Dardanup Park Pty Ltd

DARDANUP PARK

LOT 185 HAROLD DOUGLAS DRIVE AND 1 (LOT 2) HAROLD DOUGLAS DRIVE, DARDANUP WEST PRELIMINARY GEOTECHNICAL INVESTIGATION

November 2021
10012-G-R-001-00-Geotechnical Report

WML
Consulting Engineers

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1 EXECUTIVE SUMMARY

WML Consultants Pty Ltd ('WML') was engaged by Mr David Offer and Mrs Anne-Marie Offer ('the Client') to carry out a preliminary geotechnical investigation for the proposed subdivision at Lot 185 Harold Douglas Drive and 1 (Lot 2) Harold Douglas Driver, Dardanup West ('the site'). An investigation of the site was undertaken by WML in September 2021 to assess the proposed subdivision area for the capability of supporting the proposed development. This report addresses the following geotechnical matters:

- preliminary site classification in accordance with AS 2870-2011 "Residential Slabs and Footings" and recommendations for remedial works to improve the site classification,
- suitable footing systems, including preliminary allowable bearing capacity and settlements estimates,
- drainage conditions,
- geotechnical design parameters for earth retaining structures,
- design California bearing ratio (CBR) values for pavement design by others,
- bulk earthworks,
- preliminary Acid Sulphate Soil study.

In general, the site was underlain by three geological units: Bassendean Sand (typically overlying "Coffee rock"), Guilford Formation (represented by the variable type of soils, including clays, sandy clays, clayey sands and sands), and shallow Bassendean Sand over Guilford Formation. Encountered soils were typically loose to medium dense or soft to very stiff. Organic clay was identified in one of the test pits within the northern portion of the site, to a depth of 0.9 m below the ground surface. Groundwater seepage was observed at just over half of the investigation locations at depths ranging between 0.6 m and 1.4 m below the existing ground surface. A large portion of the lower-lying area of the site was waterlogged at the time of the investigation due to stormwater ponding on the clayey topsoil. Available groundwater monitoring data indicates that stabilised groundwater levels range from about 0.13 m and 1.33 m below the existing ground surface. Therefore, for the design of the site drainage and lot levels, a peak groundwater level is considered to be at the existing ground surface.

Based on the results of the investigation, a preliminary site classification of "Class P" is considered appropriate for the site due to the high groundwater table and loose/soft/organic deposits within the shallow depths, which lower the bearing capacity of the subgrade. However, the site classification can be improved to "Class A" or "Class S" following selective earthworks. Those earthworks would include removal of unsuitable organic/soft clay soils (where required), proof compacting the exposed subgrade and placement of clean sand fill material) to the required design lot levels. It is considered that rising the site levels by at least 1.2 m would provide sufficient separation from the groundwater and improve the site classification to "Class A" or "Class S". At least 1.5 m of clean granular fill material is required within this area (Dardanup) to achieve "Class A".

Assuming that the recommended remedial earthworks included in this report are completed, pad and strip footings may be designed for an allowable bearing pressure of 100 kPa. This recommendation is for pad footing widths between 0.5 m and 1.5 m and strip footings between 0.5 m and 1 m wide. Elastic settlements of up to about 20 mm are expected.

Any pavements supported on the existing subgrade should be designed using a CBR value of 4%. Should granular fill material be placed on site as part of the site classification improvement works, the design CBR can be reviewed. Drainage measures should be adopted to ensure that the subgrade and pavements do not become saturated in service. Adequate subsoil drainage shall be adopted in the proposed development.

Laboratory test results indicated that Potential Acidic or Acid Sulfate Soils might be present at the site. According to the "Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes" guideline prepared by DWER in June 2015, Bassendean Sands, whilst perhaps not fitting the traditional description of ASS, nonetheless have some acid generating potential and can release a significant amount of acidity and/or iron when disturbed. These soils have many of the same properties as ASS and should be investigated and managed as ASS would be. It is recommended that detailed ASS investigation, including chromium reducible sulphur testing, is performed within the areas where soil disturbance is likely.

2 INTRODUCTION

WML Consultants Pty Ltd ('WML') was engaged by Mr David Offer and Mrs Anne-Marie Offer ('the Client') to carry out a preliminary geotechnical investigation for the proposed subdivision at Lot 185 Harold Douglas Drive and 1 (Lot 2) Harold Douglas Driver, Dardanup West ('the site'). It is understood the works will include subdividing a portion of the 89 ha site into 37 new semi-rural/semi-residential lots covering an area of between 1.01 ha and 2.17 ha.

This report summarises our findings of the investigation together with recommendations for design and construction for the proposed development.

The geotechnical investigation was authorised by you via WML Consultancy Authorisation No 10012 dated 1st September 2021.

This report, and the information presented herein, must be read in conjunction with our attached 'Report Limitations'.

3 CLIENT-SUPPLIED DOCUMENTS

The following documents were provided by the Client to assist with the investigation:

- *'Subdivision Concept Plan; Lot 2 Harold Douglas Drive and Lot 185 Venn Road, Dardanup'*, prepared by Across Planning in September 2021 (Ref No. 21008-1-01a).

4 SITE SETTING AND PROPOSED DEVELOPMENT

The site is located in Dardanup West, approximately 13 km southeast of the Bunbury CBD and is bounded by Harold Douglas Drive and Venn Road to the North, existing drain to the east, and existing rural properties to the south and west. A site location plan is included in Drawings as '10012-G-001 Rev 0'.

At the time of the investigation, the site was typical farmland and included a residential house, several shed structures, one permanent bridge structure, a few temporary drain crossings, and water tanks. The remaining area comprised typical paddocks and was covered predominantly by grass and large trees. An open-drain intersected the site, entering from the south-eastern corner and exiting at the western boundary of the site. A series of smaller north-south and east-west trending drainage ditches were noted within the site, typically along with the existing fencing that divided the site into smaller paddocks. The existing ground surface was observed to be relatively flat within the majority of the site, and the current ground level is understood to be between about RL 22 m AHD and about RL 24 m AHD. A small sand dune was noted within lots 1008, 1009, 1010 and 1011, where ground levels were up to about 4 m higher than the rest of the site (up to about RL 28 m AHD).

At the time of the investigation fieldwork, approximately half of the site was inaccessible or difficult to access with the 4WD vehicle due to water ponding at the surface. Lots 1033, 1034, 1035, 1036, 1001, 1002, 1003, 1004 were predominantly inundated or covered by saturated topsoil. Some other lots comprised locally perched water and/or watering holes (Lots 1028, 1029, 1030, 1008, 1022, 1015, 1017, 1020, 1021, 1024, 1025).

Photographs depicting typical site conditions at the time of the investigation are presented in Figures attached to this report.

Based on the provided "Subdivision Concept Plan" prepared by Across Planning in September 2021, the site will be subdivided into 37 new semi-rural/semi-residential lots covering an area between 1.01 ha and 2.17 ha. No details of the proposed structures were known at the time of the preparation of this report. However, it is expected that the proposed structures will comprise up to double-storey residential buildings and single-storey shed structures, with associated water/septic tanks. It is expected that the structures will be supported on shallow pad/strip footings and ground-bearing slabs.

5 OBJECTIVES

The objectives of the investigation, as stated in our proposal dated 5 July 2021 (Ref No. 10012-G-P-001), were to:

- Assess the existing subsurface soil and groundwater conditions across the site,
- Provide a preliminary site classification(s) in accordance with AS 2870-2011,
- Provide recommendations and geotechnical design parameters for earth retaining structures,
- Recommend appropriate site preparation procedures, including compaction criteria,
- Advice on the re-use of in situ soils as fill,
- Design infiltration rates for disposal of treated effluent, and
- Provide a subgrade California bearing ratio (CBR) value for pavement design by others.

6 FIELD PROGRAMME

Fieldwork for the investigation was completed between the 7th and 8th September 2021 and comprised:

- A site walkover to observe existing site features and to take record photographs,
- Machine excavated test pits (TP) at 20 locations across the site, extending to a depth of between 1.2 m and 2.5 m below the existing ground surface,
- Testing with dynamic cone penetrometer (DCP) adjacent to each test pit, extending to a depth of between 0.95 m and 2.15 m below the existing ground surface,
- Field permeability testing using a Talsma-Hallam permeameter at four locations within site,
- Collection of disturbed soil samples from the test pits for geotechnical laboratory testing, and
- Collection of disturbed soil samples from the test pits for preliminary acid sulphate soils (ASS) testing.

A senior geotechnical engineer and a geotechnical engineer from WML completed the fieldwork, logged the materials encountered in the test pits and conducted the DCP and field permeability tests. The test locations were positioned in accordance with the site plan as included in 'Drawings' attached to this report (drawing No 10012-G-001, Rev 0). The summary of the investigations completed is presented in Table 1.

Table 1: Summary of the Investigation Fieldwork.

Test Location[1)]	Termination Depth (m)	Reason for Termination	Depth to Groundwater (m)	Stratigraphy
TP 1	2.5	Target depth	0.9[2)]	TOPSOIL over SAND (SP), over Sandy GRAVEL (GP), over Sandy CLAY (CH), over Clayey SAND (SC)
TP 2	2.0	Wet collapse	0.65[2)]	TOPSOIL over CLAY (CI), over SAND (SP), over Sandy CLAY (CI)
TP 4	1.6	Wet collapse	0.60[2)]	TOPSOIL over SAND (SP)
TP 5	1.9	Wet collapse	0.70[2)]	TOPSOIL over Sandy CLAY (CL) over SAND (SP)
TP 6	2.1	Dry collapse	GNE	TOPSOIL over SAND (SP)
TP 7	1.7	Wet collapse	GNE	TOPSOIL over SAND (SP), over "COFFEE ROCK"
TP 8	1.7	Dry collapse	GNE	TOPSOIL over SAND (SP)
TP 9	1.8	Wet collapse	0.8[2)]	TOPSOIL over SAND (SP), over Clayey SAND (SC), over SAND (SP)
TP 10	2.0	Dry collapse	GNE	TOPSOIL over SAND (SP)
TP 11	2.0	Dry collapse	GNE	TOPSOIL over SAND (SP)
TP 13	1.2	Wet collapse	GNE	TOPSOIL over Sandy CLAY (CI), over SAND (SP)
TP 14	1.9	Wet collapse	GNE	TOPSOIL over SAND (SP), over "COFFEE ROCK"
TP 15	1.9	Wet collapse	0.70[2)]	TOPSOIL over SAND (SP)
TP 16	1.8	Wet collapse	GNE	TOPSOIL over SAND (SP), over "COFFEE ROCK"
TP 18	2.5	Target depth	1.5[2)]	TOPSOIL over CLAY (CH), over Sandy CLAY (CI), over SAND (SP), over Clayey SAND (SC), over SAND (SP)
TP 20	2.0	Wet collapse	0.6[2)]	TOPSOIL over Sandy CLAY (CL), over SAND (SP)

TO 21	2.5	Target depth	1.2[2)]	TOPSOIL over Sandy CLAY (CH) over Clayey SAND (SC), over CLAY (CH)
TP 23	2.4	Wet collapse	0.9[2)]	TOPSOIL over Organic CLAY (OL), over Sandy CLAY (CH), over SAND (SP), over Sandy CLAY (CH)
TP 24	2.4	Wet collapse	0.6[2)]	TOPSOIL over Candy CLAY (CI), over Clayey SAND (SC)
TP 25	1.7	Wet collapse	1.4[2)]	TOPSOIL over CLAY (CH), over Clayey SAND (SC), over Sand (SP)

Notes: All depths are relative to the existing ground surface.

[1)] TP 3, TP 12, TP 17, TP 19 and TP 22 were removed from the scope of the investigation.

[2)] Groundwater seepage

6.1 Test Pits

The test pits were excavated using an 8-tonne excavator equipped with a toothed bucket supplied and operated by JAK Civil Pty Ltd.

The soil descriptions included on the test pit logs were completed in general accordance with AS1726-2017 *"Geotechnical Site Investigations"*. The test pit logs are presented in Appendix A. Test pits were excavated, logged, photographed and backfilled. When backfilling each test pit, the fill was tamped down with the back of the bucket every 0.5 m - 1.0 m and backtracked with an excavator when filled. Some of the test pits could not be compacted and required installation of safety fencing due to backfill soil being in a soft and saturated condition. The test pit locations are shown on Drawing 10012-G-001 attached to the report.

6.2 Dynamic Cone Penetrometer (DCP) Testing

The DCP tests were completed in accordance with AS 1289.6.3.2 *"Determination of the Penetration Resistance of a Soil – 9 kg Dynamic Cone Penetrometer Test"*. DCP blow counts are included on the test pit log profiles, Appendix A.

6.3 In-situ Permeability Testing

The permeability testing was completed using the Talsma-Hallam method in accordance with AS /NZS 1547:20212 *"On-site domestic wastewater management"*. The test results are provided in Section 7.4, Table 5.

7 LABORATORY TESTING

7.1 Geotechnical Testing

To assist in the evaluation of geotechnical design parameters and for confirmation of the visual classification of the soils, laboratory testing was carried out by Construction Sciences, a NATA accredited laboratory. The testing comprised the following:

- Moisture content on 8 samples (AS 1289 2.1.1)
- Particle size distribution on 8 samples (AS 1289 3.6.1)
- Atterberg limits on 7 samples (AS 1289 3.1.1, 2.1.1, 3.2.1, 3.3.1, 3.4.1),
- California Bearing Ratio (CBR) on 2 samples (AS 1289 6.1.1, 5.1.1, AS 2.1.1)
- Organic content on 1 sample (Walkley-Black method)

The results of the testing are presented in **Error! Reference source not found.**, with the laboratory test certificates i ncluded in Appendix B.

Table 2: Summary of Soil Classification Testing

Location	Depth (m)	Test	Moisture Content (%)	PSD			Atterberg's Limits			Soil Classification
				Fines (%)	Sand (%)	Gravel (%)	LL (%)	PI (%)	LS (%)	
TP 1	2.0	PSD/PI	20.9	52	36	12	56	39	16.0	Sandy CLAY (CH)
TP 9	0.3 – 0.8	PSD/PI	22.0	32	68	-	23	10	4.0	Clayey SAND (SC)
TP 18	0.5 – 1.0	PSD/PI	27.3	68	32	-	44	28	12.5	Sandy CLAY (CI)
TP 20	0.5 – 0.7	PSD/PI	20.1	42	58	-	30	17	7.0	Sandy CLAY (CL)
TP 21	0.5	PSD/PI	24.4	59	41	-	51	34	13.0	Sandy CLAY (CH)
TP 21	1.0	PSD/PI	20.0	22	66	12	36	22	9.5	Clayey SAND (SC)
TP 23	1.6	PSD/PI	31.0	64	36	-	-	-	-	Sandy CLAY (CH)
TP 25	1.4	PSD/PI	19.2	31	69	-	35	22	9.0	Clayey SAND (SC)

Notes: All depths are relative to the existing ground surface.
PSD – Particle Size Distribution; LL – Liquid Limit; PI – Plasticity Index; LS – Linear Shrinkage

Table 3: Summary of the CBR Testing

Test Pit	Depth (m)[1)]	Strength			Soil Type
		OMC[1)] (%)	MDD (t/m3)	CBR[2)] (%)	
TP 9	0.3 – 0.8	12.0	1.88	4.0	Clayey SAND (SC)
TP 20	0.5 – 0.7	14.0	1.84	6.0	Sandy CLAY (CL)

Notes: All depths are relative to the existing ground surface.
OMC – Optimum Moisture Content; MDD – Maximum Dry Density; CBR – California Bearing Ratio
[1)] Tested at 95% laboratory dry density ratio.
[2)] Soaked CBR value quoted at 5 mm penetration.

7.2 Acid Sulfate Soil Testing

Soil samples were collected at 0.5 m depth intervals from 10 test pit locations, placed on ice and kept frozen until delivery to Eurofins, a NATA accredited laboratory, for acid sulfate field testing. The results of the testing are attached in Appendix B and summarized in Table 4 below.

Table 4: ASS Laboratory Testing Summary

Test Pit	Depth	pH_F	pH_{Fox}	ΔpH	Reaction	Test Pit	Depth	pH_F	pH_F	ΔpH	Reaction
1	0.0	7.1	4.5	2.6	Strong	15	0.0	5.4	3.0	2.4	Strong
	0.5	6.2	3.7	2.5	Moderate		0.5	5.5	4.5	1.0	No reaction
	1.0	6.4	4.5	1.9	Strong		1.0	5.0	4.1	0.9	Moderate
	1.5	5.7	4.5	1.2	Moderate		1.5	4.8	4.2	0.6	Moderate
	2.0	5.8	4.5	1.3	Moderate		-	-	-	-	-
	2.5	5.5	4.3	1.2	Moderate		-	-	-	-	-
4	0.0	6.5	4.2	2.3	Strong	20	-	-	-	-	-
	0.5	6.2	4.9	1.3	Moderate		0.5	6.3	5.4	0.9	Moderate
	1.0	6.1	5.0	1.1	Moderate		1.0	7.2	5.6	1.6	Moderate
	1.5	5.7	4.5	1.2	Moderate		1.5	7.1	5.5	1.6	Moderate
	-	-	-	-	-		2.0	7.4	5.5	1.9	Moderate
	-	-	-	-	-		-	-	-	-	-
5	0.0	5.8	3.0	2.8	Extreme	21	0.0	5.8	4.1	1.7	Moderate
	0.5	5.5	4.2	1.3	Moderate		0.5	5.7	4.6	1.1	Moderate
	1.0	6.1	5.1	1.0	Moderate		1.0	5.8	4.7	1.1	Moderate
	1.5	6.0	5.0	1.0	Moderate		1.5	6.0	5.0	1.0	Moderate
	-	-	-	-	-		2.0	5.8	4.8	1.0	Moderate
	-	-	-	-	-		2.5	5.8	4.9	0.9	Moderate
6	0.0	8.0	5.0	3.0	Strong	23	0.0	6.7	3.2	3.5	Extreme
	0.5	6.0	3.5	2.5	Moderate		0.5	5.6	3.5	2.1	Extreme
	1.0	6.1	4.4	1.7	Moderate		1.0	6.0	4.8	1.2	Extreme
	1.5	5.8	5.0	0.8	No reaction		1.5	5.5	4.7	0.8	Moderate
	-	-	-	-	-		2.0	5.6	4.9	0.7	Moderate
	-	-	-	-	-		2.4	5.4	4.9	0.5	Moderate
10	-	-	-	-	-	-	-	-	-	-	-
	0.5	6.0	4.4	1.6	Moderate		-	-	-	-	-
	1.0	5.9	4.7	1.2	No reaction		-	-	-	-	-
	1.5	5.9	5.0	0.9	No reaction		-	-	-	-	-
	2.0	5.7	5.0	0.7	Moderate		-	-	-	-	-
	-	-	-	-	-		-	-	-	-	-
13	0.0	6.2	3.7	2.5	Strong	-	-	-	-	-	-
	0.5	6.3	3.9	2.4	Strong		-	-	-	-	-
	1.0	6.8	5.3	1.5	Moderate		-	-	-	-	-
	1.5	6.2	5.1	1.1	Moderate		-	-	-	-	-
	-	-	-	-	-		-	-	-	-	-
	-	-	-	-	-		-	-	-	-	-

Note: pH_f – pH field test; pH_{fox} – pH field peroxide test; red text highlights results that indicate Acidic Soils or Potential Acid Sulfate Soils (PASS).

8 SUBSURFACE CONDITIONS

8.1 Geology

The 1:50,000 scale Geological Map 'Bunbury-Burekup' indicates that the site is underlain by three geological units: BASSENDEAN SAND (Qpb), GUILFORD FORMATION (Qpa) and BASSENDEAN SAND over GUILFORD FORMATION (Qpb/Qpa).

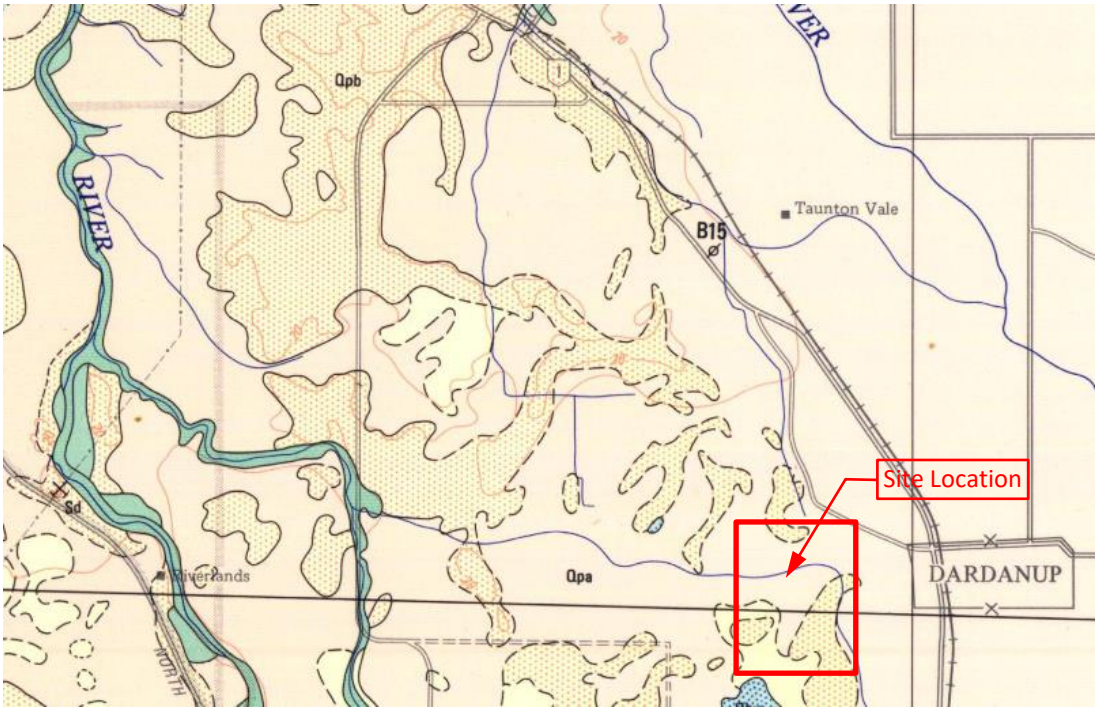


Figure 1: Extract from 1:50 000 Geological Map Series, "Bunbury-Burekup".

No published groundwater information was available for the site.

8.2 Sub-surface Profile

The site can be broken down into three zones based on the geology of the existing soils:

Zone 1: Bassendean Sand

This zone comprises low dunes of SAND (SP), generally fine to medium-grained, pale grey, grey and pale yellow mottled grey, but also yellow and yellow-orange, generally loose to medium dense, moist to wet and typically encountered to the test pit termination depths of between 1.6 m and 2.1 m below ground surface. At three test pit locations (TP 7, 14 and 16), an indurated sand layer was observed at the end of the test pit, commonly called 'Coffee Rock'. This layer was only visually identified immediately prior to the test pit collapse or was excavated as sand/gravel/cobble mix until test pit collapse.

Zone 2: Guildford Formation

This zone comprises mainly Alluvium represented by the variable type of soils, including Sandy CLAY (CL, CI, CH), Clayey SAND (SC), SAND (SP) and CLAY (CI, CH). There was no consistency in the structure of the layers or their thickness. The soils were typically brown mottled orange and grey, with a trace of fine-grained gravel, moist to wet, soft to very stiff (clays), or loose to dense (sands). At TP 1 and TP 2, Clayey SAND and Sandy CLAY with fine to medium-grained lateritic gravel were encountered from a depth of 2.1 m and 1.6 m, respectively.

