Doc: GE2.1.1

# PRELIMINARY GEOTECHNICAL INVESTIGATION

**For:** Noble Hodge

**Project Address:** Lot 1 Driver Road Corner Furniss Road Darch, WA

**Project Number:** D

**Job Number:** J

**Revision Number:** DRAFT

**Author:** M E Castle

**Date:** 21 July 2021

Structerre Consulting Engineers
(+618) 9205 4500
1 Erindale Road, Balcatta WA 6021
wageotecheng@structerre.com.au
www.structerre.com.au

# TABLE OF CONTENTS





1 Erindale Road, Balcatta, Western Australia 6021 | PO Box 792, Balcatta, Western Australia 6914
Phone (+618) 9205 4500 | Fax (+618) 9205 4501 | Email wageotecheng@structerre.com.au | Web www.structerre.com.au
ABN 71 349 772 837 Zemla Pty Ltd ACN 008 966 283 as trustee for the Young Purich and Higham Unit Trust trading as Structerre Consulting Engineers

# 1. PROJECT DETAILS

## 1.1. Introduction

At the request of Noble Hodge, Structerre Consulting (Structerre) have conducted a Geotechnical Assessment of Lot 1 Driver Road Corner Furniss Road Darch, WA. The purpose of the investigation was to provide the following for residential subdivision purposes:

- An assessment of subsurface soil profile and groundwater conditions across the proposed area of development;
- Site classification in accordance with AS 2870-2011 Residential Slabs and Footings;
- Wind Classification in accordance with AS 4055-2012 Wind Loads for Housing;
- Recommendations on earthworks and site preparation for the proposed development.

CMW Geosciences, on behalf of the Handle Group have previously conducted a Geotechnical Investigation of the site of which Lot 1 forms part of during August and September 2017 and provided a Technical Memorandum outlining their findings. The field investigation included 10 deep test boreholes ranging in depth from 4.5m to 20.2m to ascertain fill quality and extent.

Structerre were provided with a preliminary site plan prepared by Development Engineering Consultants showing surface contours, dimensions of the proposed lots, the existing stockpiles and the location in relation to the site boundaries.

The proposed development consists of a mixture of commercial Lots to north of the site with residential Lots including internal roads and public open space (compensation basins).

## 1.2. Site Description

The site is located at the corner of Driver and Furniss Roads in Darch, City of Wanneroo. Driver road lies to the west of the site with Furniss road to the north and vacant property to the east and south of the site, (formerly part of the extraction quarry site) of which Lot 1 forms part of.

The site generally falls from the northeast to southwest and is covered with a number of stockpiles of various recycled fill products. A containment bund is constructed inside the western boundary with two industrial buildings surrounded by hardstand located in the northeastern corner. Some light regrowth vegetation has occurred over the stockpiles and bunding within the site.

# 2. DESK STUDY

## 2.1. Geological Setting

The Perth sheet 1: 50,000 Environmental Geology Series (Part Sheets 2034 III and 2134 III, 1986) prepared by the Geological Survey of Western Australia indicates that the following geological layers underlie the site:

- SAND (S7) – pale and olive yellow, medium to coarse-grained, sub-angular to sub-rounded quartz, trace of feldspar, moderately sorted of residual origin (Sand derived from Tamala Limestone Qts).

## 2.2. Ground Surface and Groundwater Level

The Perth Groundwater Atlas (Waters & Rivers Commission) indicates the ground surface level at this site is approximately 54m at the north falling to 46m at the south western corner of the site, Australian Height Datum (AHD). This is consistent with the survey data provided by the Client.

The May 2003 groundwater level at the site was approximately 39m AHD and the historical maximum was indicated to be approximately 41m AHD. It should be noted that the groundwater levels can vary significantly due to seasonal variation and the data from the recorded maximum levels should be used only as a guide.

## 2.3. Earthquake Coefficient

In accordance with AS 1170.4-2007 Structural Design Actions the site is located within an area with an earthquake acceleration coefficient of between 0.09 and 0.10.

## 2.4. Wind Classification

In accordance with AS 4055-2012 Wind Loads for Housing, wind classification of this site falls within the non-cyclonic “N1” category.

## 2.5. Site History

A historical reference of the site was included in CMW Geosciences desktop assessment of the site using aerial photography, summarising events identified from 1953 to 2017, (time of the review).

An extract of the site history is presented in the Table 1.

**Table 1 – Site History**

| Year of Photograph | Observations |
|---|---|
| 1953* | Site is generally vacant apart from minor sand tracks and possible fence lines.<br>Vegetation comprises grasses, small shrubs and trees. |
| 1965 | Site is vacant of development and remains naturally vegetated<br>Distinct tracks / firebreaks / fence lines have been cleared to the north and southof the site<br>Land to the south of the site has been sub-divided. Land-use is assumed to be small-scale farming / market gardens<br>Possible sand mining occurring to the west of the site |
| 1968 | Vegetation stripping of the western portion of the site has commenced<br>Sand mining operations within the western portion of the site appears to havecommenced<br>Unsealed access road to the site has been constructed from the south-west<br>The remainder of the site remains naturally vegetated |
| 1970 | Sand mining activities have expanded<br>Vegetation stripping has occurred within the south-west corner of the site<br>Land has been cleared to the north of the site for possible farming |
| 1975 | Sand mining activities have extended to both the south and the east affectingapproximately the eastern half of the site<br>Active mining face in the north-west portion of the site<br>An oval track has been constructed in the south-western portion of the site as apossible horse racing / trotting track<br>Small buildings have been constructed along the main access road through to the site possibly related to the oval track<br>The cleared eastern portion has been partitioned into six sections, possible horsepaddocks associated with the race / trotting track |
| 1981 | The entire north-west portion of the site is an active sand quarry. The mining faceis along the northern edge of the site and is deepest towards the northern centralportion where visible groundwater is ponding<br>Sand mining activities occur to the north-west and west of the site<br>An unsealed access track has been constructed from the south-west corner of thesite to the north-west corner |
| 1985 | Sand mining focused in the central portion of the site. Paddocks in the eastern central area have been stripped of vegetation possibly inpreparation for sand mining activities<br>Possible stockpiled material is visible in the north-west portion. Stockpiles are brown in colour and are possible composed of organic material.<br>Tip edge filling operations are occurring from the northern edge of the site. The tipface is estimated to be approximately 3-5m in depth |
| 1987 | Sand mining activities have extended into the eastern third of the site<br>Filling activities in the north-west are extending south and south-east<br>The oval horse track is still visible |
| 1988 | Vegetation has been stripped to the extent of the eastern boundary of the site<br>Residential buildings are visible to the south of the site |

