



Appendix C Site and Soil Evaluation

TAYCOT Pty Ltd

LOT 51 RAYMOND ROAD, ROELANDS, WA

SITE-AND-SOIL EVALUATION (SSE)

November 2025
12130-G-R-001-1



WML
Consulting Engineers

Document History and Status				
Revision	Prepared By	Reviewed By	Purpose of Issue	Date
A	AG	RH	Internal draft	5/12/2024
0	AG	RH	Issued to Client	5/12/2024
1	AG	RH	Report revised in agreement with the new Structure Plan Concept	4/11/2025

Issued to:	Travis Taylor
WML Project Number:	12130
Document Name:	12130-G-R-001-1

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WML Report No 10185-G-R-001-0

APPENDIX B

WML Report No 12714-G-L-001-0

1 INTRODUCTION

WML Consultants Pty Ltd (WML) were engaged by TAYCOT Pty Ltd (the Client) to undertake a Site-and-Soil Evaluation (SSE) for the proposed rural-residential subdivision of Lot 51 Raymond Road, Roelands, WA.

This report presents a summary of the geotechnical investigation works performed by WML between October 2021 and February 2022 (as detailed in WML Report No 10185-G-R-001, attached in Appendix A) and an assessment of the suitability of the site for on-site effluent disposal. The SSE has been prepared with reference to the Government Sewerage Policy 2019 (GSP 2019) and AS/NZS 1547:2012 '*On-site domestic-wastewater management.*'

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

1.1 Client-supplied information

The following information was made available by the Client to assist with the preparation of this report.

- "Structure Plan Concept -1ha Lot 51 on DP421006 Raymond Road, Roelands" drawing, Ref. No 22536-05, prepared by Harley Dykstra, dated 5th of August 2025.

1.2 Objectives of this report

The objectives of the geotechnical study were to:

- Review available information and conduct a desktop study of the proposed development site.
- Review the information and data provided in the previous WML report No 10185-G-R-001.
- Review the 2025 groundwater monitoring data summarised in WML report No 12714-G-L-001-0.
- Assess the suitability of the site and in-situ soils for effluent disposal according to Government Sewerage Policy 2019 (GSP19) and AS/NZS 1547:2012.
- Provide recommendations for effluent treatment and application systems.
- Provide relevant setback distances in accordance with AS/NZS 1547 and GSP19.
- Provide a drawing showing the available Land Application Areas (LAAs) and required horizontal setbacks.

1.3 Site description

The proposed development site is located at Lot 51 Raymond Road, in Roelands, Western Australia, approximately 16 km northwest of Bunbury. The property is bounded by Raymond Road to the north, Treendale Road to the south and west, and Wilman Wadandi Highway to the east. The lot covers a total area of 9.0849 hectares.

Based on the updated structure plan concept drawing supplied for this revision, it is understood that the site is proposed to be subdivided into nine rural-residential lots, each covering a minimum of 1 ha.

Based on available survey data presented on the concept plan, the site is generally level, with gentle variations within the topographic profile presenting elevations typically ranging from RL 12.0 m AHD to RL 14.0 m AHD.

The site is a typical farmland, predominantly covered by grass, with a couple of isolated trees growing within the northern portion of the site, and an overhead powerline intersecting the site in a north-south direction.

2 SITE ASSESSMENT

The site's key features in relation to the effluent management for the site are summarised in Table 1 below. Additionally:

- The site is within a Government Sewerage Policy 2019 (GSP 2019) sewage-sensitive area (estuary catchments on the Swan and Scott Coastal Plains and within 1 km of significant wetlands); refer to Figure 1.
- The site is listed as a multiple-use palusplain wetland in the Department of Biodiversity, Conservation and Attractions (DBCA) Swan Coastal Plain geomorphic wetlands database; refer to Figure 2.
- The site is not within the 1 in 100 (1%) Annual Exceedance Probability flood area (shown in Figure 3). However, the majority of the site is located within 1% AEP Floodplain Development Control Area (DWER); shown in Figure 4.
- The closest watercourse is a man-made open drain located adjacent to the eastern boundary of the site. The discharge point of the drain is not known.
- Collie River is located approximately 180 m south of the site boundary.
- No public drinking water sources are located within 100 m of the site. The closest public drinking water sources (Protection Area-P1) are located about 5 km southwest and northwest of the site boundary.

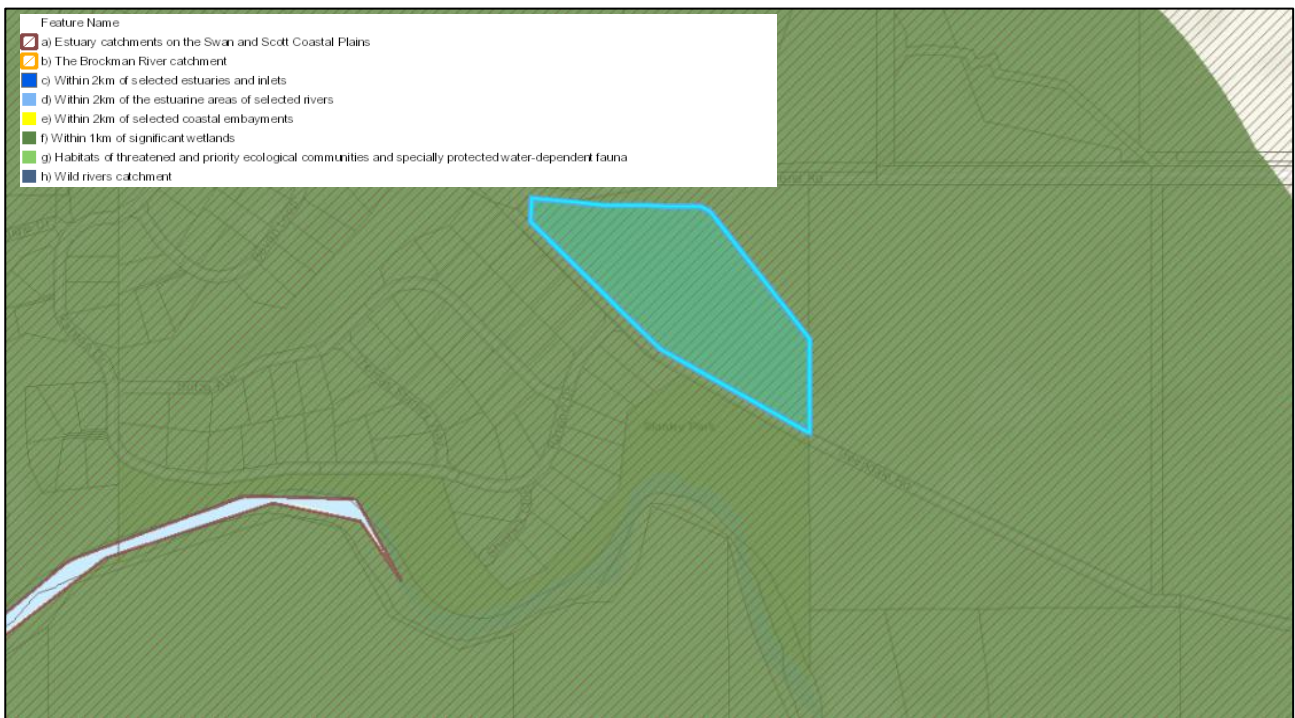


Figure 1. Excerpt from Department of Planning, Lands and Heritage website (Government Sewerage Policy maps).

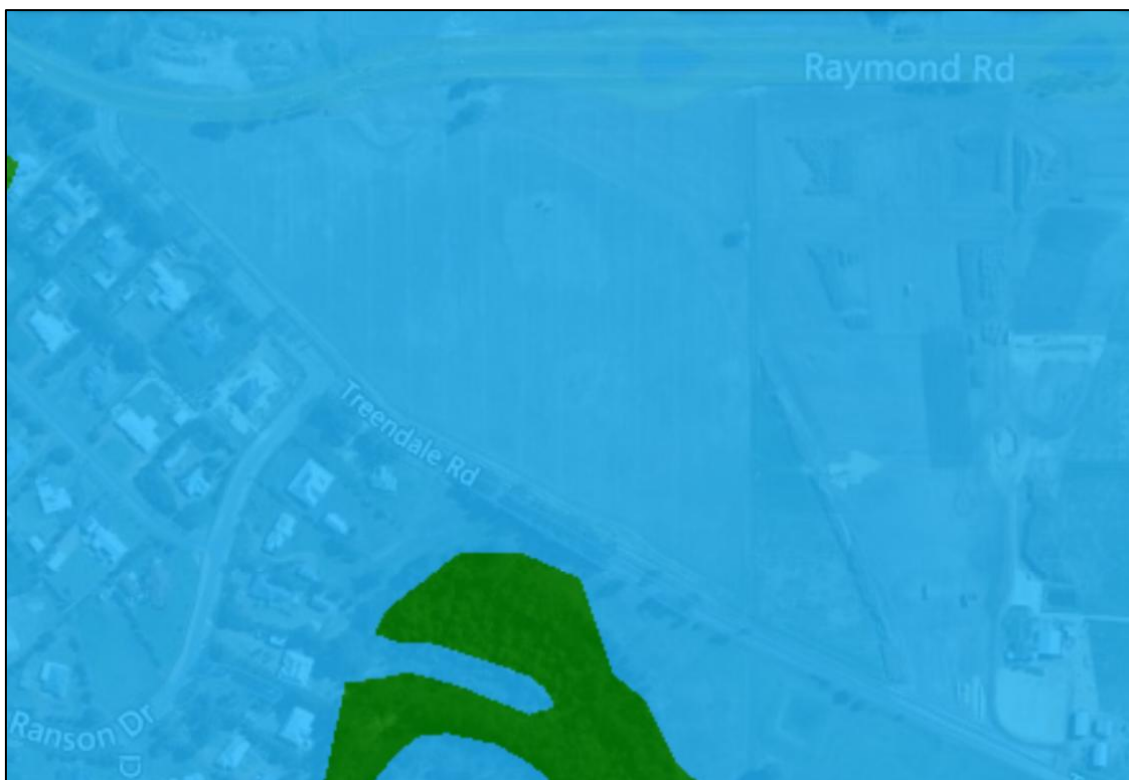


Figure 2. Geomorphic Wetlands, Swan Coastal Plain (DBCA).



Figure 3. 1 in 100 (1%) AEP Floodplain Area.



Figure 4. Excerpt from DWER – 1% AEP Floodplain Development Control Area.

Table 1: Site assessment

Feature	Description	Level of Constraint	Mitigation Measures
Climate	Average annual rainfall 718.4 mm (BOM Bunbury Comparison Climate Station No 009965). Estimated average annual pan evaporation 1500 mm (BOM pan evaporation maps)	Low	Not needed (NN)
Drainage	The site generally presents poor drainage conditions due to low permeability clays encountered near the existing ground surface within the majority of the site and due to the site being relatively flat. Based on the groundwater level readings undertaken in the winter 2025 season, the peak groundwater levels varied across the site from 1.6 m bgl at BH2 in the northern portion of the site to 0.44 m bgl at BH5(2) within the southeast portion of the site. Please refer to WML report 12714-G-L-001-0 attached in Appendix B for details.	High	Elevated land application systems are recommended to provide the required separation from low permeability clays and peak groundwater levels.
Watercourses	No watercourses are located within the site. The closest watercourse is a man-made open drain located adjacent to the eastern boundary of the site. Collie River is located approximately 180 m south of the site boundary.	Moderate	Position land application areas as far from the existing open drain as possible.

Feature	Description	Level of Constraint	Mitigation Measures
Surface Water/Flooding	The site is not located within 1 in 100 (1%) AEP flood areas; however, the majority of the site is located within the 1% AEP Floodplain Development Control Area.	Moderate	The disposal areas shall be elevated to achieve a minimum vertical separation of 1.5 m from the discharge point of the system and the peak groundwater levels.
Erosion & Landslip	No evidence of erosion present	Low	NN
Landform	Flat to very gently undulating plain.	Low	NN
Exposure & Aspect	No physical structure is currently present within the site to impede sun or wind exposure.	Low	NN
Imported Fill	No imported fill was identified on site.	Low	NN
Rock Outcrops	No rock outcrops were identified on site.	Low	NN
Run-on & Runoff	Minimal run-on/run-off is expected due to the relatively flat ground surface within the site.	Low	NN
Slope	Flat, generally less than 1°.	Low	NN
Vegetation	The majority of the proposed development area is currently covered by grass.	Low	NN

Notes: NN = Not Needed

2.1 Separation from the drain

As per the information provided above, a portion of an old drainage channel is located adjacent to the eastern boundary of the site, with one of the proposed lots (Lot 9) allowing less than 100 m of the horizontal setback distance (stated in the GSP (2019)) from the existing drain to the land application area (LAA). Based on the available aerial imagery, it appears that the drainage path historically led to the old dam located east of the proposed development (see Figure 5 below). Following the recently constructed Wilman Wadandi Highway, the drainage channel has been modified, and the majority of the connecting old drainage channels and the dam were removed during the construction of the new highway. It is currently unknown whether the remaining portion of the channel connects to any other channel; however, the aerial photographs indicate no discharge point to any other waterway. Considering the relatively flat ground surface within the existing site and the adjacent property, limited surface run-off is expected towards the drain. WML recommends at least 50 m setback from the existing drain to the future LAAs; however, this can potentially be reduced further with the additional protective measures as detailed below.