A soft ORGANIC CLAY layer (OL) was encountered in TP 23 below the topsoil layer, to a depth of 0.9 m below the ground surface.

Zone 3: Shallow Bassendean Sand over Guilford Formation

This zone was observed only in one test pit, TP 1, and comprised SAND (SP) to a depth of 0.9 m below the ground surface underlain by 'Coffee Rock' excavated as Sandy GRAVEL (GP) to a depth of 1.3 m, which in turn was underlain by Sandy CLAY (CH) and Clayey SAND (SC) of Guilford Formation to the test pit termination depth of 2.5 m.

Topsoil was encountered at all test pit locations to a depth of between 0.1 m and 0.45 m below the existing ground surface.

8.3 Groundwater

At the time of the investigation fieldwork (beginning of September 2021), groundwater seepage was observed in 12 of the 20 test pits at depths between 0.6 m and 1.5 m below the existing ground surface.

No stabilized water table was observed during the investigation.

Based on the information provided by the Client, ten (10) groundwater monitoring wells were installed on site in the past, with the maximum recorded groundwater levels for 2021 (20 September 2021) between 0.13 m and 1.33 m below existing ground level.

A large portion of the site is susceptible to seasonal waterlogging due to the clayey nature of the topsoil within those areas and/or the underlying clay layer on top of which stormwater is ponding during the wet season and during/following heavy rainfall events. Therefore, groundwater is expected to influence the proposed development.

For the design of the drainage system, the pre-development peak groundwater level shall be considered at the existing ground surface for the majority of the site, except the elevated sand dune area located within the south-eastern portion of the site.

8.4 In-situ Permeability Testing

Four in-situ permeability tests were undertaken adjacent to TP 6, TP 8, TP 16 and TP 18 locations. Boreholes 90 mm in diameter and 500 mm depth were excavated and filled with water to saturate the surrounding soil. A constant head of water was applied, and a known volume of water was timed to dissipate. Generally, the permeability of the soil decreased with each successive test. No change in water level was observed adjacent to TP 18, potentially due to fully saturated soils. The results are tabulated below.

Table 5: Permeability Test Results

Location	Insitu Permeability Test	
	m/s	m/day
TP 6	$7.84*10^{-5}$	6.77
TP 8	$8.09*10^{-5}$	6.99
TP 16	$6.28*10^{-5}$	5.43
TP 18	Not recorded	Not recorded

Although the permeability test results indicate that the Bassendean Sand (Zone 1) can be classified as well-permeable, the maximum groundwater levels recorded in the existing groundwater monitoring wells indicate that poor drainage conditions exist within the existing low lying portion of the site.

9 GEOTECHNICAL DISCUSSION

Based on the results of the investigation, the site is considered geotechnically capable of supporting the proposed development, provided that site preparation/remediation measures recommended in Section 9 are adopted.

9.1 Site Classification

Based on the fieldwork and laboratory test results, a general and preliminary site classification of "Class P" is considered appropriate in accordance with Section 2, point 2.1.3 of AS2870-2011 "Residential Slabs and Footings". This is due to loose sands, soft clays and organic clays encountered within the site during the investigation fieldwork and high groundwater levels that may reduce bearing capacity and increase settlements.

The above site classification can be improved following the completion of site preparation/remedial works as detailed in Section 9. The recommended site preparation works depend on the existing soil profile and surface conditions, and it is expected that at the completion of the works, the site can be reclassified as follows:

- Class S – for areas of minimum 1.2 m of sand cover (fill, in-situ sand and/or both) over clayey subgrade; or
- Class A – for areas of minimum 1.5 m of sand cover over the clayey subgrade.

CLASSIFICATION BY CHARACTERISTIC SURFACE MOVEMENT (y_s)

Characteristic surface movement (y_s) mm	Site classification in accordance with Table 2.1
$0 < y_s \leq 20$	S
$20 < y_s \leq 40$	M
$40 < y_s \leq 60$	H1
$60 < y_s \leq 75$	H2
$y_s > 75$	E

Figure 2: Extract from AS2870:2011 (Table 2.3)

Sites with inadequate bearing strength or where ground movement may be significantly affected by factors other than reactive soil movements due to normal moisture conditions shall be classified as Class P. Class P sites include: the site contains uncontrolled or controlled fill as identified in AS 2870 Clause 2.5.3, soft or unstable foundations such as soft clay or silt or loose sands, landslip, mine subsidence, collapsing soils and soils subject to erosion, reactive sites subject to abnormal moisture conditions and sites that cannot be classified in accordance with AS 2870 Clause 2.1.2.

9.2 Footing Systems

Following completion of the site preparation and remedial works, it is considered that high-level footings (pad/strip footings) and ground-bearing slabs will be suitable to support residential structures up to 2-storey high and associated small shed structures.

Shallow footings should be designed in accordance with AS2870-2011 and should be embedded a minimum of 500 mm below the final finished ground level.

Assuming that the recommended preparation and remedial earthworks included in this report are completed, and compaction testing has confirmed that the required level of compaction has been achieved, pad and strip footings may be designed for an allowable bearing pressure of 100 kPa. This recommendation is for pad footing widths between 0.5 m and 1.5 m and strip footings between 0.5 m and 1 m wide. Elastic settlements of up to about 20 mm are expected.

It is assumed that footings for residential structures will not be carrying significant eccentric loading, such as below retaining walls. Foundations with significant eccentric loading or those designed to resist lateral forces must be assessed separately.

We have also assumed that the groundwater table will be located at a depth of at least 1 m below the proposed footing level. The above assumptions must be checked on site, and WML notified immediately if any of these assumptions are incorrect.

The bearing characteristics of the ground and the recommended safe bearing pressure rely on the adequate maintenance of the existing surface conditions, which is the responsibility of the contractor (during construction) and the owner (long term). Remedial works should be expected during construction after periods of wet weather, following any significant rainfall or if surface water is present in the vicinity of the site at any time (as this could soften the underlying subgrade). If water is observed at the site during the construction works, or any other unexpected changes in the ground conditions are observed on site, WML must be notified immediately to check the above assessment.

9.3 Drainage

Based on the nature of the in-situ soils and groundwater levels, it is considered that poor drainage conditions exist within the majority of the site, within the shallow subgrade (<2.5 m below ground surface). Good drainage conditions are considered only within the elevated sand dune zone located within the south-eastern portion of the site. At the time of the investigation, the trafficability within site was closely related to the existing subsurface and drainage conditions.

Shallow groundwater levels were recorded within approximately half of the site, and perched groundwater was observed at the surface within the northwester and north-eastern part of the site and several locations within the central and southern portion of the site.

It is recommended that any water introduced to the site be managed and directed to the main stormwater drain.

A suitable subsoil drainage system will be required to manage the risk of water being retained in drainage trenches adjacent to road pavements, etc. It is recommended that a minimum 1% slope be adopted when shaping the clayey subgrade at the site to encourage water drainage in the direction required. Grading and sealing the surface of the clay soil surfaces towards subsoil drains will also improve subsurface drainage.

Due to the nature of the existing subsurface conditions, the pre-development peak groundwater level shall be considered to be at the existing ground surface for the majority of the site, and therefore, the site in its current state is not considered suitable for on-site stormwater disposal, except for the south-eastern portion of the site (elevated sand dune).

Although no documents addressing the required finished floor levels in respect to groundwater/flood levels issued by the Shire of Dardanup were available, the other local government policies (including City of Bunbury “Local Planning Policy; Development in Flood Affected Areas”) indicate that the following should be considered when designing the finished floor levels:

- The drainage system is to be designed so that the floor levels of all habitable buildings are a minimum of 300 mm above the 100-year ARI storm flood level, and
- finished floor levels are to be a minimum of 1.2 m above the pre-development peak groundwater level. If the land is to be filled, then subsoil drainage is to be placed to maintain the peak groundwater at its pre-development level.

9.4 Earth Retaining Structures

No details about proposed retaining structures were available at the time of the preparation of this report.

The following earth pressure coefficients for granular backfill material may be adopted to earth retaining structures:

Table 6: Geotechnical parameters for earth retaining structures.

Soil layer	Density / Consistency	Active Earth Pressure Ka	Passive Earth Pressure Kp	Unit weight γ (kN/m³) moist/saturated	Drained Cohesion c' (kPa)	Phi φ' (°)
SAND (FILL)	Medium Dense	0.295	3.39	18/20	0	33
	Dense	0.259	3.85	19/21	0	36

Wall friction has not been accounted for when prescribing the above values as the wall may be subject to vibration caused by vehicular loading and settlement.

All retaining walls should be designed for lateral loads due to hydrostatic build-up behind the wall, say at least half the wall height, even if the wall backfill is designed to be fully drained.

It is imperative that adequate drainage be provided. Backfill behind the wall, if required, should be a free-draining material, 20 mm same size aggregate, to ensure that hydrostatic pressures are not allowed to develop.

Any compaction process of the backfill material behind the retaining wall generates lateral stresses within the fill, which can act against the back of the wall. If the stresses are high enough, they can lead to movement or deformation of the wall. The effect of the compaction shall be taken into account during the design of the wall. Care should be taken to not overcompact the drainage backfill behind the retaining wall.

9.5 Pavement Subgrade

Two bulk subgrade samples were selected for testing from the near-surface soil layers. The soaked California bearing ratio (CBR) tests sampled from these areas produced results as shown in Table 3, Section 6.1. The CBR tests were performed on samples compacted to a target density ratio of 95% of modified maximum dry density at about optimum moisture content.

The CBR test results indicated the lowest CBR value of 4 %. To account for natural variations within the clayey subgrade, a design subgrade CBR of 4 % can be adopted for flexible pavement design for the proposed development, provided that at least 150 mm of capping layer is placed on the exposed subgrade. This recommendation assumes that the subgrade will be compacted to a minimum density ratio of 95% MMDD and that the capping layer thickness is not included in the overall thickness of pavement. Should cut/fill works be planned on site, including placement of fill material as part of site classification improvement works, the design CBR can be reviewed.

Drainage measures should be adopted to ensure that the subgrade and pavements do not become saturated in service. Adequate subsoil drainage shall be adopted in the proposed development.

The exposed subgrade should be closely inspected at the time of construction to ensure that material of lower than the assumed design strength does not support the pavement at any locations. Should weaker subgrade material be encountered, consideration should be given to removing and replacing the weak strata with higher quality material or reassessing the pavement design.

10 EARTHWORKS

At the time of the preparation of this report, no information regarding the proposed bulk earthworks strategy for the development was available. The following measures outlined below are aimed at improving the site in preparation for the construction of on-ground slabs, shallow footings, pavements and low-height retaining walls.

We have considered preparation earthworks for roads and paved areas separately from future building areas, as it is expected that the access roads will be required to maintain levels close to the existing site levels and will be constructed using appropriate drainage layer and subsoil drainage.

The earthworks should be constructed in accordance with AS 3798:2007 – "Earthworks for Residential and Commercial Developments". The below construction and site preparation recommendations are considered minimum requirements. This report is not intended for use as a specification for construction.

It should be noted that during and immediately after the wet season, the site may be difficult to access, and the subgrade performance will be significantly reduced. Measures to protect clayey subgrades during wet weather periods should include surface run-off collection grading and sealing clayey subgrade surfaces using a smooth drum roller, and diverting surface water away from construction areas. Other subgrade protection measures such as temporary trafficable layers and prevention of construction traffic over poor subgrade areas during wet periods may also be effective.

10.1 Site Preparation

The site preparation recommendations included below assume that any subgrade improvement works for residential sites will include building up site levels using inert granular fill materials (such as non-reactive sand) to increase the vertical separation between the footings/slabs and the groundwater levels and to minimise potential surface movements due to the presence of reactive clays at some parts of the site. Based on the results of the investigation and the groundwater monitoring data available, it is recommended to raise the existing site levels by at least 1.2 m to provide a minimum clearance of 1.2 m between the peak-groundwater levels and the finished floor levels. This requirement will not apply to the south-eastern portion of the site comprising the elevated sand dune area, where this clearance is already provided.

The following preliminary site preparation measures are recommended:

10.1.1 Future Building Sites – Zone 1 and Zone 3

- Strip all vegetation and topsoil from the site (including grubbing out of any tree roots and root zones). Depressions formed by the removal of vegetation and tree roots should have all disturbed soil cleaned out and be backfilled with approved granular fill.
- Moisture condition the exposed sand subgrade (if required), and proof compact exposed surface using at least 6 passes of suitable compaction equipment to achieve a minimum dry density ratio of 95% MMDD at +/- 2% optimum moisture content (OMC) to a depth of 1 m below ground surface,
- Any identified weak areas must be excavated and replaced with approved granular fill.
- Place select fill on the prepared and certified natural subgrade to the required levels in layers not exceeding 300 mm and compact each layer to a minimum dry density ratio of 95 % MMDD at +/- 2% OMC,
- Verify that the required compaction in any placed fill has been achieved by on-site testing and inspection,
- Complete bulk excavation in cut areas to the underside of footings/ top of subgrade level and stockpile for re-use if required,
- Conduct on-site testing to confirm compaction requirements have been achieved to a minimum depth of 900 mm below all footings,
- Construct footings in accordance with structural engineers design.

Please note that the removal of trees may result in a temporary rise in groundwater levels.

Water seepage issues are expected on site during periods of wet weather due to the presence of permeable in-situ sands and high groundwater. Future flood levels must be considered when setting site development levels and planning earthworks.

It is recommended that the foundation construction works be planned for a period of dry weather and that any excavations remain open for the shortest possible duration to prevent ground softening and the possible deterioration of the subgrade. Any areas of the subgrade that have softened or been exposed to erosion by surface water must be excavated and replaced with approved granular fill.

10.1.2 Future Building Sites – Zone 2

- Strip all vegetation and topsoil from the site (including grubbing out of any tree roots and root zones). Depressions formed by the removal of vegetation and tree roots should have all disturbed soil cleaned out and be backfilled with approved clayey fill.
- Any identified organic CLAY layers (encountered in TP 23) must be excavated and replaced with approved clay, sandy clay or clayey sand fill. Backfilling depressions formed in clay layers using well permeable granular fill should be avoided due to potential "pool effect" risk.
- Any exposed CLAY layers shall be graded and sealed with a smooth drum roller to drain water away from the building footprints and foundation areas. It is recommended that a minimum 1% fall slope shall be used to promote water movement away from footings. Grading the clay surface towards subsoil drains will improve subsurface drainage.
- Moisture condition exposed subgrade (if required) and proof compact exposed surface using at least 6 passes of suitable compaction equipment to achieve a minimum DDR of at least 95% MDD (standard compaction) at +/-2% OMC.
- Any identified weak areas must be excavated and replaced with approved clayey fill.
- Place select fill on the prepared and certified natural subgrade to the required levels in loose layers not exceeding 300 mm and compact each layer to a minimum dry density ratio of 95 % MMDD at +/- 2% OMC,
- Verify that the required compaction in any placed fill has been achieved by on-site testing and inspection,
- Complete bulk excavation in cut areas to the underside of footings/ top of subgrade level and stockpile for re-use if required,
- Conduct on-site testing to confirm compaction requirements have been achieved to a minimum depth of 900 mm below all footings,
- Construct footings in accordance with structural engineers design.

10.1.3 Future Roads

- Topsoil and vegetation shall be removed from the site as per recommendations in 9.1.1 and 9.1.2.
- Any exposed clayey subgrade shall be graded and sealed with a smooth drum roller to promote drainage away from the road corridor. It is recommended that a minimum of 1% all slope be adopted to promote water drainage. Grading the clay surface towards the subsoil drains will improve subsurface drainage.
- Moisture condition exposed subgrade (if required) and proof compact exposed surface using at least 6 passes of suitable compaction equipment over exposed subgrade to achieve a DDR of at least 95% MDD (Standard compaction for clay subgrade, modified for granular subgrade) to a depth of 0.5 m below all pavements. Any identified weak areas must be excavated and replaced with approved fill to satisfy the specified compaction requirements.
- Any approved fill materials used to improve the subgrade or build up subgrade levels shall be placed in loose layers not exceeding 300 mm and compacted to a minimum dry density ratio of 95 % MMDD at +/- 2% OMC.
- For subgrade CBR <12%, the pavement thickness design may be based on CBR 12%, provided that a sufficient soil improvement layer is placed below the pavement. The thickness of this layer shall be determined by pavement engineers.
- Without a specific subgrade improvement design, a design CBR value of 4% may be adopted for the design of pavements, provided that a capping layer of 150 mm is placed over the clayey subgrade.

- At least 150 mm of approved capping fill must be placed immediately above the subgrade classified as being 'expansive' (such as the clay soils encountered at the site). The capping layer fill can comprise a lower sub-base quality material, in-situ stabilised material, or imported fill material with the assigned swell of not more than 1.5% (AS 1289.6.1.1) and permeability not higher than $1x10^{-9}$ m/sec. The capping fill shall extend for a distance of at least 1 m behind the back of the kerb and channel or the edge of the pavement if there is no kerb and channel.
- Where the subgrade is classified as being expansive (such as the clay soils encountered on the site), subsoil drains must be designed to be contained wholly within the capping layer. In addition, no part of the subsurface drainage trench shall be located within 150 mm of the underlying subgrade. If necessary, the capping layer may have to be thickened to satisfy this requirement.

10.2 Compaction

Any exposed subgrade must be compacted using suitable plant and equipment to a DDR of at least 95% MDD (standard compaction for clays, modified compaction for sands and gravels) as determined in accordance with AS 1289 5.1.1 or 5.2.1.

Approved granular fill and in-situ sands beneath footings, slabs and flexible pavement areas must be compacted using suitable plant and equipment to a DDR of at least 95% MMDD as determined in accordance with AS 1289 5.2.1.

Field density tests shall be used to check the compliance of the compacted material. The tests shall be carried out at the frequency detailed in Table 8.1 of AS3798:2007 ***Type 1***.

- Method 5.3.1 of AS 1289 (Sand replacement method using a sand-cone pouring apparatus);
- Method 5.8.1 of AS 1289 (Nuclear surface moisture-density gauge).

For clean in-situ sand and imported clean sand fill, alternatively to the above methods, a Perth Sand Penetrometer (PSP) may be used for compaction control. An on-site PSP calibration against another controlled compaction testing method must be completed, and the results of this calibration must be provided to the Engineer prior to use of the PSP for general testing. Logs of all PSP tests are to be provided to the Engineer progressively.

The following blow counts must be met as a minimum (if calibrated PSP test results indicate higher blows are required to meet the compaction requirements, then the higher blow counts are to be adopted).

Table 7: Minimum PSP Blow Counts

Depth	Blow count/300mm
150 – 450mm	8
450mm – 750mm	10
750mm – 1050mm	12
1050mm – 1350mm	12+

Over excavation and replacement of loose materials may be required where the minimum dry density ratios cannot be achieved.

10.3 Excavatability

The excavatability of the natural strata on site (to a depth of at least 2.5 m) should cause no problems for excavation using conventional plant, with the encountered soils being within the excavation limits of a smaller dozer (eg Cat D6 or similar) in bulk excavations or medium size backhoe (eg Case 500 or similar) in trench excavations.

If any variation from the material outlined in the attached test pit logs is encountered, WML should be contacted immediately to assess the nature of the strata. All confined excavations or trenches deeper than 1.5 m shall be fully supported or battered in accordance with occupational health and safety regulations.

10.4 In-situ Material Quality

Material won from excavation work carried out on site within Zone 1 is expected to comprise fine to coarse-grained BASSENDEAN SAND (SP), which is considered to be a good quality fill material. Any Sandy CLAYS and Clayey SANDS identified in Zone 2 and 3 are considered not suitable for re-use.

10.5 Structural Fill

All imported granular fill materials used on this project must conform to the material requirements of AS3798-2007 "*Guidelines for Earthworks for Commercial and Residential Developments*".

10.6 Batter Slopes

The sides of any excavations must be battered back to a suitably stable angle to allow the works to be completed safely. For initial site preparation works, previous experience has indicated that the following maximum cut/fill batter slopes, for batter heights not exceeding 4 m, may be adopted:

Table 8: Maximum Unprotected Batter Slopes.

Material	Short Term (maximum) Height <4m[a)]	Long Term (maximum) Height <4m[a)]
Compacted FILL (SAND)	1V:2.5H	1V:3H[b)]
Medium Dense to Dense SAND	1V:2.5H	1V:3H [b)]
Firm to Stiff CLAY	1V:2H	1V:2.5H

Notes:

[a)] For batter slopes higher than 4 m, a further assessment shall be carried out.

[b)] Surface protection required

11 ACID SULFATE SOILS

Forty-six (46) field test results were assessed using the following criteria:

- pH_f less than 4;
- pH_{fox} less than 3;
- The change in pH was greater than 2;
- There was a strong reaction following the addition of hydrogen peroxide;
- A sulphurous smell was present during sampling;
- Dominant vegetation on site is characteristic of vegetation tolerant to salt, acid and/or waterlogging.

The presence of Actual Acid Sulfate Soils (AASS) is indicated by pH_f value of less than 4. The results of this investigation did not identify any samples with a pH_f less than 4 requiring the assessment of further ASS indicators to determine if Potential Acid Sulfate Soils (PASS) are present on site.

Twenty (20) samples from seven (7) test pits indicated that Potential Acidic or Acid Sulfate Soils might be present at the site.

According to the "Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes" guideline prepared by DWER (former DER) in June 2015, Bassendean Sands, whilst perhaps not fitting the traditional description of ASS, nonetheless have some acid generating potential and can release a significant amount of acidity and/or iron when disturbed. These soils have many of the same properties as ASS and should be investigated and managed as ASS would be.

It is recommended that detailed ASS investigation, including chromium reducible sulphur testing, is performed within the areas where soil disturbance is likely.

12 FUTURE INVESTIGATIONS

The spacing of the investigation locations and the quantity of geotechnical testing performed can be considered suitable for a preliminary investigation. If these sites are to be developed, we recommend further geotechnical investigations are to be undertaken within the proposed building envelopes on a lot by lot basis to gather data suitable for detailed site classification, design and recommendations.

Further testing should be carried out to confirm the extent of the organic clays identified in TP 23.

13 SAFETY IN DESIGN

This project has design elements, however, these elements are considered rudimentary, with the associated risks and hazards being widely known and understood. Any competent person carrying out this type of work should be aware of these hazards and apply standard industry practices to mitigate the risks.

14 CLOSURE

We trust that the above and attached meet your present requirements. If you have any questions or need more information, please contact the authors of the report.

We draw your attention to the attached “Report Limitations” included with this letter report. This information sheet is intended to provide additional information about this letter report and information included within it. This information is provided not to reduce the level of responsibility accepted by WML but to ensure that all parties that rely on this report, and the information contained herein, are aware of the responsibilities that each assumes in so doing.

15 REFERENCES

1. Geological Series Map 1:50,000 Scale 'Bunbury-Burekup';
2. AS 1726:1993 – Geotechnical Site Investigations;
3. AS 3798:2007 - Guidelines on earthworks for commercial and residential developments;
4. Acid Sulfate Soils Risk Map 50k (DWER-049) – Department of Water and Environmental Regulations;
5. "Identification and investigation of acid sulfate soils and acidic landscapes" – Department of Environment Regulation, June 2015;
6. City of Bunbury – Local Planning Policy: 'Development in Flood Affected Areas'.