| | |
|---|---|
| 1990 | Sand mining has advanced towards the east of the site<br>Industrial / commercial buildings have begun to be constructed north-west of the site |
| 1995 | Sand mining in the north-western portion of the site appears to have ceased and is focused on the southern central and north eastern portion of the site<br>The southern central area remains undeveloped<br>The oval horse track is still visible with minor landfill operations and structures are visible in the southwest corner |
| 2000 | Filling of the north-eastern portion of the site appears mostly complete. A fill tip face is visible in the central eastern section estimated to be approximately >10m high. This face appears partially filled by 2001<br>Landfill activities are visible in the central western portion of the site and stockpiles of material are visible towards the north-west corner<br>Residential development to the east of the site is complete<br>Sites to the south still appear to be used for market gardening and sites to the west are largely vacant. Subdivision appears to be underway on the northern end of the adjoining lot to the west |
| 2003 | Screening / stockpiling plant are visible and appear to be part of the landfill operations<br>Sand mining / fill recycling activities appears to be underway within the north-west corner and southern central portions of the site |
| 2005 | The majority of filling appears to have been completed in the eastern portion of the site though continues in the south-central portion and northwest corner<br>Market gardens to the south have ceased and residential development is partially complete |
| 2006 | Land fill stockpiles are visible in the far north-western portion of the site<br>Filling in the south-central portion of the site almost complete |
| 2008 | Site appears similar to 2017 aerial photograph<br>The eastern portion of the site appears to be gradually re-vegetating<br>Active landfill operations continue in the western portion of the site<br>Residential land use is apparent to the west, south and east of the site. Land to the north remains undeveloped |
| 2010 | Active landfill operations continue within the western portion of the site. Activities include stockpiling of landfill, screening and sorting of landfill and loading out of<br>screened product by trucks via the south-west access road |
| 2012 | Landfill operations continue similar to 2010 photograph<br>Residential land is now developed to the west, south and east of the site and commercial development is underway to the north of the site. |
| 2017 | Landfill operations continue within the north-west portion of the site. |

### 2.6. Field Investigation – Scope of Works

The field investigation on was carried out by CMW Geosciences between 22 August and 6 September 2017 and comprised of the following within the propsed development area:

- 10 x boreholes were drilled to a depth of between 4.5m and 20m over the site for material assessment and soil profiling, (SH1 - SH3, SH6, SH9, SH11, SH12, SH19, SH20 and SH22).

A copy of the boreholes conducted are included in Appendix 3 of this report.

## 3. RESULTS OF THE INVESTIGATION

### 3.1. Subsurface Soil Profile

The subsurface soil profile presented below was determined from the ground conditions encountered within the boreholes logging conducted by CMW Geosciences:

**Table 2 – Subsurface Soil Profile**

| Depth to Base of Strata (m) | Material Description |
|---|---|
| 0.0 – 20.2+ | FILL: SAND (fine to medium grained), with building rubbles (bricks and crushed bricks) and trace silt, loose to medium dense |
| -2.2 > -20m | NATURAL: SAND (fine to medium grained), trace silt, medium dense |

The soils encountered are consistent with the expected site conditions as predicted from the site history and environmental geology map for the location.

It is important to note that there may be pockets of fill on site that are deeper than that encountered by the investigation boreholes.

The subsurface soil conditions encountered are presented in the bore logs, within Appendix 3 of this report.

### 3.2. Groundwater

Groundwater was recorded in borehole SH2 approximately 13m below ground level during drilling. No other boreholes encountered water over the site at the time of assessment.

# 4. GEOTECHNICAL CONSTRUCTION CONSIDERATIONS

## 4.1. Site Classification

AS 2870-2011 Residential Slabs and Footings provides guidance on site classification for residential slabs and footing design based on the expected ground surface movement and depth of expected moisture changes.

**Table 2 – Classification Based on Site Reactivity**

| AS 2870-2011 Residential Slabs and Footings - Clause 2.1.2 Table 2.1 | |
|---|---|
| **Class** | **Foundation** |
| A | Most sand and rock sites with little or no ground movement from moisture changes |
| S | Slightly reactive clay sites, which may experience only slight ground movement from moisture changes (0<ys≤20mm) |
| M | Moderately reactive clay or silt sites, which may experience moderate ground movement from moisture changes (20<ys≤40mm) |
| H1 | Highly reactive clay sites, which may experience high ground movement from moisture changes (40<ys≤60mm) |
| H2 | Highly reactive clay sites, which may experience very high ground movement from moisture changes (60<ys≤75mm) |
| E | Extremely reactive sites, which may experience extreme ground movement from moisture changes (ys>75mm) |
| **Clause 2.1.3 Classification of other Sites** | |
| P | Sites which include 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 site that cannot be classified in accordance to Table 2.1 |

The site in its current condition is classified as Class “P” due to presence of uncontrolled fill extending to depth over the proposed development site.

Based on results of this investigation the site can be developed to an equivalent Class “A or Class S” site in accordance with AS 2870-2011 provided that unsuitable materials are removed and replaced with engineer-controlled fill materials in accordance with the earthwork recommendations as outlined in Section 4.3 of this report.

## 4.2. Drainage

The site can be considered suitable for on-site disposal of stormwater runoff subject to the proposed development. For on-site disposal of stormwater runoff, soakwells of sufficient sizes are required, and should be positioned a minimum of 1.2m or the depth of soakwell (whichever is greater) from any proposed or existing foundations (including those beyond the boundaries of the site) to reduce the risk of differential settlement.

## 4.3. Earthworks

It is considered that the developed site is to be remediated for a mixed use commercial and residential subdivision, subject to appropriate earthworks and foundation design being undertaken.

All earthworks shall be undertaken in accordance with AS3798-2007 “Earthworks for Residential and Commercial developments”.

The proposed earthworks program is provided and subject to amendment after an initial site investigation has been conducted to determine the current conditions of deep fill over the proposed development area.

It is considered that all currently compacted placed structurally suitable materials below -2.5m from proposed finished levels will remain in place after initial proof rolling, excluding any loosely placed stockpiled materials. All areas currently lower than -2.5m are to be filled and compacted in layers with structural fill obtained either onsite or imported to the site.

The associated works can be separated into the two separate areas, being Area A – areas currently above -2.5m from finished design levels (FSL) and Area B, areas currently below -2.5m from finished design levels (FSL).

