact Lyndon Mutter on 9442 0342.

Yours sincerely

Benson Todd
REGIONAL MANAGER

30 November 2020

Swan Region
Cnr Australia II Drive and Hackett Drive, Crawley WA 6009
Locked Bag 104, Bentley Delivery Centre, Western Australia 6983
Phone: (08) 9442 0300 Email: [lyndon.mutter@dbca.wa.gov.au

Development Services
629 Newcastle Street Leederville WA 6007
PO Box 100 Leederville WA 6902
T (08) 9420 2099
F (08) 9420 3193

Your Ref: 20.2020.290.1 – AD20/101159
Our Ref: DEV371339 (File: 103966100)
Enquiries: Nick McLachlan
Direct Tel: 9420 3909
Fax: 9420 2714

10 November 2020

City of Rockingham
PO BOX 2142
ROCKINGHAM DC WA 6967

Attention: David Banovic

Re: CBH Kwinana Fertiliser Expansion Project

The Water Corporation has no objection to the proposed development.

It is noted that the corporation has an existing potable water pipe asset within Rockingham Beach Road and reserve Lot 8003.

Given the works proximity to the corporation's asset, in line with the corporations Working Near Assets Technical Guidelines, a damage risk assessment and working near assets approval shall be obtained prior to construction.

Please provide the above comments to the landowner, developer and/or their representative.

Should you have any queries or require further clarification on any of the above issues, please do not hesitate to contact the Enquiries Officer.

Nick McLachlan
Senior Planner – Land Planning
Development Services

Cockburn Sound Management Council

Prime House, 8 Davidson Terrace, Joondalup WA 6027
Locked Bag 10, Joondalup DC WA 6919

Your Ref: 20.2020.290.1-AD20/101159
Our Ref: CSMC 2020-15
Enquiries: Tina Runnion
Phone: 08 6364 6668
Email: tina.runnion@dwer.wa.gov.au

Mr David Banovic
Senior Planning Officer
City of Rockingham

Via email: customer@rockingham.wa.gov.au

Dear Mr Banovic

PROPOSED FERTILISER STORAGE, BLENDING AND DISCHARGE FACILITY – Lot 108 and 1304 Rockingham Beach Road and Lot 8003 on Deposited Plan 47607, Lot 4552 on Deposited Plan 220690 and Lot 1585 on Deposited Plan 191087, East Rockingham

Thank you for your correspondence dated 26 October 2020 seeking comment from the Cockburn Sound Management Council (CSMC) on Co-operative Bulk Handling Limited's (CBH) proposal to develop a Fertiliser Storage, Blending and Discharge Facility on the abovementioned land.

It is noted that CBH is seeking Development Approval for the proposed Fertiliser Storage, Blending and Discharge Facility and that the City of Rockingham and Western Australian Planning Commission will formally consider the development application.

Under its Terms of Reference, CSMC is an advisory council to the Minister for Environment and as such, does not have a role in providing advice to decision-making authorities on development proposals in Cockburn Sound. CSMC provides advice and recommendations to the Minister on the environmental management of Cockburn Sound to ensure the protection and maintenance of water quality and associated environmental values for the Cockburn Sound marine area.

CSMC appreciates being kept informed of proposed developments that may impact on Cockburn Sound's environmental values.

If you have any queries, please contact Tina Runnion, Coordinator Cockburn Sound Management Council on 6364 6668 or by email at tina.runnion@dwer.wa.gov.au.

Yours sincerely,

Emeritus Professor Kateryna Longley
Chair, Cockburn Sound Management Council

5 November 2020

Wed 28/10/2020 3:29 PM

Dean Davidson <Dean.Davidson@fremantleports.com.au>

RE: External Referral - Lot 108 and 1304 Rockingham Beach Road and Lot 8003 on Deposited Plan 47607, Lot 4552 on Deposited Plan 220690 and Lot 1585 on Deposited Plan 191087, East Rockingham

To David Banovic; mail

You replied to this message on 29/10/2020 7:17 AM.

Hi David, thank you for referring this to us, we have reviewed the proposal and have no comment.
Regards
Dean

Dean Davidson
Planning Manager
Planning and Place Making
1 Cliff Street | Fremantle WA 6160
ph +61 8 9430 3390 | mob 0438 930 063 | fax +61 8 9336 577
www.fremantleports.com.au | dean.davidson@fremantleports.com.au

Thu 3/12/2020 10:03 AM

Sam Lissiman <Sam.Lissiman@dplh.wa.gov.au>

General (Licensed) (CBH Kwinana Fertiliser Expansion Project) - Lots 108, 1304 and 8003 Patterson Road, East Rockingham

To David Banovic; Greg Delahunty

Referral to Department of Planning - Proposed Fertiliser Storage, Blending & Discharge Facility.pdf
.pdf File

20190430_Westport_Beacon_KRL_APR_2019.pdf
.pdf File

Apologies for the delay in getting a response through to you.

In summary, the Department has no objection to the proposal with comments obtained from our Infrastructure, Planning and Policy division (IPP) included below. Westport has also provided a no objection via the IPP team and internally, the Department's Land Management Metropolitan & Peel division provided a response of 'no comment'.

Map of Proposal

IPP Analysis

- Westport Beacon 4 - Kwinana Rail Loop alternative concept (April 2019 - attached) shows the Kwinana Rail loop proposal.
- Westport and the Department of Transport are currently undertaking work to define the land requirements for a new rail corridor and options for MRS Amendment for the Kwinana Rail Loop.
- Information to proceed with the MRS amendment has yet to be received.
- IPP have confirmed with Westport that this proposal does not appear to be within the possible alignment - as outlined in Westport Beacon 4.
- Therefore, IPP have no objections to the proposal.

As discussed on the phone Greg, if the City has any comment to make in relation to the oceanside part of the proposal please send these through in the next two weeks.

Thanks and regards

Ignore | Delete | Junk | Delete
Reply | Reply All | Forward | Meeting | IM | More | Respond
Move | Rules | OneNote | Actions | Move
Mark Unread | Categorize | Follow Up | Tags
Translate | Find | Related | Select | Editing
Zoom | Zoom

Wed 4/11/2020 12:55 PM

Jonathan Roach <Jonathan.Roach@developmentwa.com.au>

RE: External Referral - Lot 108 and 1304 Rockingham Beach Road and Lot 8003 on Deposited Plan 47607, Lot 4552 on Deposited Plan 220690 and Lot 1585 on Deposited Plan 191087, East Rockingham

To David Banovic

You replied to this message on 4/11/2020 1:00 PM.

Hi David,

Thank you for the email. DevelopmentWA does not have any comments on the proposal.

DevelopmentWA is the landowner and the site is leased to the proponent. Prior to the proponent securing access to the site, DevelopmentWA and JTSI must be satisfied with the proposal.

DevelopmentWA also needs to sign the DA form as the landowner. Through this process, DevelopmentWA reviews the plans prior to lodgement with the City.

Regards

Jonathan Roach
Development Manager

DevelopmentWA

40 The Esplanade, Perth WA 6000
T 08 9482 7433 M 0401 571 358 F +61 8 9481 0861
developmentwa.com.au

Government of **Western Australia**
Department of **Mines, Industry Regulation and Safety**
Resources Safety

Your ref: DA 6555
Our ref: X0001/201901
Enquiries: Eric Gruber - Ph 9358 8037
Email: eric.gruber@dmirs.wa.gov.au

David Banovic
Senior Planning Officer
City of Rockingham
Civic Boulevard Rockingham, WA 6967

Dear David,

DEVELOPMENT APPLICATION – Fertiliser Facility – Lot 108 and 1304 Rockingham Beach Road, Kwinana Beach WA 6167 – DA 6555

A request for comment was received from the City of Rockingham in relation to the above planning application and the proposal to establish a Fertiliser Facility, at the above address.

Based on the provided information, the products which are UN3082 are stored in Intermediate Bulk Containers (IBC) and are not classified at Dangerous Goods under SP01. The remainder of the bulk products are not classified as Dangerous Goods. As a result this site would not be considered as requiring a Dangerous Goods Storage Licence.

DMIRS constitutes a number of directorates that may still have interest in this site. However as a result of our assessment that the site will not require a Dangerous Goods Storage Licence, it is therefore not tested for distance/buffers under Dangerous Goods legislation or relevant Australian Standards.

In relation to assessing the fire risk of the site, I would recommend the use of a fire risk consultant or seek the assistance of the Department of Fire and Emergency Services.

If you have any queries regarding this letter, please contact me on 9358 8037.