LIMITATIONS

REPORT LIMITATIONS

WML have undertaken investigations, performed consulting services, and prepared this report based on the Client's specific requirements, documents and information supplied, and previous experience. If changes occur in the nature or design of the project, we should be allowed to review this report and provide additional recommendations, if any. It is the responsibility of the Client to transmit the information and recommendations of this report to the appropriate organisations or people involved in design of the project, including but not limited to developers, owners, buyers, architects, engineers, and designers.

We performed our professional services in accordance with generally accepted geotechnical engineering principles and practices currently employed in the area; no warranty, expressed or implied, is made as to the professional advice included in this report.

Any data provided by third parties including, but not limited to: sub-consultants, published data, and the Client, may not be verified and WML assumes no responsibility for the adequacy, incompleteness, inaccuracies, or reliability of this information. WML does not assume any responsibility for assessments made partly or entirely based on information provided by third parties.

This repot has been prepared based on investigation locations which are explicitly representative of the specific sample or test points. Interpretation of conditions between such points cannot be assumed to represent actual subsurface information and there are unknowns or variations in ground conditions between test locations that cannot be inferred or predicted.

This report is based upon field and other conditions encountered at the time of report preparation. If unexpected subsurface conditions are encountered, WML shall be notified immediately to review those conditions and provide additional and/or modified recommendations, as necessary.

Our services did not include any contamination or environmental assessment of the site or adjacent sites. The nature of geotechnical investigation differs from the environmental investigation practice. If you require any environmental considerations to be applied to your project, WML can advise on further steps to be undertaken.

Geotechnical assessments are typically based on judgment of the investigation data and visual observations of the site and materials.

This document must not be subject to unauthorised use that is, reusing without written authorisation of WML. Such authorisation is essential because it requires WML to evaluate the document's applicability given new circumstances, not the least of which is passage of time.

FIGURES

PHOTO SHEET

Job No.:	10012
Job Title:	Geotechnical Investigation
Project:	Dardanup Park
Location:	1 Harold Douglas Drive, Dardanup West, WA
Photo Title	Site Photographs

Figure 1: Looking west across the site from TP 20 location.

Figure 2: Looking southeast across the site from TP 25 location. Ponding water at the ground surface.

Figure 3: A drainage channel stretching from southeast to northwest discharging to the existing drain noted north of TP 16 location.

Figure 4: Water ponding adjacent to TP 13 location.

Figure 5: Looking east from TP 13 location. Ground surface slightly rising towards east.

Figure 6: Looking northwest from TP 11 location. Existing drain on the right and shed structures on the left.

Figure 7: Looking southwest from TP 21 location.

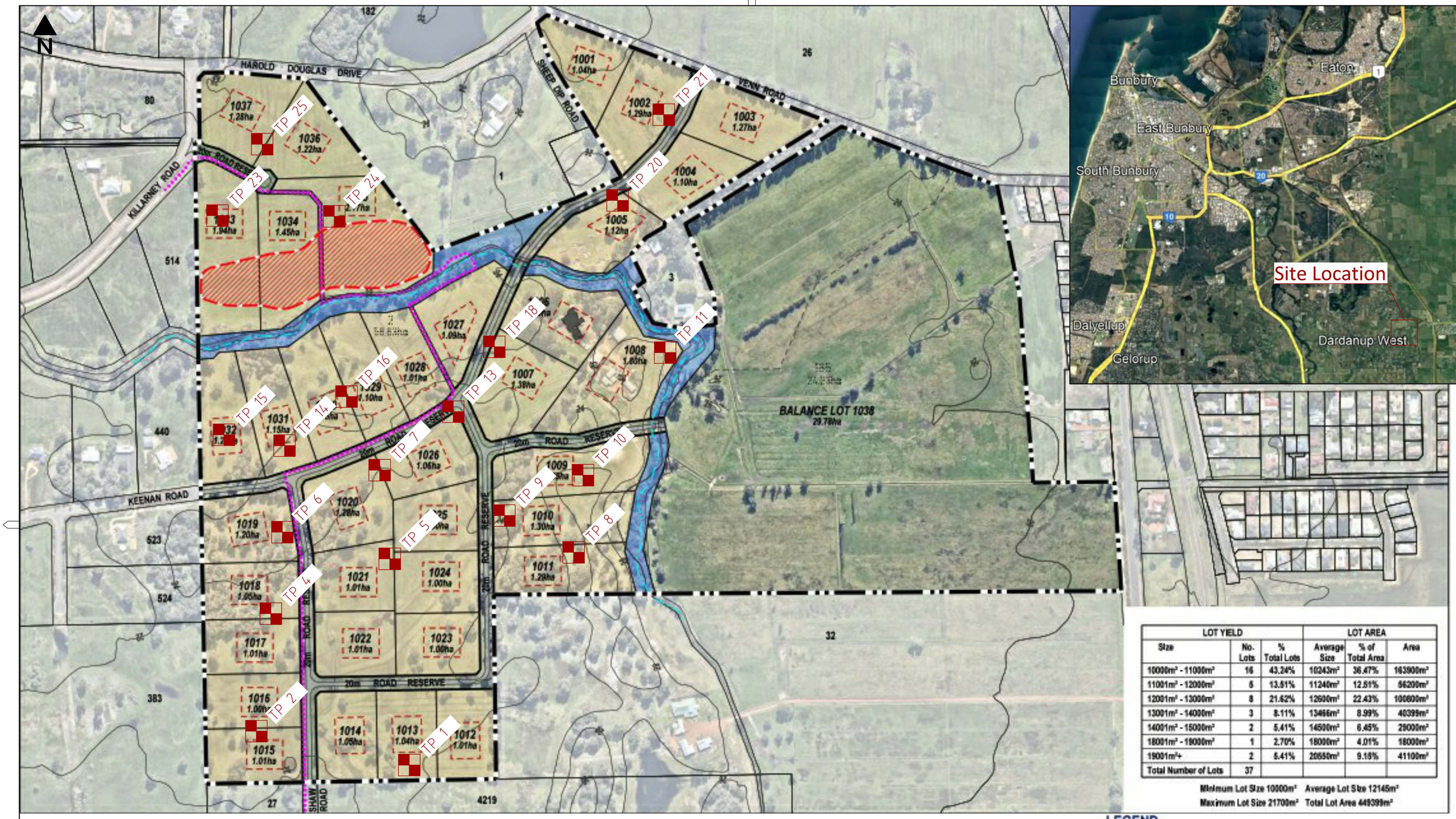
Figure 8: Waterlogging east of the TP 21.

Figure 9: Looking southwest towards observed inundated area located west of TP 5.

Figure 10: Looking east towards observed inundated area located east of TP 5.

Figure 11: Looking southwest from TP 2 location.

DRAWINGS



LOT YIELD			LOT AREA		
Size	No. Lots	% Total Lots	Average Size	% of Total Area	Area
10000m² - 11000m²	16	43.24%	10243m²	36.47%	163900m²
11001m² - 12000m²	5	13.51%	11240m²	12.51%	56200m²
12001m² - 13000m²	8	21.62%	12600m²	22.43%	100800m²
13001m² - 14000m²	3	8.11%	13466m²	8.99%	40399m²
14001m² - 15000m²	2	5.41%	14500m²	6.45%	29000m²
18001m² - 19000m²	1	2.70%	18000m²	4.01%	18000m²
19001m²+	2	5.41%	20550m²	9.15%	41100m²
Total Number of Lots	37				

Minimum Lot Size 10000m² Average Lot Size 12145m²
Maximum Lot Size 21700m² Total Lot Area 449399m²

NOTES

1. REFER TO REPORT 10012-G-R-001 FOR INVESTIGATION AND DESIGN INFORMATION.

LEGEND

TP 21 TEST PIT LOCATION

LEGEND

- SUBJECT SITE
- PROPOSED BOUNDARY
- EXISTING BOUNDARY
- PROPOSED DRAIN RESERVE
- BUILDING ENVELOPE (Max 2000m²)
- EXISTING BUILDING / STRUCTURE TO BE RETAINED
- BUILDING EXCLUSION ZONE (Susceptible to seasonal waterlogging)
- BRIDLE TRAIL
- 1.0m CONTOURS
- EXISTING DRAIN

PLAN
1:2500

SCALE A1

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REVISIONS				
N°.	DESCRIPTION	APPROVED	DATE	DRAWN
A	ISSUED FOR REVIEW		20.10.2021	AG

NOTE: INDICATES SIGNATURES ON ORIGINAL ISSUE OF DRAWING OR LAST REVISION OF DRAWING

	NAMES PRINTED IN FULL	DATE
DESIGNED	A.GORCZYNSKA	OCT' 2021
DRAWN	A.GORCZYNSKA	OCT' 2021
VERIFIED		
APPROVED		

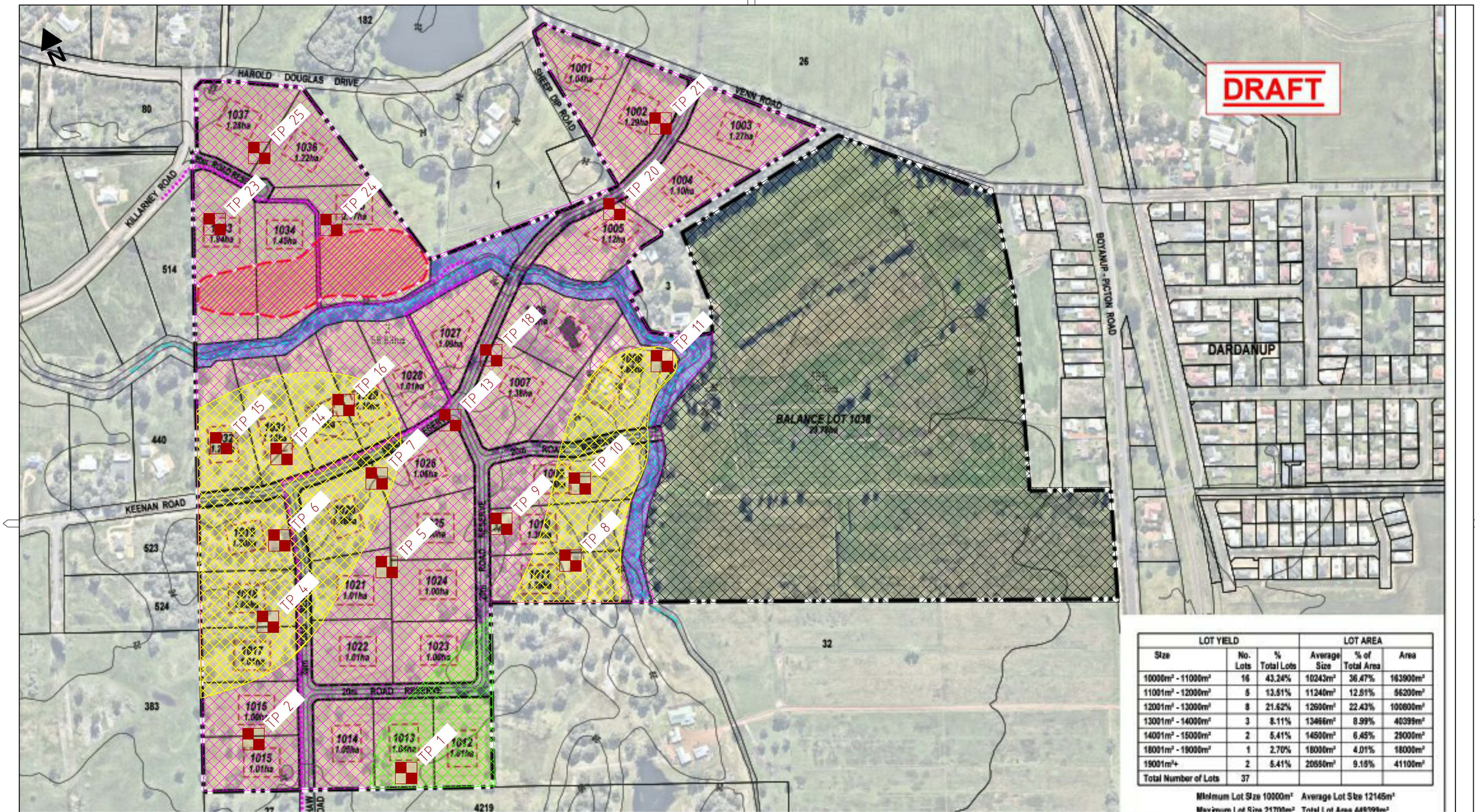
CLIENT: DARDANUP PARK PTY LTD

PROJECT: 1 HAROLD DOUGLAS DR, DARDANUP WEST

DRAWING TITLE: SITE INVESTIGATION PLAN

THIS DRAWING SHALL BE TREATED AS PRELIMINARY AND IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED.

DRAWING NUMBER: 10012-G-001 REVISION: 0



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NOTES

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LEGEND

- ZONE 1 - BASSENDEAN SAND
- ZONE 2 - BASSENDEAN SAND OVER GUILFORD FORMATION
- ZONE 3 - GUILFORD FORMATION
- BALANCE LOT - NOT INCLUDED IN THE INVESTIGATION

SCALE: Not to Scale

LEGEND

- SUBJECT SITE
- PROPOSED BOUNDARY
- EXISTING BOUNDARY
- PROPOSED DRAIN RESERVE
- BUILDING ENVELOPE (Max 2000m²)
- EXISTING BUILDING / STRUCTURE TO BE RETAINED
- BUILDING EXCLUSION ZONE (Susceptible to seasonal waterlogging)
- BRIDLE TRAIL
- 1.0m CONTOURS
- EXISTING DRAIN

SCALE A1

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REVISIONS

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DRAWN	A.GORCZYNSKA	OCT' 2021
VERIFIED		
APPROVED		

CLIENT: DARDANUP PARK PTY LTD

PROJECT: 1 HAROLD DOUGLAS DR, DARDANUP WEST

DRAWING TITLE: SITE GEOLOGY MAP

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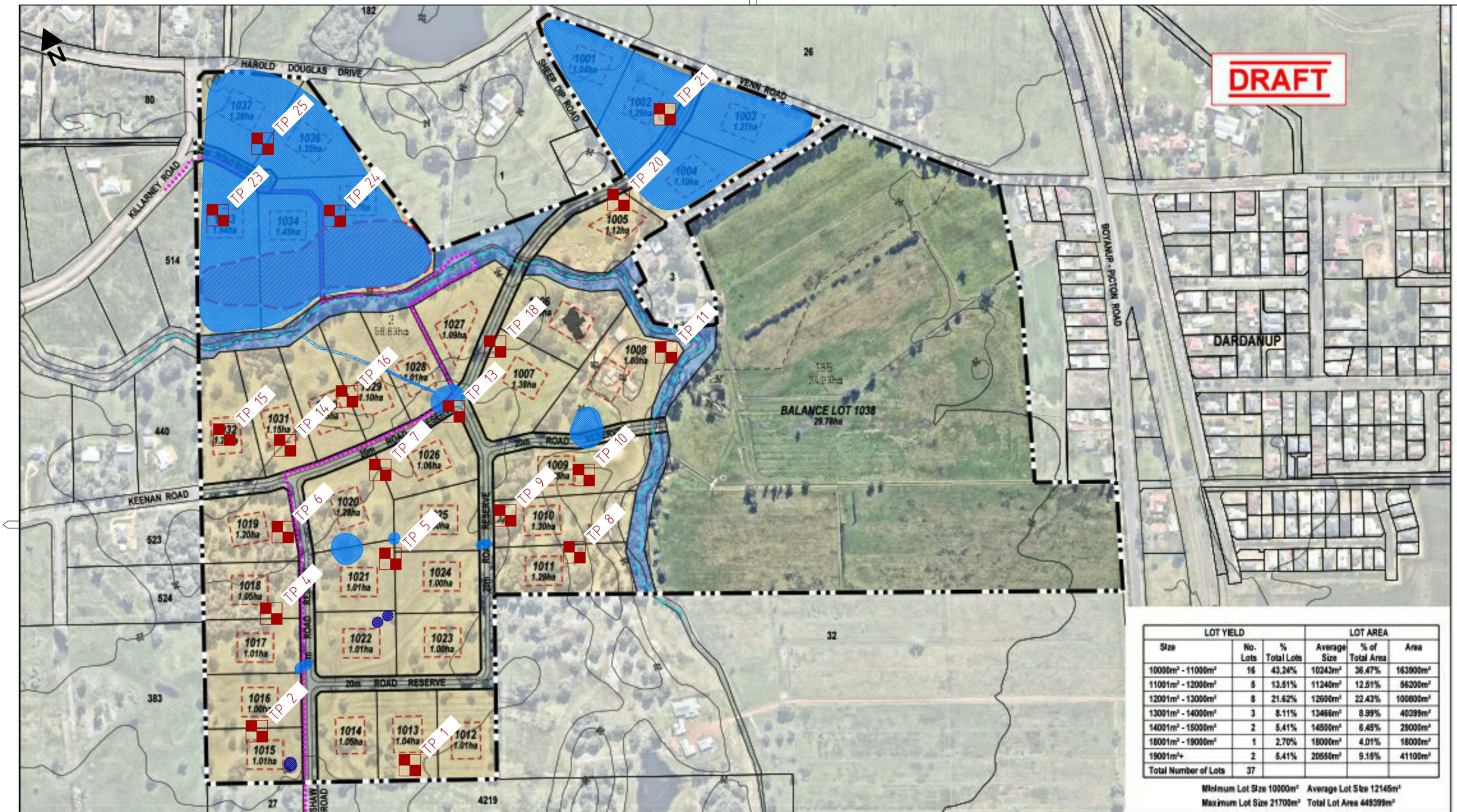
DRAWING NUMBER: 10012-G-002 REVISION: 0



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NOTES

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LEGEND

AREAS SUSCEPTIBLE TO SEASONAL WATERLOGGING

OBSERVED WATERING HOLES

LEGEND

SUBJECT SITE
PROPOSED BOUNDARY
EXISTING BOUNDARY
PROPOSED DRAIN RESERVE
BUILDING ENVELOPE (Max 2000m²)
EXISTING BUILDING / STRUCTURE TO BE RETAINED
BUILDING EXCLUSION ZONE (Susceptible to seasonal waterlogging)
BRIDLE TRAIL
1.0m CONTOURS
EXISTING DRAIN

PLAN
1:2500

SCALE
A1

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REVISIONS				
N°	DESCRIPTION	APPROVED	DATE	DRAWN
A	ISSUED FOR REVIEW		20.10.2021	AG

NOTE: ^INDICATES SIGNATURES ON ORIGINAL ISSUE OF DRAWING OR LAST REVISION OF DRAWING

NAMES PRINTED IN FULL		DATE
DESIGNED	A.GORCZYNSKA	OCT' 2021
DRAWN	A.GORCZYNSKA	OCT' 2021
VERIFIED		
APPROVED		

CLIENT: DARDANUP PARK PTY LTD

PROJECT: 1 HAROLD DOUGLAS DR, DARDANUP WEST

DRAWING TITLE: MAP OF SEASONAL WATERLOGGING

THIS DRAWING SHALL BE TREATED AS PRELIMINARY AND IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED.

DRAWING NUMBER: 10012-G-003 REVISION: 0

APPENDIX A

TEST PIT LOGS

WML accessible expertise	**TRIAL PIT: TP 1**	SHEET: 1 OF 1
CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 383095.0 m E 6303088.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
	0.0	9 kg Dynamic Cone Penetrometer Depth (m) Blows 0.05 - 0.20 4 0.20 - 0.35 6 0.35 - 0.50 4 0.50 - 0.65 6 0.65 - 0.80 6 0.80 - 0.95 9		SP	**TOPSOIL: SAND**, fine to medium grained, grey, trace of low plasticity fines, moist, loose
	0.5			SP	**SAND**, fine to medium grained, grey slightly mottled pale grey, trace of non-plastic fines, moist, medium dense, BASSENDEAN SAND
▽ 0.9m	1.0			GP	**Sandy GRAVEL**, fine to coarse grained, fine to coarse grained sand, dark brown slightly mottled orange, with low plasticity clay, moist, medium dense, "Coffey Rock" excavated as gravel, sand and cobbles up to 150 mm diameter. Groundwater seepage observed at few locations within the layer
	1.5			CH	**Sandy CLAY**, high plasticity, fine to coarse grained sand, orange mottled red and grey, trace of fine grained gravel, moist, very stiff, GUILFORD FORMATION
	2.0			SC	**Clayey SAND**, fine to coarse grained, high plastictiy clay, orange mottled grey, with fine to medium grained lateritic gravel, wet, medium dense, GUILFORD FORMATION
	2.5				Hole Terminated at 2.50 m Target depth

WML accessible expertise	**TRIAL PIT: TP 2**	SHEET: 1 OF 1
CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 382883.0 m E 6303135.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
				CL	**TOPSOIL: CLAY**, low plasticity, dark brown, with fine to medium grained sand and fine roots, moist, soft
		9 kg Dynamic Cone Penetrometer Depth (m) Blows 0.05 - 0.20 1 0.20 - 0.35 1 0.35 - 0.50 3 0.50 - 0.65 4 0.65 - 0.80 6 0.80 - 0.95 11 0.95 - 1.10 8 1.10 - 1.25 11 1.25 - 1.40 10 1.40 - 1.55 15 1.55 - 1.70 12 1.70 - 1.85 15 1.85 - 2.00 20		CI	**CLAY**, medium plasticity, dark brown mottled brown and orange, with fine to medium grained sand, trace of weekly cemented sand of fine grained gravel size, trace of fine roots, moist, soft, GUILFORD FORMATION
0.65m	0.5			SP	**SAND**, fine to coarse grained, pale yellow mottled orange, trace of low plasticity fines, wet, medium dense, GUILFORD FORMATION
	1.0			CI	**Sandy CLAY**, medium plasticity, fine to medium grained sand, grey mottled brown, moist, stiff, GUILFORD FORMATION
	1.5			CI	**Sandy CLAY**, low to medium plasticity, fine to medium grained weekly cemented sand, pale grey/cream, with fine to medium grained lateritic gravel, moist, stiff/very stiff, GUILFORD FORMATION becoming cream mottled orange at 1.8 m
	2.0				Hole Terminated at 2.00 m Wet Collapse
	2.5				

WML accessible expertise	**TRIAL PIT: TP 4**	SHEET: 1 OF 1
CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 382903.0 m E 6303298.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
		9 kg Dynamic Cone Penetrometer		SP	**TOPSOIL: SAND**, fine to coarse grained, black/brown, with low plasticity clay, moist, loose
		Depth (m) Blows 0.05 - 0.20 4 0.20 - 0.35 3 0.35 - 0.50 2 0.50 - 0.65 1 0.65 - 0.80 2 0.80 - 0.95 4		SP	**SAND**, fine to coarse grained, orange, with low plasticity clay, moist, loose, BASSENDEAN SAND
	0.5	0.95 - 1.10 10 1.10 - 1.25 8 1.25 - 1.40 13 1.40 - 1.55 7 1.55 - 1.70 6 1.70 - 1.85 15 1.85 - 2.00 14			
▽ 0.6m				SP	**SAND**, fine to coarse grained, pale yellow mottled orange, moist, very loose/loose, BASSENDEAN SAND groundwater seepage observed at 0.6 m, becomes wet at about 0.95 m becomes medium dense
	1.0				
	1.5				
	2.0				Hole Terminated at 1.60 m Wet Collapse
	2.5				