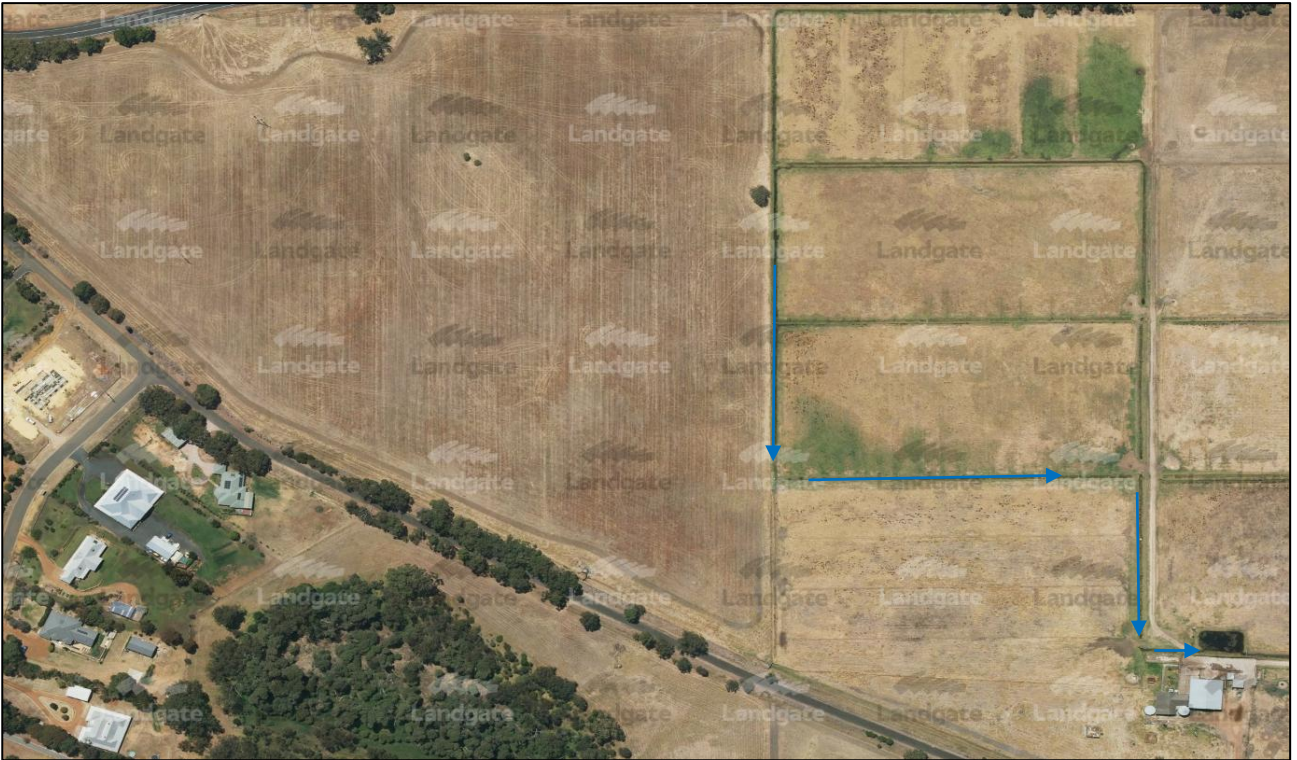


Figure 5: Historical aerial photograph - 2021.



Figure 6: Recent aerial photograph – December 2024.

Based on the GSP (2019), smaller setbacks may be considered, provided that the reduced setbacks will not have a significant impact on the environment or public health. This can be achieved by implementing the following environmental protective measures in addition to the recommendations provided in Section 4:

- Design earthworks levels and a suitable lot drainage system that will ensure no direct pathway from the effluent disposal area to the drain (for example, directing stormwater towards bio-retention basins/swales, or providing a bund between the drain and the land application area).
- Plant vegetation with high nutrient uptake (such as grasses and shrubs) that tolerates wet conditions and has high evapotranspiration capacity. **Figure 7** and **Figure 8** below provide guidance on suitable/unsuitable plant species.
- Maximise wind and sun exposure within the LAAs.
- Increase the size of land application areas and decrease the design loading rates (DLR).
- Ensure the horizontal setback between the LAAs and the drain is maximised.

SUITABLE PLANT SPECIES FOR OF LAND APPLICATION AREAS

GENUS	SPECIES	COMMON NAME
Grasses		
Buffalo		
Kikuyu		
Ground Cover		
Acanthus	mollis	
Crinum	pedunculatum	
Hardenbergia		
Hibbertia	scandens	
Lonandra	longifolia	
Pennisetum	alopecuroides	Swamp Foxtail
Ophiopogon		
Viola	hederacea	Native Violet
Shrubs		
Baeckea	stenophylla	Weeping Baeckea
Baeckea	vigata	
Banksia	robur	Broad Leaved Banksia
Callistemon	pachyphyllus	Wallum Bottlebrush
Comesperma	defoliatum	
Leptospermum	juniperinum	
Leptospermum	laevigatum	
Leptospermum	liversidgei	
Leptospermum	semibaccatum	
Melastoma	affine	Blue Tongue
Pultenaea	paleacea	

Figure 7: Excerpt from a published document by Somerset Council (QLD) – Suitable Plant Species.

THESE SPECIES ARE NOT SUITABLE WITHIN TEN METRES OF DISPOSAL AREA		
Banksia	integrifolia	
Callistemon	viminalis	
Callistemon	salignus	
Casuarina	cunninghamiana	
Casuarina	glauca	Swamp Sheoak
Eucalyptus	intermedia	Red Bloodwood
Eucalyptus	microcorys	Tallowood
Eucalyptus	robusta	Swamp Mahogany
Glochidion	ferdinandii	Cheese Tree
Leptospermum	peteronii	
Lophostemon	suaveolens	
Melaleuca	armillaris	
Melaleuca	leucadendra	
Melaleuca	quinquenervia	Paperbarked Tea Tree

Figure 8: Excerpt from a published document by Somerset Council (QLD) – Unsuitable Plant Species.

3 SOIL ASSESSMENT

The in-situ soils have been assessed for suitability for on-site sewerage management through a desktop review of published soil survey information, field investigation and laboratory testing completed by WML between October 2021 and February 2022.

3.1 Fieldwork

Fieldwork was carried out by WML geotechnical engineers on the 9th of October 2021 and comprised:

- Drilling of eight (8) machine-augered boreholes, designated BH1 to BH8, to a depth of between 2.5 and 5 m below ground level (m BGL).
- Converting six of the boreholes (BH1, BH2, BH4, BH5(1), BH5(2) and BH7) into monitoring wells to a depth of up to 5 m.
- In-situ permeability tests adjacent to BH1, BH5 and BH7 using the Talsma-Hallam permeability method.
- The collection of representative soil samples from boreholes for laboratory testing.

The BH5 was repeated to allow the installation of an additional, shallow groundwater monitoring well (1.25 m deep) to monitor the perched groundwater levels (BH5(2)).

The approximate test locations are presented on the site map 10185-G-001, which is attached to the WML report No 10185-G-R-001, which is, in turn, included in Appendix A. The borehole logs are also included in the above-mentioned WML report.

3.2 Sub-surface profile and groundwater

Based on the results of the investigation, the site is underlain by the Guilford Formation, which was typically represented by CLAY and Sandy CLAY to the test termination depths. At the BH5 location, a 1 m thick sandy layer (SAND over Clayey SAND) was encountered over the clays.

Groundwater levels were monitored throughout the 2025 winter season, with the peak groundwater levels varying between 1.6 m bgl in the northern portion of the site to 0.44 m bgl within the southeastern portion of the site.

Detailed subsurface conditions are presented on the borehole logs included in WML report No 10185-G-R-001-0 attached in Appendix A.

3.3 In-situ permeability

In-situ permeability tests were undertaken using the constant head Talsma-Hallam method in accordance with AS/NZS 1547:2012. The permeability test consisted of a 160 mm diameter borehole drilled to a depth 400 mm below the existing ground level (to extend below the topsoil layer) and filled with water to saturate the surrounding soil. A constant head of water was then applied, and a known volume of water was timed to dissipate. Table 2 presents the results of the in-situ permeability testing.

Table 2: In-situ permeability test results

Location ID	In-situ Permeability Test	
	m/s	m/day
BH1	5.73×10^{-9}	4.95×10^{-4}
BH5	$< 1 \times 10^{-9}$	NO
BH7	$< 1 \times 10^{-9}$	NO

Notes: NO = Not Obtainable

The test results indicate that the in-situ soils encountered across the site are typically low-permeability and present properties of Category 5 soils as per AS1547:2012.

3.4 Laboratory soil testing

Representative soil samples were submitted to NATA-accredited laboratories (Western Geotechnical and MPL Laboratories) for testing. The laboratory test results are summarised below, and the laboratory test certificates are presented in WML Report No 10185-G-001.

Table 3: Summary of soil classification testing

Location ID	Depth (m)	PSD			Atterberg Limits				¹ Soil Classification (USCS)
		Fines (%)	Sand (%)	Gravel (%)	LL (%)	PL (%)	PI (%)	LS (%)	
BH6	0.5	39	57	4	27	10	17	6.5	Sandy CLAY (CL)
BH7	0.7	50	45	5	38	18	20	8	Sandy CLAY (CI)

Notes:

Terminology - PSD = Particle Size Distribution; LL = Liquid Limit; PL = Plastic Limit; PI = Plasticity Index; LS = Linear Shrinkage;

¹Soil classifications based on the classification of fine and coarse-grained soils presented in Table 9 and Table 10 of AS1726:2017.

Table 4: Summary of Phosphorus Retention Index (PRI) testing

Location ID	Depth (m)	PRI	Soil Description
BH5	0.6	59.1	Clayey SAND (SC)
BH5	1.9	>1000.0	CLAY (CH)
BH6	0.4	228.8	Sandy CLAY (CI)
BH6	0.5	176.3	Sandy CLAY (CL)
BH7	0.1	664.3	Sandy CLAY (CI)
BH7	0.4	>1000.0	CLAY (CI)
BH7	0.7	552.0	Sandy CLAY (CI)

3.5 Soil Categorisation

AS/NZS 1547:2012 requires the determination of soil categories from which effluent infiltration capacities can be determined. The factors that affect a soil category are:

- Soil texture and structure
- Dispersion
- Shrink/swelling of soils
- Depth of groundwater
- Presence of hard or impermeable layers
- Soil permeability

The materials of the site observed during the investigation can be categorised in accordance with Table 5.1 of the standard:

Table 5: Typical soil parameters and soil category in accordance with AS/NZS 1547:2012

Soil Type	Permeability		PRI	Soil Category
	m/s	m/day		
Clayey SAND	Not tested	Not tested	50-100	3
Sandy CLAY	Not tested	Not tested	100-1000	5
CLAY	$<1 \times 10^{-9}$	$<8.64 \times 10^{-4}$	>1000	6

4 RECOMMENDATIONS

4.1 Wastewater management system

A detailed design of the wastewater management system for the proposed residential lots is beyond the scope of this report. However, based on the results of the SSE investigation and the requirements of the Government Sewerage Policy 2019, the treatment of the generated wastewater to a secondary level with nutrient removal utilising either drip irrigation or absorption trench/beds application system can be considered satisfactory.

The primary constraints influencing the design are considered to be the following:

- Vertical separation between the practically impermeable clays and peak groundwater levels and the discharge point of the application system.
- Horizontal separation from the portion of the old open drain located directly east of the site.

The final selection of the system should be undertaken by the Client from the list of approved Department of Health Secondary Treatment systems and should achieve a maximum output of:

- 20 mg/L of Biochemical Oxygen Demand (BOD)
- 30 mg/L of Total Suspended Solids (TSS)
- 10 cfu/100mL of Escherichia (E) coli

It is recommended that the owner consult an irrigation expert familiar with effluent irrigation equipment to design the system and an appropriately registered plumbing/drainage practitioner to install the system. The irrigation plan must ensure even effluent application throughout the entire irrigation area. To ensure even effluent distribution, the pump capacity must be adequate for the size and configuration of the system, considering head and friction losses due to changes in elevation, pipes, valves, fittings, etc.