Yours faithfully,

Eric Gruber

_____
Eric Gruber
Team Leader Dangerous Goods
Dangerous Goods and Critical Risks Directorate
17 November 2020

Mineral House 100 Plain Street East Perth Western Australia 6004
Telephone +61 8 9222 3333358 8037
www.dmirs.wa.gov.au
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ABN 69 410 335 356


Kwinana Quay
WESTERN TRADE COAST
S
S
S
LATITUDE 32
MA2
4500+
Town of Kwinana
3
3
ROAD
James Point Port
S
KWINANA INDUSTRIAL AREA
ROAD
THOMAS
OR2
200+
Ocean
OR1
200+
KWINANA TERMINAL (PRIVATE)
KWINANA
KT1
300+
BE1
1300
CH1
500+
Approximate location of the Development Area
PATERSON
PAR1
600+
ROCKINGHAM INDUSTRIAL ZONE
WV1
2500+
WW1
800+
ROCKINGHAM FORESHORE
AVENUE
ROCKINGHAM
1
BA1
3900+
BA4
3200+
City of Rockingham

David Banovic

From: David Banovic
Sent: Friday, 22 January 2021 8:16 AM
To: 'Sam Lissiman'
Cc: Greg Delahunty
Subject: RE: General (Licensed) (CBH Kwinana Fertiliser Expansion Project) - Lots 108, 1304 and 8003 Patterson Road, East Rockingham

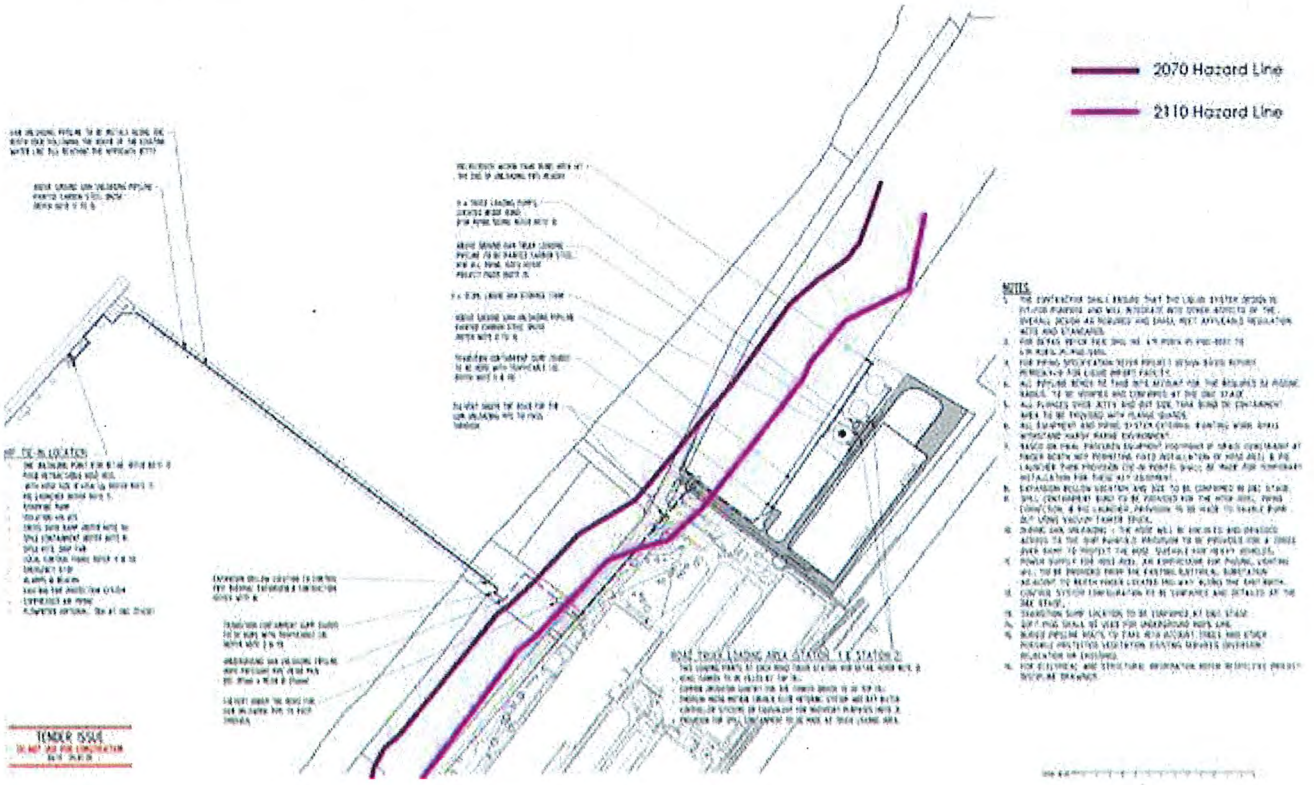
Hi Sam,

Apologies for the delay in getting a response through to you.

In summary, the City of Rockingham has no objections to the proposed Seaward Development subject to the following condition being imposed:

1. *Prior to commencement of development, the applicant shall address the modelled coastal erosion risk to the proposed development, in accordance with State Planning Policy 2.6 – Coastal Planning Policy and the City of Rockingham Coastal Hazard Risk Management and Adoption Plan. The applicant must implement measures to protect the proposed infrastructure once the most landward part of the Horizontal Shoreline Datum is within the S1 storm erosion allowance of 17 metres of the proposed development. All measures identified must be implemented to the satisfaction of the City of Rockingham and Western Planning Commission for duration of the development.*

The proposed overall development has not addressed the threat of coastal erosion as identified by the City's Coastal Hazard Risk Management and Adaptation Plan (CHRMAP). The illustration below shows that the proposed pipeline (dotted line) will be laid over land between the modelled erosion hazard lines for 2070 and 2110.



As a result of the condition the applicant is obliged to:

- Address the risk of coastal erosion on the proposed development;
- Implement measures to protect the infrastructure once an appropriate trigger has been reached.

The City has previously raised this matter with the proponent as detailed below.

City Comment	Applicant Response	City Response
*The application concludes that the proposed pipeline development has a low inundation vulnerability up to 2110 and therefore is considered at low risk to coastal processes for the near future, does not cause impacts on the coastline and is consistent with the objectives of SPP 2.6 State Planning Policy 2.6 – Coastal Planning Policy. Despite this, the application has not addressed all coastal processes listed in SPP2.6 and has only taken into account inundation and not coastal erosion. An internal assessment of erosion vulnerability shows that the proposed development is within the coastal erosion hazard lines as modelled in the City's Coastal Hazard Risk Management and Adaptation Plan (**CHRMAP**). The modelled erosion hazard lines are shown in Figure 2 below. It is noted that pipeline is to be built on existing infrastructure, however, the works will only increase the value of the assets at risk. The CHRMAP has acknowledged the strategic economic importance of CBH Kwinana Grain Terminal to the State and this infrastructure has been identified as a priority area for long-term protection, subject to this protection being funded by CBH Group or the State Government. As such, the following information is requested:* *- The applicant must address the modelled coastal erosion risk to the proposed development in accordance with SPP 2.6 State Planning Policy 2.6 – Coastal Planning Policy, noting that although the City has identified the strategic importance of the CBH Kwinana Grain Terminal,*	This comment relates to the waterside development application. It is acknowledged that the location where the pipeline crosses the foreshore zone is between the 2030 and 2070 Hazard Lines (for a 100 year ARI). The City's position on protection against coastal measures is noted, and is consistent with CBH's own understanding. It is noted, however, that the addition of the pipeline will not measurably impact the value of the infrastructure current asset. Given the planning approval process cannot be used to apply new conditions to existing approved infrastructure, funding arrangements for protection works will necessarily be negotiated with parties outside of this particular planning approval process.	The new pipeline and the access way onto Rockingham Beach Road are also proposed as part of the landside Development Application. The extent of these two proposed developments extend beyond the areas of existing approved infrastructure and, as such, the planning approvals process can be used to ensure that the risk of future coastal hazards is suitably addressed prior to these developments commencing. To address this risk, it is recommended that both approvals apply the same condition. This condition should ensure the applicant is obliged to implement measures to protect or remove infrastructure once the most landward part of the Horizontal Shoreline Datum (HSD) is within the S1 storm erosion allowance of 17 metres of the most seaward point of the proposed development. This condition will ensure that the proposal has applied the State's approach for addressing the risk of approving infill developments in areas that are vulnerable to coastal processes.

it was determined that the protection of the site should be funded by CBH and the State. As the CHRMAP was endorsed by Council, it is the City's position that any future protection of this infrastructure will not be funded by the City.		

