Geotechnical Investigation

Proposed Warehouse Development 221-227, 289-317 Luddenham Road Orchard Hills NSW 2748

5017200153-AR1

Prepared for HB+B Property
10/06/2020

Construction Sciences

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Document Information

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A	1/06/2020	Final	Nicholas Leong	Vipul de Silva
AR1	10/06/2006	Minor Editorial Comments	Nicholas Leong	Vipul de Silva

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Appendices

1 Introduction

As requested, Construction Sciences Pty Ltd (CS) has carried out a geotechnical study at 221-227, 289-317 Luddenham Road Orchard Hills NSW 2748 . This report has been prepared to assist the Planning Proposal submission an any future Development Applications across the site. The report content covers preliminary pavement thickness design for subdivision roads, interim AS2870 Classifications and preliminary foundation design recommendations for the proposed warehouse structures.

2 Site Description and Geology

Reference to the Penrith, 1:100,000 , Geological Series Sheet indicates the site is underlain by Wianamatta Group Bringelly Shale (Twib), comprised of shale, carbonaceous claystone, laminite, lithic sandstone, rare coal.

The site is bounded by Patons Lane to the north, Luddenham Road to the east, residential property to the south and an open paddock to the south. At the time of the fieldwork, the site was observed to have undulating terrain throughout with a trending slope of 1° toward the south. Vegetation consisted of predominantly grass ground cover with scattered pockets of tall grass throughout the site. Tall trees were also found throughout the site. Three dams were present on the southern half of the site. Occupied residential properties were also found on site.

A general overview of the site is shown in Photo 1 and Photo 2 below.

Photo 1: General Site Overview Facing southeast

Photo 2: General Site Overview Facing south

3 Fieldwork

Fieldwork was carried out from the 4th May 2020 to 8th May 2020 and comprised of 79 test pits spread across the site. The test pits were excavated to a maximum depth of 2.0m using a 5.5t Excavator with a 300mm bucket.

The fieldwork was carried out by an Engineering Geologist from CS, who selected test locations, carried out sampling and compiled engineering logs of the profiles encountered.

Dynamic Cone Penetrometer (DCP) tests were carried out adjacent to selected test pits to aid the assessment of subsurface soil strength.

Approximate test pit locations are shown on the attached Site Plan, ref: 5017200153-AR1-1 and 2presented in Appendix B.

The subsurface soil profiles encountered in the boreholes are summarised in Table 1 below. Reference should be made to the attached borehole logs for a more detailed description of soils encountered at a particular location.

4 Subsurface Conditions

The subsurface conditions found in the test pits TP1-TP79 are summarised in Table 1 below. Reference should be made to test pit logs included in Appendix B.

Table 1: Summary of Subsurface Profile

Layer/Description	Depth to Base of Layer (m)
TOPSOIL: SILT / Gravelly SILT/ Gravelly SAND / Silty CLAY/ Sandy SILT/ Silty Gravelly SAND	0.0 to 0.3
ASPHALT	0.0 to 0.01
FILL: Gravelly SAND / Gravelly SILT / Silty CLAY	0.0 to 1.0
RESIDUAL: CLAY, Silty CLAY , Sandy CLAY , Clayey SAND and Clayey GRAVEL low to high plasticity, brown mottled grey red to brown, stiff to hard	0.2 to >2.0
WEATHERED ROCK: SILTSTONE, pale grey, extremely weathered, low strength SANDSTONE, grey, high weathered, low strength SHALE, grey, highly weathered, very low strength	1.0 to >2.0

Groundwater was encountered in TP47 only during our investigation within the residual soil layer. It should be noted that field works were undertaken after a period of moderate rainfall, however, the depth to groundwater may vary in response to environmental factors including weather and seasonal change.

5 Laboratory Test Results

Laboratory testing comprised ten (10) California Bearing Ratio (CBR) tests to aid subgrade assessment for pavement thickness design. Sixty-five (65) Moisture Content tests and nine (9) Atterberg Limit Tests were also carried out to aid assessment and soil reactivity. One hundred and sixty-five (165) Ec/pH tests and ten (10) Chloride, Sulphate tests and twelve (12) CEC tests were carried out to aid assessment for soil exposure classification for durability of concrete and steel in ground. Laboratory test results are summarised in Table 2, Table 3 and Table 4 below.