WML accessible expertise	**TRIAL PIT: TP 5**	SHEET: 1 OF 1
CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 383068.0 m E 6303374.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
	0.0	9 kg Dynamic Cone Penetrometer Depth (m) Blows 0.05 - 0.20 2 0.20 - 0.35 0 0.35 - 0.50 2 0.50 - 0.65 3 0.65 - 0.80 5 0.80 - 0.95 6 0.95 - 1.10 8 1.10 - 1.25 12 1.25 - 1.40 17 1.40 - 1.55 10 1.55 - 1.70 6 1.70 - 1.85 7 1.85 - 2.00 11		CL	**TOPSOIL: CLAY**, low plasticity, dark brown, with fine grained sand, wet, soft
▽ 0.7m	0.5			CL	**Sandy CLAY**, low plasticity, fine to medium grained sand, dark brown mottled brown, wet, very soft, GUILFORD FORMATION at about 0.5 m becomes firm
	1.0			SP	**SAND**, fine to medium grained, pale yellow mottled orange, wet, medium dense, lateritic soil observed beneath this layer, however not possible to excavate due to wet collapse, GUILFORD FORMATION
	1.5				
	2.0				Hole Terminated at 1.90 m Wet Collapse
	2.5				

WML accessible expertise	**TRIAL PIT: TP 6**	SHEET: 1 OF 1
CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 382919.0 m E 6303411.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
Not Encountered	0.5	9 kg Dynamic Cone Penetrometer Depth (m) Blows 0.05 - 0.20 3 0.20 - 0.35 3 0.35 - 0.50 4 0.50 - 0.65 3 0.65 - 0.80 3 0.80 - 0.95 4 0.95 - 1.10 6 1.10 - 1.25 6 1.25 - 1.40 5 1.40 - 1.55 7 1.55 - 1.70 8 1.70 - 1.85 8 1.85 - 2.00 7		SP	**TOPSOIL: SAND**, fine to medium grained, dark grey, with low plasticity fines and fine to medium roots, moist, loose
	1.0			SP	**SAND**, fine to medium grained, pale yellow mottled grey, trace of low plasticity fines, moist, loose, BASSENDEAN SAND at about 0.95 m becoming medium dense
	1.5				
	2.0				at about 1.9 m becoming mottled orange and with fine to medium grained gravel of moderately cemented sand
	2.5				Hole Terminated at 2.10 m Dry Collapse

WML accessible expertise	**TRIAL PIT: TP 7**	SHEET: 1 OF 1
CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 383054.0 m E 6303497.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
Not Encountered				SP	**TOPSOIL: SAND**, fine to medium grained, dark grey, with low plasticity fines and fine roots, moist, loose
	0.5	9 kg Dynamic Cone Penetrometer Depth (m) Blows 0.05 - 0.20 4 0.20 - 0.35 5 0.35 - 0.50 4 0.50 - 0.65 5 0.65 - 0.80 5 0.80 - 0.95 5 0.95 - 1.10 5 1.10 - 1.25 6 1.25 - 1.40 5 1.40 - 1.55 4 1.55 - 1.70 11		SP	**SAND**, fine to medium grained, grey, trace of low plasticity fines, moist, medium dense, BASSENDEAN SAND
	1.0			SP	**SAND**, fine to medium grained, pale grey, trace of low plasticity fines, wet, medium dense, BASSENDEAN SAND
	1.5				at 1.7 m 'Coffey Rock' excavated as cobbles, not possible to dig further due to wet collapse Hole Terminated at 1.70 m Dry Collapse
	2.0				
	2.5				

TRIAL PIT: TP 8

SHEET: 1 OF 1

CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 383322.0 m E 6303384.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
Not Encountered	0.5	9 kg Dynamic Cone Penetrometer Depth (m) Blows 0.05 - 0.20 1 0.20 - 0.35 2 0.35 - 0.50 3 0.50 - 0.65 3 0.65 - 0.80 3 0.80 - 0.95 3 0.95 - 1.10 3 1.10 - 1.25 3 1.25 - 1.40 3 1.40 - 1.55 3 1.55 - 1.70 3 1.70 - 1.85 4 1.85 - 2.00 3 2.00 - 2.15 5		SP	**TOPSOIL: SAND**, fine to medium grained, grey, trace of low plasticity fines, with fine roots throughout, moist, loose
	1.0			SP	**SAND**, fine to medium grained, grey, trace of low plasticity fines, moist, loose, BASSENDEAN SAND at about 0.6 m becoming grey mottled pale grey and white
	1.5				
	2.0				Hole Terminated at 1.70 m Dry Collapse
	2.5				

WML accessible expertise	**TRIAL PIT: TP 9**	SHEET: 1 OF 1
CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 383227.0 m E 6303434.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
	0.5	9 kg Dynamic Cone Penetrometer Depth (m) Blows 0.05 - 0.20 2 0.20 - 0.35 1 0.35 - 0.50 3 0.50 - 0.65 7 0.65 - 0.80 6 0.80 - 0.95 6 0.95 - 1.10 3 1.10 - 1.25 4 1.25 - 1.40 4 1.40 - 1.55 2 1.55 - 1.70 3 1.70 - 1.85 2 1.85 - 2.00 2 2.00 - 2.15 2		CL	**TOPSOIL: CLAY**, low plasticity, dark brown, trace of fine grained sand, with organic matter and fine to medium roots throughout, moist, soft
				SP	**SAND**, coarse grained, brown/orange mottled grey, trace of low plasticity fines, wet, loose, GUILFORD FORMATION
				SC	**Clayey SAND**, fine to medium grained, low plasticity clay, brown mottled dark brown, trace of fine to medium grained gravel, wet, medium dense, GUILFORD FORMATION
0.8m ▽	1.0			SP	**SAND**, fine to medium grained, grey/brown mottled brown, trace of low plasticity clay, wet, medium dense, GUILFORD FORMATION at about 1.4 m becoming loose
	1.5			SP	**SAND**, fine to coarse grained, dark brown mottled pale brown, with low plasticity fines, wet, loose, GUILFORD FORMATION
	2.0				Hole Terminated at 1.80 m Wet Collapse
	2.5				

WML accessible expertise	**TRIAL PIT: TP 10**	SHEET: 1 OF 1
CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 383336.0 m E 6303490.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
Not Encountered	0.0	9 kg Dynamic Cone Penetrometer Depth (m) Blows 0.05 - 0.20 2 0.20 - 0.35 2 0.35 - 0.50 3 0.50 - 0.65 3 0.65 - 0.80 3 0.80 - 0.95 3 0.95 - 1.10 3 1.10 - 1.25 3 1.25 - 1.40 3 1.40 - 1.55 4 1.55 - 1.70 4 1.70 - 1.85 4 1.85 - 2.00 6 2.00 - 2.15 6		SP	**TOPSOIL: SAND**, fine to medium grained, grey/yellow, trace non-plastic fines and fine roots, dry, loose
	0.5			SP	**SAND**, fine to medium grained, pale yellow mottled yellow, trace of non-plastic fines, dry, loose, BASSENDEAN SAND
	1.0				
	1.5				at about 1.4 m becoming medium dense
	2.0				at about 2 m becoming orange
					Hole Terminated at 2.00 m Dry Collapse
	2.5				

WML accessible expertise	**TRIAL PIT: TP 11**	SHEET: 1 OF 1
CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 383450.0 m E 6303660.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
Not Encountered	0.0	9 kg Dynamic Cone Penetrometer Depth (m) Blows 0.05 - 0.20 3 0.20 - 0.35 5 0.35 - 0.50 4 0.50 - 0.65 3 0.65 - 0.80 3 0.80 - 0.95 3 0.95 - 1.10 4 1.10 - 1.25 3 1.25 - 1.40 5 1.40 - 1.55 6 1.55 - 1.70 5 1.70 - 1.85 9 1.85 - 2.00 10		SP	**TOPSOIL: SAND**, fine to medium grained, brown, with non-plastic fines and fine roots, moist, loose, at the surface observed some sparse pisolitic gravel (fill)
				SP	**SAND**, fine to medium grained, pale brown slightly mottled grey, trace of non-plastic fines and fine roots, moist, medium dense, BASSENDEAN SAND
	0.5				**SAND**, fine to medium grained, yellow/orange, trace of non-plastic fines and gravel size weakly cemented sand (forming 'Coffey Rock'), moist, loose/medium dense, BASSENDEAN SAND
	1.0			SP	at about 1.1 m becoming medium dense
	1.5				
	2.0				Hole Terminated at 2.00 m Dry Collapse
	2.5				

WML accessible expertise	**TRIAL PIT: TP 13**	SHEET: 1 OF 1
CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 383156.0 m E 6303578.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
Not Encountered		9 kg Dynamic Cone Penetrometer		CI	**TOPSOIL: CLAY**, low plasticity, dark brown, trace of fine to medium grained sand, with fine roots, moist, firm
	0.5	Depth (m) Blows 0.05 - 0.20 2 0.20 - 0.35 1 0.35 - 0.50 3 0.50 - 0.65 4 0.65 - 0.80 4 0.80 - 0.95 5 0.95 - 1.10 6 1.10 - 1.25 6 1.25 - 1.40 7 1.40 - 1.55 4 1.55 - 1.70 8 1.70 - 1.85 8 1.85 - 2.00 9		CI	**Sandy CLAY**, medium plasticity, fine to medium grained sand, brown slightly mottled orange, trace of fine roots, moist, firm, GUILFORD FORMATION at about 0.5 m becoming wet
	1.0			SP	**SAND**, fine to medium grained, pale yellow mottled orange, trace of low plasticity fines, and fine roots, wet, medium dense, GUILFORD FORMATION
	1.5				Hole Terminated at 1.20 m Dry Collapse
	2.0				
	2.5				

TRIAL PIT: TP 14

SHEET: 1 OF 1

CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 382922.0 m E 6303531.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
Not Encountered	0.0	9 kg Dynamic Cone Penetrometer Depth (m) Blows 0.05 - 0.20 3 0.20 - 0.35 4 0.35 - 0.50 3 0.50 - 0.65 3 0.65 - 0.80 4 0.80 - 0.95 5 0.95 - 1.10 5 1.10 - 1.25 4 1.25 - 1.40 4 1.40 - 1.55 7 1.55 - 1.70 6 1.70 - 1.85 8 1.85 - 2.00 6		SP	**TOPSOIL: SAND**, fine to medium grained, dark grey, with non-plastic fines and fine roots, moist, loose
	0.5			SP	**SAND**, fine to medium grained, grey, trace of fine roots and non-plastic fines, moist, loose/medium dense, moisture increasing with depth, BASSENDEAN SAND at about 0.5 m becoming pale grey at about 0.8 m becoming medium dense
	1.0				a coarse tree root at about 1 m
	1.5			GP	**GRAVEL**, fine to coarse grained, dark brown, wet, dense, 'Coffey Rock' excavated as gravel and cobbles
	2.0				Hole Terminated at 1.90 m Dry Collapse
	2.5				

WML accessible expertise	**TRIAL PIT: TP 15**	SHEET: 1 OF 1
CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 382838.0 m E 6303546.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
		9 kg Dynamic Cone Penetrometer		SM	**TOPSOIL: Silty SAND**, fine to medium grained, low plasticity silt, dark brown, with fine to medium roots, moist, medium dense
		Depth (m) Blows 0.05 - 0.20 5 0.20 - 0.35 3 0.35 - 0.50 4 0.50 - 0.65 5 0.65 - 0.80 5 0.80 - 0.95 4		SP	**SAND**, fine to medium grained, grey mottled pale brown, trace of non-plastic fines and fine to medium roots, moist, medium dense, BASSENDEAN SAND
	0.5	0.95 - 1.10 4 1.10 - 1.25 5 1.25 - 1.40 3 1.40 - 1.55 7 1.55 - 1.70 6 1.70 - 1.85 10 1.85 - 2.00 12		SP	**SAND**, fine to medium grained, pale brown mottled grey, trace of non-plastic fines, with fine roots, wet, medium dense, BASSENDEAN SAND
▽ 0.7m	1.0				
	1.5				
	2.0				Hole Terminated at 1.90 m Wet Collapse
	2.5				

TRIAL PIT: TP 16

SHEET: 1 OF 1

CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 383008.0 m E 6303599.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
Not Encountered	0.0	9 kg Dynamic Cone Penetrometer Depth (m) Blows 0.05 - 0.20 4 0.20 - 0.35 5 0.35 - 0.50 4 0.50 - 0.65 3 0.65 - 0.80 3 0.80 - 0.95 4 0.95 - 1.10 4 1.10 - 1.25 4 1.25 - 1.40 8 1.40 - 1.55 9 1.55 - 1.70 5 1.70 - 1.85 2 1.85 - 2.00 1		SP	**TOPSOIL: SAND**, fine to medium grained, grey/brown, with non-plastic fines and fine roots, moist, medium dense
				SP	**SAND**, fine to medium grained, pale grey/pale yellow, trace of non-plastic fines, moist, medium dense, BASSENDEAN SAND
	0.5			SP	**SAND**, fine to medium grained, pale yellow mottled grey, trace of non-plastic fines, wet, medium dense, BASSENDEAN SAND
	1.0				at about 1.7 m becoming orange and loose
	1.5				at about 1.8 m 'Coffey Rock' excavated as gravel and cobbles could not continue excavation due to wet collapse
	2.0				Hole Terminated at 1.80 m Wet Collapse
	2.5				

WML accessible expertise	**TRIAL PIT: TP 18**	SHEET: 1 OF 1
CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 383213.0 m E 6303668.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
	0.0	9 kg Dynamic Cone Penetrometer Depth (m) Blows 0.05 - 0.20 2 0.20 - 0.35 1 0.35 - 0.50 5 0.50 - 0.65 4 0.65 - 0.80 5 0.80 - 0.95 8 0.95 - 1.10 10 1.10 - 1.25 7 1.25 - 1.40 13 1.40 - 1.55 18 1.55 - 1.70 17 1.70 - 1.85 17 1.85 - 2.00 21		CI	**TOPSOIL: CLAY** medium plasticity, dark brown, trace of fine to medium grained sand, trace of fine to medium roots, moist, soft
	0.5			CI	**CLAY**, medium plasticity, brown mottled orange and grey, trace of fine to medium grained sand and fine to medium roots, moist, firm, GUILFORD FORMATION
				CI	**Sandy CLAY**, medium plasticity, fine grained sand, grey mottled orange, trace of fine to medium roots, moist, firm, GUILFORD FORMATION
	1.0			SP	**SAND**, fine to medium grained, grey mottled orange, trace of non-plastic fines, moist, medium dense, GUILFORD FORMATION at about 1.3 m becoming wet
▽ 1.5m	1.5			SC	**Clayey SAND**, fine to medium grained, medium plasticity clay, orange mottled grey, trace of fine roots, wet, dense, GUILFORD FORMATION
	2.0			SP	**SAND**, fine to coarse grained, grey mottled yellow, with clayey sand and sandy clay lumps, wet, dense, GUILFORD FORMATION
	2.5				Hole Terminated at 2.50 m Target depth

WML accessible expertise	**TRIAL PIT: TP 20**	SHEET: 1 OF 1
CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 383384.0 m E 6303871.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
	0.0	9 kg Dynamic Cone Penetrometer Depth (m) Blows 0.05 - 0.20 2 0.20 - 0.35 3 0.35 - 0.50 3 0.50 - 0.65 4 0.65 - 0.80 4 0.80 - 0.95 4 0.95 - 1.10 4 1.10 - 1.25 6 1.25 - 1.40 5 1.40 - 1.55 3 1.55 - 1.70 2 1.70 - 1.85 2 1.85 - 2.00 6 2.00 - 2.15 14		CH	**TOPSOIL: CLAY**, high plasticity, black, with fine roots throughout, trace of fine grained sand, moist, soft/firm
0.6m ▽	0.5			CL	**Sandy CLAY**, low plastictiy, fine to medium grained sand, brown mottled grey, with fine roots throughout, moist, firm, GUILFORD FORMATION
	1.0			SP	**SAND**, fine to medium grained, yellow mottled grey, trace of non-plastic fines, wet, medium dense, GUILFORD FORMATION at about 1.4 m becoming loose at about 1.8 m becoming medium dense
	1.5				
	2.0				Hole Terminated at 2.00 m Wet Collapse
	2.5				

TRIAL PIT: TP 21

SHEET: 1 OF 1

CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 383448.0 m E 6303990.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
	0.0	9 kg Dynamic Cone Penetrometer Depth (m) Blows 0.05 - 0.20 1 0.20 - 0.35 3 0.35 - 0.50 4 0.50 - 0.65 6 0.65 - 0.80 9 0.80 - 0.95 13 0.95 - 1.10 21 1.10 - 1.25 19 1.25 - 1.40 17 1.40 - 1.55 20 1.55 - 1.70 19 1.70 - 1.85 18 1.85 - 2.00 25		OH	**TOPSOIL: Organic CLAY**, medium to high plasticity, dark brown/black mottled brown, with fine roots, trace of fine grained sand, moist, soft
	0.5			CH	**Sandy CLAY**, high plasticity, fine to coarse grained sand, brown mottled grey, trace of fine roots, moist, soft, GUILFORD FORMATION
				CH	**Sandy CLAY**, high plasticity, fine to coarse grained sand, brown mottled grey, wet, firm, GUILFORD FORMATION
	1.0			SC	**Clayey SAND**, fine to coarse grained, medium plasticity clay, brown mottled orange/grey, trace of fine grained gravel, trace of fine roots, moist, stiff, GUILFORD FORMATION
1.2m	1.5			CH	**CLAY**, high plasticity, brown mottled orange/grey, with fine to coarse grained sand, moist, stiff, GUILFORD FORMATION at about 1.85 m becoming very stiff
	2.0				
	2.5				Hole Terminated at 2.50 m Target depth

WML accessible expertise	**TRIAL PIT: TP 23**	SHEET: 1 OF 1
CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 382829.0 m E 6303850.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
				SC	**TOPSOIL: Clayey SAND**, fine to medium grained, low plasticity clay, dark brown, moist, loose
	0.5	9 kg Dynamic Cone Penetrometer Depth (m) Blows 0.20 - 0.35 1 0.35 - 0.50 3 0.50 - 0.65 5 0.65 - 0.80 6 0.80 - 0.95 11 0.95 - 1.10 11 1.10 - 1.25 8 1.25 - 1.40 6 1.40 - 1.55 8 1.55 - 1.70 11 1.70 - 1.85 17 1.85 - 2.00 15 2.00 - 2.15 10		OL	**ORGANIC CLAY**, medium plasticity, dark brown, with fine to medium grained sand and fine grained gravel, moist, soft, GUILFORD FORMATION (ALLUVIUM) at about 0.5 m becoming firm
▽ 0.9m	1.0			CH	**Sandy CLAY**, high plasticity, fine to medium grained sand, dark brown slightly mottled grey, with fine roots and trace of fine grained gravel, wet, firm, GUILFORD FORMATION
	1.5			SP	**SAND**, coarse grained, brown, with medium plasticity fines, wet, medium dense, GUILFORD FORMATION
				CH	**Sandy CLAY**, high plasticity, fine to coarse grained sand, brown/orange mottled grey, moist, very stiff, GUILFORD FORMATION
	2.0			CH	**Sandy CLAY**, high plasticity, fine to medium grained sand, brown mottled orange, trace of fine grained gravel, moist, stiff, GUILFORD FORMATION
	2.5				Hole Terminated at 2.40 m Wet Collapse

WML accessible expertise	**TRIAL PIT: TP 24**	SHEET: 1 OF 1
CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 382991.0 m E 6303849.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
	0.0			CH	**TOPSOIL: CLAY**, high plasticity, black, with fine roots throughout, trace of fine grained sand, moist, soft
		9 kg Dynamic Cone Penetrometer Depth (m) Blows 0.20 - 0.35 2 0.35 - 0.50 1 0.50 - 0.65 1 0.65 - 0.80 3 0.80 - 0.95 4		CI	**Sandy CLAY**, medium plasticity, fine to medium grained sand, dark brown, with fine roots throughout, trace of fine to medium grained gravel, moist, soft, GUILFORD FORMATION
▽ 0.6m	0.5	0.95 - 1.10 5 1.10 - 1.25 5 1.25 - 1.40 4 1.40 - 1.55 7 1.55 - 1.70 7 1.70 - 1.85 10 1.85 - 2.00 10 2.00 - 2.15 12		SC	**Clayey SAND**, fine to coarse grained, medium plasticity clay, dark brown, with fine roots and fine to medium grained gravel, wet, medium dense, GUILFORD FORMATION
	1.0				
	1.5				
	2.0				
	2.5				Hole Terminated at 2.40 m Wet Collapse

WML accessible expertise	**TRIAL PIT: TP 25**	SHEET: 1 OF 1
CLIENT: Dardanup Park Pty Ltd	CONTRACTOR: WML Consultants	LOGGED: A.Gorczynska
PROJECT: Geotechnical Investigation	MACHINE: 8 tonne excavator	LOGGED DATE: 07/09/2021
LOCATION: 1 Harold Douglas Dr, Dardanup West, WA	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10012	POSITION: 382891.0 m E 6303949.0 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
	0.0			CL	**TOPSOIL: CLAY**, low plasticity, dark brown/black, with fine roots throughout, trace of fine grained sand, moist, soft
		9 kg Dynamic Cone Penetrometer Depth (m) Blows 0.20 - 0.35 1 0.35 - 0.50 3 0.50 - 0.65 6 0.65 - 0.80 10 0.80 - 0.95 14 0.95 - 1.10 16 1.10 - 1.25 13 1.25 - 1.40 14 1.40 - 1.55 13 1.55 - 1.70 15 1.70 - 1.85 16 1.85 - 2.00 19 2.00 - 2.15 17		CH	**CLAYEY**, high plasticity, dark brown slightly mottled pale brown, trace of fine grained sand and fine to medium grained gravel, moist, firm, GUILFORD FORMATION
	0.5				
	1.0			SC	**Clayey SAND**, fine to coarse grained, low to medium plasticity clay, dark brown mottled orange and grey, wet, medium dense, GUILFORD FORMATION
▽ 1.4m	1.5			SP	**SAND**, fine to coarse grained, pale grey slightly mottled pale yellow, trace of non-plastic fines, wet, dense, GUILFORD FORMATION
	2.0				Hole Terminated at 1.70 m Wet Collapse
	2.5				

PHOTO SHEET

Job No.:	10012
Job Title:	Geotechnical Investigation
Project:	Dardanup Park
Location:	1 Harold Douglas Drive, Dardanup West, WA
Photo Title	Test Pit Profiles

Figure 1: Soil profile at TP 1 location.