**Area A -Areas currently extending above -2.5m (FSL)**

- All vegetation and organics is to be cleared, grubbed and mulched. These materials can be stockpiled for reuse in landscaping or disposed off-site, as required.
- Areas above -2.5m FSL to be cut to provide a working base. Any suitable structural fill won from the excavations can be stockpiled and reused as fill in the lower portions of the site.
- Base of excavations to be compacted in situ using an appropriate impact compaction methodology (i.e. HEIDYC or heavy vibratory roller).
- A stiffened raft is to be constructed on the compacted base (i.e. at approximately 2.0m below finished level), comprising a layer of non-woven geotextile underlying 0.15m compacted crushed stone layer, a layer of geo-grid and a second 0.15m layer of compacted crushed stone.
- Settlement monitoring plates be installed on top of the completed stiffened raft.

**Area B - Areas currently below -2.5m (FSL)**

- All vegetation and organic materials is to be cleared, grubbed and mulched. These materials can be stockpiled for reuse in landscaping or disposed off-site, as required.

- Base of stripped surfaces to be compacted in situ using an appropriate impact compaction methodology (i.e. HEIDYC or similar heavy Vibrating roller).
- The area is to be filled in layers (no more than 400mm) and compacted, in accordance with AS3798, to -2.5m below (FSL) with non-reactive granular fill including materials cut from site and blended to meet structural requirements.
- A stiffened raft is to be constructed on the compacted base (i.e. at approximately 2.0m below finished level), comprising a layer of non-woven geotextile underlying 0.15m compacted crushed stone layer, a layer of geo-grid and a second 0.15m layer of compacted crushed stone.
- Settlement monitoring plates be installed on top of the completed stiffened raft.

**Combined Areas A & B**

- The upper profile is to be filled in layers (not exceeding 400mm / layer) and compacted, in accordance with AS3798, as outlined in Table 4 below to the required finished level with non-reactive granular fill or materials cut from site and blended to meet structural requirements.
- It is recommended the upper 1m profile to consist of clean free draining sand fill having an insitu permeability of 5m or greater when compacted to the requirements of AS3798.

**Table 3 – Compaction Requirements**

| Item | Application | Minimum relative compaction, % | |
|---|---|---|---|
| | | Minimum density ratio (Standard Compaction Effort) (Cohesive soils) | Minimum density index (Cohesionless soils) |
| 1 | Residential - lot, fill, house, sites | 95 | 70 |

- The settlements generated by the placement of the structural fill above the geotextile raft should be monitored to enable geotechnical parameters to be back analysed and a surcharging strategy to be recommended, if necessary.

Once complete it is anticipated the completed Lots within the development will achieve an Equivalent Class A or Class S as defined in AS2870 “Residential slabs and footings” depending on the determined settlements obtained during earthworks monitoring.

Please be advised the above recommendations are general in nature and will be subject to change based on the actual materials and ground conditions encountered onsite at the time of the earthworks.

## 5. CONCLUSIONS

A preliminary site assessment has been conducted for the proposed mixed use commercial and residential development to provide earthworks recommendations for the site. Parameter and design recommendations are incorporated in the body of the report. The following conclusions have been drawn from the site investigation:

- The average subsurface soil profile encountered comprised uncontrolled FILL up to 20m and underlain by SAND to the investigated depth of 25m.
- Groundwater or perched water was encountered in Borehole SH2 13.0m below current ground level. No other boreholes conducted on the site encountered groundwater.
- It is considered that the site can be considered suitable for on-site drainage, subject to the recommended earthworks.
- The site can be classified as Class “A or Class S” in accordance with AS 2870-2011, subject to measured settlements conducted, during and at completion of the recommended earthworks as outlined in this report.
- The full scope of the recommended earthworks is presented in Section 4.3, but generally comprises:
    - Stripping of topsoil and unsuitable materials
    - Excavating to -2.5m below design levels, where required (Area A)
    - Structural filling to -2.5m below design levels, where required (Area B)
    - Proof compaction of the base of excavations
    - Placement of geotextile raft at -2m below design level
    - Placement and compaction of structural sand fill to required level
    - Assessment of settlement from surcharge derived from structural fill above geotextile raft.

## 6. LIMITATION OF FIELD INVESTIGATIONS

This report has been prepared in accordance with generally accepted consulting practice for Noble Hodge using information supplied at the time and for the project specific requirements as understood by Structerre. To the best of our knowledge the information contained in this report is accurate at the date of issue, however it should be emphasised that any changes to ground conditions and/or the proposed structures may invalidate the recommendations given herein.

The conclusions and recommendations in this report are based on the site conditions revealed through selective point sampling, representing the conditions of the site in total, although the area investigated represents only a small portion of the site. The actual characteristics may vary significantly between successive test locations and sample intervals other than where observations, explorations and investigations have been made.

The materials and their geotechnical properties presented in this report may not represent the full range of materials and strengths that actually exist on site and the recommendations should be regarded as preliminary in nature. Allowances should be made for variability in ground conditions and any consequent impact on the development. Structerre accepts no responsibility and shall not be liable for any consequence of variations in ground conditions.

If ground conditions encountered during construction are different to that described in this report, this office should be notified immediately.

For and behalf of

STRUCTERRE CONSULTING

Author: Mel Castle
Geotechnical Division Manager

Checked By: Bruce Zhang
Senior Geotechnical Engineer



| Job # | Revision | Authored | Checked | Authorised |
|---|---|---|---|---|
| J | DRAFT | MEC | BZ | MEC |
| | | | | |

## 7. REFERENCES

Department of Water – Perth Groundwater Atlas

Geological Survey of Western Australia 1:50,000 Environmental Geology Series

AS 1170.4-2007 Structural design actions – Earthquake actions in Australia

AS 1726-2017 Geotechnical Site Investigation

AS 2870-2011 Residential Slabs And Footings

AS 3798-2007 Guidelines On Earthworks For Commercial And Residential Developments

AS 4055-2012 Wind Loads For Housing

CMW Geosciences Technical Memorandum - PER2017-0193AB Rev0 Dated 14 March 2018

# APPENDIX 1 – SITE PLAN (PROPOSED)

FURNISS ROAD

DRIVER ROAD

PROPOSED DRAINAGE BASIN

## LEGEND

- SITE BOUNDARY
- 52.0 NEIGHBOUR CONTOURS
- 51.00 EXISTING SURFACE CONTOUR
- •27.89 EXISTING SURFACE SPOT LEVEL
- PROPOSED RETAINING WALL
- FUTURE RETAINING WALL
- EXISTING RETAINING WALL
- 24.0 PROPOSED LOT LEVEL (FLAT LOT)

VOLUMES FROM ESL & SURROUNDS TO LOTS - ("BDY CELL 6")