The following shall be considered minimum requirements for the design and installation of the effluent management systems for all Lots:

- Generated effluent from each lot should be treated using a secondary treatment system (STS) with nutrient removal.
- Subsurface application of the effluent is recommended, utilising either inverted leach drains or sub-surface drip irrigation systems.
- The land application areas shall achieve a minimum vertical separation of 1.0 m between the clay subgrade and the discharge point of the application system and a minimum separation of 1.5 m between the peak groundwater level and the discharge point of the application system.
- Where fill is imported, the material shall be a sandy loam with an approximate clay content between 10-20% and achieve a minimum PRI of 20. The soil shall be able to be classified as a Category 2 soil in accordance with AS 1547.
- The design should include at least a 50 m setback distance between the land application areas and the drain located directly east of the site boundary. Based on the GSP (2019), smaller setbacks may be considered, provided that the reduced setbacks will not have a significant impact on the environment or public health. Additional environmental protective measures should be implemented where a reduced horizontal setback from the drain is proposed. Please refer to Section 2.1 for details.
- High nutrient uptake vegetation should be planted around the LAA immediately following the system's installation to increase the evapotranspiration rate.
- A suitable drainage system for the entire subdivision should be designed to ensure appropriate flow paths of the surface water within the subdivision. Stormwater must not be disposed of in the wastewater treatment system or the land application area.

- The area should be fenced or otherwise delineated (such as landscaping) to prevent vehicle access; signs should be erected to inform owners/tenants and visitors of the effluent irrigation area's extent and limit their access and impact on the area.

Sizing the land application area for domestic wastewater can be performed by following Schedule 2 of the GSP19. Assuming disposal of a secondary treated effluent through Category 5 soil, a conversion factor of 0.33 can be used with the expected wastewater load for each lot. For a standard residential property, this will result in an LAA of approximately 300 m².

Available application areas within each lot are shown in Drawing 12130-G1-DG-002.

4.2 Setback Distances

Setback buffer distances from effluent land application areas and treatment systems are required to help prevent human contact, maintain public amenities and protect sensitive environments. The relevant buffer distances recommended are:

Table 6: Relevant setback distances in accordance with GSP 2019 and AS / NZS 1547:2012

Feature	Setback distance (m)
Private bore for household/drinking water purposes	30
Drainage system that discharges directly into a waterway or wetland without treatment	100
Waterway/watercourse (measured from the edge of the wetland vegetation)	100
Existing portion of an old drain directly east of the site (the results of the desktop study indicate that the drain does not discharge directly into a waterway or wetland).	50
<u>Vertical</u> distance to peak groundwater levels	¹⁾ 1.5
Property boundary	1.5
Buildings	2
Surface water	55
Recreational areas (children's play areas, swimming pools and so on)	7
In-ground water tank	8
Retaining wall and Embankments, escarpments, cuttings	3m or 45° angle from the toe of the wall (whichever is greater)

¹⁾Measured from the discharge point of the application system.

4.3 Monitoring, Operation and Maintenance

Maintenance is to be carried out in accordance with the DOH Approval of the selected secondary treatment system and manufacturers' recommendations. The treatment system will only function adequately if appropriately and regularly maintained.

To ensure the treatment system functions adequately, residents must:

- Have a suitably qualified maintenance service technician for the secondary treatment system at the frequency required by the manufacturer under the local government permit to use.
- Use household cleaning products that are suitable for ATUs.
- Keep as much fat and oil out of the system as possible.
- Conserve water (AAA-rated fixtures and appliances are recommended).

To ensure the land application system functions adequately, residents must:

- Regularly harvest (mow) vegetation within the LAA and remove this to maximise uptake of water and nutrients.
- Monitor and maintain the subsurface mound system following the manufacturer's recommendations.
- Regularly clean in-line filters.

5 CLOSURE

As a result of our assessment, we recommend that sustainable on-site sewage management and disposal systems be installed to meet the needs of the proposed subdivision.

There are ongoing landowner obligations to ensure that the operation and management of the treatment and disposal system are regularly maintained in accordance with relevant health regulations and manufacturer's recommendations.

We trust that the information provided satisfies your present requirements and meets with your approval. Should you have any queries, please do not hesitate to contact the author.

We draw your attention to the attached "*Report Limitations*" included with this report. This information sheet is intended to provide additional information about this report and the 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.

6 REFERENCES

Department of Health (DoH), 'Approved Secondary Treatment Systems' 14 November 2019, (Accessed December 2021), https://ww2.health.wa.gov.au/Articles/A_E/Approved-aerobic-treatment-unit

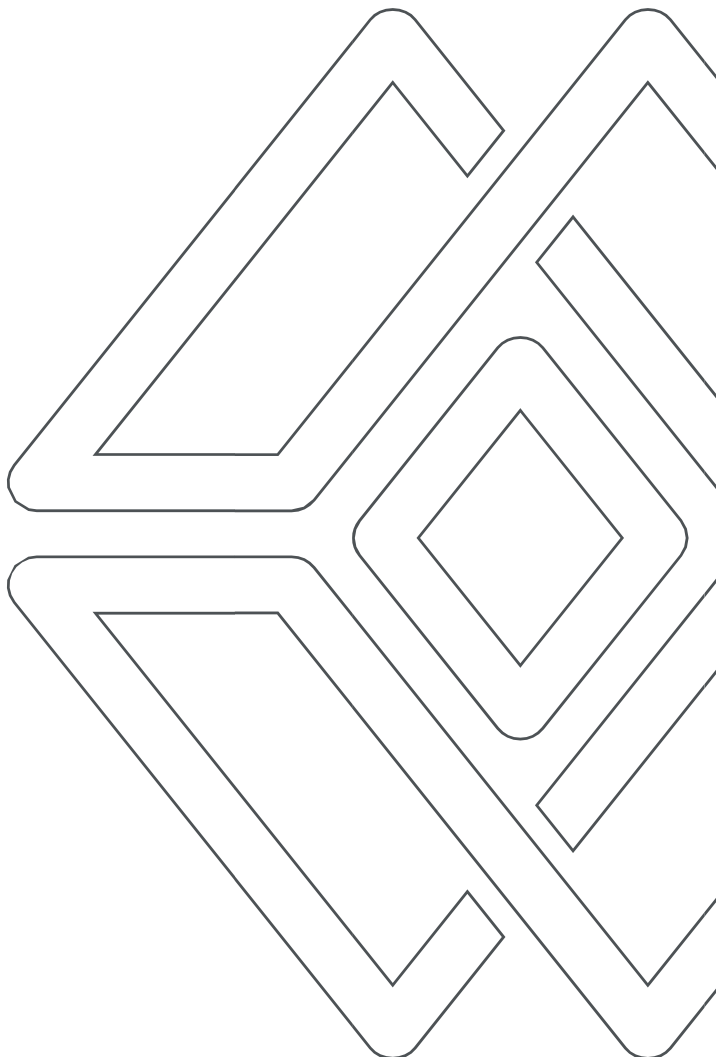
Bureau of Meteorology (BoM), Climate Data Online, 'Monthly rainfall for Bunbury Comparison Monitoring station 009510', (Accessed November 2021), http://www.bom.gov.au/jsp/ncc/cdio/weatherData/av?p_nccObsCode=139&p_display_type=dataFile&p_stn_num=009510

Government of Western Australia (2019) 'Government Sewerage Policy'

Standard Australia / Standards New Zealand (2012). AS/NZS 1547:2012 'On-site domestic-wastewater management.'



LIMITATIONS



REPORT LIMITATIONS



This geotechnical report is provided for the sole use by the Client. This report must not be applied for any other purpose or project except the one originally contemplated without written authorisation from WML. WML accepts no responsibility for the use of this report / document, in whole or in part, in other contexts or for any other purpose.

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, however minor, it is recommended WML review this report to assess their impacts and provide additional recommendations, if any. WML does not assume any responsibility or liability for problems that arise due to developments on site of which we were not informed.

This report utilises data and information provided by third parties, including, but not limited to sub-consultants, published data, and the Client. This information has been assumed to be correct unless otherwise stated. WML assumes no responsibility for assessments made partly or entirely based on information provided by third parties or for the adequacy, incompleteness, inaccuracies, or reliability of any data provided by third parties.

It is the responsibility of the Client to transmit the information, recommendations, and limitations of this report to the appropriate organisations or people involved in design of the project, including, but not limited to developers, builders, owners, buyers, architects, engineers, and designers.

WML's opinions are based on upon information that existed at the time of the production of this report and ground conditions encountered at the time the site study was performed. This geotechnical report should not be relied upon if its adequacy has been affected by: the passage of time, by man-made events, such as construction on or adjacent to the site, or by natural events, such as floods, earthquakes, or groundwater fluctuations. In the event of the above changes, WML should be contacted to determine if this report is still reliable or whether additional testing is required.

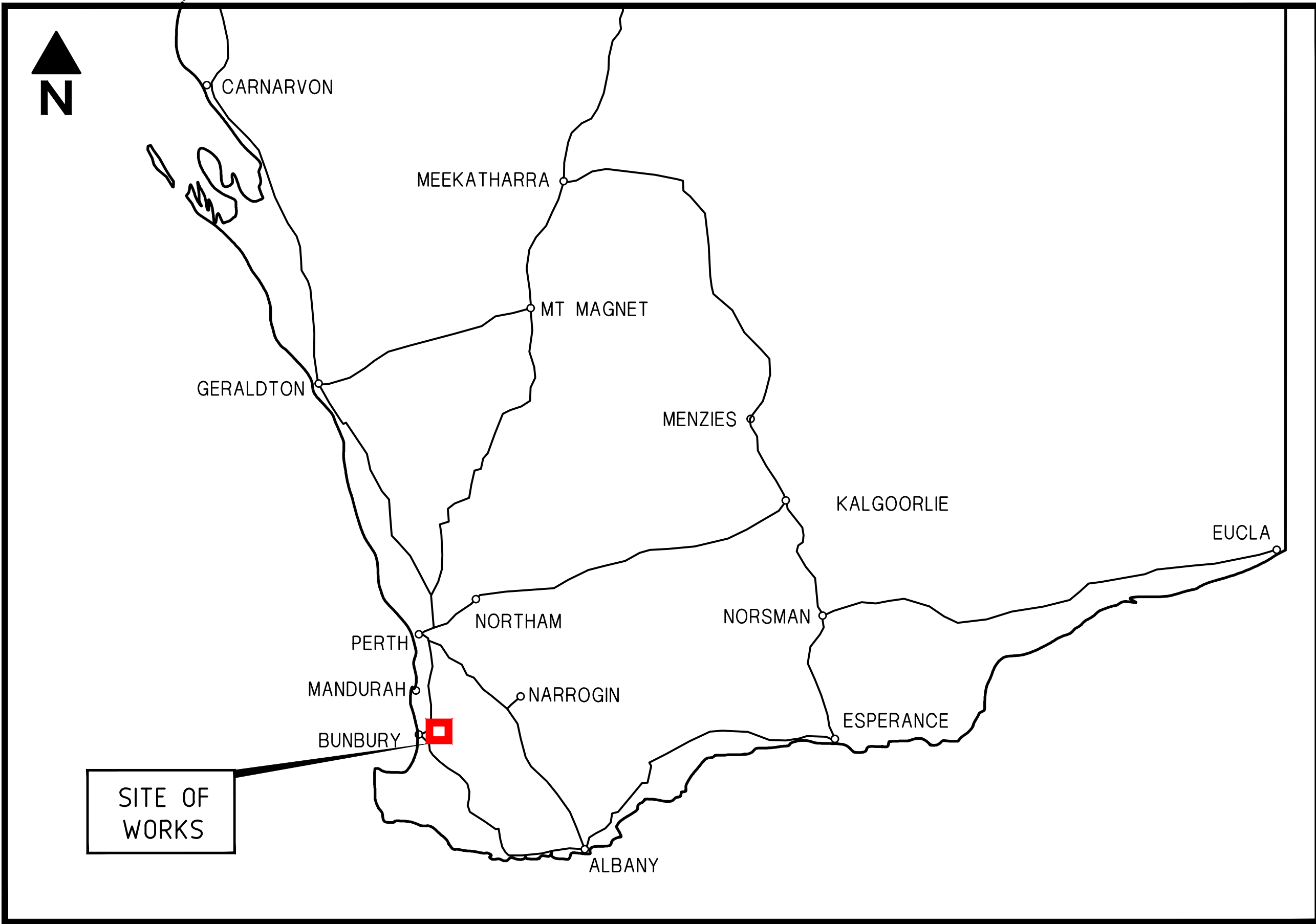
The subsurface conditions identified within this report are based only upon investigation locations where subsurface tests have been conducted and / or samples obtained, which are explicitly representative of the specific sample or test location. Interpretation of conditions between such points cannot be assumed to represent actual subsurface information and unknowns or variations in ground conditions between test locations that cannot be inferred or predicted. Actual subsurface conditions may differ significantly from those indicated in this report. Specific warning is also given that many factors, either natural or artificial, may render ground conditions different from those which pertained at the time of the investigation. WML does not accept any responsibility for any variance in the ground conditions that may exist across the site. If unexpected subsurface conditions are encountered, WML shall be notified immediately to review those conditions and provide additional and/or modified recommendations, as necessary.