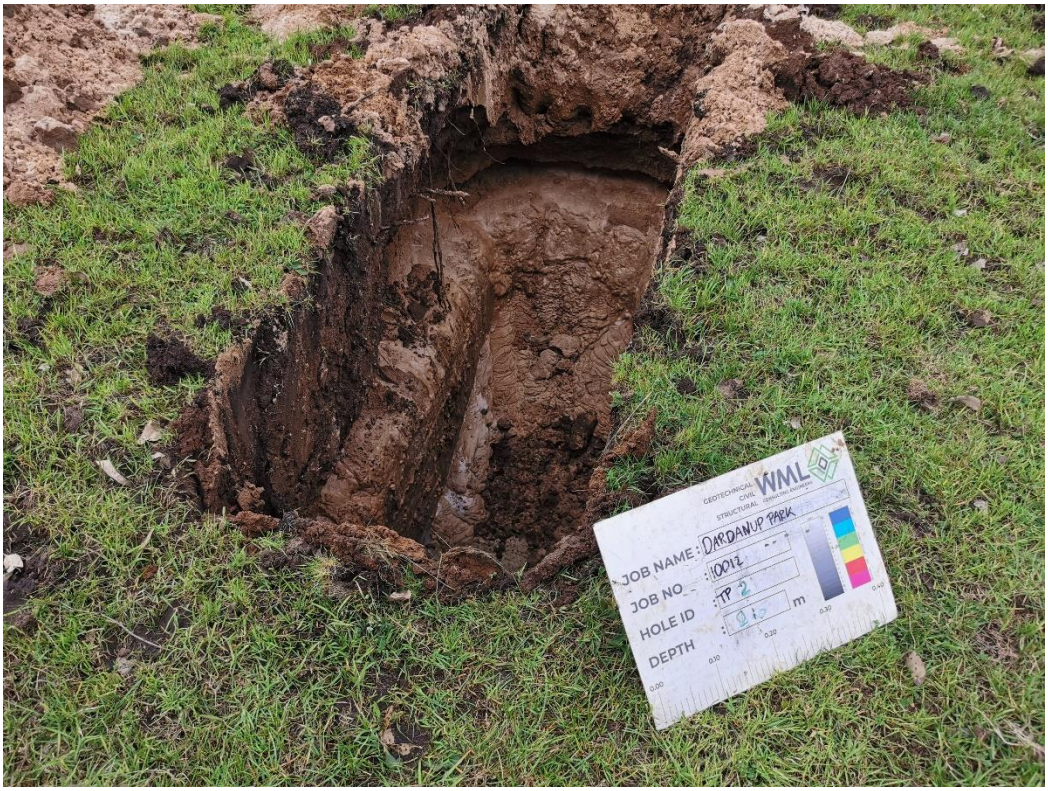

Figure 2: Soil profile at TP 2 location.

Figure 3: Soil profile at TP 4 location.

Figure 4: Soil profile at TP 5 location.

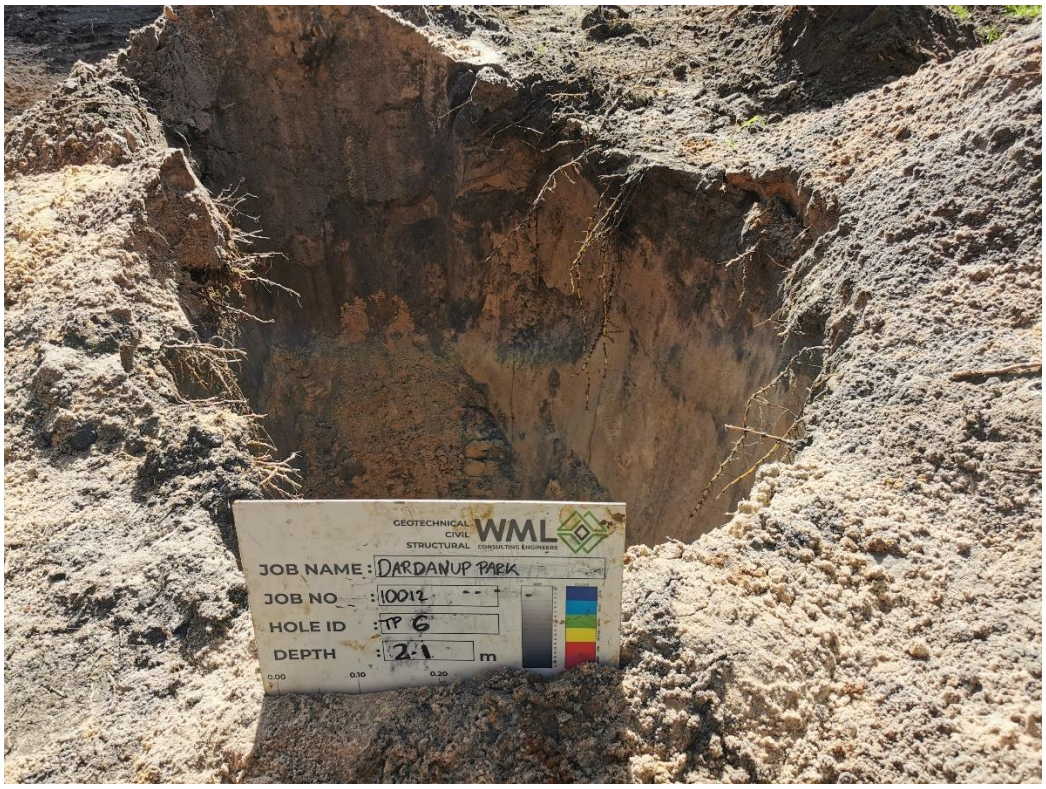

Figure 5: Soil profile at TP 6 location.

Figure 6: Soil profile at TP 7 location.

Figure 7: Soil profile at TP 8 location.

Figure 8: Soil profile at TP 9 location.

Figure 9: Soil profile at TP 10 location.

Figure 10: Soil profile at TP 11 location.

Figure 11: Soil profile at TP 13 location.

Figure 12: Soil profile at TP 14 location.

Figure 13: Soil profile at TP 15 location.

Figure 14: Soil profile at TP 16 location.

Figure 15: Soil profile at TP 18 location.

Figure 16: Soil profile at TP 20 location.

Figure 17: Soil profile at TP 21 location.

Figure 18: Soil profile at TP 23 location.

Figure 19: Soil profile at TP 24 location.

Figure 20: Soil profile at TP 25 location.

APPENDIX B

LABORATORY TEST RESULTS

Construction Sciences

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MOISTURE CONTENT REPORT

Client:	WML Consultants	Report Number:	5022/R/49492-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	Various
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	24/09/2021 Page 1 of 1

Test Procedures:	AS1289.2.1.1

Sample Number	5022/S/81675	5022/S/81676	5022/S/81677	5022/S/81678
ID / Client ID	-	-	-	-
Lot Number	TP 9 Depth 0.3-0.8m	TP 20 Depth 0.5-0.7m	TP 1 Depth 2.0m	TP 18 Depth 0.5-1.0m
Date / Time Sampled	21/09/2021	21/09/2021	21/09/2021	21/09/2021
Sampling Method	Tested As Received	Tested As Received	Tested As Received	Tested As Received
Sampled By	Client Sampled	Client Sampled	Client Sampled	Client Sampled
Tested By	Hermanus Coetzee	Hermanus Coetzee	Hermanus Coetzee	Hermanus Coetzee
Date Tested	23/09/2021	23/09/2021	23/09/2021	23/09/2021
Material Source	Test Pit	Test Pit	Test Pit	Test Pit
Material Type	-	-	-	-
Test Pit No.	9	20	1	18
Depth	0.3-0.8	0.5-0.7	2.0	0.5-1.0
Moisture Content (%)	**22.0**	**20.1**	**20.9**	**27.3**

Sample Number	5022/S/81679	5022/S/81680	5022/S/81681	5022/S/81682
ID / Client ID	-	-	-	-
Lot Number	TP 21 Depth 0.5m	TP 21 Depth 1.0m	TP 23 Depth 1.6m	TP 25 Depth 1.4m
Date / Time Sampled	21/09/2021	21/09/2021	21/09/2021	21/09/2021
Sampling Method	Tested As Received	Tested As Received	Tested As Received	Tested As Received
Sampled By	Client Sampled	Client Sampled	Client Sampled	Client Sampled
Tested By	Hermanus Coetzee	Hermanus Coetzee	Hermanus Coetzee	Hermanus Coetzee
Date Tested	23/09/2021	23/09/2021	23/09/2021	23/09/2021
Material Source	Test Pit	Test Pit	Test Pit	Test Pit
Material Type	-	-	-	-
Test Pit No.	21	21	23	25
Depth m	0.5	1.0	1.6	1.4
Moisture Content (%)	**24.4**	**20.0**	**31.0**	**19.2**

Remarks	Results apply to the sample/s as received.

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 5022

Approved Signatory: Janine Fischer
Form ID: W20Rep Rev 3

Construction Sciences

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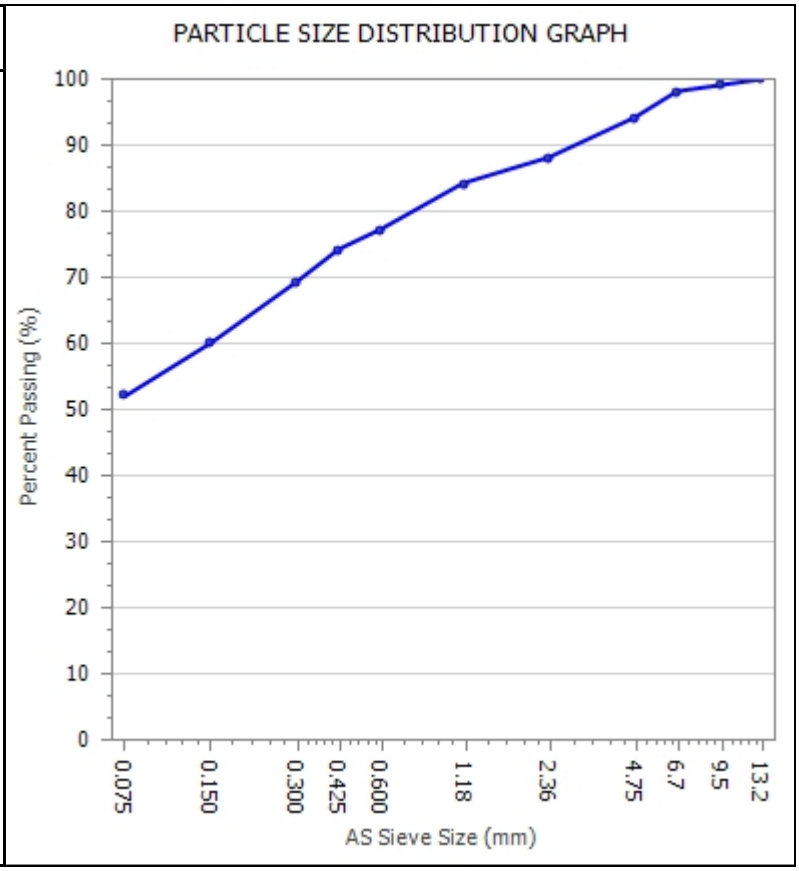
PARTICLE SIZE DISTRIBUTION REPORT

Client:	WML Consultants	Report Number:	5022/R/49653-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 1 Depth 2.0m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	1/10/2021 Page 1 of 1

Test Procedures:	AS1289.3.6.1		
Sample Number	5022/S/81677	Sample Location	
Sampling Method	Tested As Received	Test Pit No.	1
Date Sampled	21/09/2021	Depth m	2.0
Sampled By	Client Sampled		
Date Tested	29/09/2021		
Material Source	Test Pit	Material Type	Brown gravelly sandy CLAY

AS Sieve (mm)	Specification Minimum (%)	**Percent Passing (%)**	Specification Maximum (%)
13.2		**100**	
9.5		**99**	
6.7		**98**	
4.75		**94**	
2.36		**88**	
1.18		**84**	
0.600		**77**	
0.425		**74**	
0.300		**69**	
0.150		**60**	
0.075		**52**	



Remarks	Results apply to the sample/s as received.

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NATA

Accreditation Number: 1986
Corporate Site Number: 5022

Approved Signatory: Janine Fischer
Form ID: W9Rep Rev 2

Construction Sciences

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PARTICLE SIZE DISTRIBUTION REPORT

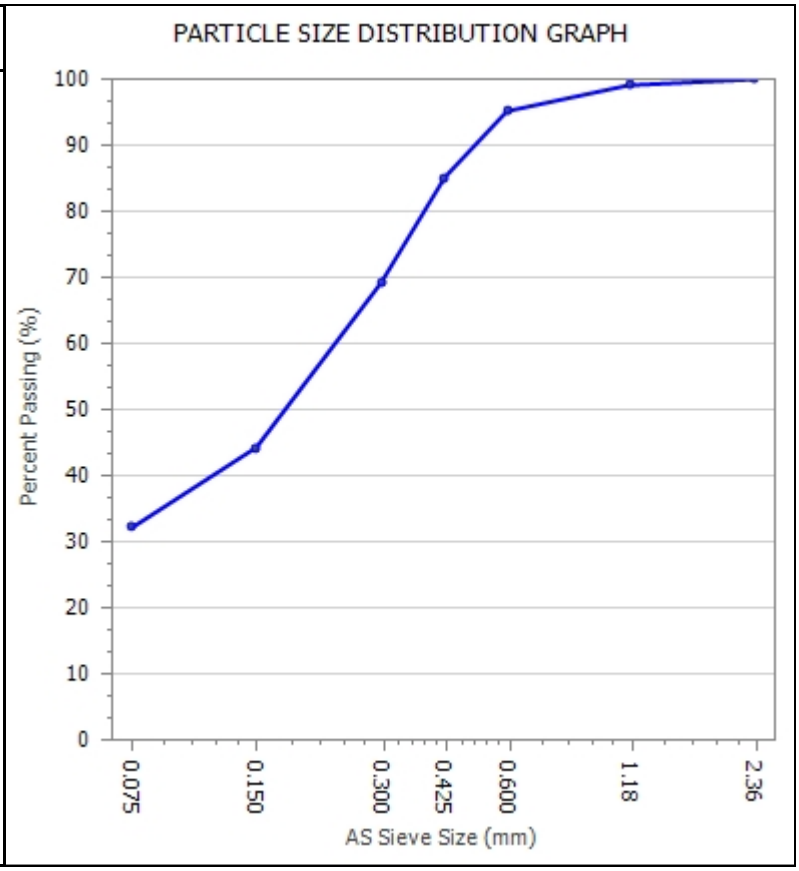
Client:	WML Consultants	Report Number:	5022/R/49651-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 9 Depth 0.3-0.8m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	1/10/2021 Page 1 of 1

Test Procedures:	AS1289.3.6.1
Sample Number	5022/S/81675
Sampling Method	Tested As Received
Date Sampled	21/09/2021
Sampled By	Client Sampled
Date Tested	29/09/2021
Material Source	Test Pit

Sample Location

Test Pit No.		9
Depth	m	0.3-0.8
Material Type		Brown Sandy CLAY

AS Sieve (mm)	Specification Minimum (%)	**Percent Passing (%)**	Specification Maximum (%)
2.36		**100**	
1.18		**99**	
0.600		**95**	
0.425		**85**	
0.300		**69**	
0.150		**44**	
0.075		**32**	



Remarks: Results apply to the sample/s as received.

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Accreditation Number: 1986
Corporate Site Number: 5022

Approved Signatory: Janine Fischer
Form ID: W9Rep Rev 2

Construction Sciences

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PARTICLE SIZE DISTRIBUTION REPORT

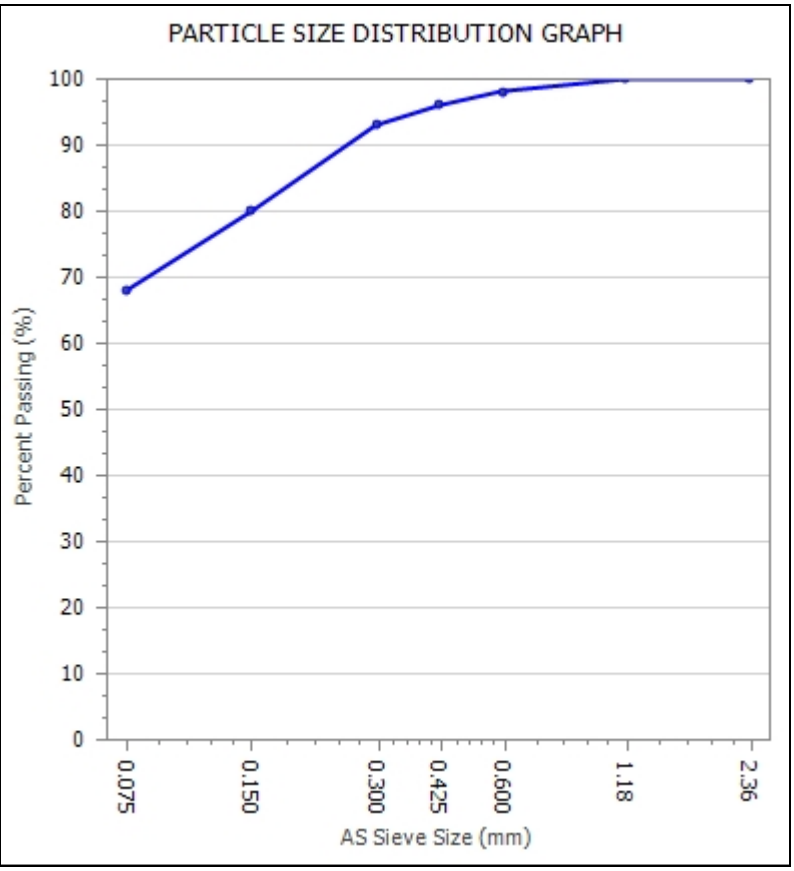
Client:	WML Consultants	Report Number:	5022/R/49654-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 18 Depth 0.5-1.0m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	1/10/2021 Page 1 of 1

Test Procedures:	AS1289.3.6.1
Sample Number	5022/S/81678
Sampling Method	Tested As Received
Date Sampled	21/09/2021
Sampled By	Client Sampled
Date Tested	29/09/2021
Material Source	Test Pit

Sample Location

Test Pit No.		18
Depth	m	0.5-1.0
Material Type		Brown CLAY

AS Sieve (mm)	Specification Minimum (%)	**Percent Passing (%)**	Specification Maximum (%)
2.36		**100**	
1.18		**100**	
0.600		**98**	
0.425		**96**	
0.300		**93**	
0.150		**80**	
0.075		**68**	



Remarks	Results apply to the sample/s as received.

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 5022

Approved Signatory: Janine Fischer
Form ID: W9Rep Rev 2

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PARTICLE SIZE DISTRIBUTION REPORT

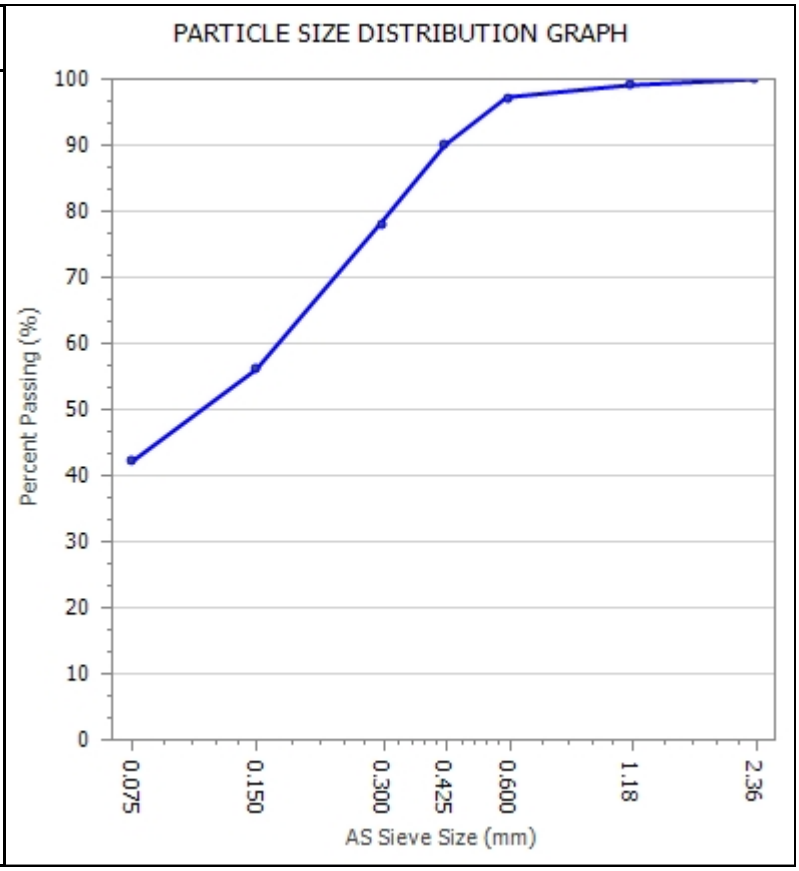
Client:	WML Consultants	Report Number:	5022/R/49652-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 20 Depth 0.5-0.7m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	1/10/2021 Page 1 of 1

Test Procedures:	AS1289.3.6.1
Sample Number	5022/S/81676
Sampling Method	Tested As Received
Date Sampled	21/09/2021
Sampled By	Client Sampled
Date Tested	29/09/2021
Material Source	Test Pit

Sample Location

Test Pit No.		20
Depth	m	0.5-0.7
Material Type		Brown Sandy CLAY

AS Sieve (mm)	Specification Minimum (%)	**Percent Passing (%)**	Specification Maximum (%)
2.36		**100**	
1.18		**99**	
0.600		**97**	
0.425		**90**	
0.300		**78**	
0.150		**56**	
0.075		**42**	



Remarks	Results apply to the sample/s as received.

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 5022

Approved Signatory: Janine Fischer
Form ID: W9Rep Rev 2

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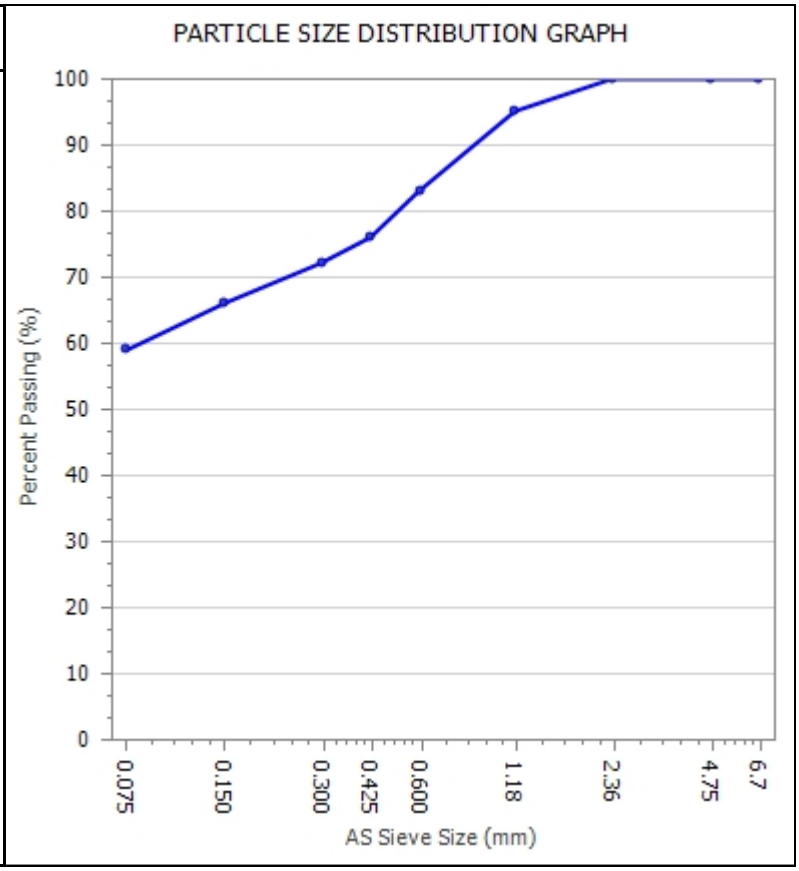
PARTICLE SIZE DISTRIBUTION REPORT

Client:	WML Consultants	Report Number:	5022/R/49655-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 21 Depth 0.5m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	1/10/2021 Page 1 of 1

Test Procedures:	AS1289.3.6.1		
Sample Number	5022/S/81679	Sample Location	
Sampling Method	Tested As Received	Test Pit No.	21
Date Sampled	21/09/2021	Depth m	0.5
Sampled By	Client Sampled		
Date Tested	29/09/2021		
Material Source	Test Pit	Material Type	Brown Sandy CLAY

AS Sieve (mm)	Specification Minimum (%)	**Percent Passing (%)**	Specification Maximum (%)
6.7		**100**	
4.75		**100**	
2.36		**100**	
1.18		**95**	
0.600		**83**	
0.425		**76**	
0.300		**72**	
0.150		**66**	
0.075		**59**	



Remarks	Results apply to the sample/s as received.