Table 2: Summary of CBR Laboratory Test Results

Test Pit No.	Depth (m)	Material	FMC (%)	OMC (%)	MDD (t/m^3)	CBR Swell(%)	CBR (%)
TP34	0.20-0.60	Clay, brown	6.8	16.0	1.68	5.0	2.0
TP39	0.20-0.50	Clay, red	15.5	16.5	1.66	3.5	4.5
TP44	0.20-0.60	Silty Clay, brown	17.8	21.0	1.55	3.0	5
TP47	0.20-0.60	Clayey Silt, brown	19.4	22.5	1.54	4.0	4.5

TP51	0.20-0.50	Clay, red	11.6	15.5	1.57	8.5	1.0
TP58	0.20-0.60	Clay, brown	13.5	16.0	1.71	3.5	4.5
TP61	0.20-0.60	Clayey Silt , brown	15.1	17.5	1.67	5.5	1.5
TP64	0.40-0.60	Silty Clay, brown	14.2	16.0	1.65	2.0	2.0
TP70	0.20-0.50	Clayey Silt, brown	21.0	27.5	1.53	11	11
TP80	0.20-0.60	Clay, red	17.3	20.0	1.63	2.0	2.0

Table 3: Summary of Atterberg Limit Test Results

Test Pit No.	Depth (m)	Material	LL (%)	PL (%)	PI (%)
TP15	1.40-1.50	Silty Clay , grey	68	20	48
TP16	0.40-0.50	Clay, mottled red	66	20	46
TP20	0.20-0.30	Sandy Clay, brown	36	14	22
TP24	0.40-0.50	Clay, red	80	23	57
TP38	1.40-1.50	Silty Clay, grey	71	21	50
TP54	0.40-0.50	Silty Clay brown	59	21	38
TP66	0.40-0.50	Clay, brown	71	24	47
TP74	1.40-1.50	Clay, grey	70	21	49
TP80	0.20-0.30	Clay, red	75	23	52

Table 4: Summary of Geochemical Laboratory Test Results

Test Pit No.	Depth (m)	pH	Ec (µS/cm)	FMC (%)	Chloride (Cl) (mg/kg)	Sulphate (SO_4) (mg/kg)	CEC (meq/100g)
TP05	1.30-1.50	5.8	72		51	12	**13**
TP11	0.40-0.50	5.8	53	21	71	19	**13**
TP13	0.40-0.50	4.9	200	21			**16**
TP32	0.00-0.20	5.9	31	15	12	<10	**5.5**
TP34	0.20-0.3	5.2	220	21	320	280	**12**
TP54	1.40-1.50	5.2	250		270	35	**21**
TP60	0.40-0.50	6.0	81		16	36	**14**
TP67	1.40-1.50	4.2	760	17	1900	<10	**6.7**
TP70	0.40-0.50	5.4	40	30			**8.5**
TP72	0.40-0.50	5.7	48	19	28	50	
TP73	1.40-1.50	5.7	29	14			**9.1**
TP79	1.10-1.20	5.6	39	11	32	26	
TP80	1.40-1.50	5.4	89	14	93	40	
TP80	**1.90-2.00**	**5.4**	**79**	**13**			**16**

Electrical Conductivity (EC) and pH results are included Attachment B. Laboratory test reports are included in in Appendix C. A table of Ec and pH values along with exposure classification of all samples tested is included in Attachment 1 in Appendix C.