Regards,

LOT 1585 & LOT 4552 ROCKINGHAM BEACH ROAD, EAST ROCKINGHAM - CONSTRUCTION OF UAN DISCHARGE PIPELINE AND CARGO RECEIVAL EQUIPMENT

Form 1 – Responsible Authority Report
(Regulation 12)

DAP Name:	Metro Outer JDAP	
Local Government Area:	City of Rockingham	
Applicant:	Planning Solutions	
Owner:	Fremantle Port Authority	
Value of Development:	$2.1 million ☐ Mandatory (Regulation 5) ☒ Opt In (Regulation 6)	
Responsible Authority:	Western Australian Planning Commission	
Authorising Officer:	Planning Director - Metropolitan South and Peel	
LG Reference:	20.2020.290.1	
DAP File No:	DAP/20/01879	
Application Received Date:	23 October 2020	
Report Due Date:	7 December 2020 (extension of time until 23 June 2021)	
Application Statutory Process Timeframe:	60 days with an additional 183 days agreed	
Attachment(s):	1. Development Plan 2. Extent of Development Site 3. Pipeline Route 4. Undergrounding Plan 5. Aerial Image and Site Context 6. Zoning Map	
Is the Responsible Authority Recommendation the same as the Officer Recommendation?	☒ Yes ☐ N/A	Complete Responsible Authority Recommendation section
	☐ No	Complete Responsible Authority and Officer Recommendation sections

Responsible Authority Recommendation

That the Metro Outer Joint Development Assessment Panel resolve to:

Approve Development Assessment Panel application reference DAP/20/01879 and the accompanying plan dated 8 June 2021 (**Attachment 1**), pursuant to clause 30(1) of the Metropolitan Region Scheme, subject to the following conditions:

Conditions

1. This decision constitutes planning approval only. If development has not substantially commenced within four years of this approval being granted, the approval shall lapse and be of no further effect.

2. The pipeline is to be removed, modified or protected at the lessee's cost when the most landward part of the Horizontal Shoreline Datum is within 17 metres of the proposed development to the satisfaction of the Western Australian Planning Commission, on the advice of the City of Rockingham and the Fremantle Port Authority.

3. Any damage to the dune system that occurs during construction is to be restored to its original state to the satisfaction of the Western Australian Planning Commission, on the advice of the City of Rockingham.

Advice Notes

1. This decision constitutes planning approval under the Metropolitan Region Scheme only. It is the applicant's responsibility to comply with all other applicable legislation and obtain all required approvals, licences and permits prior to commencement of this development**.**

2. With regard to Condition 2, the applicant is advised that the Horizontal Shoreline Datum means the active limit of the shoreline under storm activity, as defined in *State Planning Policy 2.6 – State Coastal Planning Policy* (2013). The applicant is advised that the 17 metre distance between the Horizontal Shoreline Datum and the proposed development is the S1 value for this location which is obtained from the Coastal Hazard Risk Management and Adaptation Plan prepared for the City of Rockingham. S1 is the allowance for absorbing the current risk of storm erosion, as defined in State Planning Policy 2.6.

3. The Water Corporation advises that it has an existing potable water pipe asset within Rockingham Beach Road. Given the works proximity to this asset, a damage risk assessment and working near assets approval shall be obtained from the Water Corporation prior to construction.

4. Under section 51C of the *Environmental Protection Act 1986* (EP Act), clearing of native vegetation is an offence unless undertaken under the authority of a clearing permit, or the clearing is subject to an exemption. Exemptions for clearing that are a requirement of written law, or authorised under certain statutory processes, are contained in Schedule 6 of the EP Act. It is the applicant's responsibility to determine compliance with exemptions and therefore whether a clearing permit is required.

Details: outline of development application

Region Scheme	Metropolitan Region Scheme
Region Scheme - Zone/Reserve	Waterways Parks and Recreation
Local Planning Scheme	N/A
Local Planning Scheme - Zone/Reserve	N/A
Structure Plan/Precinct Plan	N/A
Structure Plan/Precinct Plan - Land Use Designation	N/A
Use Class and permissibility:	N/A

Lot Size:	10834 m^2
Existing Land Use:	CBH Kwinana Grain Jetty
State Heritage Register	No
Local Heritage	☒ N/A ☐ Heritage List ☐ Heritage Area
Design Review	☒ N/A ☐ Local Design Review Panel ☐ State Design Review Panel ☐ Other
Bushfire Prone Area	Yes
Swan River Trust Area	No

Proposal:

An application for development approval has been received by the Western Australian Planning Commission seeking approval over Lot 1585 and Lot 4552 Rockingham Beach Road, East Rockingham for the construction of a liquid urea ammonium nitrate (UAN) discharge pipeline and UAN cargo receival equipment (unloading hose) (**Attachment 1** - Development Plan; **Attachment 2** - Extent of Development Site).

The works are associated with the Co-operative Bulk Handling Limited (CBH) Kwinana Fertiliser Project which includes a concurrent proposal for the UAN fertiliser storage facility and a solid fertiliser storage facility on Lot 108 Rockingham Beach Road. These works are also being determined by the Development Assessment Panel (DAP/20/01878). The estimated cost of the pipeline portion of the development related to this report is $2.1 million and the applicant has opted into the JDAP process.

Liquid UAN is proposed to be received at the existing CBH jetty berth from UAN cargo chemical tankers. A UAN cargo unloading hose will be located on the jetty to attach to the tankers before discharging the UAN along the pipeline. The infrastructure comprises of:

- UAN pipeline - one 300mm single wall carbon steel pipeline; and
- UAN cargo unloading hose - one 203 mm diameter unloading hose retained on a retractable reel and connected to the pipeline.

The pipeline is proposed to be installed on the south side of the existing jetty roadway above an existing water pipeline before it crosses under the jetty access and is routed underground to the proposed fertiliser storage facility on nearby Lot 108 (**Attachment 3** - Pipeline Route; **Attachment 4** - Undergrounding Plan).

The proposal is considered 'development' under the *Planning and Development Act 2005* (the Act), however is not considered to be 'permitted development' under the Metropolitan Region Scheme (MRS). Approval is therefore required from the Western Australian Planning Commission for such work under Section 16(1a) of the MRS. This report provides an assessment of the application under the MRS.

The City has provided a separate Responsible Authority Report (RAR) for the landside component of the project - the fertiliser storage facility.

Background:

The development site includes the existing CBH jetty and Lot 1585, located adjacent to the CBH Kwinana Grain Terminal (**Attachment 5** - Aerial Image and Site Context). The site is within the Western Trade Coast - Western Australia's largest industrial area which includes the Rockingham Industry Zone, Kwinana Strategic Industrial Area, Australian Marine Complex and the Latitude 32 Industry Zone.

The site is reserved for Waterways (CBH jetty) and Parks and Recreation (Lot 1585) under the Metropolitan Region Scheme (MRS) and is not zoned or reserved under the City of Rockingham's Town Planning Scheme No. 2 (TPS 2) (**Attachment 6** - Zoning Map).

Lot 1585 has direct access to Rockingham Beach Road which links to Kwinana Beach Road and the Kwinana Strategic Industrial area to the north.

The development site is leased by Fremantle Ports Authority to CBH, and managed under the *Port Authorities Act 1999*.

Environmental requirements

The CBH Kwinana Fertiliser Project has been assessed by the Environmental Protection Authority (EPA) under s. 45 of the *Environmental Protection Act 1986* (EP Act) due to the project's potential for impacts to the marine environmental quality of Cockburn Sound. The EPA has recommended that the project be approved subject to conditions, and a Ministerial Statement is expected to be issued in late June 2021 outlining specific implementation measures to be adhered to.

In addition to the above, the Department of Water and Environmental Regulation (DWER) regulates emissions and discharges from the construction and operation of prescribed premises through a works approval and licensing process, under Part V of the EP Act. DWER has advised that the proposed operations are likely to cause the premises to become a prescribed premises in accordance with the EP Act for the following category as per Schedule 1 of the EP Act:

> '75: Chemical blending or mixing not causing a discharge: premises on which chemicals or chemical products are mixed, blended or packaged in a manner that causes or is likely to cause a discharge of waste into the environment.'

It is the applicant's responsibility to obtain a works approval and licence application for the proposed development under the EP Act and this has been captured in an advice note. Any potential off-site impacts resultant from the proposed development will be appropriately considered through this process and the implementation of the Ministerial Statement.