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 5022

Approved Signatory: Janine Fischer
Form ID: W9Rep Rev 2

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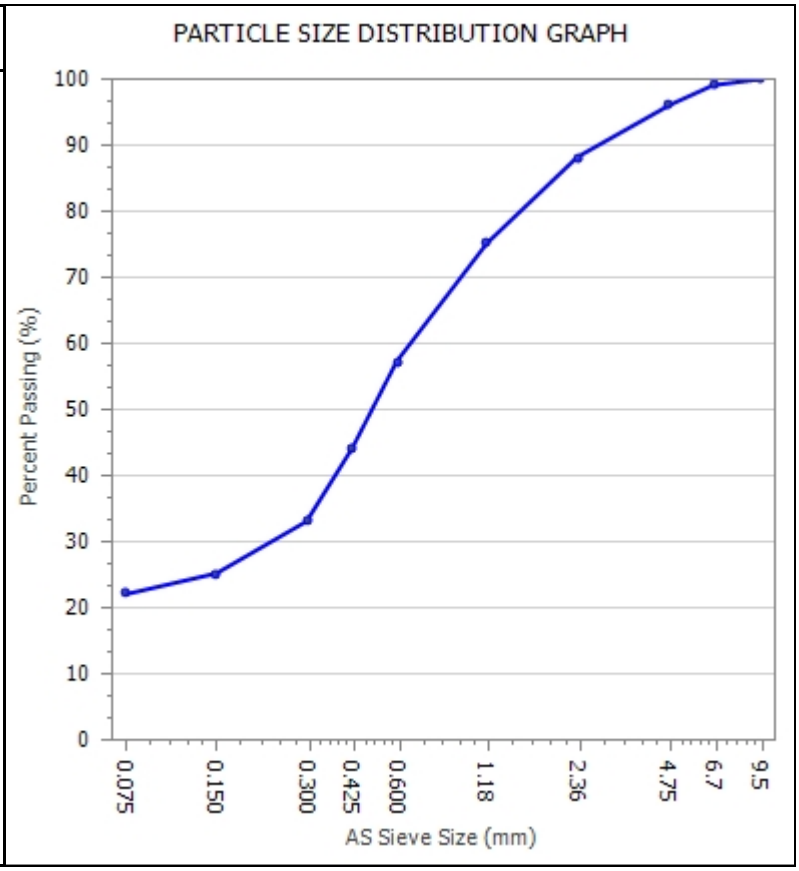
PARTICLE SIZE DISTRIBUTION REPORT

Client:	WML Consultants	Report Number:	5022/R/49656-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 21 Depth 1.0m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	1/10/2021 Page 1 of 1

Test Procedures:	AS1289.3.6.1		
Sample Number	5022/S/81680	Sample Location	
Sampling Method	Tested As Received	Test Pit No.	21
Date Sampled	21/09/2021	Depth m	1.0
Sampled By	Client Sampled		
Date Tested	29/09/2021		
Material Source	Test Pit	Material Type	Brown clayey SAND

AS Sieve (mm)	Specification Minimum (%)	**Percent Passing (%)**	Specification Maximum (%)
9.5		**100**	
6.7		**99**	
4.75		**96**	
2.36		**88**	
1.18		**75**	
0.600		**57**	
0.425		**44**	
0.300		**33**	
0.150		**25**	
0.075		**22**	



Remarks	Results apply to the sample/s as received.

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 5022

Approved Signatory: Janine Fischer
Form ID: W9Rep Rev 2

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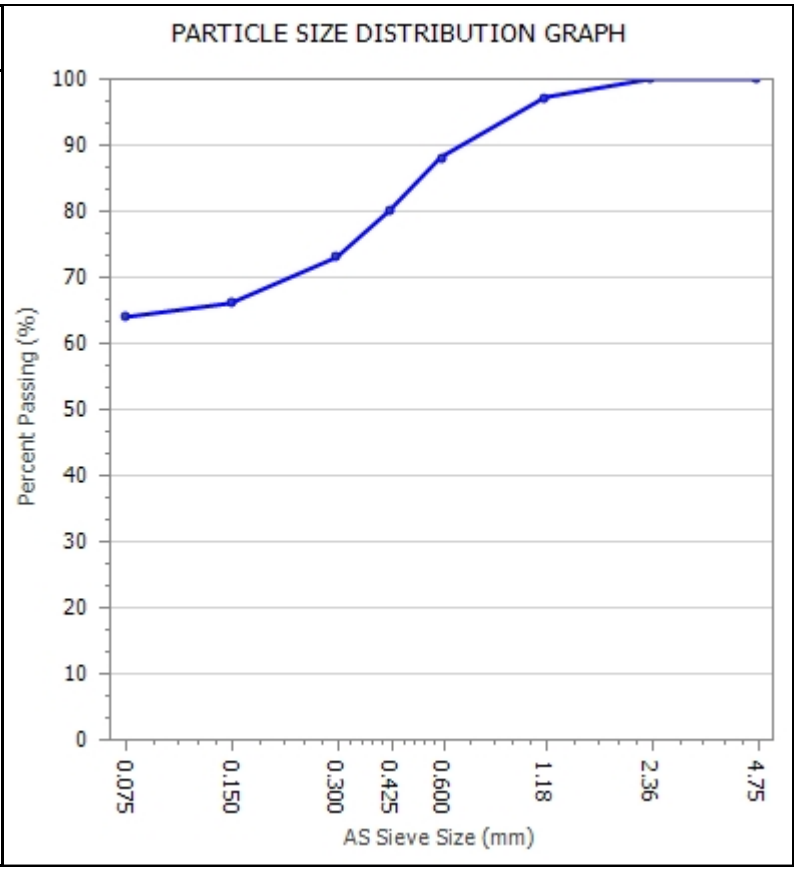
PARTICLE SIZE DISTRIBUTION REPORT

Client:	WML Consultants	Report Number:	5022/R/49657-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 23 Depth 1.6m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	1/10/2021 Page 1 of 1

Test Procedures:	AS1289.3.6.1		
Sample Number	5022/S/81681	Sample Location	
Sampling Method	Tested As Received	Test Pit No.	23
Date Sampled	21/09/2021	Depth m	1.6
Sampled By	Client Sampled		
Date Tested	29/09/2021		
Material Source	Test Pit	Material Type	Brown Sandy CLAY

AS Sieve (mm)	Specification Minimum (%)	**Percent Passing (%)**	Specification Maximum (%)
4.75		**100**	
2.36		**100**	
1.18		**97**	
0.600		**88**	
0.425		**80**	
0.300		**73**	
0.150		**66**	
0.075		**64**	



Remarks	Results apply to the sample/s as received.

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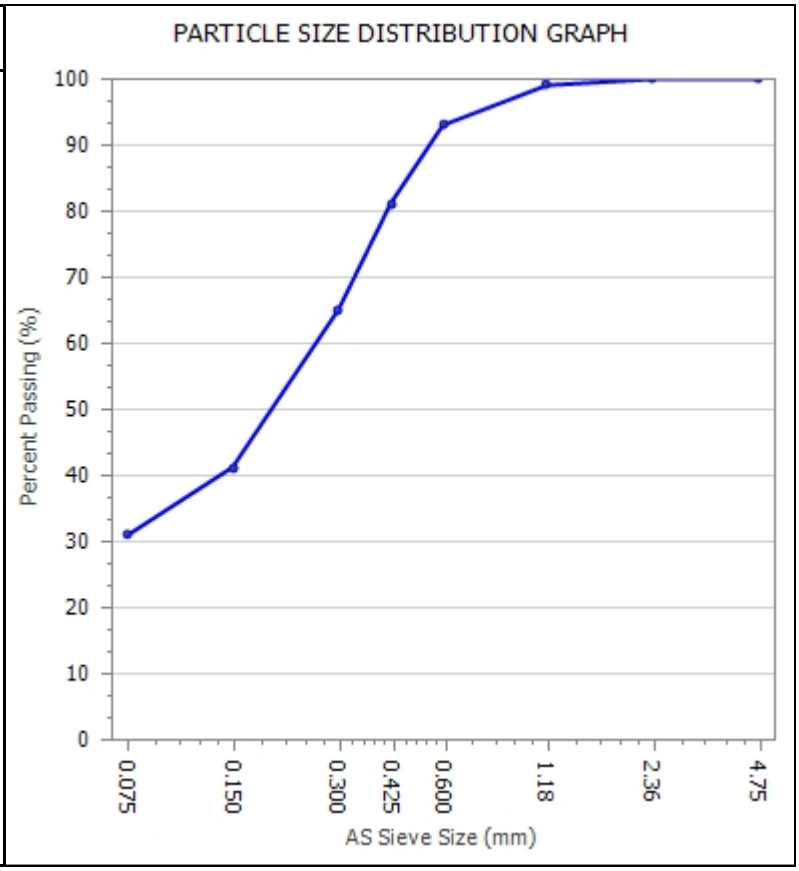
PARTICLE SIZE DISTRIBUTION REPORT

Client:	WML Consultants	Report Number:	5022/R/49658-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 25 Depth 1.4m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	1/10/2021 Page 1 of 1

Test Procedures:	AS1289.3.6.1		
Sample Number	5022/S/81682	Sample Location	
Sampling Method	Tested As Received	Test Pit No.	25
Date Sampled	21/09/2021	Depth m	1.4
Sampled By	Client Sampled		
Date Tested	29/09/2021		
Material Source	Test Pit	Material Type	Brown clayey SAND

AS Sieve (mm)	Specification Minimum (%)	**Percent Passing (%)**	Specification Maximum (%)
4.75		**100**	
2.36		**100**	
1.18		**99**	
0.600		**93**	
0.425		**81**	
0.300		**65**	
0.150		**41**	
0.075		**31**	



Remarks	Results apply to the sample/s as received.

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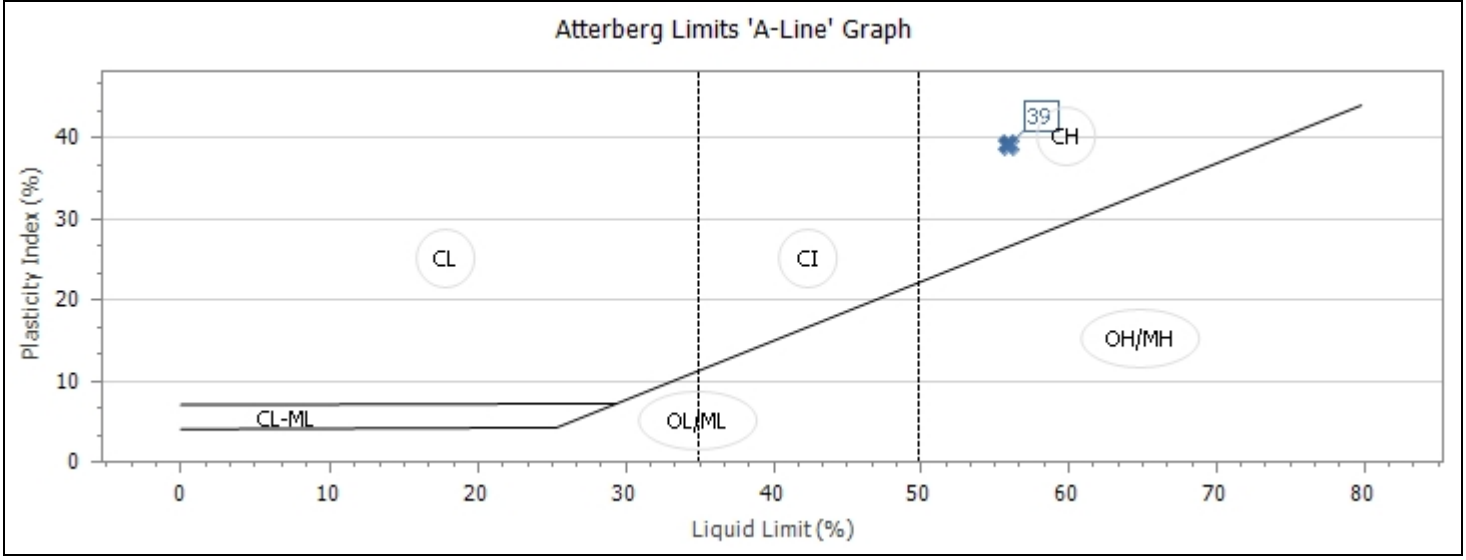
ATTERBERG LIMITS REPORT

Client:	WML Consultants	Report Number:	5022/R/49684-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 1 Depth 2.0m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	4/10/2021 Page 1 of 1

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.3.4.1, AS1289.2.1.1, AS1726 (Tables 9/10)		
Sample Number	5022/S/81677	Sample Location	
Sampling Method	Tested As Received	Test Pit No.	1
Date Sampled	21/09/2021	Depth m	2.0
Sampled By	Client Sampled		
Date Tested	1/10/2021		
Att. Drying Method	Oven Dried	Material Source	Test Pit
Atterberg Preparation	Dry Sieved	Material Type	Brown gravelly sandy CLAY
LL Device	Cassagrande	Water Type	Potable
Material Description	Brown sandy gravelly CLAY		

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**56**	
Plastic Limit (%)		**17**	
Plasticity Index (%)		**39**	
Linear Shrinkage (%)		**16.0**	
Linear Shrinkage Mould Length / Defects:	Mould Length: 126.0mm / -		



Remarks	Results apply to the sample/s as received.

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Form ID: W11Rep Rev 1

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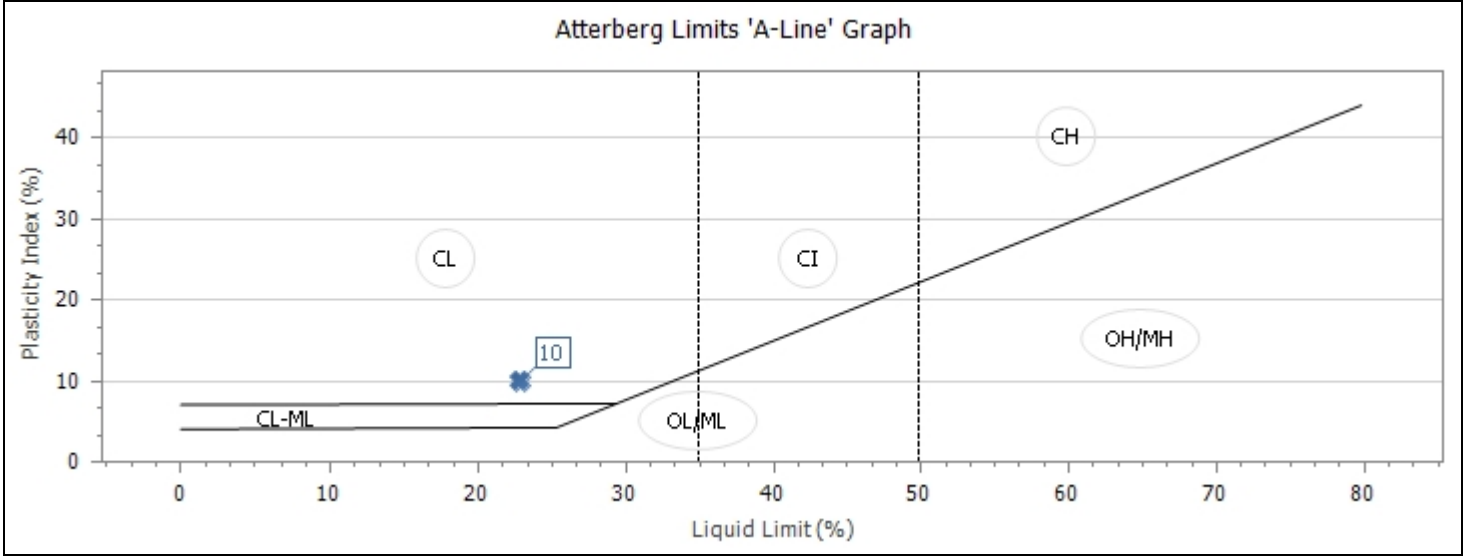
ATTERBERG LIMITS REPORT

Client:	WML Consultants	Report Number:	5022/R/49668-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 9 Depth 0.3-0.8m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	1/10/2021 Page 1 of 1

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.3.4.1, AS1289.2.1.1, AS1726 (Tables 9/10)		
Sample Number	5022/S/81675	Sample Location	
Sampling Method	Tested As Received	Test Pit No.	9
Date Sampled	21/09/2021	Depth m	0.3-0.8
Sampled By	Client Sampled		
Date Tested	30/09/2021		
Att. Drying Method	Oven Dried	Material Source	Test Pit
Atterberg Preparation	Dry Sieved	Material Type	Brown Sandy CLAY
LL Device	Cassagrande	Water Type	Potable
Material Description	Brown sandy CLAY		

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**23**	
Plastic Limit (%)		**13**	
Plasticity Index (%)		**10**	
Linear Shrinkage (%)		**4.0**	
Linear Shrinkage Defects:	-		



Remarks	Results apply to the sample/s as received.

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Form ID: W11Rep Rev 1

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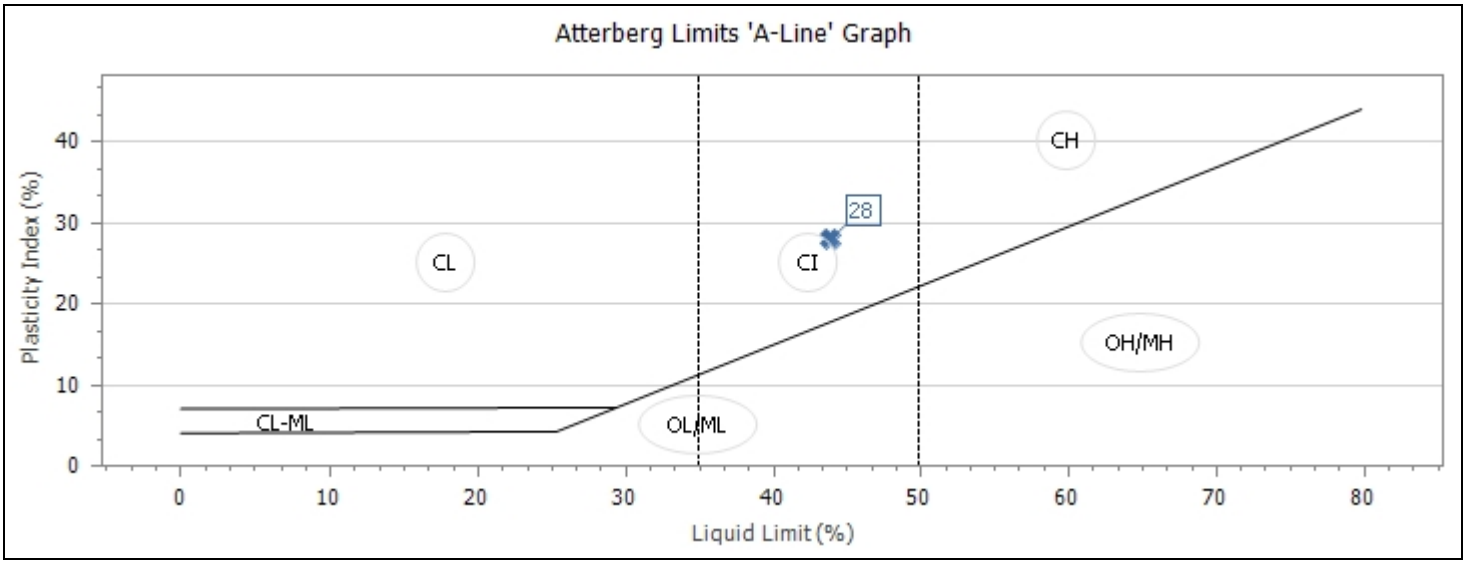
ATTERBERG LIMITS REPORT

Client:	WML Consultants	Report Number:	5022/R/49669-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 18 Depth 0.5-1.0m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	1/10/2021 Page 1 of 1

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.3.4.1, AS1289.2.1.1, AS1726 (Tables 9/10)		
Sample Number	5022/S/81678	Sample Location	
Sampling Method	Tested As Received	Test Pit No.	18
Date Sampled	21/09/2021	Depth m	0.5-1.0
Sampled By	Client Sampled		
Date Tested	30/09/2021		
Att. Drying Method	Oven Dried	Material Source	Test Pit
Atterberg Preparation	Dry Sieved	Material Type	Brown CLAY
LL Device	Cassagrande	Water Type	Potable
Material Description	Brown Clay		

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**44**	
Plastic Limit (%)		**16**	
Plasticity Index (%)		**28**	
Linear Shrinkage (%)		**12.5**	
Linear Shrinkage Defects:	-		



Remarks	Results apply to the sample/s as received.