CUT VOLUMES ARE NEGATIVE
FILL VOLUMES ARE POSITIVE

| | |
|---|---|
| TOTAL CUT | -186855.909 |
| TOTAL FILL | 276229.180 |
| TOTAL BALANCE | 89373.271 |
| IE EXCESS OF FILL OVER CUT | 89373.271 |

POLYGON PLAN AREA = 119518.732

1:1000 (A1)



| No. | DATE | BY | REVISION | |
|---|---|---|---|---|
| D | 25/9/19 | JEG | UPDATED LEVELS | SRA |
| C | 24/9/19 | JEG | UPDATED LEVELS | SRA |
| B | 19/9/19 | JEG | UPDATED LEVELS AND ESL CONTOURS | SRA |
| A | 30/8/19 | JEG | INITIAL ISSUE | SRA |

CLIENT: NOBLE HODGE PTY LTD

DEVELOPMENT ENGINEERING CONSULTANTS
SUITE 3, 123A COLIN ST,
WEST PERTH, 6005
WESTERN AUSTRALIA
Ph: (08) 9481 1900
Fax: (08) 9481 1700

PROJECT: LOT 1 DRIVER ROAD
CNR FURNISS ROAD
DARCH
W.A.P.C. No. -

DRAWING: LAYOUT PLAN EARTHWORKS & RETAINING WALLS

CAD DRAWING DO NOT MANUALLY ALTER Z:\Proposals\PRO1216 - Noble Hodge - Lot 1 Drive Road, Cnr Furniss Rd, Darch\Design\Drawings\PRO1216 K01.dwg25/09/2019

| SCALE | DRAWN | CHECK | REV No. |
|---|---|---|---|
| 1:1000 | JEG | SRA | D |
| DATE | DESIGNED | APPROVED | |
| 30/8/19 | JEG | SRA | |

PROJECT NUMBER PRO1216
DRAWING NUMBER K01

# BOREHOLE LOG - SH01

Client: Handle Property Group
Project: Landfill Redevelopment Driver Rd
Location: Driver Rd, Darch
Project ID: PER2017-0193
Date: 23/08/2017

CMW Geosciences

1:50 Sheet 1 of 2

Logged by: DJP Position: E.391165m N.6480418m Hole Diameter: 114mm Plant used: Commachio C205
Checked by: MW Elevation: Angle from horizontal: 90° Contractor: Envirotech

| Well | Groundwater | Samples & Insitu Tests: Depth | Samples & Insitu Tests: Type & Results | RL (m) | Depth (m) | Graphic Log | Material Description<br>Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components | Moisture Condition | Consistency/ Relative Density | Structure & other observations |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | | FILL: Gravelly SAND: angular to subangular, fine to coarse grained, pale brown mottled grey; gravel, angular, medium to coarse grained, of concrete and brick; with silt, trace cobbles. | | | |
| | | 1.8-2.0 | B | | 1 | | | | | |
| | | | | | 2 | | *... at 2.10m, wood fragment* | | | |
| | | | | | 3 | | FILL: Sandy GRAVEL: angular to subrounded, fine to coarse grained, red brown, of brick; sand, fine to coarse grained, with cobbles. | | | |
| | | | | | 4 | | FILL: SAND: subangular to subrounded, fine to medium grained, dark brown; with gravel, fine to coarse grained, of brick, concrete, tile, plastic, asphalt and glass; with cobbles; trace organic fines. | | | |
| | | | | | 5 | | *... from 5.00m to 5.10m, trace rootlets* | M | | |
| | | | | | 6 | | | | | |
| | | 7.2-7.3 | B | | 7 | | *... from 7.20m to 7.30m, trace rootlets* | | | |
| | | | | | 8 | | *... at 8.40m, wood fragments* | | | |
| | | | | | 9 | | | | | |
| | | | | | 10 | | | | | |

Termination Reason: Target depth reached
Remarks:

# BOREHOLE LOG - SH01

Client: Handle Property Group
Project: Landfill Redevelopment Driver Rd
Location: Driver Rd, Darch
Project ID: PER2017-0193
Date: 23/08/2017

CMW Geosciences

1:50 Sheet 2 of 2

Logged by: DJP Position: E.391165m N.6480418m Hole Diameter: 114mm Plant used: Commachio C205
Checked by: MW Elevation: Angle from horizontal: 90° Contractor: Envirotech

| Well | Groundwater | Samples & Insitu Tests: Depth | Samples & Insitu Tests: Type & Results | RL (m) | Depth (m) | Graphic Log | Material Description<br>Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components | Moisture Condition | Consistency/ Relative Density | Structure & other observations |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 11 | | FILL: SAND: subangular to subrounded, fine to medium grained, dark brown; with gravel, fine to coarse grained, of brick, concrete, tile, plastic, asphalt and glass; with cobbles; trace organic fines.<br>... *at 10.20m, trace wood chips*<br>... *at 10.40m, decomposed wood fragments* | | | |
| | | | | | 12 | | SW: SAND: subangular to subrounded, fine to coarse grained, white streaked pale grey. (Bassendean Sand) | | | |
| | | | | | | | Borehole terminated at 12.0 m | | | |
| | | | | | 13 | | | | | |
| | | | | | 14 | | | | | |
| | | | | | 15 | | | | | |
| | | | | | 16 | | | | | |
| | | | | | 17 | | | | | |
| | | | | | 18 | | | | | |
| | | | | | 19 | | | | | |
| | | | | | 20 | | | | | |

Termination Reason: Target depth reached
Remarks:

# BOREHOLE LOG - SH02

Client: Handle Property Group
Project: Landfill Redevelopment Driver Rd
Location: Driver Rd, Darch
Project ID: PER2017-0193
Date: 23/08/2017

CMW Geosciences

1:50 Sheet 1 of 2

Logged by: DJP Position: E.391304m N.6480526m Hole Diameter: 114mm Plant used: Commachio C205
Checked by: MW Elevation: Angle from horizontal: 90° Contractor: Envirotech

| Well | Groundwater | Samples & Insitu Tests: Depth | Samples & Insitu Tests: Type & Results | RL (m) | Depth (m) | Graphic Log | Material Description<br>Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components | Moisture Condition | Consistency/ Relative Density | Structure & other observations |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.8-0.9 | B | | 1 | | FILL: Gravelly SAND: angular to subangular, fine to coarse grained, pale brown mottled grey; gravel, angular, medium to coarse grained, of concrete and brick; with silt, trace cobbles.<br>*... from 0.80m to 1.10m, trace fragments of wood; trace organic fines* | | | |
| | | 2.8-3.0 | B | | 2<br>3 | | FILL: SAND: subangular to subrounded, fine to medium grained, black mottled dark brown; trace gravel of brick, concrete, tile, plastic and glass; trace organic fines. | | | |
| | | | | | 4 | | FILL: Sandy GRAVEL: angular to subrounded, fine to coarse grained gravel, red brown, of brick. | | | |
| | | | | | 5<br>6<br>7<br>8<br>9<br>10 | | FILL: Gravelly SAND: angular to subangular, fine to coarse grained, mottled grey brown; gravel, angular, medium to coarse grained, pale brown, of concrete and brick; trace silt, trace cobbles, trace boulders.<br>*... at 5.20m, piece of chipboard*<br>*... at 6.70m, piece of chipboard*<br>*... at 6.90m, aesbestos sheeting*<br>*... at 7.40m, cardboard and woody fragments*<br>*... at 8.80m, metal strapping* | | | |