This geotechnical assessment is based upon judgment of the investigation data, visual observations of the site and materials encountered, along with the proposed land use and project specifications. The findings and recommendations presented within this report represent professional opinions and estimates and should not be taken as fact unless explicitly stated. In general, statements of fact are limited to what was done and / or what was observed on site.

The recommendations provided in this report are preliminary only; final recommendations can only be given after observing the actual subsurface conditions revealed during construction. WML does not assume responsibility or liability for the recommendations in this report if construction observation has not been performed by a WML geotechnical engineer.

Our services did not include any contamination or environmental assessment of the site or adjacent sites. The equipment and techniques used to perform a geoenvironmental study differ from those used to perform a geotechnical investigation. If you require any geoenvironmental information for your project, WML can advise on further steps to be undertaken.

WML have 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.



MAP
NOT TO SCALE



LOCALITY PLAN
NOT TO SCALE



SITE PLAN
NOT TO SCALE



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REVISIONS				
N°	DESCRIPTION	APPROVED	DATE	DRAWN
A	ISSUED FOR REVIEW			

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

NAMES PRINTED IN FULL		DATE
DESIGNED	A. GORCZNSKA	DEC '24
DRAWN	C. HICK	DEC '24
VERIFIED		
APPROVED		

CLIENT	
TAYCOT PTY LTD	
PROJECT	
LOT 51 SITE SOIL EVALUATION	

DRAWING TITLE
LOT 51 RAYMOND ROAD, ROELANDS
SUBDIVISION
LOCALITY PLAN

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

DRAWING NUMBER
12130-G1-DG-001

REVISION
A

NTS
SCALE
A1



- LEGEND**
- BH 1 WML BORE HOLE
 - RECOMMENDED LAND APPLICATION AREA (300m²)
 - LAND AVAILABLE FOR APPLICATION AREA
 - SCOTT COASTAL PLAIN SEWERAGE SENSITIVE AREA
 - EXISTING DRAINAGE CHANNEL
 - 50m SETBACK TO SURFACE WATER
 - SITE EXTENTS

WML
Consulting Engineers
Civil | Geotechnical | Structural
CONSULTANT DRAWING NUMBER 12130-G1-DG-002

REVISIONS				
Nº	DESCRIPTION	APPROVED	DATE	DRAWN
B	STRUCTURE DRAWING (22536-05A SPI) UPDATED			
A	ISSUED FOR REVIEW			

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

NAMES PRINTED IN FULL		DATE
DESIGNED	A. GORCZNSKA	NOV '25
DRAWN	C. HICK	NOV '25
VERIFIED		
APPROVED		

CLIENT	
TAYCOT PTY LTD	
PROJECT	
LOT 51 SITE SOIL EVALUATION	

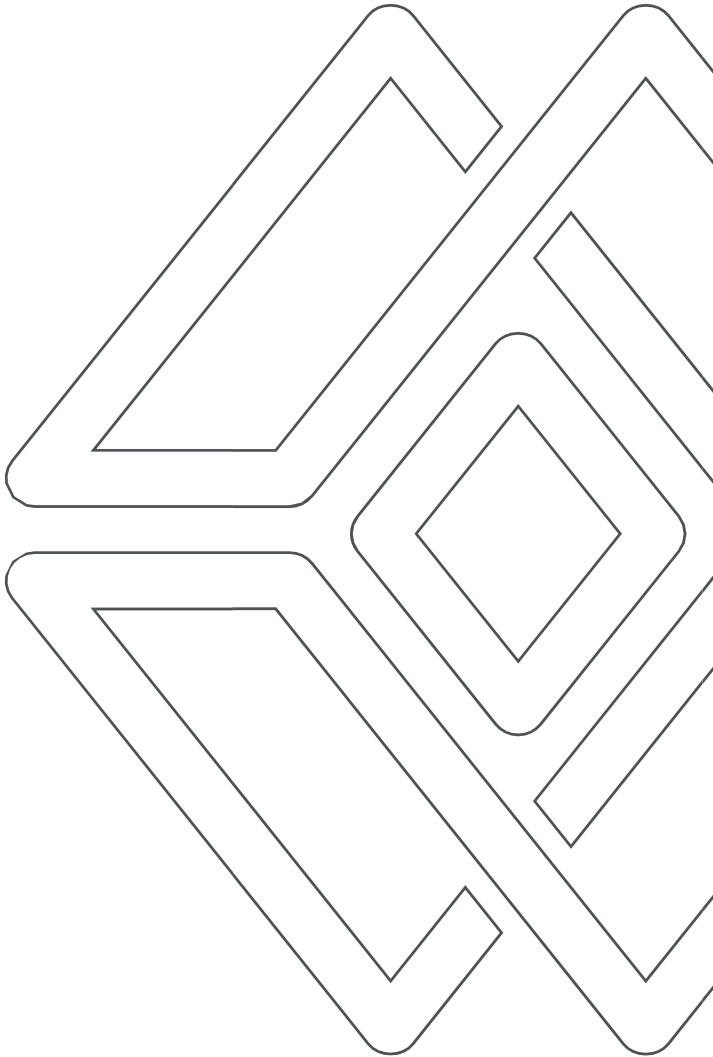
DRAWING TITLE	
LOT 51 RAYMOND ROAD, ROELANDS SUBDIVISION	
LAND APPLICATION AREAS	

THIS DRAWING SHALL BE TREATED AS PRELIMINARY AND IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED.	
DRAWING NUMBER	REVISION
12130-G1-DG-002	B



APPENDIX A

WML REPORT NO
10185-G-R-001



BOB TAYLORS

SOUTHERN PORTION (LOT 51 ON DP 421006) - GEOTECHNICAL INVESTIGATION

February 2022
10185-G-R-001-0



Document History and Status				
Revision	Prepared By	Reviewed By	Purpose of Issue	Date
B	H.Khatim	S. Maris	Draft	28/10/2021

Issued to:	Robert Taylor
WML Project Number:	10185
Document Name:	10185-G-R-001-0



Hajran Khatim
Geotechnical Engineer
Author

Simon Maris
Principal Geotechnical Engineer
Reviewer

For and on behalf of WML Consultants Pty Ltd

WML Consultants Pty Ltd

ABN 36 092 471 531

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1 INTRODUCTION

TAYCOT engaged WML Consultants (WML) on behalf of their client to undertake ground water monitoring well installation geotechnical investigation for the proposed subdivision at Northwest of Raymond Road, Roelands WA 6226. This factual report presents the results of the geotechnical investigation outlining fieldwork undertaken, laboratory tests and the location of measured groundwater wells.

This report and the information provided herein must be read in conjunction with the attached “Geotechnical Report Limitations” document.

2 SITE DESCRIPTION

The proposed subdivision is located at Northwest of Raymond Rd intersecting with Treendale Rd, approximately 16km northwest Bunbury. The proposed area for the subdivision is relatively flat paddock, with a 13m – 14m drop-off to a river (Collie River) to the south of the site. The site has overhead powerlines running through the northwest of the site to the southwest. Medium-sized native trees are located at the border of the site. A small and narrow bituminous road is located directly behind the proposed location of the subdivision.

3 SITE INVESTIGATION

Fieldwork for the investigation was carried out on the 9th of October 2021 and included the following:

- 8 Machine Auger holes to a nominal target depth of 2.5m or refusal.
- Groundwater monitoring wells installed to a depth of up to 5m
- 8 Perth Sand Penetrometer (PSP) or Dynamic Cone Penetrometer (DCP) tests to a nominal target depth of 1.05m or refusal.
- In-situ permeability tests using a Talsma-Hallam Permeameter in accordance with AS 1547-2012.
- 8 Phosphorus Retention Index (PRI) tests.
- 2 Classification tests (PSD and Atterberg Limits).

The fieldwork was undertaken by a WML principal geotechnical engineer and a geotechnical engineer. The materials encountered in the auger boreholes were logged in accordance with AS 1726, DCP tests were undertaken, and samples were collected for subsequent laboratory testing. The tests locations were positioned in accordance with the site plan. A summary of the investigations completed is presented in Table 1.

Table 1: Summary of fieldwork

Test Reference	Termination Depth (m)	Easting	Northing	Reason for Termination	Depth to Groundwater (m)	Stratigraphy
BH1	5	384830.1	6315760.5	Target Depth	GNE	TOPSOIL: Sandy CLAY (CI), over CLAY (CI).
BH2	5	384984.1	6315780.4	Target Depth	3.60	
BH3	2.5	384894.9	6315676.1	Target Depth	GNE	
BH4	5	385090.9	6315557.2	Target Depth	2.10	TOPSOIL: Sandy CLAY (CI), over CLAY (CI), over Sandy CLAY (CI), over CLAY (CI).

BH5 (1)	5	385194.0	6315475.5	Target Depth	0.90	TOPSOIL: Sandy CLAY (CI), over SAND (SP), over clayey SAND (CS), over sandy CLAY (CI), over CLAY (CI).
BH5 (2)	1.25	385194.4	6315484.8	Target Depth	GNE	TOPSOIL: Sandy CLAY (CI), over SAND (SP), over clayey SAND (CS), over sandy CLAY (CI)
BH6	2.5	385185.9	6315597.0	Target Depth	GNE	TOPSOIL: Sandy CLAY (CI), over CLAY (CI).
BH7	5	385118.9	6315683.6	Target Depth	2.40	
BH8	2.5	385015.7	6315698.5	Target Depth	GNE	

Notes:

All depths are relative to the existing ground surface

GNE – groundwater not encountered

The soil descriptions on the borehole logs were completed in general accordance with AS 1726-2017 “Geotechnical Site Investigations”. The borehole logs are presented in Appendix A. All the boreholes were backfilled to as close to the original conditions as possible, or monitoring wells were installed.

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 all the borehole logs, Appendix A.

3.1 In-situ permeability tests

Permeability testing was conducted using the Talsma-Hallam method, and three depths were tested within each mechanical auger borehole. The boreholes were constructed to a 160mm in diameter, 400 mm deep, was 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. Time and volume measurements were taken at each consecutive ‘fall’ in water level within the test tube and used to calculate the permeability of the target soil area. An analysis of the results was undertaken to ensure a constant flow rate was observed, with other data excluded as outliers (generally the first reading as soil saturation is reached). A summary of the permeability testing is presented in Table 2. From the data gathered from the investigation, the permeability test results indicate that the clay encountered across the site is typically impermeable. Site drainage should consider this.

Table 2: In-situ permeability test results

Location ID	In-situ Permeability Test	
	m/s	m/day
BH1	5.73×10^{-9}	4.95×10^{-4}
BH5	NO	NO ($< 1 \times 10^{-9}$)
BH7	NO	NO ($< 1 \times 10^{-9}$)

Note: NO – Not Obtainable

4 PUBLISHED GEOLOGY

The 1:50,000 scale Geological Map 'Bunbury' indicates that the site is underlain by Guilford Formation (Quaternary), which typically comprises mainly alluvial sandy clays.