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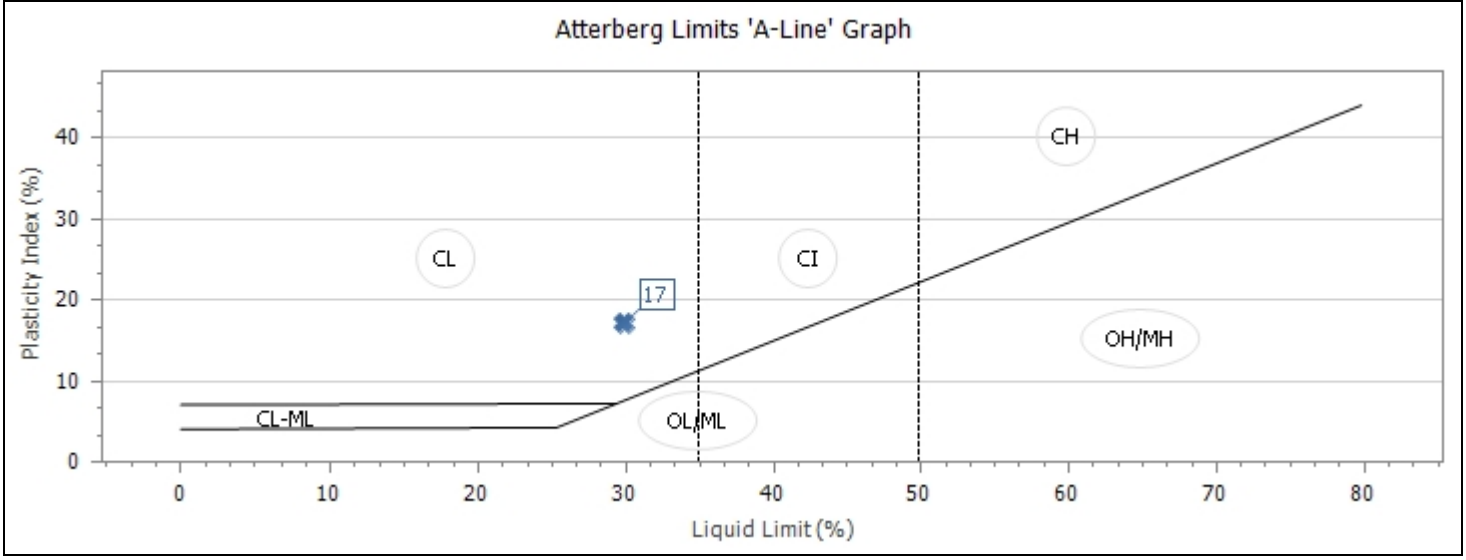
ATTERBERG LIMITS REPORT

Client:	WML Consultants	Report Number:	5022/R/49713-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 20 Depth 0.5-0.7m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	5/10/2021 Page 1 of 1

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.3.4.1, AS1289.2.1.1, AS1726 (Tables 9/10)		
Sample Number	5022/S/81676	Sample Location	
Sampling Method	Tested As Received	Test Pit No.	20
Date Sampled	21/09/2021	Depth m	0.5-0.7
Sampled By	Client Sampled		
Date Tested	4/10/2021		
Att. Drying Method	Air Dried	Material Source	Test Pit
Atterberg Preparation	Dry Sieved	Material Type	Brown Sandy CLAY
LL Device	Cassagrande	Water Type	Potable
Material Description	Brown sandy CLAY		

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**30**	
Plastic Limit (%)		**13**	
Plasticity Index (%)		**17**	
Linear Shrinkage (%)		**7.0**	
Linear Shrinkage Defects:	-		



Remarks	Results apply to the sample/s as received.

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Form ID: W11Rep Rev 1

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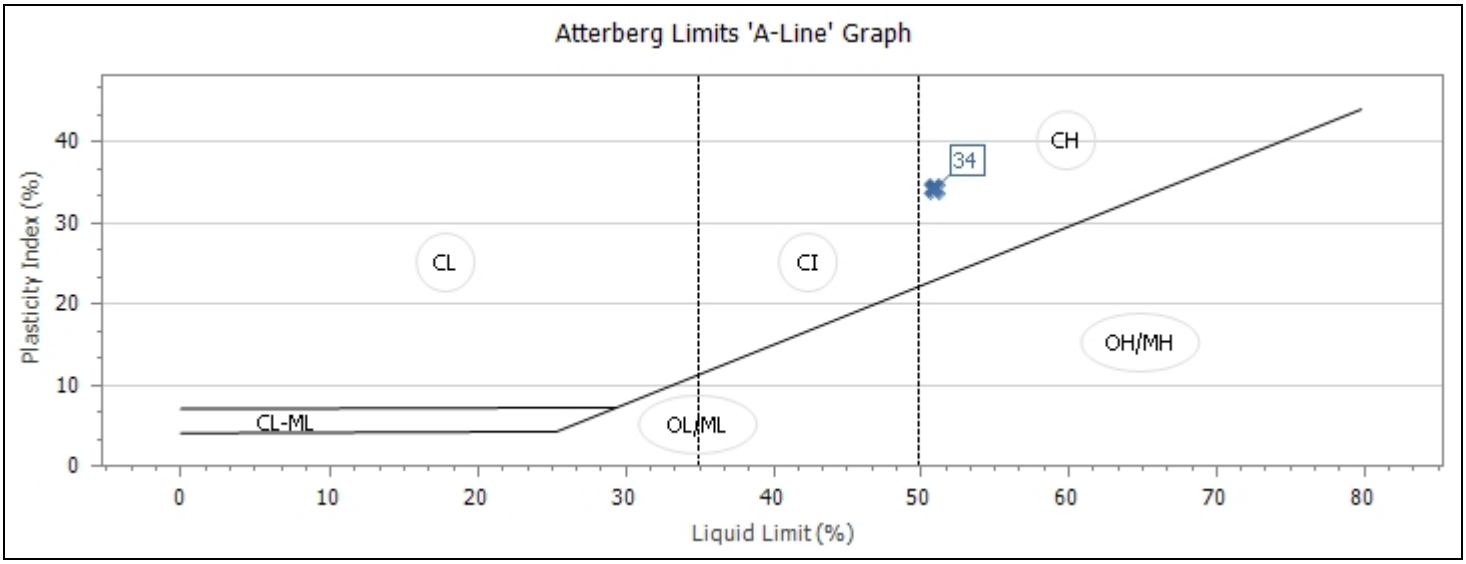
ATTERBERG LIMITS REPORT

Client:	WML Consultants	Report Number:	5022/R/49670-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 21 Depth 0.5m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	1/10/2021 Page 1 of 1

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.3.4.1, AS1289.2.1.1, AS1726 (Tables 9/10)		
Sample Number	5022/S/81679	Sample Location	
Sampling Method	Tested As Received	Test Pit No.	21
Date Sampled	21/09/2021	Depth m	0.5
Sampled By	Client Sampled		
Date Tested	30/09/2021		
Att. Drying Method	Oven Dried	Material Source	Test Pit
Atterberg Preparation	Dry Sieved	Material Type	Brown Sandy CLAY
LL Device	Cassagrande	Water Type	Potable
Material Description	Brown Sandy Clay		

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**51**	
Plastic Limit (%)		**17**	
Plasticity Index (%)		**34**	
Linear Shrinkage (%)		**13.0**	
Linear Shrinkage Defects:	-		



Remarks	Results apply to the sample/s as received.

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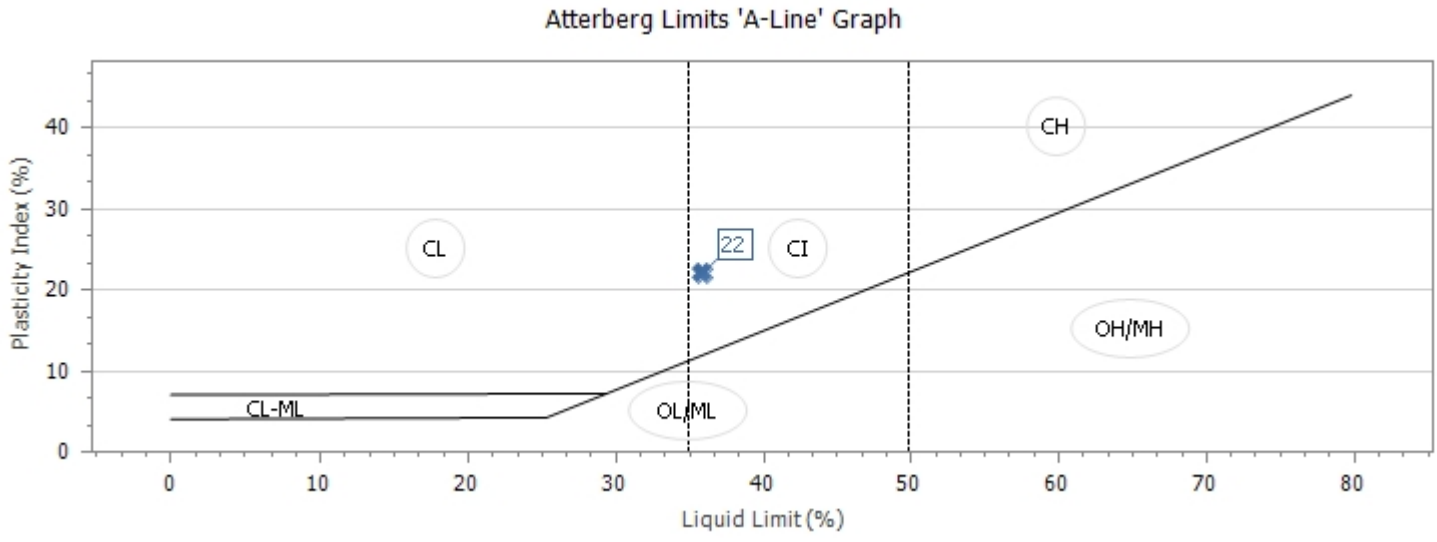
ATTERBERG LIMITS REPORT

Client:	WML Consultants	Report Number:	5022/R/49685-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 21 Depth 1.0m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	4/10/2021 Page 1 of 1

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.3.4.1, AS1289.2.1.1, AS1726 (Tables 9/10)		
Sample Number	5022/S/81680	Sample Location	
Sampling Method	Tested As Received	Test Pit No.	21
Date Sampled	21/09/2021	Depth m	1.0
Sampled By	Client Sampled		
Date Tested	1/10/2021		
Att. Drying Method	Oven Dried	Material Source	Test Pit
Atterberg Preparation	Dry Sieved	Material Type	Brown clayey SAND
LL Device	Cassagrande	Water Type	Potable
Material Description	Brown Clayey Sand		

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**36**	
Plastic Limit (%)		**14**	
Plasticity Index (%)		**22**	
Linear Shrinkage (%)		**9.5**	
Linear Shrinkage Mould Length / Defects:	Mould Length: 125.0mm / -		



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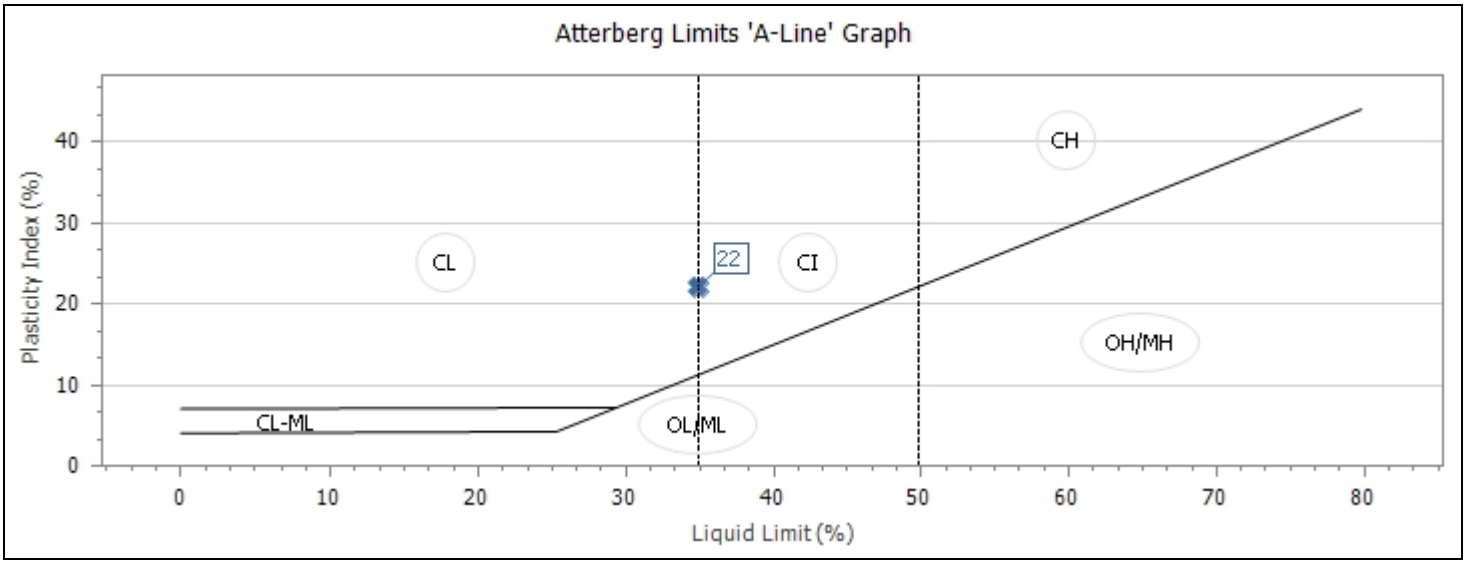
ATTERBERG LIMITS REPORT

Client:	WML Consultants	Report Number:	5022/R/49686-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 25 Depth 1.4m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	4/10/2021 Page 1 of 1

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.3.4.1, AS1289.2.1.1, AS1726 (Tables 9/10)		
Sample Number	5022/S/81682	Sample Location	
Sampling Method	Tested As Received	Test Pit No.	25
Date Sampled	21/09/2021	Depth m	1.4
Sampled By	Client Sampled		
Date Tested	1/10/2021		
Att. Drying Method	Oven Dried	Material Source	Test Pit
Atterberg Preparation	Dry Sieved	Material Type	Brown clayey SAND
LL Device	Cassagrande	Water Type	Potable
Material Description	Brown Clayey SAND		

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**35**	
Plastic Limit (%)		**13**	
Plasticity Index (%)		**22**	
Linear Shrinkage (%)		**9.0**	
Linear Shrinkage Mould Length / Defects:	Mould Length: 125.0mm / -		



Remarks	Results apply to the sample/s as received.

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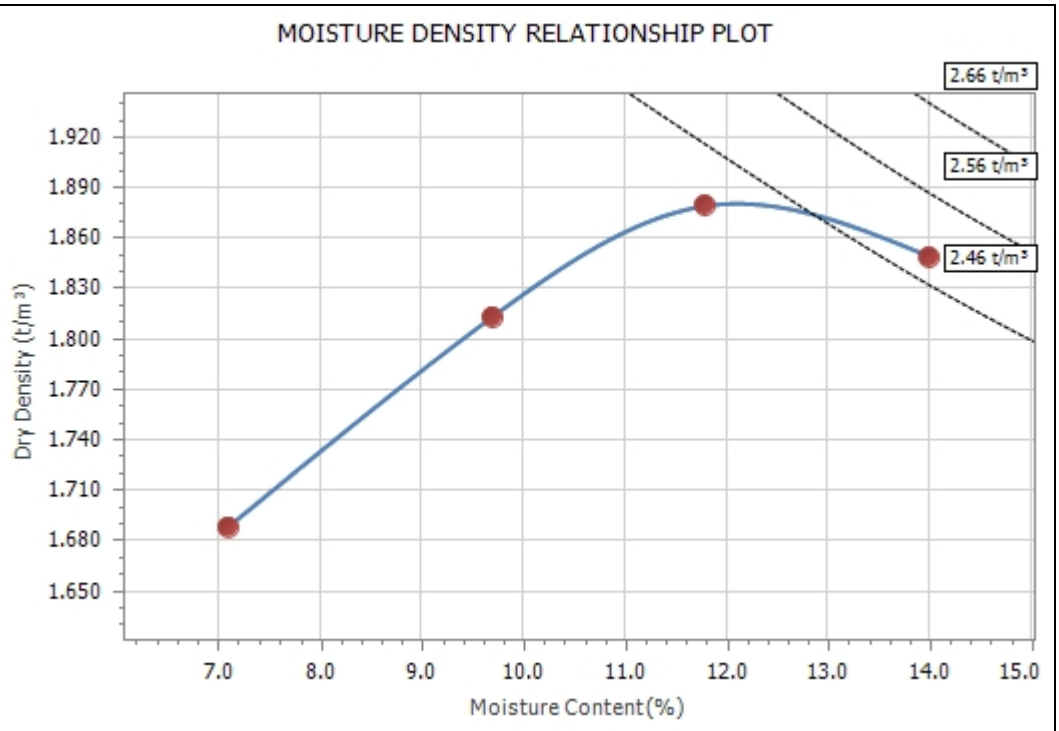
MOISTURE DENSITY RELATIONSHIP REPORT

Client:	WML Consultants	Report Number:	5022/R/49493-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 9 Depth 0.3-0.8m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	24/09/2021 Page 1 of 1

Test Procedures	AS1289.5.1.1, AS1289.2.1.1	Sample Location	
Sample Number	5022/S/81675	Test Pit No.	9
Sampling Method	Tested As Received	Depth m	0.3-0.8
Date Sampled	21/09/2021		
Sampled By	Client Sampled		
Date Tested	23/09/2021	Compactive Effort	Standard
Material Source	Test Pit	Fraction Tested (mm)	< 19.0mm
Material Type		Percent Oversize (%)	0.0
Liquid Limit Method	Estimation	Total Curing Time (hrs)	n/a
Material Description	Brown sandy CLAY		

Moisture / Density Relationship Data

Moisture Content (%)	Dry Density (t/m³)
7.1	1.688
9.7	1.813
11.8	1.879
14.0	1.849



Maximum Dry Density (t/m³):	**1.88**	**Optimum Moisture Content (%):**	**12.0**

Remarks: Results apply to the sample/s as received.

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NATA

Accreditation Number: 1986
Corporate Site Number: 5022

Approved Signatory: Janine Fischer
Form ID: W4Rep Rev2

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CALIFORNIA BEARING RATIO REPORT

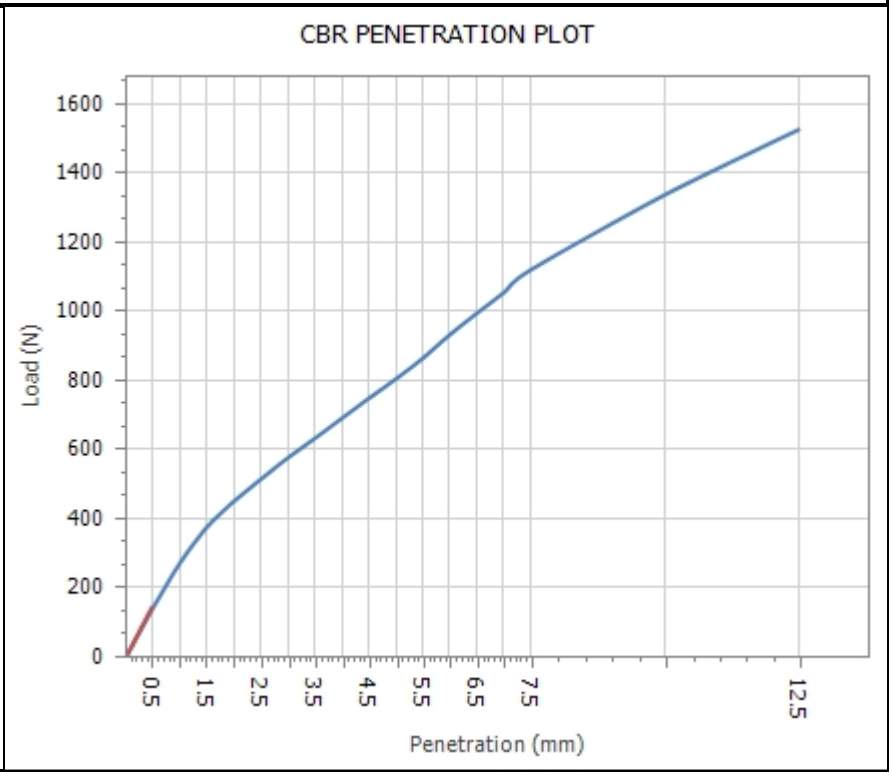
Client:	WML Consultants	Report Number:	5022/R/49554-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 9 Depth 0.3-0.8m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	29/09/2021 Page 1 of 1

Test Procedures	AS1289.6.1.1, AS1289.5.1.1, AS1289.2.1.1

		Sample Location		
Sample Number	5022/S/81675	Test Pit No.		9
Sampling Method	Tested As Received	Depth	m	0.3-0.8
Date Sampled	21/09/2021			
Sampled By	Client Sampled			
Date Tested	28/09/2021			
Material Source	Test Pit	Material Limit Start		-
Material Type	-	Material Limit End		-
Client Reference	-	Compactive Effort		Standard

Material Description	Brown sandy CLAY

Maximum Dry Density (t/m³):	1.88
Optimum Moisture Content (%):	12.0
Field Moisture Content (%):	9.4
Sample Percent Oversize (%)	0.0
Oversize Included / Excluded	Excluded
Target Density Ratio (%):	95
Target Moisture Ratio (%):	100
Placement Dry Density (t/m³):	1.78
Placement Dry Density Ratio (%):	95.0
Placement Moisture Content (%):	12.3
Placement Moisture Ratio (%):	101.5
Test Condition / Soaking Period:	Soaked / 4 Days
CBR Surcharge (kg)	4.5
Dry Density After Soak (t/m³):	1.78
Total Curing Time (hrs)	48
Liquid Limit Method	Estimation
Moisture (top 30mm) After Soak (%)	17.4
Moisture (remainder) After Soak (%)	14.8
CBR Swell (%):	0.0
Minimum CBR Specification (%):	-
CBR Value @ 5.0mm (%):	**4.0**



Remarks	Results apply to the sample/s as received.

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 5022

Approved Signatory: Janine Fischer
Form ID: W2ASRep Rev2

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Laboratory: **Bunbury**
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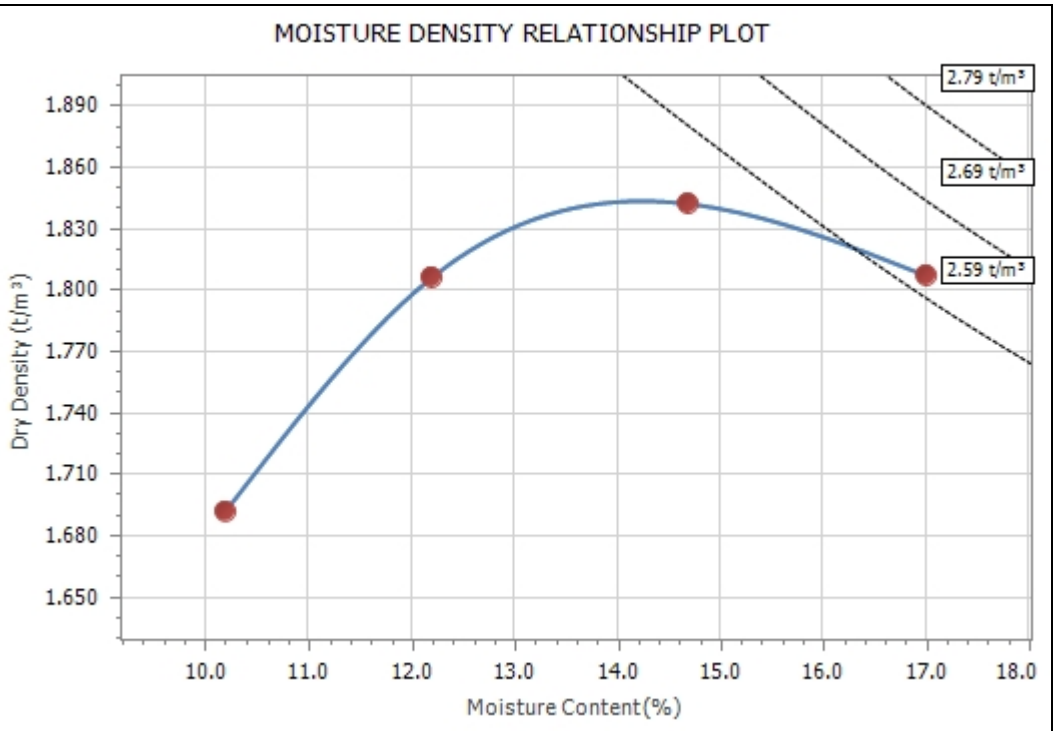
MOISTURE DENSITY RELATIONSHIP REPORT

Client:	WML Consultants	Report Number:	5022/R/49494-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 20 Depth 0.5-0.7m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	24/09/2021 Page 1 of 1

Test Procedures	AS1289.5.1.1, AS1289.2.1.1	Sample Location	
Sample Number	5022/S/81676	Test Pit No.	20
Sampling Method	Tested As Received	Depth m	0.5-0.7
Date Sampled	21/09/2021		
Sampled By	Client Sampled		
Date Tested	23/09/2021	Compactive Effort	Standard
Material Source	Test Pit	Fraction Tested (mm)	< 19.0mm
Material Type		Percent Oversize (%)	0.0
Liquid Limit Method	Estimation	Total Curing Time (hrs)	n/a
Material Description	Brown sandy CLAY		

Moisture / Density Relationship Data

Moisture Content (%)	Dry Density (t/m³)
10.2	1.692
12.2	1.806
14.7	1.842
17.0	1.807



Maximum Dry Density (t/m³):	1.84	**Optimum Moisture Content (%):**	14.0

Remarks: Results apply to the sample/s as received.