6 Discussion and Recommendations

6.1 Soil Salinity

Soil salinity was assessed based on electrical conductivity (Ec) of 1:5 (by mass) soil: water suspension and multiplying by a factor depending upon textural classification of soil to assess the electrical conductivity of pore water within the soil mass when it saturated (Ec). A salinity scale has been adopted for the site salinity rating. The salinity scale adopted is given below:

Salinity Classification	Ec dS/m
Non Saline (NS)	0 – 1.99
Slightly Saline (SS)	2.0 – 3.99
Moderately Saline (MS)	4.0 – 7.99
Very Saline (HS)	8.0- 15.0
Highly Saline	>15.0

One hundred and sixty-five (165) salinity samples from test pits (TP01 to TP80) were collected from 4th May 2020 to 8th May 2020 during the geotechnical investigation are shown on the attached Drawings 5017200153-A-1 and 2. Samples were collected from depths of 0.5m, 1.0m, 1.5m and 2.0m intervals. The test results are shown in Attachment B and summarised in Table 2 below

Table 5: Salinity Distribution Table

Salinity Rating	No. of Sampled	Percentage %
Non Saline	96	58.2
Slightly Saline	42	25.5
Moderately Saline	26	15.8
Very Saline	1	0.6

It is seen that a substantial area contains moderately saline soils. A Salinity Management Plan may be required prior to undertaking earthworks, construction of infrastructure and proposed buildings.

6.2 Exposure Classification

Sulphate content in the samples ranged from <10mg/kg to 280mg/kg.

Chloride content of the samples tested ranged from 12mg/kg to 1900mg/kg.

Cation Exchange capacity (CEC) ranged from 5.5meq/100g to 21meq/100g

Residential lots are rated in accordance with Electrical Conductivity of saturated pores (Ec_e) based on the following basis. (Refer table 5.1 AS2870-2011).

Table 6: Exposure Classification for concrete in Saline Soils

Electrical Conductivity Ec_e (dS/m)	Exposure Rating
0 - <4	**A1**
4 - <8	**A2**
8 - <16	**B1**
>16	**B2**

In addition, the exposure classification is also based on soil pH for sulphate soils and sulphate content. The relevant parameters are reproduced in Table 7:

Table 7: Exposure Classifiation for concrete in Sulfate Soils

Sulfate Content in soil (ppm)	pH	Exposure class in Soil A	Exposure class in Soil B
<5000	>5.5	A2	A1
5000-<10000	4.5-<5.5	B1	A2
10000-<20000	4.0-<4.5	B2	B1
>20000	<4	C2	B2

Note:

Soil A: Sands and gravels under groundwater table.

Soil B: All soils above groundwater table and silt and clay below groundwater table.

Table 5 of AS2870-2011 specifies concrete strength for various exposure classifications for residential footings. It may be noted that the concrete strength specified for residential footings, which are essentially shallow footings, are different to those specified in AS2159-2009 for piles.

Table 8: Exposure Classifiation rating

Electrical Conductivity Ec_e (dS/m)	Minimum Concrete Strength (MPa)
A1	20
A2	25
B1	32
B2	40
C1 and C2	50

Soil pH was measured in One hundred and sixty-five (165) soil samples and the results ranged from 3.7 to 7.1. Vvalues ranging from (pH>4.5 to pH≤5.5) are considered "mild" and values >5.5 are considered "non-aggressive" in terms of exposure classification for concrete in accordance with AS 2159-2009, Piling Code.

The highest concentration of sulphate and chloride was assessed to be 280 mg/Kg(ppm) and 1900mg/kg (ppm). AS2159 indicates that sulphate content up to 5000ppm is considered to be non-aggressive to concrete members in ground and chloride content up to 5000ppm is considered to non-aggressive to steel structures in ground.

Based on the above, all samples tested would be rated as Exposure classification A1 or A2.
The above exposure ratings are for standard footings designed in accordance with AS 2870-2011. If deeper pier footings are proposed, site specific geotechnical investigations may be required to assess exposure classifications.

6.3 Salinity Management

The following salinity management aspects may be undertaken during the development of the subdivision.