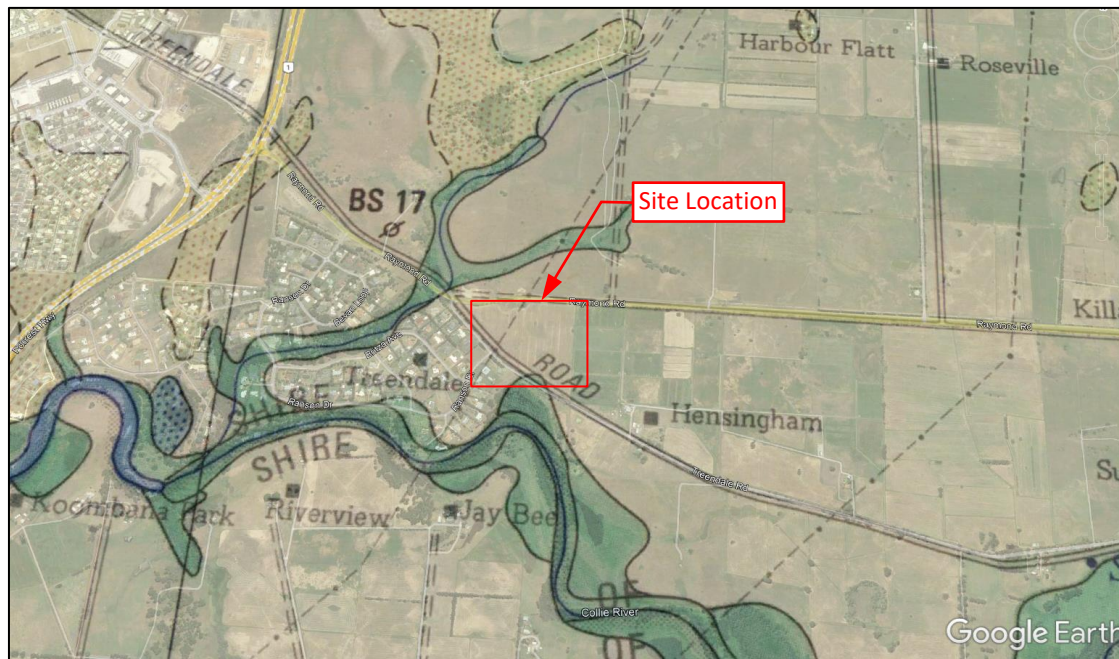


Figure 1: Extract from 1:50 000 Geological Map Series, "Bunbury".

4.1 Groundwater

Groundwater levels were recorded at BH2 (3.60 m), BH4 (2.10 m), BH5 (1) (0.90 m) & BH7 (2.40 m) during drilling and after the installation of monitoring wells.

5 LABORATORY TESTING

Seven representative samples of the subsurface material were submitted to Western Geotechnical & Laboratory Services. A NATA accredited laboratory for particle size distribution (PSD), Atterberg limits with linear shrinkage test and Phosphorous retention index (PRI). The test results are shown below in table 3:

A summary of the lab test is provided in table 2 below, and the laboratory test certificates are attached to this report in Appendix B.

Table 3: Laboratory testing summary

Location	Depth (m)	PSD			Atterberg Limits			
		Fines (%)	Sand (%)	Gravel (%)	LL (%)	PL (%)	PI (%)	LS (%)
BH6	0.5	39	57	4	27	10	17	6.5
BH7	0.7	50	45	5	38	18	20	8

Note: PSD – Particle Size Distribution; PI – Plasticity Index; LL – Liquid Limit; LS – Linear Shrinkage, Phosphorous retention index; PRI

The laboratory testing was carried out in accordance with Australian Standard AS1289 'Methods of Testing Soils For Engineering Purposes'.

Table 4: Phosphorous retention index results

Location	Depth (m)	PRI
BH5	0.6	59.1
BH5	1.9	>1000.0
BH6	0.4	228.8
BH6	0.5	176.3
BH7	0.1	664.3
BH7	0.4	>1000.0
BH7	0.7	552.0

6 GROUND CONDITIONS

The ground generals consist of stiff to very stiff CLAY and Sandy CLAY and don't present any significant geotechnical risks to the project. It should be noted that a sandy layer (approximately 1m thick) above the clays was encountered in the southwestern corner of the site (BH 5). Perched groundwater at 0.9m below ground level within the sand at BH5 was encountered. Groundwater was encountered at depth beyond 2.4m or not encountered at all in the other monitoring wells.

7 GEOTECHNICAL SITE CLASSIFICATION

Based upon the investigations results, the site may be classified in accordance with AS 2870:2011 - "Residential Slabs and Footings" which requires an estimation of the expected surface movement due to the wetting and drying of a foundation. A site classification "M" is considered appropriate for the site.

**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)

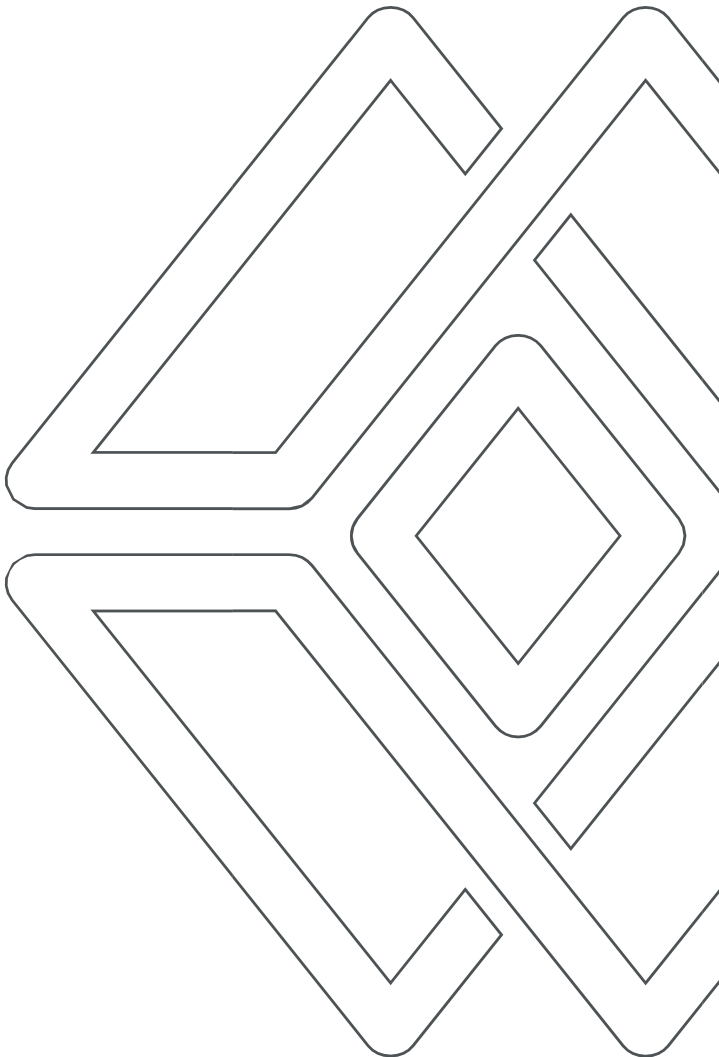
8 CLOSURE

We trust that the information provided within this report satisfies your present requirements and meets with your approval. Should you have any queries, please do not hesitate to contact the author of this report.

We draw your attention to the attached “Report Limitations” included with this report. This information sheet is intended to provide additional information about this 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.

9 REFERENCES

1. Geological Series Map 1:50,000 Scale ‘Bunbury.’
2. AS 1726:2017 – ‘Geotechnical Site Investigations’.



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.

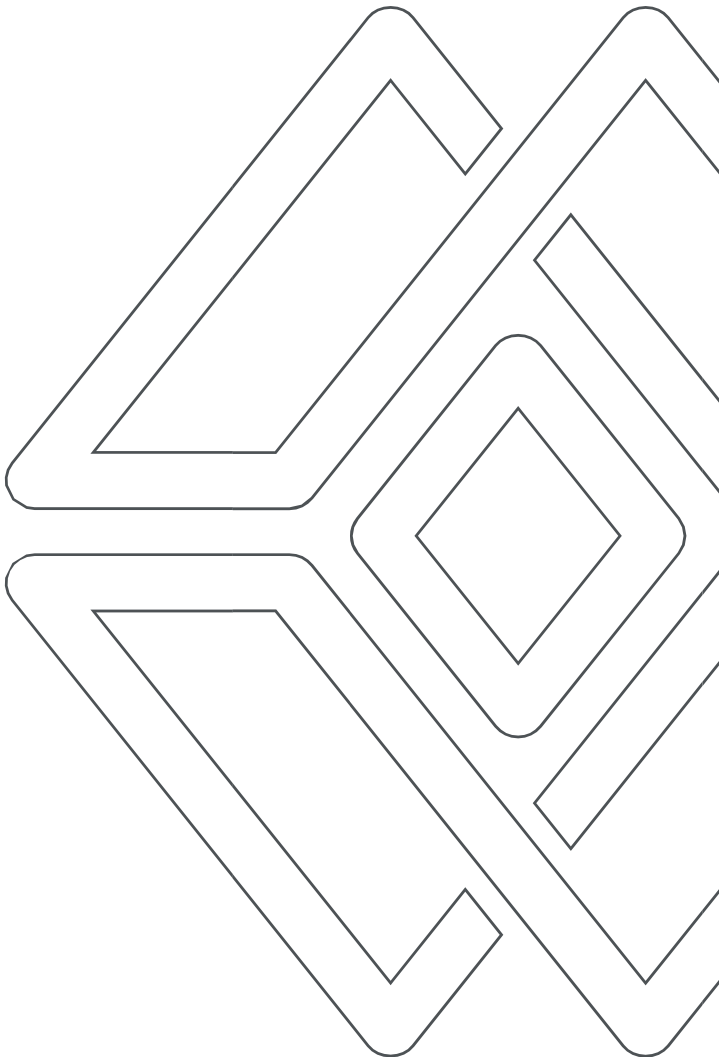
This report has been prepared based on investigation locations which are explicitly representative of the specific sample or test points. Interpretation of conditions between such points cannot be assumed to represent actual subsurface information and there are unknowns or variations in ground conditions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