The application will also need to demonstrate compliance with the *Environmental Protection (Noise) Regulations 1999, Environmental Protection (Packaged Fertiliser) Regulations 2010 and Environmental Protection (Unauthorised Discharges) Regulations 2004.*

Legislation and Policy:

Legislation

- *Planning and Development Act 2005 - Part 10: Subdivision and Development Control*
- *Metropolitan Region Scheme - Part IV: Development;*
- *Planning and Development (Development Assessment Panels) Regulations 2011; and*
- *Environmental Protection Act 1986 and relevant Regulations.*

State Government Policies

- *South Metropolitan Peel Sub-regional Planning Framework;*
- *State Planning Policy 2.6 - Coastal Planning Policy;*
- *State Planning Policy 3.7 - Planning in Bushfire Prone Areas;*
- *State Planning Policy 4.1 - State Industrial Buffer;*
- *Development Control Policy 4.2 - Planning for Hazards and Safety; and*
- *Development Control Policy 5.3 - Use of Land Reserved for Parks and Recreation and Regional Open Space.*

Consultation:

Consultation with other Agencies or Consultants

The City of Rockingham supports the proposal and recommends the inclusion of the condition and advice related to the protection of the pipeline as per *State Planning Policy 2.6 – State Coastal Planning Policy* (SPP 2.6; WAPC 2013).

The Department of Water and Environmental Regulation (DWER) has no objection to the proposal, however, provided a number of recommendations relating to industry regulation and the clearing of native vegetation.

The application was also referred to the following agencies and servicing authorities who provided no objections or no comment:

- Department of Planning, Lands and Heritage (Infrastructure, Planning and Policy, and Heritage and Property services);
- Department of Biodiversity, Conservation and Attractions;
- Water Corporation;
- Westport Taskforce;
- Main Roads WA; and
- Fremantle Port Authority.

The applicant and the City of Rockingham were supportive of the proposed draft conditions.

Planning Assessment:

Metropolitan Region Scheme

Clause 30 of the MRS requires the WAPC to have regard to the following factors when determining a development application:

- the purpose for which the land is zoned or reserved under the MRS;
- the orderly and proper planning of the locality; and
- the preservation of the amenities of the locality.

In this regard, the following comments are provided:

- the proposed development and operation of the pipeline is compatible with the Parks and Recreation and Waterways reservations of the land under the MRS and is considered complimentary to the infrastructure already on site;
- the proposal is consistent with the orderly and proper planning of the locality as it is dependent on a coastal location and will integrate with existing infrastructure in an area already identified as a strategic node suitable for industrial development; and
- the site, by virtue of its location within the Rockingham Industrial Area, minimises the amenity impacts resulting from the proposed development. Environmental impacts are to be addressed via the necessary DWER prescribed premise licence and Ministerial Statement conditions.

Taking the above into consideration, the proposed development is consistent with orderly and proper planning and preservation of amenity. The proposal is also compatible with the nature and purpose of the site and industrial character of the location.

Sub-regional Planning Framework

The *South Metropolitan Peel Sub-Regional Planning Framework* (Framework) designates Lot 1585 as land for nature/passive recreation. Notwithstanding this, the development is proposed on the existing CBH jetty structure and underneath the road reserve on Lot 1585. The development is therefore consistent with the existing uses currently on site and where no suitable alternative location for such uses has been identified.

Development Control Policy 5.3 – Use of Land Reserved for Parks and Recreation and Regional Open Space

Development Control Policy 5.3 – Use of Land Reserved for Parks and Recreation and Regional Open Space (DC 5.3) provides guidance on development which may be permitted on land reserved for Parks and Recreation under the MRS. It outlines that such uses shall be restricted to those which are consistent with furthering the enhancement of the reserve and facilitating its use for recreational or conservation purposes. In this case, the existing use of Lot 1585 for the CBH jetty is at odds with the intent of DC 5.3 as it does not serve a recreation or a conservation purpose, and is not publicly accessible.

However, the proposal is compatible with the existing approved use of the site and therefore it is considered appropriate to depart from the provisions of DC 5.3 in this instance.

Industrial Planning

Recognising the significance of industrial development to the State's economy, *State Planning Policy 4.1 - State Industrial Buffer Policy* (SPP 4.1) seeks to protect industry and infrastructure facilities from the encroachment of incompatible land uses. SPP 4.1 does not specify required offsite buffer distances but instead leaves it to be determined by the environmental regulatory processes. The proposed development is located within the Rockingham Industrial Zone (RIZ) which is subject to an existing buffer.

DWER has advised that in accordance with Schedule 1 of the *Environmental Protection Regulations 1987* and the EP Act (Part V Works Approval Application) the premises is categorised as Category 75 – Chemical blending or mixing not causing a discharge. The proposed infrastructure will be subject to conditions under a licence to be granted under the EP Act and any potential off-site impacts resultant from the proposed development will be appropriately considered through this process.

The proposed development is consistent with the intent and objectives of SPP 4.1.

In addition to the above, *Development Control Policy - Planning for Hazards and Safety* (DC 4.2) supports the location of hazardous industries within industrial areas, separated from residential areas. The subject site is located within the established RIZ, separate from residential development, therefore, is considered to be consistent with DC 4.2.

Coastal Planning

SPP 2.6 and the associated *Coastal hazard risk management and adaptation planning guidelines* (Guidelines) recommend the preparation of a Coastal Hazard Foreshore Management Plan (CHRMAP) for areas in the coastal zone to identify land that could potentially be impacted by coastal hazards (erosion and inundation) over a planning timeframe of 100 years (up to 2110), relative to storm events and projected sea level rise.

The City prepared a CHRMAP in 2019 which identifies the impact of coastal hazards on the Rockingham coastline and identifies the CBH Kwinana Grain Terminal and jetty as a priority area for long term protection due to its strategic economic importance to the State. Section 7 of SPP 2.6 recognises that in certain circumstances development may need to occur within an area identified to be potentially impacted by physical coastal processes within the planning time frame. One of these circumstances is for 'industrial development that is demonstrably dependent on a foreshore location', such as this proposal. The construction of the pipeline is dependent on the CBH Grain Terminal jetty which will allow the offloading of the liquid UAN from tankers and transportation of this material to the proposed fertiliser storage facility.

With regard to the mapped impacts of inundation and erosion in this location, the CHRMAP identifies an overall low vulnerability to inundation in 2110, but a high vulnerability to erosion. It is therefore recommended that the proposed development be removed, modified or protected when the risk to coastal hazards is no longer manageable. In this circumstance, the identified site-specific trigger distance for this location is 17 metres from the Horizontal Shoreline Datum (HSD), which is the allowance for absorbing the risk of storm erosion, and the condition and associated advice note specifies this. The CHRMAP stipulates that the protection is to be funded by CBH Group or the State, and in this regard, the applicant has agreed that the condition refer to the costs being incurred by the lessee (CBH Group).

An additional condition requiring the dune system to be rehabilitated in the event that damage is caused during construction is also recommended.

Bushfire Planning

Lot 1585 is wholly located within a bushfire prone area, pursuant to *State Planning Policy 3.7 - Planning in Bushfire Prone Areas* (SPP 3.7) due to the presence of coastal

vegetation. The WAPC's *Planning Bulletin 111/2016 - Planning in Bushfire Prone Areas* (PB 111/2016) specifies that exemptions from the requirements of SPP 3.7 and the deemed provisions are to be pragmatically applied by decision-makers, and include proposals which do not result in an increase to the bushfire threat or involve the occupation of employees on site for any considerable amount of time.

The landside component of the project (fertiliser storage facility) includes the preparation of a Bushfire Risk Management Plan (BRMP) for a high risk/flammable land use. This BRMP identified UAN as a non-flammable liquid, and as such, there is no risk of fire ignition from small spills if they occur.

The majority of the pipeline subject of this report is to be located underground within the MRS reserve with a small portion being above ground where it links into the existing jetty structure. Additionally, employees will only be on site during unloading periods to attach UAN cargo receival equipment, which is outside of the bushfire prone area. The proposal is therefore considered exempt from the requirements of SPP 3.7.

Substantial commencement

In relation to the substantial commencement of works, it is noted that:

(a) the Metropolitan Region Scheme does not set out specific requirements in terms of the substantial commencement of works within a nominated time frame;
(b) the *Planning and Development (Development Assessment Panels) Regulations 2011*, in r.16A, state that where a development assessment panel grants approval to an application, the development must be substantially commenced within four years of the date of the determination;
(c) the *COVID-19 Response and Economic Recovery Omnibus Act 2020*, in s.33, provides for the automatic two year extension of a substantial commencement period, provided the approval is issued after 8 April 2020 and during a state of emergency; and
(d) the application indicates works are expected to be completed within two years.