Termination Reason: Target depth reached
Remarks:

# BOREHOLE LOG - SH02

Client: Handle Property Group
Project: Landfill Redevelopment Driver Rd
Location: Driver Rd, Darch
Project ID: PER2017-0193
Date: 23/08/2017

CMW Geosciences

1:50 Sheet 2 of 2

Logged by: DJP Position: E.391304m N.6480526m Hole Diameter: 114mm Plant used: Commachio C205
Checked by: MW Elevation: Angle from horizontal: 90° Contractor: Envirotech

| Well | Groundwater | Samples & Insitu Tests: Depth | Samples & Insitu Tests: Type & Results | RL (m) | Depth (m) | Graphic Log | Material Description<br>Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components | Moisture Condition | Consistency/ Relative Density | Structure & other observations |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 11 | | FILL: Gravelly SAND: angular to subangular, fine to coarse grained, mottled grey brown; gravel, angular, medium to coarse grained, pale brown, of concrete and brick; trace silt, trace cobbles, trace boulders.<br>*... at 11.20m, woody fibres*<br>*... at 11.30m, copper wire/electronic waste* | | | |
| | | 11.4-11.5 | B | | 12 | | FILL: SAND: subangular to subrounded, fine to medium grained, black mottled brown; trace gravel of brick, concrete, tile, plastic and glass; trace organic fines.<br>*... from 12.20m to 12.70m, clay laminations, orange-brown, medium plasticity* | | | |
| | ▼ | | | | 13 | | *... from 13.30m to 13.60m, Sandy GRAVEL, pale grey, with fines* | | | |
| | | | | | 14 | | SW: SAND: subangular to subrounded, fine to coarse grained sand, white streaked pale grey. (Bassendean Sand) | | | |
| | | | | | | | Borehole terminated at 14.5 m | | | |
| | | | | | 15 | | | | | |
| | | | | | 16 | | | | | |
| | | | | | 17 | | | | | |
| | | | | | 18 | | | | | |
| | | | | | 19 | | | | | |
| | | | | | 20 | | | | | |

Termination Reason: Target depth reached
Remarks:

# BOREHOLE LOG - SH03

Client: Handle Property Group
Project: Landfill Redevelopment Driver Rd
Location: Driver Rd, Darch
Project ID: PER2017-0193
Date: 05/09/2017

CMW Geosciences

1:50 Sheet 1 of 1

Logged by: DJP Position: E.391116m N.6480372m Hole Diameter: 114mm Plant used: Fraste Multidrill
Checked by: MW Elevation: Angle from horizontal: 90° Contractor: Ecoprobe

| Well | Groundwater | Samples & Insitu Tests: Depth | Samples & Insitu Tests: Type & Results | RL (m) | Depth (m) | Graphic Log | Material Description<br>Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components | Moisture Condition | Consistency/ Relative Density | Structure & other observations |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | | FILL: SAND: subangular to subrounded, fine to coarse grained, dark brown mottled brown; with gravel of brick and concrete, with cobbles, trace fines. | | | |
| | | | | | 1 | | | | | |
| | | | | | 2 | | | | | |
| | | | | | 3 | | | | | |
| | | | | | 4 | | *... at 4.00m, wood fragment* | | | |
| | | | | | 5 | | | | | |
| | | | | | 6 | | | | | |
| | | | | | 7 | | SW: SAND: subangular to subrounded, fine to coarse grained sand, yellow. (Bassendean Sand) | | | |
| | | | | | 8 | | *... from 7.80m to 9.00m, pale grey* | | | |
| | | | | | 9 | | Borehole terminated at 9.0 m | | | |
| | | | | | 10 | | | | | |

Termination Reason: Target depth reached
Remarks:

# BOREHOLE LOG - SH06

Client: Handle Property Group
Project: Landfill Redevelopment Driver Rd
Location: Driver Rd, Darch
Project ID: PER2017-0193
Date: 24/08/2017

1:50 Sheet 1 of 2

Logged by: DJP Position: E.391151m N.6480566m Hole Diameter: 114mm Plant used: Commachio C205
Checked by: MW Elevation: Angle from horizontal: 90° Contractor: Envirotech

| Well | Groundwater | Samples & Insitu Tests: Depth | Samples & Insitu Tests: Type & Results | RL (m) | Depth (m) | Graphic Log | Material Description | Moisture Condition | Consistency/ Relative Density | Structure & other observations |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | | FILL: SAND: subangular to subrounded, fine to coarse grained, dark brown mottled brown; with gravel of brick, concrete and plastic; trace cobbles, trace fines. | | | |
| | | | | | 1 | | | | | |
| | | | | | 1.5 | | FILL: Gravelly SAND: angular to subangular, fine to coarse grained, dark brown mottled black; gravel, angular, medium to coarse grained, of concrete, brick, bitumen, tile, insulation fibres and plastic; with fines, trace cobbles. | | | |
| | | 2.0-2.1 | B | | 2 | | | | | |
| | | | | | 3 | | | | | |
| | | 3.5-3.6 | B | | 3.5 | | | | | |
| | | | | | 4 | | FILL: SAND: subangular to subrounded, fine to coarse grained, dark brown black mottled brown; trace gravel of brick, concrete and plastic; trace cobbles, trace fines. | | | |
| | | | | | 5 | | | D to M | | |
| | | | | | 6 | | | | | |
| | | | | | 7 | | | | | |
| | | | | | 8 | | *... at 8.00m, trace wood fragments* | | | |
| | | | | | 9 | | | | | |
| | | | | | 10 | | | | | |

Termination Reason: Target depth reached
Remarks:

# BOREHOLE LOG - SH06

Client: Handle Property Group
Project: Landfill Redevelopment Driver Rd
Location: Driver Rd, Darch
Project ID: PER2017-0193
Date: 24/08/2017