DRAWINGS

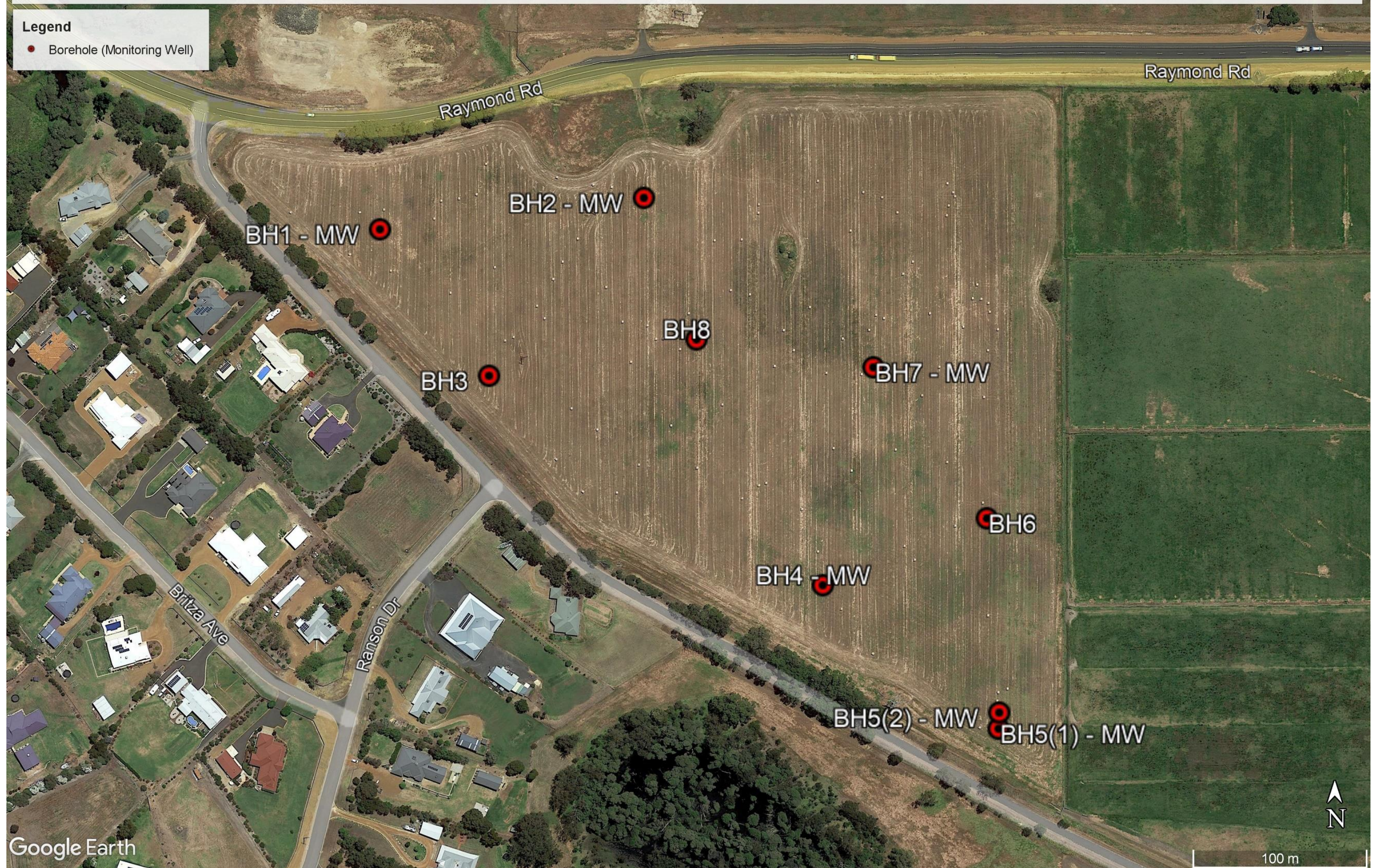
10185-G-001

Geotechnical Test Locations - Lot on Plan: P418090 153



Legend

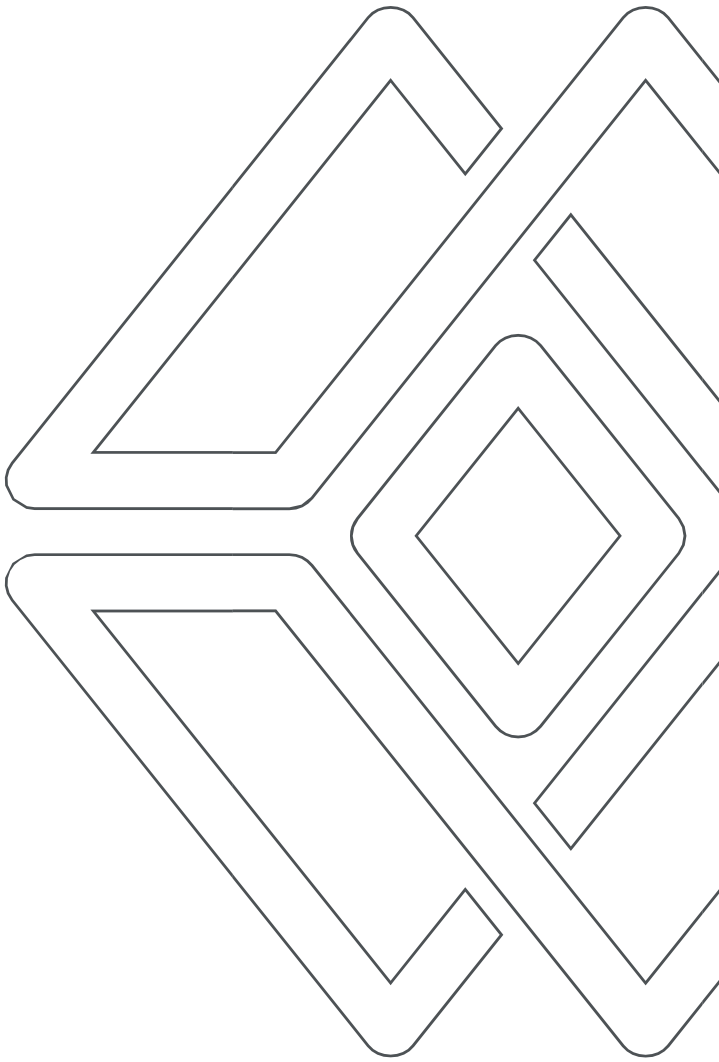
- Borehole (Monitoring Well)





APPENDIX A

LOGS



LOGGED: PT

LOGGED DATE: 07/10/2021

SURFACE RL:

CHAINAGE:

WML LIB 1.08.GLB Log WML SOIL 10185.GPJ <<DrawingFile>> 29/10/2021 11:31 10.02.00.04 Developed by Datgel

CLIENT: Taylor, RL + MJ	CONTRACTOR: WML Consultants	LOGGED: PT
PROJECT: Monitoring Well Installation	MACHINE: Drill Rig	LOGGED DATE: 07/10/2021
LOCATION: Lot on Plan: P418090 153	CO-ORD SYSTEM: MGA94 Zone 51	SURFACE RL:
JOB NO.: 10185	POSITION: 384984.1 m E 6315780.4 m N	CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
		<u>9 kg Dynamic Cone Penetrometer</u> Depth (m) Blows 0.00 - 0.15 3 0.15 - 0.30 2 0.30 - 0.45 2 0.45 - 0.60 2 0.60 - 0.75 2 In-situ VS P=110kPa 0.75 - 0.90 2 0.90 - 1.05 4 In-situ VS P=160kPa 1.00m In-situ VS P=170kPa 1.75m In-situ VS P=120kPa		CI	Moist, dark brown, stiff, sandy CLAY with a trace of fine roots.
				CI	Moist, yellow brown, very stiff, CLAY .
				CI	Dry, brown grey, very stiff, CLAY .
				CI	Dry, red brown mottled grey red, very stiff, CLAY .
				CI	Dry, brown red mottled grey, hard, CLAY with a trace of coarse grained sand.
					Hole Terminated at 5.00 m Target Depth; Monitoring Well: Screened from 4.8 - 3.8 mbgl, top of well 1 m above ground level

LOGGED: PT

LOGGED DATE: 07/10/2021

SURFACE RL:

CHAINAGE:

WML LIB 1.08.GLB Log WML SOIL 10185.GPJ <<DrawingFile>> 29/10/2021 11:31 10.02.00.04 Developed by Datgel

CLIENT: Taylor, RL + MJ

CONTRACTOR: WML Consultants

LOGGED: PT

PROJECT: Monitoring Well Installation

MACHINE: Drill Rig

LOGGED DATE: 07/10/2021

LOCATION: Lot on Plan: P418090 153

CO-ORD SYSTEM: MGA94 Zone 51

SURFACE RL:

JOB NO.: 10185

POSITION: 385090.9 m E 6315557.2 m N

CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
		9 kg Dynamic Cone Penetrometer Depth (m) Blows 0.00 - 0.15 3 0.15 - 0.30 2 0.30 - 0.45 2 0.45 - 0.60 4 0.60 - 0.75 5 0.75 - 0.90 10 0.90 - 1.05 11 Mean $Q_{95} = 220 \text{ kPa}$		CI	Moist, dark brown, stiff, sandy CLAY with a trace of fine roots.
				CI	Moist, orange brown, very stiff, CLAY .
	0.5			CI	
	1.0			CI	Dry, red brown mottled grey, very stiff, CLAY .
	1.5			CI	Dry, red brown mottled grey, very stiff, sandy CLAY .
	2.0			CH	Dry, red mottled grey, very stiff, CLAY .
	2.5			CH	
	3.0			CH	Dry, red mottled grey, hard, CLAY .
	3.5			CH	
	4.0			CH	
	4.5			CH	Dry, grey mottled red orange, hard, CLAY .
	5.0				Hole Terminated at 5.00 m Target Depth; Monitoring Well: Screened from 4.8 - 3.8 mbgl, top of well 1 m above ground level

CLIENT: Taylor, RL + MJ

CONTRACTOR: WML Consultants

LOGGED: PT

PROJECT: Monitoring Well Installation

MACHINE: Drill Rig

LOGGED DATE: 07/10/2021

LOCATION: Lot on Plan: P418090 153

CO-ORD SYSTEM: MGA94 Zone 51

SURFACE RL:

JOB NO.: 10185

POSITION: 385194.0 m E 6315475.5 m N

CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
				CI	Moist, dark brown, stiff, sandy CLAY with a trace of fine roots.
				SP	Wet, grey, medium dense, fine to medium grained, SAND .
	0.5			SP	Wet, grey slightly mottled orange, medium dense, fine to medium grained, clayey SAND .
	1.0			CI	Moist, orange brown mottled grey, stiff, sandy CLAY .
	1.5			CI	Dry, orange brown mottled grey, very stiff, CLAY with a trace of fine to medium grained sand.
	2.0			CH	Dry, red mottled grey, very stiff, CLAY .
	2.5			CH	
	3.0			CH	
	3.5			CH	
	4.0			CH	
	4.5			CH	
	5.0				Hole Terminated at 5.00 m Target Depth; Monitoring Well: Screened from 4.8 - 3.8 mbgl, top of well 1 m above ground level

CLIENT: Taylor, RL + MJ

CONTRACTOR: WML Consultants

LOGGED: PT

PROJECT: Monitoring Well Installation

MACHINE: Drill Rig

LOGGED DATE: 07/10/2021

LOCATION: Lot on Plan: P418090 153

CO-ORD SYSTEM: MGA94 Zone 51

SURFACE RL:

JOB NO.: 10185

POSITION: 385194.4 m E 6315484.8 m N

CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
				CI	Moist, dark brown, stiff, sandy CLAY with a trace of fine roots.
				SP	Wet, grey, medium dense, fine to medium grained, SAND .
	0.5			SP	Wet, grey slightly mottled orange, medium dense, fine to medium grained, clayey SAND .
	1.0			CI	Moist, orange brown mottled grey, stiff, sandy CLAY .
	1.5				Hole Terminated at 1.25 m Target Depth; Monitoring Well: Screened from 1.25 - 0.25 mbgl, top of well 1 m above ground level
	2.0				
	2.5				
	3.0				
	3.5				
	4.0				
	4.5				
	5.0				

CLIENT: Taylor, RL + MJ

CONTRACTOR: WML Consultants

LOGGED: PT

PROJECT: Monitoring Well Installation

MACHINE: Drill Rig

LOGGED DATE: 07/10/2021

LOCATION: Lot on Plan: P418090 153

CO-ORD SYSTEM: MGA94 Zone 51

SURFACE RL:

JOB NO.: 10185

POSITION: 385185.9 m E 6315597.0 m N

CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
		9 kg Dynamic Cone Penetrometer		SP	Moist, dark brown, stiff, fine to medium grained, clayey SAND with a trace of fine roots.
		Depth (m) Blows			Dry, orange brown, stiff, CLAY with some fine to coarse grained sand.
	0.40m				
	0.00 - 0.15	4			
	0.15 - 0.30	3			
	0.30 - 0.45	4			
	0.45 - 0.60	5			
	0.60 - 0.75	7			
	0.75 - 0.90	6			
	0.90 - 1.05	5			
	1.0			CI	
	1.5				
	2.0			CI	Dry, red brown mottled grey, very stiff, CLAY .
	2.5			CI	Dry, brown slightly mottled red grey, hard, CLAY with a trace of coarse grained sand.
	2.5				Hole Terminated at 2.50 m Target depth
	3.0				
	3.5				
	4.0				
	4.5				
	5.0				

CLIENT: Taylor, RL + MJ

CONTRACTOR: WML Consultants

LOGGED: PT

PROJECT: Monitoring Well Installation

MACHINE: Drill Rig

LOGGED DATE: 07/10/2021

LOCATION: Lot on Plan: P418090 153

CO-ORD SYSTEM: MGA94 Zone 51

SURFACE RL:

JOB NO.: 10185

POSITION: 385118.9 m E 6315683.6 m N

CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
		8 kg Dynamic Cone Penetrometer Depth (m) Blows 0.00 - 0.15 3 0.15 - 0.30 3 0.30 - 0.45 3 0.45 - 0.60 5 0.60 - 0.75 7 0.75 - 0.90 7 0.90 - 1.05 8		SP	Moist, dark brown, medium dense, fine to medium grained, clayey SAND with a trace of fine roots.
	0.40m				
	0.50			CI	Dry, orange brown, stiff, CLAY with some fine to coarse grained sand.
	1.00				
	1.50				
	2.00			CI	Dry, red brown mottled orange grey, very stiff, CLAY .
	2.50				
	3.00			CI	Dry, red brown mottled orange grey, hard, CLAY .
	3.50				
	4.00				
	4.50				
	5.00				Hole Terminated at 5.00 m Target Depth; Monitoring Well: Screened from 6.0 - 3.0 mbgl, top of well 1 m above ground level