Based on the above, the standard four year substantial commencement period is sufficient.

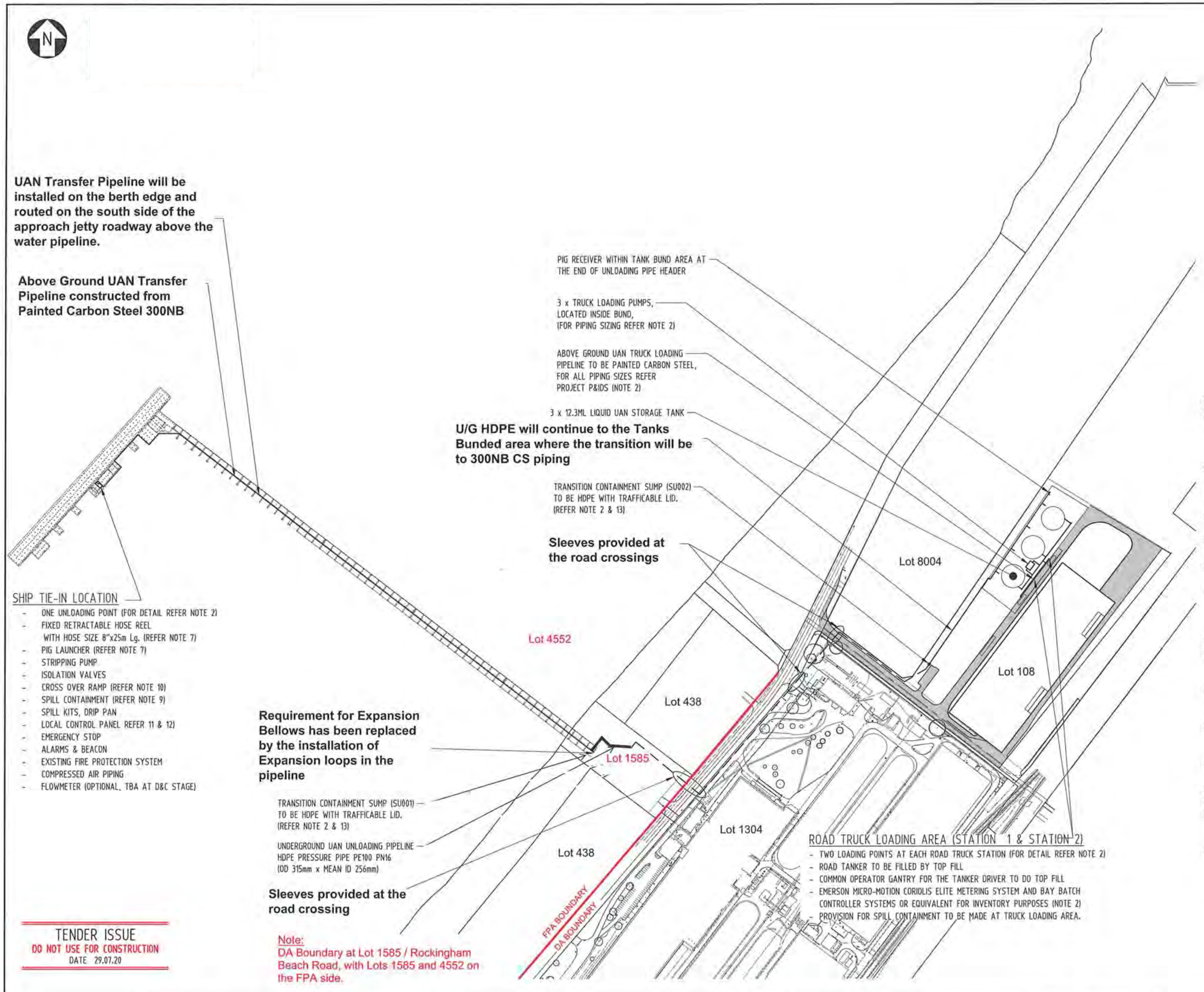
Conclusion:

Based on the above assessment, while the development is not consistent with the purpose of the land reservation in a typical sense, it is recognised as an enhancement to State-significant development that already exists on site. In this instance, it is considered compatible with the Parks and Recreation and Waterways reservations under the Metropolitan Region Scheme, and consistent with orderly and proper planning and the preservation of the amenities of the locality.

It is recommended that the Metro Outer JDAP approve the proposed development, subject to conditions.

DEPARTMENT OF PLANNING, LANDS AND HERITAGE

DATE	FILE
08-Jun-2021	28-50182-2



NOTES:

1. THE CONTRACTOR SHALL ENSURE THAT THE LIQUID SYSTEM DESIGN IS FIT-FOR-PURPOSE AND WILL INTEGRATE INTO OTHER ASPECTS OF THE OVERALL DESIGN AS REQUIRED AND SHALL MEET APPLICABLE REGULATION, ACTS AND STANDARDS.
2. FOR DETAIL REFER P&ID DRG. NO. 419-M2814-PI-PND-0001 TO 419-M2814-PI-PND-0004.
3. FOR PIPING SPECIFICATION REFER PROJECT DESIGN BASIS REPORT PE190349-10 FOR LIQUID IMPORT FACILITY.
4. ALL PIPELINE BENDS TO TAKE INTO ACCOUNT FOR THE REQUIRED 5d PIGGING RADIUS. TO BE VERIFIED AND CONFIRMED AT THE D&C STAGE
5. ALL FLANGES OVER JETTY AND OUT SIDE TANK BUND OR CONTAINMENT AREA TO BE PROVIDED WITH FLANGE GUARDS.
6. ALL EQUIPMENT AND PIPING SYSTEM EXTERNAL PAINTING WORK SHALL WITHSTAND HARSH MARINE ENVIRONMENT.
7. **Space allocation is provided adjacent to the Berth Substation for the installation of the Hose Reel, Pig Launcher & instrumentation**
8. **Expansion Loops Provided in the Pipeline**
9. SPILL CONTAINMENT BUND TO BE PROVIDED FOR THE HOSE-REEL, PIPING CONNECTION, & PIG LAUNCHER. PROVISION TO BE MADE TO ENABLE PUMP OUT USING VACUUM TANKER TRUCK.
10. DURING UAN UNLOADING - THE HOSE WILL BE UNCOILED AND DRAGGED ACROSS TO THE SHIP MANIFOLD. PROVISION TO BE PROVIDED FOR A CROSS OVER RAMP TO PROTECT THE HOSE, SUITABLE FOR HEAVY VEHICLES.
11. POWER SUPPLY FOR HOSE-REEL, AIR COMPRESSOR FOR PIGGING, LIGHTING etc., TO BE PROVIDED FROM THE EXISTING ELECTRICAL SUBSTATION ADJACENT TO BERTH FINGER LOCATED MID-WAY ALONG THE SHIP BIRTH.
12. CONTROL SYSTEM CONFIGURATION TO BE CONFIRMED AND DETAILED AT THE D&C STAGE.
13. TRANSITION SUMP LOCATION TO BE CONFIRMED AT D&C STAGE.
14. SOFT PIGS SHALL BE USED FOR UNDERGROUND HDPE LINE.
15. BURIED PIPELINE ROUTE TO TAKE INTO ACCOUNT TREES AND OTHER POSSIBLE PROTECTED VEGETATION, EXISTING SERVICES (DIVERSION, RELOCATION OR CROSSING).
16. FOR ELECTRICAL AND STRUCTURAL INFORMATION REFER RESPECTIVE PROJECT DISCIPLINE DRAWINGS.