CMW Geosciences

1:50 Sheet 2 of 2

Logged by: DJP Position: E.391151m N.6480566m Hole Diameter: 114mm Plant used: Commachio C205
Checked by: MW Elevation: Angle from horizontal: 90° Contractor: Envirotech

| Well | Groundwater | Samples & Insitu Tests: Depth | Samples & Insitu Tests: Type & Results | RL (m) | Depth (m) | Graphic Log | Material Description<br>Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components | Moisture Condition | Consistency/ Relative Density | Structure & other observations |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 10.7-11.2 | B | | 11 | | FILL: SAND: subangular to subrounded, fine to coarse grained, dark brown black mottled brown; trace gravel of brick, concrete and plastic; trace cobbles, trace fines.<br>*... at 10.20m, decomposed wood board*<br>*... from 10.60m to 11.70m, black; with plastic, metal, wood and brick; strong HS2 odour* | | | |
| | | | | | 12 | | FILL: SAND: subangular to subrounded, fine to coarse grained, brown mottled pale brown; trace gravel of limestone. | | | |
| | | | | | 13 | | | | | |
| | | | | | 14 | | SW: SAND: subangular to subrounded, fine to coarse grained, white streaked pale grey. (Bassendean Sand) | M to W | | |
| | | | | | | | Borehole terminated at 14.0 m | | | |
| | | | | | 15 | | | | | |
| | | | | | 16 | | | | | |
| | | | | | 17 | | | | | |
| | | | | | 18 | | | | | |
| | | | | | 19 | | | | | |
| | | | | | 20 | | | | | |

Termination Reason: Target depth reached
Remarks:

# BOREHOLE LOG - SH09

Client: Handle Property Group
Project: Landfill Redevelopment Driver Rd
Location: Driver Rd, Darch
Project ID: PER2017-0193
Date: 24/08/2017

CMW Geosciences

1:50 Sheet 1 of 1

Logged by: DJP Position: E.391133m N.6480217m Hole Diameter: 114mm Plant used: Commachio C205
Checked by: MW Elevation: Angle from horizontal: 90° Contractor: Envirotech

| Well | Groundwater | Samples & Insitu Tests: Depth | Samples & Insitu Tests: Type & Results | RL (m) | Depth (m) | Graphic Log | Material Description<br>Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components | Moisture Condition | Consistency/ Relative Density | Structure & other observations |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | | FILL: SAND: subangular to subrounded, fine to coarse grained, brown streaked grey brown; trace gravel, of concrete and brick; trace fines. | | | 0.00m: Grass on the surface |
| | | | | | 1 | | | | | |
| | | | | | 2 | | FILL: Gravelly SAND: angular to subangular, fine to coarse grained, brown mottled grey black; gravel, angular to subrounded, fine to coarse grained, of concrete, bitumen, limestone and brick; trace silt, with cobbles, trace boulders.<br>*... at 2.20m, wood fragments* | | | |
| | | 2.5-2.6 | B | | 3 | | | | | |
| | | | | | 4 | | | | | |
| | | | | | 5 | | | | | |
| | | | | | 6 | | | | | |
| | | 7.0-7.1 | B | | 7 | | *... from 7.20m to 7.20m, fibrous insulation*<br>*... from 7.50m to 7.90m, with glass and carpet* | | | |
| | | | | | 8 | | SW: SAND: subangular to subrounded, fine to coarse grained sand, white streaked pale grey. (Bassendean Sand) | | | |
| | | | | | 9 | | Borehole terminated at 9.0 m | | | |
| | | | | | 10 | | | | | |

Termination Reason: Target depth reached
Remarks:

# BOREHOLE LOG - SH11

Client: Handle Property Group
Project: Landfill Redevelopment Driver Rd
Location: Driver Rd, Darch
Project ID: PER2017-0193
Date: 25/08/2017

CMW Geosciences

1:50 Sheet 1 of 2

Logged by: DJP Position: E.391438m N.6480355m Hole Diameter: 114mm Plant used: Commachio C205
Checked by: MW Elevation: Angle from horizontal: 90° Contractor: Envirotech

| Well | Groundwater | Samples & Insitu Tests: Depth | Samples & Insitu Tests: Type & Results | RL (m) | Depth (m) | Graphic Log | Material Description<br>Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components | Moisture Condition | Consistency/ Relative Density | Structure & other observations |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | | SW: SAND: subangular to subrounded, fine to coarse grained, brown; trace gravel of brick and concrete. | | | 0.00m: Grass on the surface |
| | | 2.1-2.2 | B | | 1 | | | | | |
| | | | | | 2 | | | | | |
| | | | | | 3 | | | | | |
| | | | | | 4 | | | | | |
| | | | | | 5 | | *... from 5.00m to 5.80m, becoming dark brown streaked black* | D to M | | |
| | | | | | 6 | | FILL: SAND: subangular to subrounded, fine to coarse grained, dark brown black mottled grey brown; trace gravel of brick and concrete; trace cobbles, trace boulders, trace fines. | | | |
| | | | | | 7 | | *... at 6.90m, wood fragment*<br>*... at 7.40m, styrofoam fragment* | | | |
| | | 8.2-8.3 | B | | 8 | | *... at 7.90m, aluminium can*<br>*... at 8.50m, wood fragment* | | | |
| | | | | | 9 | | | | | |
| | | | | | 10 | | | | | |

Termination Reason: Target depth reached
Remarks:

# BOREHOLE LOG - SH11

Client: Handle Property Group
Project: Landfill Redevelopment Driver Rd
Location: Driver Rd, Darch
Project ID: PER2017-0193
Date: 25/08/2017

CMW Geosciences

1:50 Sheet 2 of 2

Logged by: DJP Position: E.391438m N.6480355m Hole Diameter: 114mm Plant used: Commachio C205
Checked by: MW Elevation: Angle from horizontal: 90° Contractor: Envirotech

| Well | Groundwater | Samples & Insitu Tests: Depth | Samples & Insitu Tests: Type & Results | RL (m) | Depth (m) | Graphic Log | Material Description<br>Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components | Moisture Condition | Consistency/ Relative Density | Structure & other observations |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 11 | | FILL: SAND: subangular to subrounded, fine to coarse grained, dark brown black mottled grey brown; trace gravel of brick and concrete; trace cobbles, trace boulders, trace fines.<br>*... at 10.00m, plastic sheeting*<br>*... from 11.00m to 12.00m, trace carpet and wood fragments* | | | |
| | | | | | 12 | | | | | |
| | | | | | 13 | | | | | |
| | | | | | 14 | | | | | |
| | | | | | | | FILL: Gravelly SAND: subangular to subrounded, fine to coarse grained, grey and red; gravel, angular to subrounded, fine to coarse grained, of brick and concrete; with cobbles, trace boulders, trace fines. | | | |
| | | 15.2-15.3 | B | | 15 | | FILL: SAND: subangular to subrounded, fine to coarse grained, dark brown black mottled grey brown; trace gravel of brick and concrete; trace cobbles, trace boulders, trace fines.<br>*... at 15.70m, metal fragments* | | | |
| | | | | | 16 | | | | | |
| | | | | | 17 | | | | | |
| | | | | | 18 | | | | | |
| | | | | | 19 | | SW: SAND: subangular to subrounded, fine to coarse grained, white streaked pale grey. (Bassendean Sand) | W | | |
| | | | | | | | Borehole terminated at 19.5 m | | | |
| | | | | | 20 | | | | | |