CLIENT: Taylor, RL + MJ

CONTRACTOR: WML Consultants

LOGGED: PT

PROJECT: Monitoring Well Installation

MACHINE: Drill Rig

LOGGED DATE: 07/10/2021

LOCATION: Lot on Plan: P418090 153

CO-ORD SYSTEM: MGA94 Zone 51

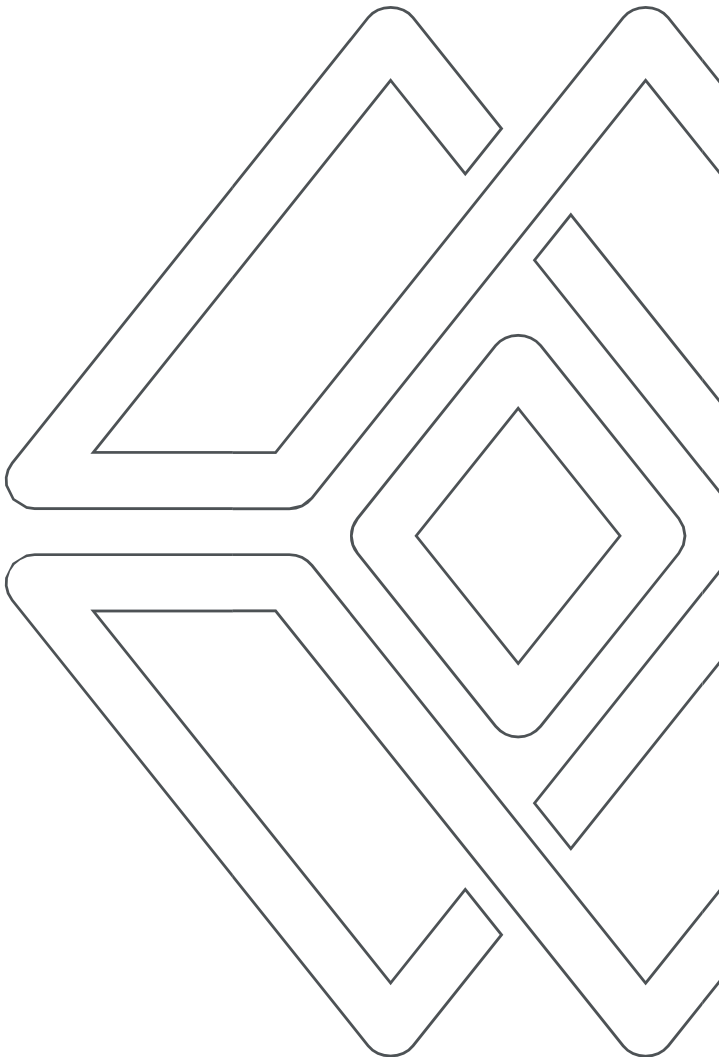
SURFACE RL:

JOB NO.: 10185

POSITION: 385015.7 m E 6315698.5 m N

CHAINAGE:

WATER	DEPTH (m)	SAMPLES OR FIELD TEST	GRAPHIC LOG	CLASSIFICATION SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION
		9 kg Dynamic Cone Penetrometer		CI	Moist, dark brown, stiff, sandy CLAY with a trace of fine roots.
		Depth (m) Blows			Moist, orange brown slightly mottled grey, very stiff, CLAY .
	0.5	0.00 - 0.15 3		CI	
		0.15 - 0.30 4			
		0.30 - 0.45 3			
		0.45 - 0.60 3			
		0.60 - 0.75 5			
		0.75 - 0.90 6			
		0.90 - 1.05 7			
	1.0				Dry, brown mottled grey, very stiff, CLAY .
	1.5			CI	
	2.0				
	2.5			CI	Dry, red brown mottled orange grey, hard, CLAY .
	3.0				Hole Terminated at 2.50 m Target depth
	3.5				
	4.0				
	4.5				
	5.0				



APPENDIX B

LABORATORY TESTING



95386
Western Geotechnical & Laboratory Serv

Lab No	6KS21149	6KS21150	6KS21151	6KS21152	6KS21153	6KS21154	6KS21155
Name	BH7 - 0.1m	BH7 - 0.4m	BH7 - 0.7m	BH6 - 0.4m	BH6 - 0.5m	BH5 - 0.6m	BH5 - 1.9m
Code	W21.13959	W21.13960	W21.13961	W21.13962	W21.13963	W21.13964	W21.13965
Customer	WML Consultants	WML Consultants	WML Consultants	WML Consultants	WML Consultants	WML Consultants	WML Consultants
Depth	0-10	0-10	0-10	0-10	0-10	0-10	0-10
Phosphorus Retention Index	664.3	> 1000.0	552.0	228.8	176.3	59.1	> 1000.0



SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.2, 3.2.1, 3.3.1 & 3.4.1

Client:	WML Consultants	Ticket No.	S4600
Client Address:	Level 3, 1 Prowse St, West Perth WA 6005	Report No.	WG21.13961_1_PI
Project:	Bob Taylors Southern Portion	Sample No.	WG21.13961
Location:	Roelands	Date Sampled:	Not Specified
Sample Identification:	BH7 - 0.7m	Date Tested:	1-11-2021

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:

Sampled by Client, Tested as Received

History of Sample:

Oven Dried <50°C

Method of Preparation:

Dry Sieved

AS 1289.3.1.2	Liquid Limit (%)	38
AS 1289.3.2.1	Plastic Limit (%)	18
AS 1289.3.3.1	Plasticity Index (%)	20
AS 1289.3.4.1	Linear Shrinkage (%)	8.0

AS 1289.3.4.1	Length of Mould (mm)	125
AS 1289.3.4.1	Condition of Dry Specimen	Cracked, Curled

Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 02-November-2021



Accreditation No. 20599

Accredited for compliance

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ACCREDITATION

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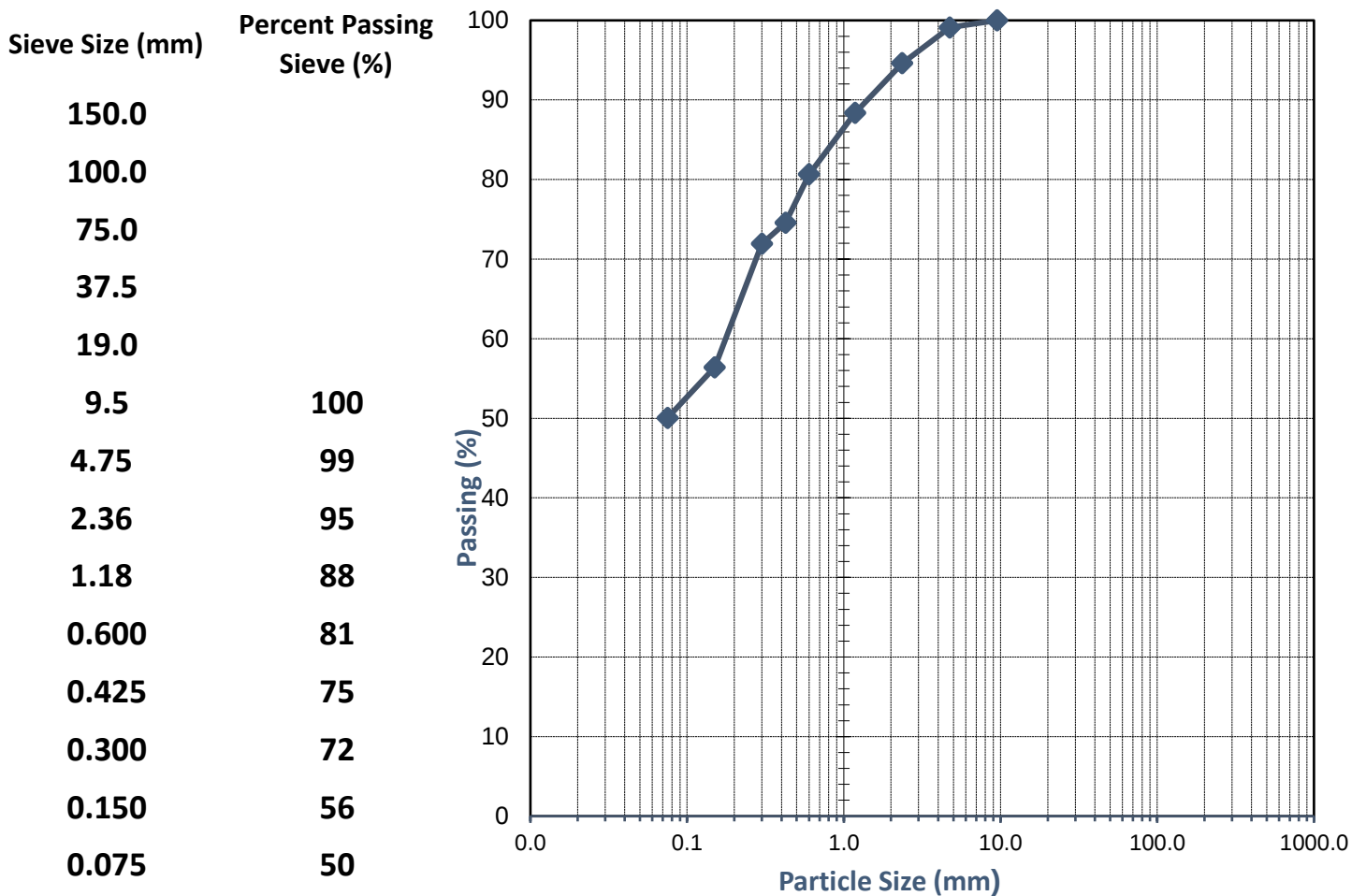
TEST REPORT - AS 1289.3.6.1

Client:	WML Consultants	Ticket No.	S4600
Client Address:	Level 3, 1 Prowse St, West Perth WA 6005	Report No.	WG21.13961_1_PSD
Project:	Bob Taylors Southern Portion	Sample No.	WG21.13961
Location:	Roelands	Date Sampled:	Not Specified
Sample Identification:	BH7 - 0.7m	Date Tested:	30/10 - 1/11/2021

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method:

Sampled by Client, Tested as Received



Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 01-November-2021



Accreditation No. 20599

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SOIL | AGGREGATE | CONCRETE | CRUSHING

TEST REPORT - AS 1289.3.1.2, 3.2.1, 3.3.1 & 3.4.1

Client:	WML Consultants	Ticket No.	S4600
Client Address:	Level 3, 1 Prowse St, West Perth WA 6005	Report No.	WG21.13963_1_PI
Project:	Bob Taylors Southern Portion	Sample No.	WG21.13963
Location:	Roelands	Date Sampled:	Not Specified
Sample Identification:	BH6 - 0.5m	Date Tested:	1-11-2021

TEST RESULTS - Consistency Limits (Casagrande)

Sampling Method:

Sampled by Client, Tested as Received

History of Sample:

Oven Dried <50°C

Method of Preparation:

Dry Sieved

AS 1289.3.1.2	Liquid Limit (%)	27
AS 1289.3.2.1	Plastic Limit (%)	10
AS 1289.3.3.1	Plasticity Index (%)	17
AS 1289.3.4.1	Linear Shrinkage (%)	6.5

AS 1289.3.4.1	Length of Mould (mm)	250
AS 1289.3.4.1	Condition of Dry Specimen	Cracked, Curled

Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 02-November-2021



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ACCREDITATION

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SOIL | AGGREGATE | CONCRETE | CRUSHING