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 5022

Approved Signatory: Janine Fischer
Form ID: W4Rep Rev2

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CALIFORNIA BEARING RATIO REPORT

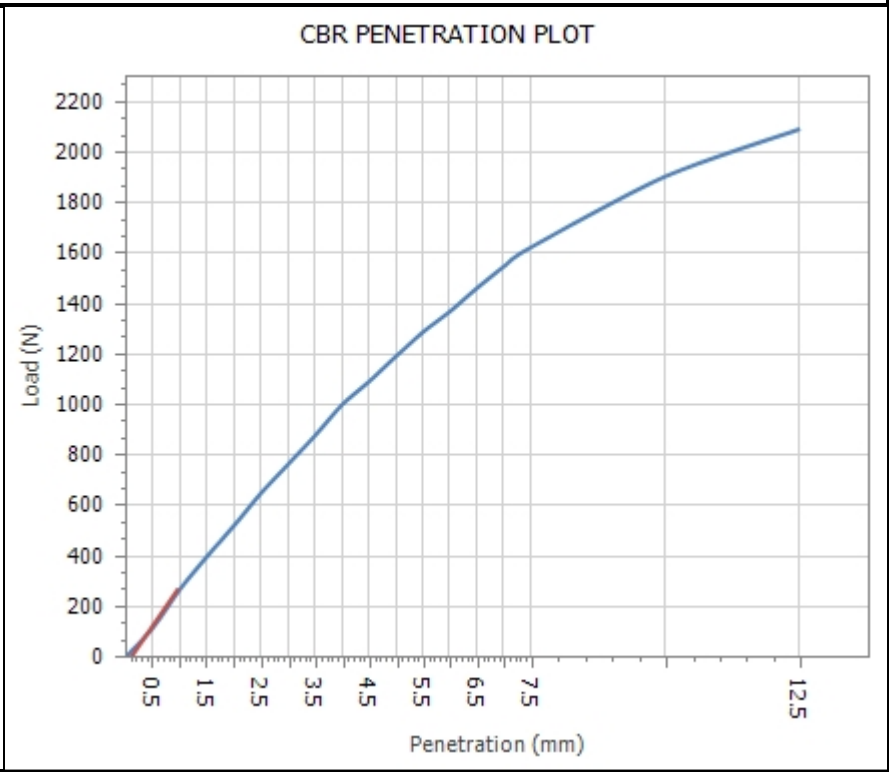
Client:	WML Consultants	Report Number:	5022/R/49555-1
Client Address:	1st Floor 62 Wittenoom Street, Bunbury	Project Number:	5022/P/1661
Project:	Dardanup Park Development	Lot Number:	TP 20 Depth 0.5-0.7m
Location:	South West WA	Internal Test Request:	5022/T/15082
Supplied To:	n/a	Client Reference/s:	Job No. 10012
Area Description:		Report Date / Page:	29/09/2021 Page 1 of 1

Test Procedures	AS1289.6.1.1, AS1289.5.1.1, AS1289.2.1.1

		Sample Location		
Sample Number	5022/S/81676	Test Pit No.		20
Sampling Method	Tested As Received	Depth	m	0.5-0.7
Date Sampled	21/09/2021			
Sampled By	Client Sampled			
Date Tested	28/09/2021			
Material Source	Test Pit	Material Limit Start		-
Material Type	-	Material Limit End		-
Client Reference	-	Compactive Effort		Standard

Material Description	Brown sandy CLAY

Maximum Dry Density (t/m³):	1.84
Optimum Moisture Content (%):	14.0
Field Moisture Content (%):	17.5
Sample Percent Oversize (%)	0.0
Oversize Included / Excluded	Excluded
Target Density Ratio (%):	95
Target Moisture Ratio (%):	100
Placement Dry Density (t/m³):	1.76
Placement Dry Density Ratio (%):	95.5
Placement Moisture Content (%):	13.7
Placement Moisture Ratio (%):	96.5
Test Condition / Soaking Period:	Soaked / 4 Days
CBR Surcharge (kg)	4.5
Dry Density After Soak (t/m³):	1.75
Total Curing Time (hrs)	48
Liquid Limit Method	Estimation
Moisture (top 30mm) After Soak (%)	18.5
Moisture (remainder) After Soak (%)	16.8
CBR Swell (%):	0.5
Minimum CBR Specification (%):	-
CBR Value @ 5.0mm (%):	**6**



Remarks	Results apply to the sample/s as received.

Accredited for compliance with ISO/IEC 17025 – Testing

NATA

Accreditation Number: 1986
Corporate Site Number: 5022

Approved Signatory: Janine Fischer
Form ID: W2ASRep Rev2

WML Consultants Pty Ltd
PO Box 2023
Bunbury
WA 6231

Attention: **Aleksandra Gorczynska**

Report **823529-S**
Project name Lot 2 Harold Douglas Drive Dardanup West
Project ID 10012:02
Received Date Sep 10, 2021

Client Sample ID			TP1_0.0	TP1_0.5	TP1_1.0	TP1_1.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			P21-Se19362	P21-Se19363	P21-Se19364	P21-Se19365
Date Sampled			Not Provided[I12]	Not Provided[I12]	Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	7.1	6.2	6.4	5.7
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.5	3.7	4.5	4.5
Reaction Ratings*[S05]	0	-	3.0	2.0	3.0	2.0

Client Sample ID			TP1_2.0	TP1_2.5	TP4_0.0	TP4_0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			P21-Se19366	P21-Se19367	P21-Se19368	P21-Se19369
Date Sampled			Not Provided[I12]	Not Provided[I12]	Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.8	5.5	6.5	6.2
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.5	4.3	4.2	4.9
Reaction Ratings*[S05]	0	-	2.0	2.0	3.0	2.0

Client Sample ID			TP4_1.0	TP4_1.5	TP5_0.0	TP5_0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			P21-Se19370	P21-Se19371	P21-Se19372	P21-Se19373
Date Sampled			Not Provided[I12]	Not Provided[I12]	Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.1	5.7	5.8	5.5
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	5.0	4.5	3.0	4.2
Reaction Ratings*[S05]	0	-	2.0	2.0	4.0	2.0

Client Sample ID			TP5_1.0	TP5_1.5	TP6_0.0	TP6_0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			P21-Se19374	P21-Se19375	P21-Se19376	P21-Se19377
Date Sampled			Not Provided[I12]	Not Provided[I12]	Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.1	6.0	8.0	6.0
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	5.1	5.0	5.0	3.5
Reaction Ratings*[S05]	0	-	2.0	2.0	3.0	2.0

Client Sample ID			TP6_1.0	TP6_1.5	TP10_0.0	TP10_0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			P21-Se19378	P21-Se19379	P21-Se19380	P21-Se19381
Date Sampled			Not Provided[I12]	Not Provided[I12]	Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.1	5.8	6.2	6.0
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.4	5.0	4.3	4.4
Reaction Ratings*[S05]	0	-	2.0	1.0	3.0	2.0

Client Sample ID			TP10_1.0	TP10_1.5	TP10_2.0	TP13_0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			P21-Se19382	P21-Se19383	P21-Se19384	P21-Se19385
Date Sampled			Not Provided[I12]	Not Provided[I12]	Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.9	5.9	5.7	6.2
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.7	5.0	5.0	3.7
Reaction Ratings*[S05]	0	-	1.0	1.0	2.0	3.0

Client Sample ID			TP13_0.5	TP13_1.0	TP13_1.5	TP15_0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			P21-Se19386	P21-Se19387	P21-Se19388	P21-Se19389
Date Sampled			Not Provided[I12]	Not Provided[I12]	Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.3	6.8	6.2	5.4
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.9	5.3	5.1	3.0
Reaction Ratings*[S05]	0	-	3.0	2.0	2.0	3.0

Client Sample ID			TP15_0.5	TP15_1.0	TP15_1.5	TP20_0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			P21-Se19390	P21-Se19391	P21-Se19392	P21-Se19393
Date Sampled			Not Provided[I12]	Not Provided[I12]	Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.5	5.0	4.8	6.3
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.5	4.1	4.2	5.4
Reaction Ratings*[S05]	0	-	1.0	2.0	2.0	2.0

Client Sample ID			TP20_1.0	TP20_1.5	TP20_2.0	TP21_0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			P21-Se19394	P21-Se19395	P21-Se19396	P21-Se19397
Date Sampled			Not Provided[I12]	Not Provided[I12]	Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	7.2	7.1	7.4	5.8
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	5.6	5.5	5.5	4.1
Reaction Ratings*[S05]	0	-	2.0	2.0	2.0	2.0

Client Sample ID			TP21_0.5	TP21_1.0	TP21_1.5	TP21_2.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			P21-Se19398	P21-Se19399	P21-Se19400	P21-Se19401
Date Sampled			Not Provided[I12]	Not Provided[I12]	Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.7	5.8	6.0	5.8
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.6	4.7	5.0	4.8
Reaction Ratings*[S05]	0	-	2.0	2.0	2.0	2.0

Client Sample ID			TP21_2.5	TP22_0.0	TP22_0.5	TP22_1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			P21-Se19402	P21-Se19403	P21-Se19404	P21-Se19405
Date Sampled			Not Provided[I12]	Not Provided[I12]	Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.8	6.7	5.6	6.0
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.9	3.2	3.5	4.8
Reaction Ratings*[S05]	0	-	2.0	4.0	4.0	4.0

Client Sample ID			TP22_1.5	TP22_2.0	TP22_2.4
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			P21-Se19406	P21-Se19407	P21-Se19408
Date Sampled			Not Provided[I12]	Not Provided[I12]	Not Provided[I12]
Test/Reference	LOR	Unit			
Acid Sulfate Soils Field pH Test					
pH-F (Field pH test)*	0.1	pH Units	5.5	5.6	5.4
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.7	4.9	4.9
Reaction Ratings*[S05]	0	-	2.0	2.0	2.0

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Acid Sulfate Soils Field pH Test	Welshpool	Sep 10, 2021	7 Days

- Method: LTM-GEN-7060 Determination of field pH (pHF) and field pH peroxide (pHFOX) tests

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Company Name: WML Consultants Pty Ltd
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WA 6231

Project Name: Lot 2 Harold Douglas Drive Dardanup West
Project ID: 10012:02

Order No.:
Report #: 823529
Phone: 08 9722 3544
Fax:

Received: Sep 10, 2021 11:27 AM
Due: Sep 17, 2021
Priority: 5 Day
Contact Name: Aleksandra Gorczynska

Eurofins Analytical Services Manager : Rhys Thomas

Sample Detail						Acid Sulfate Soils Field pH Test
Melbourne Laboratory - NATA # 1261 Site # 1254						
Sydney Laboratory - NATA # 1261 Site # 18217						
Brisbane Laboratory - NATA # 1261 Site # 20794						
Mayfield Laboratory - NATA # 1261 Site # 25079						
Perth Laboratory - NATA # 2377 Site # 2370						X
External Laboratory						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**	
1	TP1_0.0	Not Provided		Soil	P21-Se19362	X
2	TP1_0.5	Not Provided		Soil	P21-Se19363	X
3	TP1_1.0	Not Provided		Soil	P21-Se19364	X
4	TP1_1.5	Not Provided		Soil	P21-Se19365	X
5	TP1_2.0	Not Provided		Soil	P21-Se19366	X
6	TP1_2.5	Not Provided		Soil	P21-Se19367	X
7	TP4_0.0	Not Provided		Soil	P21-Se19368	X
8	TP4_0.5	Not Provided		Soil	P21-Se19369	X
9	TP4_1.0	Not Provided		Soil	P21-Se19370	X

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Company Name: WML Consultants Pty Ltd
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Project Name: Lot 2 Harold Douglas Drive Dardanup West
Project ID: 10012:02

Order No.:
Report #: 823529
Phone: 08 9722 3544
Fax:

Received: Sep 10, 2021 11:27 AM
Due: Sep 17, 2021
Priority: 5 Day
Contact Name: Aleksandra Gorczynska

Eurofins Analytical Services Manager : Rhys Thomas

Sample Detail						Acid Sulfate Soils Field pH Test
Melbourne Laboratory - NATA # 1261 Site # 1254						
Sydney Laboratory - NATA # 1261 Site # 18217						
Brisbane Laboratory - NATA # 1261 Site # 20794						
Mayfield Laboratory - NATA # 1261 Site # 25079						
Perth Laboratory - NATA # 2377 Site # 2370						X
External Laboratory						
10	TP4_1.5	Not Provided		Soil	P21-Se19371	X
11	TP5_0.0	Not Provided		Soil	P21-Se19372	X
12	TP5_0.5	Not Provided		Soil	P21-Se19373	X
13	TP5_1.0	Not Provided		Soil	P21-Se19374	X
14	TP5_1.5	Not Provided		Soil	P21-Se19375	X
15	TP6_0.0	Not Provided		Soil	P21-Se19376	X
16	TP6_0.5	Not Provided		Soil	P21-Se19377	X
17	TP6_1.0	Not Provided		Soil	P21-Se19378	X
18	TP6_1.5	Not Provided		Soil	P21-Se19379	X
19	TP10_0.0	Not Provided		Soil	P21-Se19380	X
20	TP10_0.5	Not Provided		Soil	P21-Se19381	X

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Company Name: WML Consultants Pty Ltd
Address: PO Box 2023
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Project Name: Lot 2 Harold Douglas Drive Dardanup West
Project ID: 10012:02

Order No.:
Report #: 823529
Phone: 08 9722 3544
Fax:

Received: Sep 10, 2021 11:27 AM
Due: Sep 17, 2021
Priority: 5 Day
Contact Name: Aleksandra Gorczynska

Eurofins Analytical Services Manager : Rhys Thomas

Sample Detail						Acid Sulfate Soils Field pH Test
Melbourne Laboratory - NATA # 1261 Site # 1254						
Sydney Laboratory - NATA # 1261 Site # 18217						
Brisbane Laboratory - NATA # 1261 Site # 20794						
Mayfield Laboratory - NATA # 1261 Site # 25079						
Perth Laboratory - NATA # 2377 Site # 2370						X
External Laboratory						
21	TP10_1.0	Not Provided		Soil	P21-Se19382	X
22	TP10_1.5	Not Provided		Soil	P21-Se19383	X
23	TP10_2.0	Not Provided		Soil	P21-Se19384	X
24	TP13_0.0	Not Provided		Soil	P21-Se19385	X
25	TP13_0.5	Not Provided		Soil	P21-Se19386	X
26	TP13_1.0	Not Provided		Soil	P21-Se19387	X
27	TP13_1.5	Not Provided		Soil	P21-Se19388	X
28	TP15_0.0	Not Provided		Soil	P21-Se19389	X
29	TP15_0.5	Not Provided		Soil	P21-Se19390	X
30	TP15_1.0	Not Provided		Soil	P21-Se19391	X
31	TP15_1.5	Not Provided		Soil	P21-Se19392	X

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NATA # 1261 Site # 25079

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NATA # 2377 Site # 2370

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IANZ # 1290

Company Name: WML Consultants Pty Ltd
Address: PO Box 2023
Bunbury
WA 6231

Project Name: Lot 2 Harold Douglas Drive Dardanup West
Project ID: 10012:02

Order No.:
Report #: 823529
Phone: 08 9722 3544
Fax:

Received: Sep 10, 2021 11:27 AM
Due: Sep 17, 2021
Priority: 5 Day
Contact Name: Aleksandra Gorczynska

Eurofins Analytical Services Manager : Rhys Thomas

Sample Detail						Acid Sulfate Soils Field pH Test
Melbourne Laboratory - NATA # 1261 Site # 1254						
Sydney Laboratory - NATA # 1261 Site # 18217						
Brisbane Laboratory - NATA # 1261 Site # 20794						
Mayfield Laboratory - NATA # 1261 Site # 25079						
Perth Laboratory - NATA # 2377 Site # 2370						X
External Laboratory						
32	TP20_0.5	Not Provided		Soil	P21-Se19393	X
33	TP20_1.0	Not Provided		Soil	P21-Se19394	X
34	TP20_1.5	Not Provided		Soil	P21-Se19395	X
35	TP20_2.0	Not Provided		Soil	P21-Se19396	X
36	TP21_0.0	Not Provided		Soil	P21-Se19397	X
37	TP21_0.5	Not Provided		Soil	P21-Se19398	X
38	TP21_1.0	Not Provided		Soil	P21-Se19399	X
39	TP21_1.5	Not Provided		Soil	P21-Se19400	X
40	TP21_2.0	Not Provided		Soil	P21-Se19401	X
41	TP21_2.5	Not Provided		Soil	P21-Se19402	X
42	TP22_0.0	Not Provided		Soil	P21-Se19403	X

eurofins | Environment Testing

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ABN: 50 005 085 521

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Sydney
Unit F3, Building F
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Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Phone : +61 2 4968 8448
NATA # 1261 Site # 25079

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Mayfield Laboratory - NATA # 1261 Site # 25079						
Perth Laboratory - NATA # 2377 Site # 2370						X
External Laboratory						
43	TP22_0.5	Not Provided		Soil	P21-Se19404	X
44	TP22_1.0	Not Provided		Soil	P21-Se19405	X
45	TP22_1.5	Not Provided		Soil	P21-Se19406	X
46	TP22_2.0	Not Provided		Soil	P21-Se19407	X
47	TP22_2.4	Not Provided		Soil	P21-Se19408	X
Test Counts						47

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram | **mg/L:** milligrams per litre | **ug/L:** micrograms per litre

ppm: Parts per million | **ppb:** Parts per billion | **%:** Percentage

org/100mL: Organisms per 100 millilitres | **NTU:** Nephelometric Turbidity Units | **MPN/100mL:** Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	P21-Se19364	CP	pH Units	6.4	6.7	pass	30%	Pass	
pH-FOX (Field pH Peroxide test)*	P21-Se19364	CP	pH Units	4.5	4.7	pass	30%	Pass	
Reaction Ratings*	P21-Se19364	CP	-	3.0	3.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	P21-Se19374	CP	pH Units	6.1	6.1	pass	30%	Pass	
pH-FOX (Field pH Peroxide test)*	P21-Se19374	CP	pH Units	5.1	5.1	pass	30%	Pass	
Reaction Ratings*	P21-Se19374	CP	-	2.0	2.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	P21-Se19384	CP	pH Units	5.7	5.8	pass	30%	Pass	
pH-FOX (Field pH Peroxide test)*	P21-Se19384	CP	pH Units	5.0	5.0	pass	30%	Pass	
Reaction Ratings*	P21-Se19384	CP	-	2.0	2.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	P21-Se19394	CP	pH Units	7.2	7.1	pass	30%	Pass	
pH-FOX (Field pH Peroxide test)*	P21-Se19394	CP	pH Units	5.6	5.6	pass	30%	Pass	
Reaction Ratings*	P21-Se19394	CP	-	2.0	2.0	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	P21-Se19404	CP	pH Units	5.6	5.5	pass	30%	Pass	
pH-FOX (Field pH Peroxide test)*	P21-Se19404	CP	pH Units	3.5	3.5	pass	30%	Pass	
Reaction Ratings*	P21-Se19404	CP	-	4.0	4.0	pass	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	N/A
Samples received within HoldingTime	N/A
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
I12	Where sampling date has not been provided, Eurofins | Environment Testing is not able to determine whether analysis has been performed within recommended holding times.
S05	Field Screen uses the following fizz rating to classify the rate the samples reacted to the peroxide: 1.0; No reaction to slight. 2.0; Moderate reaction. 3.0; Strong reaction with persistent froth. 4.0; Extreme reaction.

Authorised by:

Rhys Thomas Analytical Services Manager

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Environmental and Agricultural Testing Services
Unit 5, 4 Mummery Cres
Bunbury WA 6230
Phone: 08 9721 7170
Email: eatsresults@eatswa.com.au
ABN 64 606 311 399

Certificate of Analysis

Client Name:	WML Consultants		
Address:	PO Box 2023, Bunbury, WA, 6231		
Phone No:	9722 3544	Email:	ahollier@wml.com.au
Lab No:	13032	Order No:	Job 10012
Date samples received:	15/9/2021	Report date:	24/9/2021

Sample details: Nine soil samples for phosphorus retention index, collected by client, labelled:
TP4: 0.5 m
TP5: 0.5 m
TP9: 0.5 m
TP13: 0.5 m
TP15: 0.5 m
TP18: 0.7 m
TP21: 0.5 - 0.7 m
TP24: 0.5 m
TP25: 0.5 - 0.6 m

Test Methods: Samples are analysed on an as received basis using a method specified by the Australasian Soil and Plant Analysis Council.

Test Results:

Sample	Phosphorus Retention Index (PRI)
TP4: 0.5m	30
TP5: 0.5m	51
TP9: 0.5m	520
TP13: 0.5m	174
TP15: 0.5m	0.2
TP18: 0.7m	> 1000
TP21: 0.5-0.7m	> 1000
TP24: 0.5m	383
TP25: 0.5-0.6m	> 1000

Rachel Lancaster
BSc (Hort), PgDip (Agribusiness)
End of report

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16-18 Hayden Court Myaree WA 6154
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lab@mpl.com.au
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CERTIFICATE OF ANALYSIS 269800

Client Details

Client	Construction Sciences - Bunbury
Attention	Hermanus Coetzee
Address	72 McCombe Rd, BUNBURY, WA, 6230

Sample Details

Your Reference	**5022/P/1661- COC Ref 5022/CC/921**
Number of Samples	2 Soil
Date samples received	01/10/2021
Date completed instructions received	01/10/2021

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.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	07/10/2021
Date of Issue	06/10/2021

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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		269800-1	269800-2
Your Reference	UNITS	21 / 1.0	23 / 0.3-0.9
Sample ID		5022/S/81680	5022/S/81683
Date Sampled		21/09/2021	21/09/2021
Type of sample		Soil	Soil
Date prepared	-	06/10/2021	06/10/2021
Date analysed	-	06/10/2021	06/10/2021
Total Organic Carbon (Walkley Black)	mg/kg	3,600	20,000
Organic Matter*, Walkely Black	%	0.62	3.4

Method ID	Methodology Summary
INORG-036	Total Organic Carbon or Matter - A titrimetric method that measures the oxidisable organic content of soils.
INORG-036 OM	Estimated Organic Matter is calculated as per Soil Chemical Methods, Rayment and Lyons 2011 in the absence of site-specific information.

Report Comments

Samples received in good order: 18