1:2500 @ A1 / 1:5000 @ A3 — 0 40 80 120 160 200 240 m

DO NOT SCALE FROM THIS DRAWING

CBH GROUP ABN 29 256 604 947

ACOR CONSULTANTS (WA) Pty Ltd — ENGINEERS MANAGERS INFRASTRUCTURE PLANNERS — JOB. No. PE190349

REF DRAWING No.	REFERENCE DRAWING TITLE
X_PE190349_ARCH	ARCHITECTURAL
X_PE190349_JETTY SURVEY	EXISTING JETTY SURVEY
X_PE190349_FACILITY SURVEY	EXISTING FACILITY SURVEY

REV	DATE	REVISION DESCRIPTION	BY	CHK'D	APP'D
-SKT	04.06.21	JETTY PIPE RUN UPDATED (IN BOLD)			PR
C	29.07.20	TENDER ISSUE	US	BM	BM
B	29.06.20	TENDER ISSUE	US	BM	BM
A	29.05.20	TENDER ISSUE	US	BM	BM

SCALE: AS SHOWN — SHEET: A1 — PROJECT: M2814 — CONTRACT No:

DRAWN	NS	27.03.20
CHECKED	BM	01.04.20
DESIGNED	US	01.04.20
DESIGN APPR	BM	01.04.20
PROJECT APPR	PR	

TITLE: KWINANA FERTILISER IMPORT FACILITY
FERTILISER FACILITY CONCEPT STAGE DESIGN
OVERALL FACILITY PIPING
GENERAL ARRANGEMENT

DRG No: 491-M2814-PI-DGA-0001 — SHEET: 1 OF 1 — REV: C-SKT

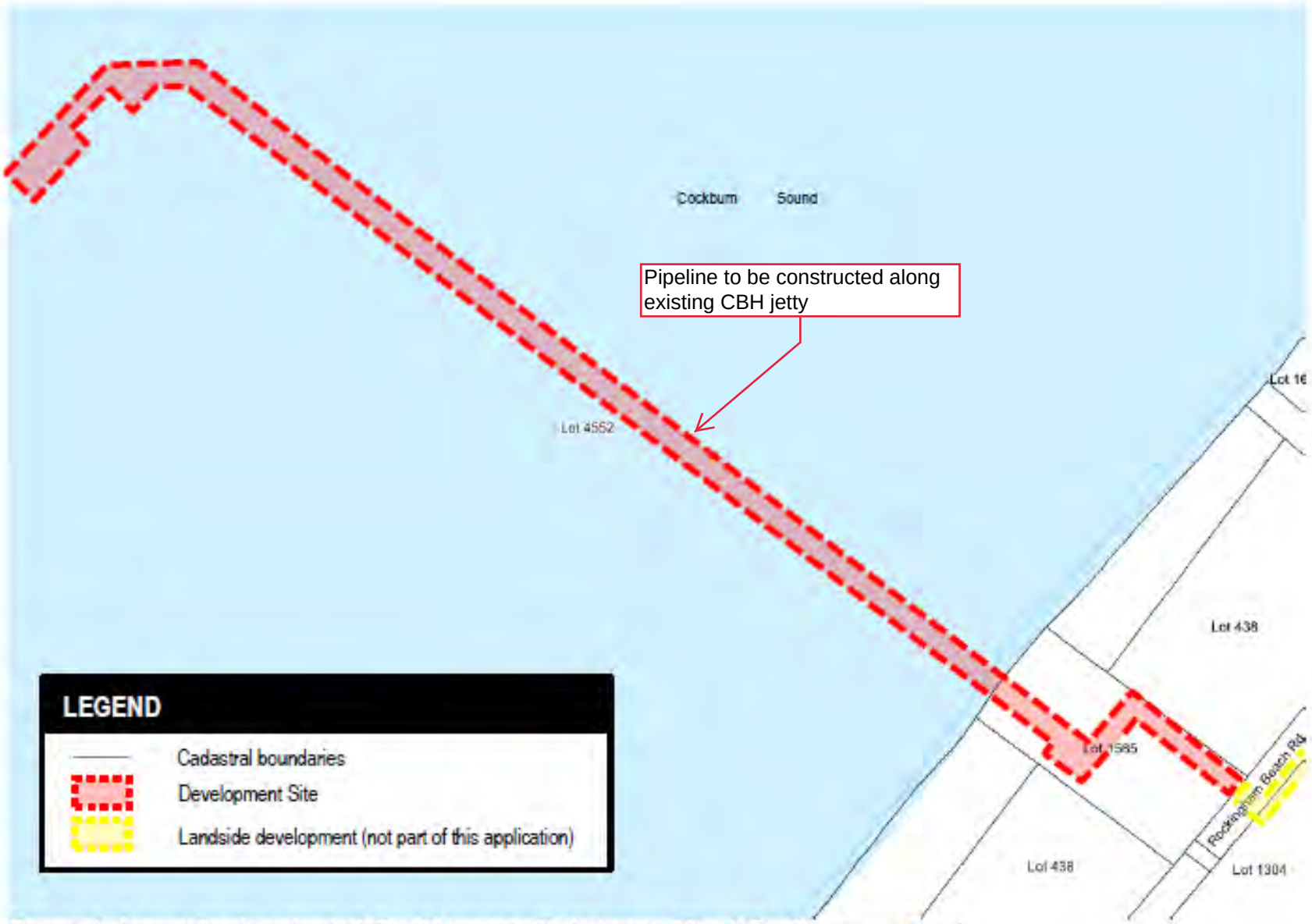
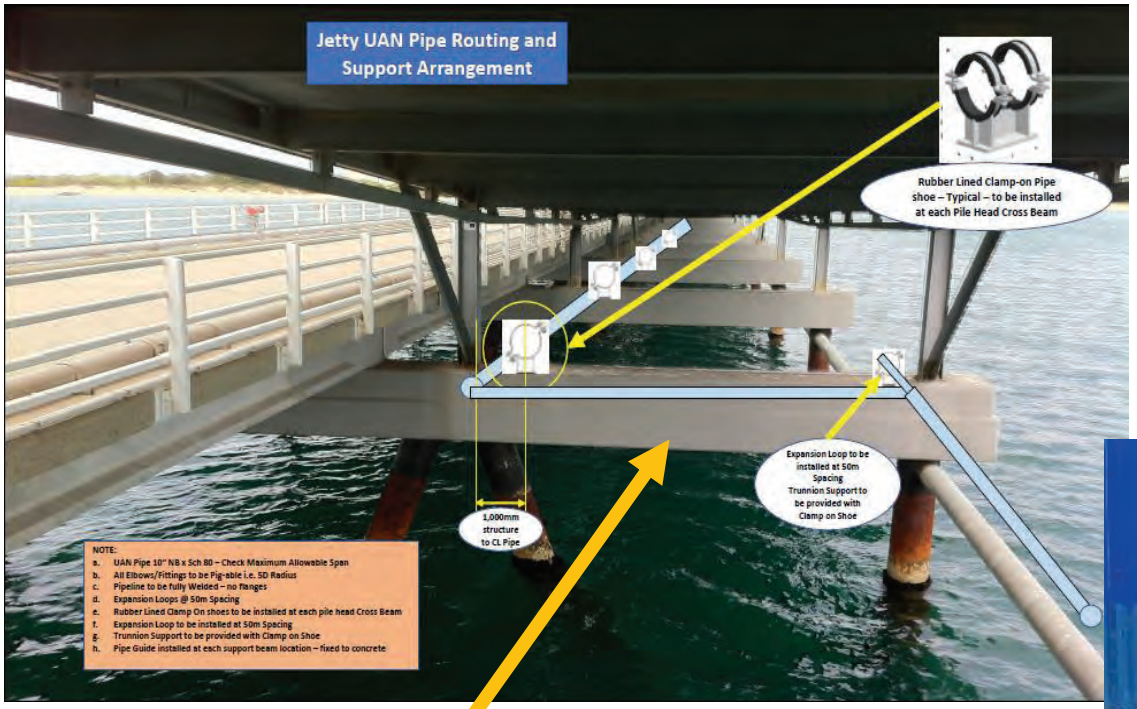


Figure 1: Approximate extent of development site (source: City of Rockingham; Acor)