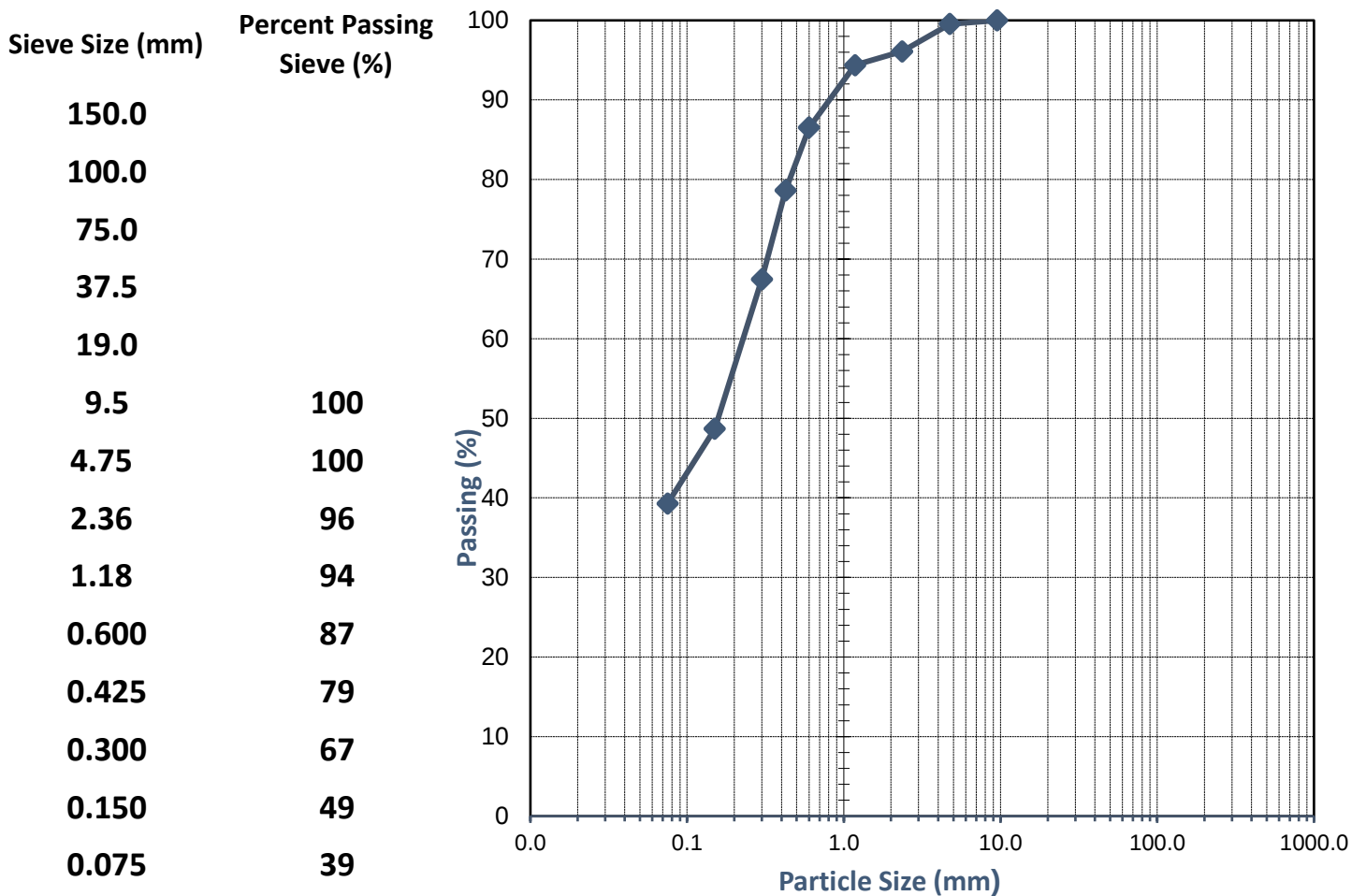
TEST REPORT - AS 1289.3.6.1

Client:	WML Consultants	Ticket No.	S4600
Client Address:	Level 3, 1 Prowse St, West Perth WA 6005	Report No.	WG21.13963_1_PSD
Project:	Bob Taylors Southern Portion	Sample No.	WG21.13963
Location:	Roelands	Date Sampled:	Not Specified
Sample Identification:	BH6 - 0.5m	Date Tested:	30/10 - 1/11/2021

TEST RESULTS - Particle Size Distribution of Soil

Sampling Method:

Sampled by Client, Tested as Received



Comments:

Approved Signatory:

Name: Cody O'Neill

Date: 01-November-2021



Accreditation No. 20599

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APPENDIX B

WML REPORT NO
12714-G-L-001-0

31 October 2025

Attention: Travis Taylor

Taycot
Level 1, 149 Victoria St,
Bunbury
WA 6230

LOT 51 RAYMOND ROAD, ROELANDS, WA – GROUNDWATER MONITORING

1 INTRODUCTION

WML Consultants Pty Ltd (WML) was engaged by Taycot Pty Ltd to undertake a groundwater monitoring programme for Lot 51, Raymond Road, Roelands, WA. This report summarises the groundwater level readings that WML undertook between August and October as part of the 2025 groundwater monitoring program.

The sub-surface soil profile has not been provided in this report; for detailed information on the materials encountered on site, please refer to the WML geotechnical report, 10185-G-R-001, dated February 2022 and WML Site-and-Soil Evaluation report, 12130-G-R-001-0 dated December 2024.

This report and the information presented herein must be read in conjunction with the attached “Report Limitations”.

1.1 Site description

The site is located in Roelands, Western Australia, and is bounded by Raymond Road to the north, Wilman Wadandi Highway to the east, and Tern Place to the south. The site is approximately 9 ha in size and is currently vacant, and the ground surface is relatively flat and covered with grass.

Site survey drawings supplied by the client show that the site elevation varies from RL 13 m AHD to 14 m AHD.

The 1:50,000 scale Geological Map ‘Bunbury - Burekup’, the site is expected to be underlain by the following geological units:

- **Qpa – GUILDFORD FORMATION:** mainly alluvial sandy clay.

1.2 Objectives

The objective of the groundwater monitoring programme was to undertake groundwater level readings in the 2025 winter season using existing groundwater monitoring wells on site.

WML Consultants Pty Ltd

ISO 9001 | ISO 14001 | ISO 45001

Level 3, 1 Prowse St, West Perth, WA 6005 | 08 9722 3566

First Floor, 25A Stephen St, Bunbury, WA 6230 | 08 9722 3544

Suite 1, 45 Brookman St, Kalgoorlie, WA 6430 | 08 9021 1811

2 GROUNDWATER MONITORING

2.1 Groundwater monitoring events

Six groundwater monitoring wells (BH-MW) were installed on site on the 9th of October 2021 by WML consultants. The monitoring wells extended up to a depth of 5 m below the ground level. Please refer to the attached site plan for details on the locations of the monitoring wells.

Groundwater monitoring events were conducted on the 25th of August, 12th of September, and 22nd of October in 2025, and are summarised in the table below. During the first groundwater monitoring event, the bores BH1 and BH7 could not be located on site. As the wells were installed four years ago, the site has undergone a number of grass cutting works and other maintenance works, which could result in damaging the wells. At the last groundwater monitoring event undertaken in October 2025, BH2 was found to have been removed by others; consequently, no measurements were obtained during that event at the BH2 location.

Table 1: Groundwater level reading (m)

Location ID	Depth of groundwater (m BGL)		
	25/08/2025	12/09/2025	22/10/2025
BH2	1.74	1.60	-
BH4	0.34	0.75	1.59
BH5(1)	0.11	0.61	1.39
BH5(2)	0.48	0.44	GNE

Note: GNE – groundwater not encountered.

3 CLOSURE

We trust that the information provided within this report satisfies your present requirements and meets with your approval. Should you have any queries, please do not hesitate to contact the author of this report.

We draw your attention to the attached “*Report Limitations*” included with this report. This information sheet is intended to provide additional information about this report and the 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.

Yours faithfully,

XWang

Xin Wang

Geotechnical Engineer

Author

For and on behalf of WML Consultants Pty Ltd



Aleksandra Gorczynska

Senior Geotechnical Engineer

Reviewer

REPORT LIMITATIONS



This geotechnical report is provided for the sole use by the Client. This report must not be applied for any other purpose or project except the one originally contemplated without written authorisation from WML. WML accepts no responsibility for the use of this report / document, in whole or in part, in other contexts or for any other purpose.

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, however minor, it is recommended WML review this report to assess their impacts and provide additional recommendations, if any. WML does not assume any responsibility or liability for problems that arise due to developments on site of which we were not informed.

This report utilises data and information provided by third parties, including, but not limited to sub-consultants, published data, and the Client. This information has been assumed to be correct unless otherwise stated. WML assumes no responsibility for assessments made partly or entirely based on information provided by third parties or for the adequacy, incompleteness, inaccuracies, or reliability of any data provided by third parties.

It is the responsibility of the Client to transmit the information, recommendations, and limitations of this report to the appropriate organisations or people involved in design of the project, including, but not limited to developers, builders, owners, buyers, architects, engineers, and designers.

WML's opinions are based on upon information that existed at the time of the production of this report and ground conditions encountered at the time the site study was performed. This geotechnical report should not be relied upon if its adequacy has been affected by: the passage of time, by man-made events, such as construction on or adjacent to the site, or by natural events, such as floods, earthquakes, or groundwater fluctuations. In the event of the above changes, WML should be contacted to determine if this report is still reliable or whether additional testing is required.

The subsurface conditions identified within this report are based only upon investigation locations where subsurface tests have been conducted and / or samples obtained, which are explicitly representative of the specific sample or test location. Interpretation of conditions between such points cannot be assumed to represent actual subsurface information and unknowns or variations in ground conditions between test locations that cannot be inferred or predicted. Actual subsurface conditions may differ significantly from those indicated in this report. Specific warning is also given that many factors, either natural or artificial, may render ground conditions different from those which pertained at the time of the investigation. WML does not accept any responsibility for any variance in the ground conditions that may exist across the site. If unexpected subsurface conditions are encountered, WML shall be notified immediately to review those conditions and provide additional and/or modified recommendations, as necessary.

This geotechnical assessment is based upon judgment of the investigation data, visual observations of the site and materials encountered, along with the proposed land use and project specifications. The findings and recommendations presented within this report represent professional opinions and estimates and should not be taken as fact unless explicitly stated. In general, statements of fact are limited to what was done and / or what was observed on site.

The recommendations provided in this report are preliminary only; final recommendations can only be given after observing the actual subsurface conditions revealed during construction. WML does not assume responsibility or liability for the recommendations in this report if construction observation has not been performed by a WML geotechnical engineer.

Our services did not include any contamination or environmental assessment of the site or adjacent sites. The equipment and techniques used to perform a geoenvironmental study differ from those used to perform a geotechnical investigation. If you require any geoenvironmental information for your project, WML can advise on further steps to be undertaken.

WML have 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.

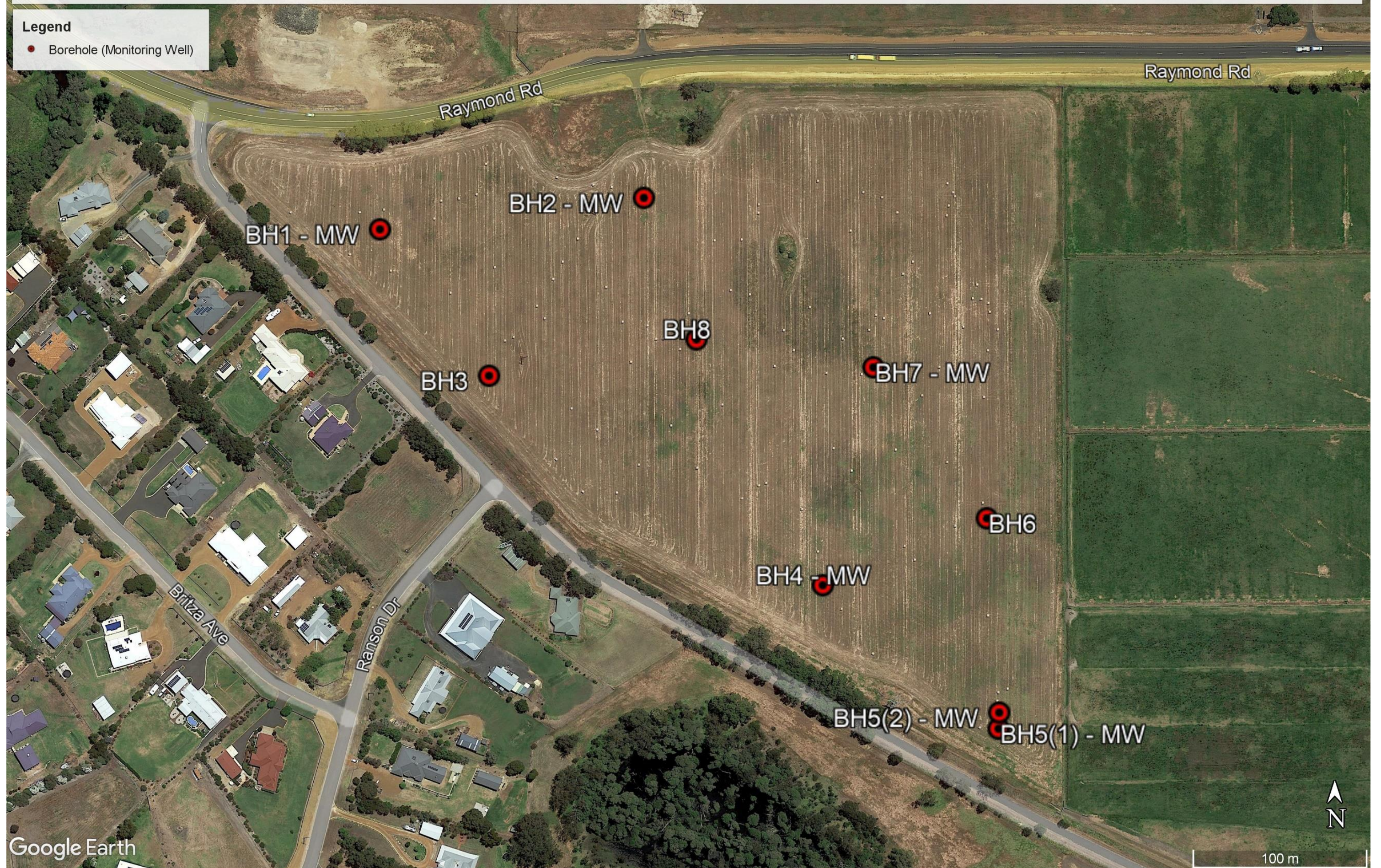
10185-G-001

Geotechnical Test Locations - Lot on Plan: P418090 153



Legend

- Borehole (Monitoring Well)



Google Earth