Termination Reason: Target depth reached
Remarks:

# BOREHOLE LOG - SH12

Client: Handle Property Group
Project: Landfill Redevelopment Driver Rd
Location: Driver Rd, Darch
Project ID: PER2017-0193
Date: 24/08/2017

CMW Geosciences

1:50 Sheet 1 of 1

Logged by: DJP Position: E.391203m N.6480239m Hole Diameter: 114mm Plant used: Commachio C205
Checked by: MW Elevation: Angle from horizontal: 90° Contractor: Envirotech

| Well | Groundwater | Samples & Insitu Tests: Depth | Samples & Insitu Tests: Type & Results | RL (m) | Depth (m) | Graphic Log | Material Description: Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components | Moisture Condition | Consistency/ Relative Density | Structure & other observations |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | | FILL: SAND: subangular to subrounded, fine to coarse grained, brown mottled pale brown; trace gravel of concrete. | | | |
| | | | | | 2 | | SW: SAND: subangular to subrounded, fine to coarse grained, white streaked pale grey. (Bassendean Sand) | D to M | | |
| | | | | | 4 | | Borehole terminated at 4.5 m | W | | |

Termination Reason: Target depth reached
Remarks:

# BOREHOLE LOG - SH19

Client: Handle Property Group
Project: Landfill Redevelopment Driver Rd
Location: Driver Rd, Darch
Project ID: PER2017-0193
Date: 06/09/2017

CMW Geosciences

1:50 Sheet 1 of 1

Logged by: DJP Position: E.391307m N.6480247m Hole Diameter: 114mm Plant used: Fraste Multidrill
Checked by: MW Elevation: Angle from horizontal: 90° Contractor: Ecoprobe

| Well | Groundwater | Samples & Insitu Tests: Depth | Samples & Insitu Tests: Type & Results | RL (m) | Depth (m) | Graphic Log | Material Description<br>Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components | Moisture Condition | Consistency/ Relative Density | Structure & other observations |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | | FILL: Gravelly SAND: angular to subangular, fine to coarse grained, dark grey brown mottled black; gravel, angular, medium to coarse grained, of brick, concrete and plastic; trace fines, trace cobbles. | M | | |
| | | 3.8-4.3 | B | | 4 | | SW: SAND: subangular to subrounded, fine to coarse grained, brown mottled dark grey brown; trace gravel, with fines.<br>*... from 3.80m to 4.30m, blue grey, trace clay* | W | | |
| | | | | | 7 | | SW: SAND: subangular to subrounded, fine to coarse grained, white streaked pale grey. (Bassendean Sand) | | | |
| | | | | | 9 | | Borehole terminated at 9.0 m | | | |

Termination Reason: Target depth reached
Remarks:

# BOREHOLE LOG - SH20

Client: Handle Property Group
Project: Landfill Redevelopment Driver Rd
Location: Driver Rd, Darch
Project ID: PER2017-0193
Date: 06/09/2017

CMW Geosciences

1:50 Sheet 1 of 2

Logged by: DJP Position: E.391127m N.6480292m Hole Diameter: 114mm Plant used: Fraste Multidrill
Checked by: MW Elevation: Angle from horizontal: 90° Contractor: Ecoprobe

| Well | Groundwater | Samples & Insitu Tests: Depth | Samples & Insitu Tests: Type & Results | RL (m) | Depth (m) | Graphic Log | Material Description<br>Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components | Moisture Condition | Consistency/ Relative Density | Structure & other observations |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1 | | FILL: SAND: subangular to subrounded, fine to coarse grained, dark brown mottled black; with gravel of brick and concrete; trace cobbles, trace fines. | | | |
| | | | | | 2 | | | | | |
| | | | | | 3 | | | | | |
| | | | | | 4 | | *... at 4.10m, carpet* | | | |
| | | | | | 5 | | | D to M | | |
| | | | | | 6 | | *... at 6.10m, plastic sheet* | | | |
| | | | | | 7 | | | | | |
| | | | | | 8 | | | | | |
| | | | | | 9 | | | | | |
| | | | | | 10 | | | | | |

Termination Reason: Target depth reached
Remarks:

# BOREHOLE LOG - SH20

Client: Handle Property Group
Project: Landfill Redevelopment Driver Rd
Location: Driver Rd, Darch
Project ID: PER2017-0193
Date: 06/09/2017

CMW Geosciences

1:50 Sheet 2 of 2

Logged by: DJP Position: E.391127m N.6480292m Hole Diameter: 114mm Plant used: Fraste Multidrill
Checked by: MW Elevation: Angle from horizontal: 90° Contractor: Ecoprobe

| Well | Groundwater | Samples & Insitu Tests: Depth | Samples & Insitu Tests: Type & Results | RL (m) | Depth (m) | Graphic Log | Material Description<br>Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components | Moisture Condition | Consistency/ Relative Density | Structure & other observations |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 11 | | SW: SAND: subangular to subrounded, fine to coarse grained, white streaked pale grey. (Bassendean Sand) | W | | |
| | | | | | 12 | | Borehole terminated at 12.0 m | | | |
| | | | | | 13 | | | | | |
| | | | | | 14 | | | | | |
| | | | | | 15 | | | | | |
| | | | | | 16 | | | | | |
| | | | | | 17 | | | | | |
| | | | | | 18 | | | | | |
| | | | | | 19 | | | | | |
| | | | | | 20 | | | | | |

Termination Reason: Target depth reached
Remarks:

# BOREHOLE LOG - SH22

Client: Handle Property Group
Project: Landfill Redevelopment Driver Rd
Location: Driver Rd, Darch
Project ID: PER2017-0193
Date: 08/09/2017