Design Improvements

UAN Pipeline and routing

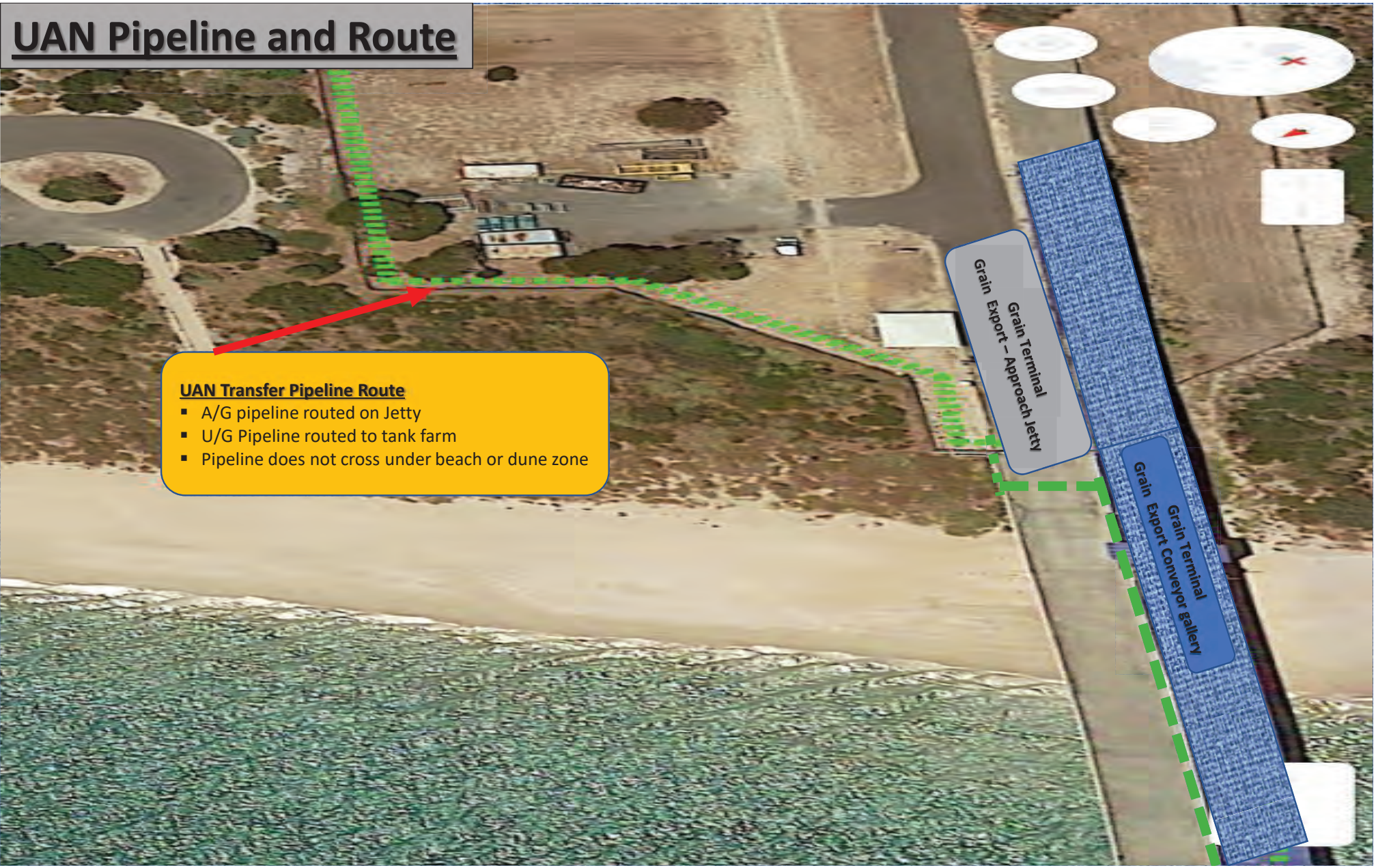


Previous - Pipeline and routing

Revised Improved

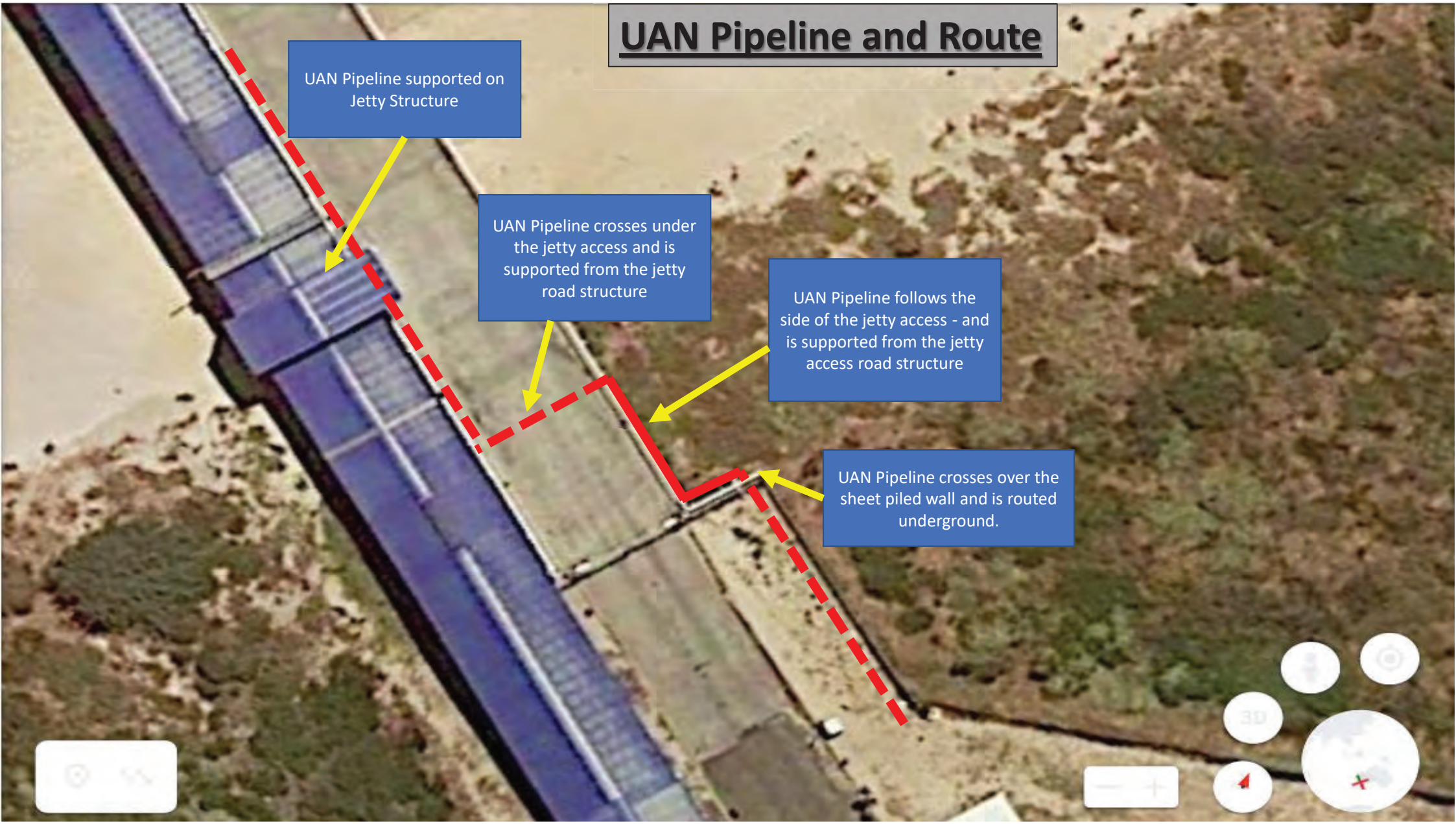
Pipeline and routing

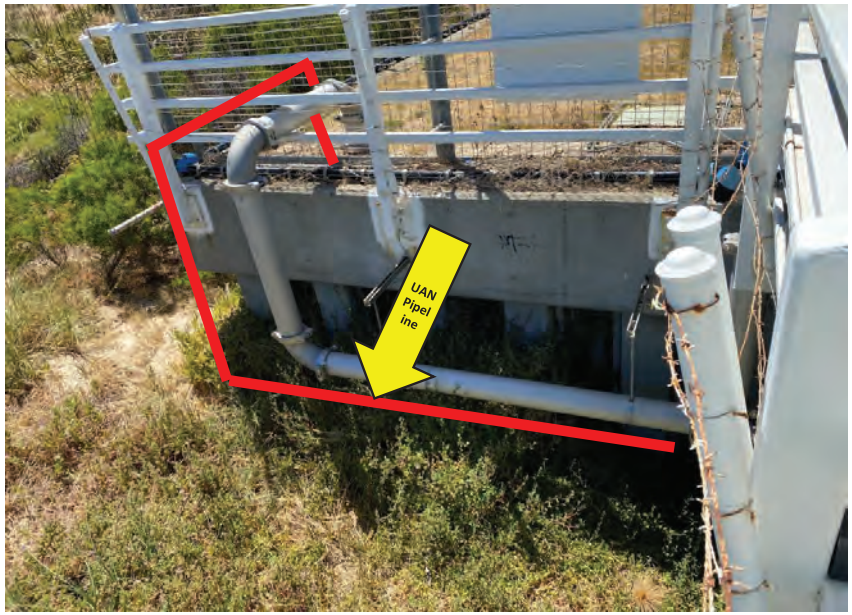
UAN Pipeline and Route



UAN Transfer Pipeline Route

- A/G pipeline routed on Jetty
- U/G Pipeline routed to tank farm
- Pipeline does not cross under beach or dune zone

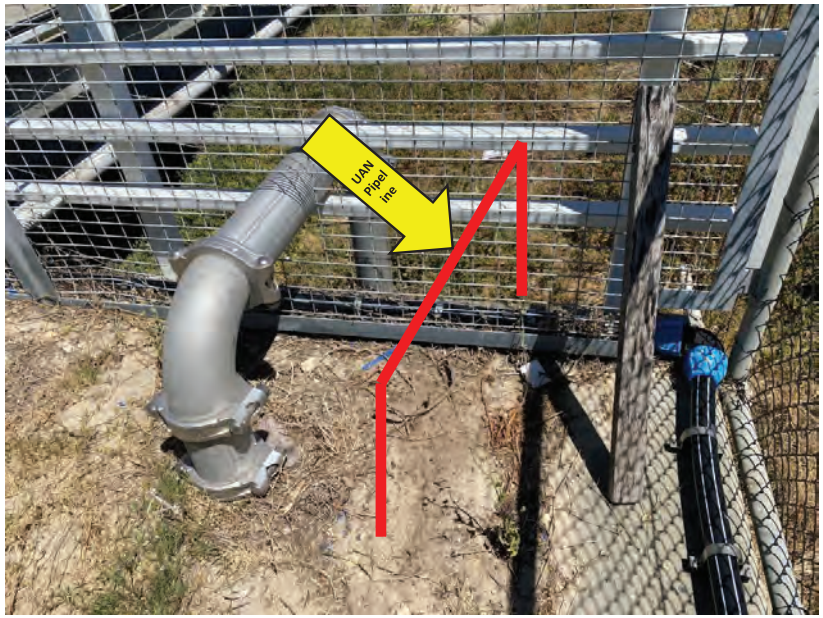

UAN Pipeline and Route
UAN Pipeline supported on Jetty Structure
UAN Pipeline crosses under the jetty access and is supported from the jetty road structure
UAN Pipeline follows the side of the jetty access - and is supported from the jetty access road structure
UAN Pipeline crosses over the sheet piled wall and is routed underground.



UAN Pipeline Route – Jetty end to Rockingham Beach Road Crossing

UAN Pipeline will cross under the jetty just before reaching the land side.

The pipeline will be supported on the jetty concrete and follow adjacent to the route of the existing Fire Water line prior to transitioning to U/G at the area west of the MSIC Security office



Legend

- Site Boundary
- Lot Boundaries
- Indicative Underground Pipeline Route

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED LANDGATE 2017
- OTHER DATA SOURCED LANDGATE 2018
- AERIAL PHOTOGRAPHY SOURCED LANDGATE 2018
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w www.360environmental.com.au

0 80 160 240 Meters
1:7,500 @ A4

N

LOCALITY MAP

PROJECT ID	DATE
3646	19/06/2020

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

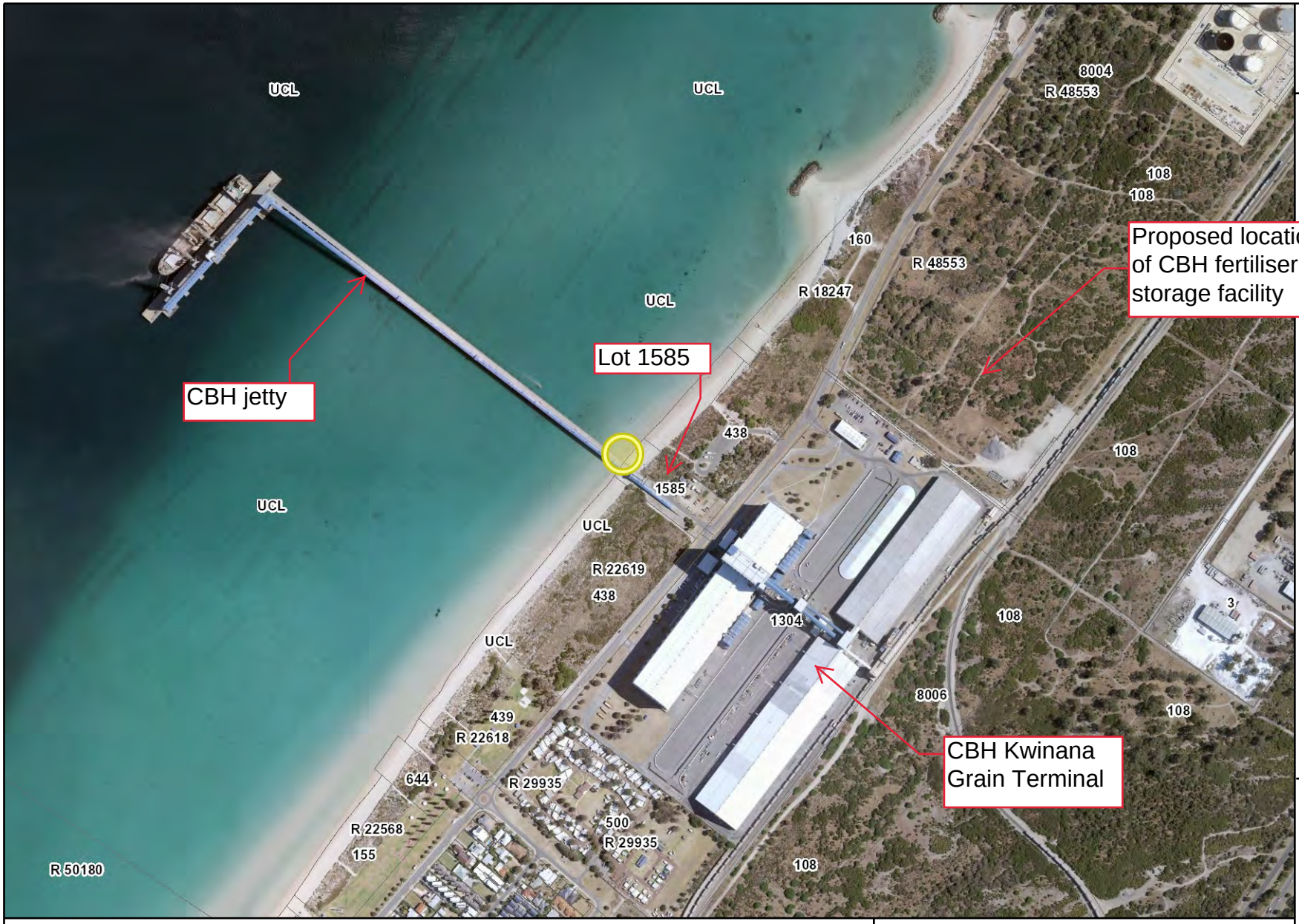
CREATED	CHECKED	APPROVED	REVISION
LF	AW	KC	0

CHB Kwinana Fertiliser Import Facility
Rockingham Beach Road

Environmental Management Plan

Figure 1
Site Location

K:\Projects\9.0 APP\3646 Kwinana Fertiliser Shed\3646 EMP\3646 EMP F01 Site Location.mxd



Department of Planning, Lands and Heritage

GOVERNMENT OF WESTERN AUSTRALIA

Legend

- Cadastre (View 1)

Notes:

* The data that appears on the map may be out of date, not intended to be used at the scale displayed, or subject to license agreements. The map should only be used in matters related to Department of Planning, Lands and Heritage business.

* This map is not intended for measurement purposes.

Map was produced using DPLH's InQuiry.

InQuiry Map

DPLH BUSINESS USE ONLY

Internal Spatial Viewer

N

0 0.22 0.43 Kilometres

1: 10,000

at A4

Projection: WGS 1984 Web Mercator Auxiliary Sphere

Date produced: 20-Apr-2021

Location Plan for: Development Application

This data is to be used only for the processing of Development Application

Application Number: **28-50182-2**
Decision: OUTSTANDING
Printed: 23/10/2020

Western Australian Planning Commission

Produced by Data Analytics,
Department of Planning, Lands and Heritage, Perth WA

Base information supplied by
Western Australian Land Information Authority SLIP 1096-2018-1

Application Status
- Approved
- Outstanding

Existing LPS Zones and Reserves
- R Code boundaries
- General industry
- Public open space
- Residential
- Special use

Easements and Referrals
- Easements

Region Scheme Reserves
- Parks and recreation
- Waterways
- Railways

Localities & Local Government Boundaries
- Local government boundary
- Locality

N
0 30 60 90 120
meters