CMW Geosciences

1:50 Sheet 1 of 2

Logged by: DJP Position: E.391243m N.6480592m Plant used: Fraste Multidrill
Checked by: MW Elevation: Angle from horizontal: 90° Contractor: Ecoprobe

| Well | Groundwater | Samples & Insitu Tests: Depth | Samples & Insitu Tests: Type & Results | RL (m) | Depth (m) | Graphic Log | Material Description<br>Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components | Moisture Condition | Consistency/ Relative Density | Structure & other observations |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | | FILL: SAND: angular to subangular, fine to coarse grained sand, angular, medium to coarse grained gravel, dark brown mottled black, with fine to coarse grained gravel, with cobbles, of concrete, brick, bitumen, tile, and plastic; trace boulders, of concrete. | | | |
| | | | | | | | *... at 0.60m, plastic liner* | | | |
| | | | | | 1 | | | | | |
| | | | | | 2 | | | | | |
| | | | | | 3 | | | | | |
| | | 3.5-3.6 | B | | | | *... at 3.40m, wood fragments* | | | |
| | | | | | 4 | | | | | |
| | | | | | | | *... at 4.50m, plastic strapping* | | | |
| | | | | | 5 | | | D to M | | |
| | | | | | 6 | | | | | |
| | | | | | | | *... at 6.40m, steel wire* | | | |
| | | | | | 7 | | | | | |
| | | | | | 8 | | | | | |
| | | | | | 9 | | | | | |
| | | | | | 10 | | | | | |

Termination Reason: Target depth reached
Remarks:

# BOREHOLE LOG - SH22

Client: Handle Property Group
Project: Landfill Redevelopment Driver Rd
Location: Driver Rd, Darch
Project ID: PER2017-0193
Date: 08/09/2017

CMW Geosciences

1:50 Sheet 2 of 2

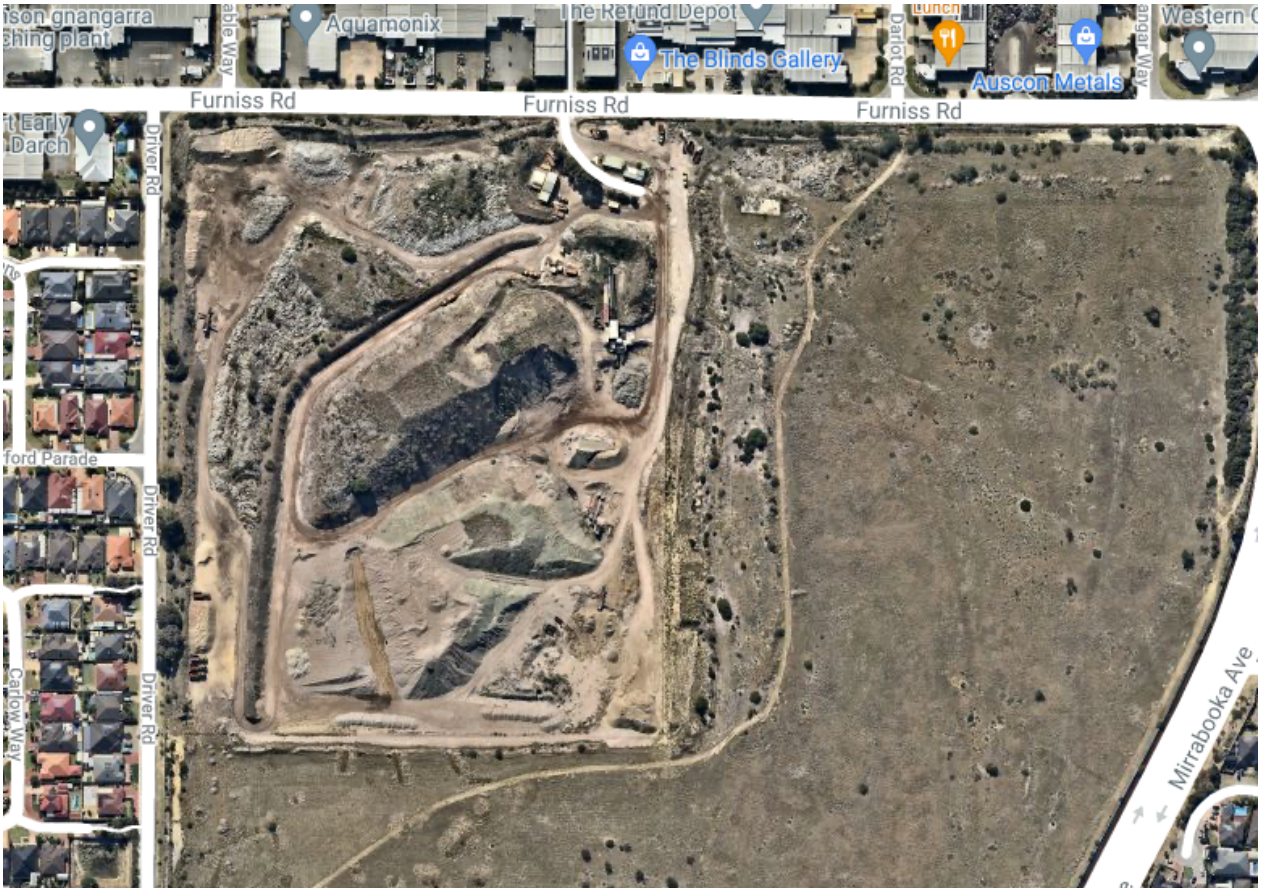
Logged by: DJP Position: E.391243m N.6480592m Plant used: Fraste Multidrill
Checked by: MW Elevation: Angle from horizontal: 90° Contractor: Ecoprobe

| Well | Groundwater | Samples & Insitu Tests: Depth | Samples & Insitu Tests: Type & Results | RL (m) | Depth (m) | Graphic Log | Material Description<br>Soil Type, Plasticity or Particle Characteristics, Colour, Secondary and Minor Components | Moisture Condition | Consistency/ Relative Density | Structure & other observations |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 11 | | FILL: SAND: angular to subangular, fine to coarse grained sand, angular, medium to coarse grained gravel, dark brown mottled black, with fine to coarse grained gravel, with cobbles, of concrete, brick, bitumen, tile, and plastic; trace boulders, of concrete.<br>*... at 10.50m, wood fragment* | | | |
| | | | | | 12 | | SAND: subangular to subrounded, fine to coarse grained sand, white. (Bassendean Sand) | M to W | | |
| | | | | | 13 | | | | | |
| | | | | | 14 | | | | | |
| | | | | | 15 | | Borehole terminated at 15.0 m | | | |
| | | | | | 16 | | | | | |
| | | | | | 17 | | | | | |
| | | | | | 18 | | | | | |
| | | | | | 19 | | | | | |
| | | | | | 20 | | | | | |

Termination Reason: Target depth reached
Remarks:

# APPENDIX 2 – SITE PHOTOS

Photograph (April 2021)



# APPENDIX 3 – BORELOGS