- An erosion and Sediment Control Plan must be developed by the appointed earthworks contractor and implemented in accordance with the NSW Department of Housing document "*Managing Urban Stormwater: Soils and Construction*" (1998).
- All sediment and erosion controls by the plan are to be installed prior to excavation/site stripping.
- The programming of development road works and major excavations should minimise the time of soil exposure and should also be planned for times where rainfall is not forecasted.
- Locate moderately and highly saline soils areas on site and clearly flag out. Excavation in these areas should follow recommendations in this report.
- Avoid water collecting in low lying areas, depressions, behind fill embankments or near trenches on the uphill sides of the roads. This can lead to water logging of the soils, evaporate concentrations of the salts, eventual breakdown in soil structure, resulting in accelerated erosion.
- Preferably design the surface water drainage system for the subdivision to coincide with pre-existing drainage pathways, thus minimising the disruption of existing surface water flows. Avoid filling or blocking preferential drainage pathways. Piping can be used to maintain drainage lines.
- Where possible materials used for roads and fill embankments should be selected to contain minimal or no salts. Where the use of potentially moderately saline soils is unavoidable, such soil should be capped with coarser grained topsoil (loam), sandy materials or crushed rock. These measures are designed to reduce the potential for scour and limit capillary rise of moisture.
- All excavation batters exposing moderately saline soils should be appropriately surfaced as soon as possible after formation. Surfacing can include topsoil, turf, planting, crushed rock or similar measures that will reduce the potential for scour.
- Surface drains should generally be provided along the top of all batters to reduce the potential for concentrated flows of water down slopes, possibly causing scour. Well graded subsoil drainage should be provided at the base of all slopes where there are road pavements below the slope, to reduce the risk of waterlogging.
- All proposed imported fill should be verified by sampling and testing to ensure the material is non to slightly saline. Moderately saline soil is not considered acceptable. Supporting information and documentation should be supplied verifying that the subject material complies.
- At locations of deep excavations, it may be possible for groundwater to seep through fractures and joints in the shale bedrock, which will potentially be exposed in such excavations. To counter the potential impacts of salts and ions carried on the seepage water, the following additional measures are recommended:

- Grade the ground surface away from the base of the cutting to be collected by the surrounding sub surface drains.
- Provide additional sub surface drainage at the toe of the cutting to collect seepage water.

- Maintain the drainage system on a regular basis to ensure water flows freely, reducing the risk of future build-up of salts or mineral staining e.g. Iron.
- Cut areas with moderately to highly saline soils within the depth of cut should be identified and marked on site.
- Site sourced materials from moderately or highly saline cut areas should be filled below 1.0m from Finished Surface Level (FSL). The top 1m of filling should be carried out with site won or imported VENM material that has a salinity rating of non to slightly saline.
- All concrete structures in contact with saline soils (MS or above) should be constructed with 40MPa concrete and 30mm cover.

This Salinity Management aspects should be included in earthworks specifications and implemented by the earthworks contractor in consultation with the geotechnical consultant.

For moderately saline soil, the following construction measures should be adopted during construction of buildings as part of salinity management:

- For slab on ground construction, a layer of bedding sand of at least 50mm thickness below the slab should be provided. This will permit free drainage of water beneath the slab, minimising the possibilities of pooling or trapping water that might potentially be carrying salts.
- A high impact damp proof membrane, not just a vapour proof membrane, should be laid under any ground bearing slab. The damp proof membrane should be extended to the outside face of the external edge beam up to the finished ground level.
- A minimum 32 MPa and 40 MPa concrete or a sulphate resisting cement with a water cement ratio no greater than 0.5, should be used for ground bearing slabs, footings, piers or beams for sites with exposure classification B1 and B2 respectively.
- The minimum cover to reinforcement must be 50mm from unprotected ground and 30mm from a membrane in contact with the ground.
- Slabs must be vibrated and cured for at least seven days. Over vibration of concrete can cause segregation of concrete aggregates, this should be avoided.
- Water should not be permitted to pond against the walls of any new structures. Surrounding pathways and parking areas should be sloped as to drain the surface water away from external walls.
- Brickwork should be of exposure grade as required in the Building Code of Australia

6.4 Pavement Design

The proposed subdivision roads may be classified as local roads. In accordance with the Penrith City Council's design specification for Pavement Design recommendations a DESA (design equivalent standard axles) value of $1x10^7$ was adopted commercial/industrial roads.

In-situ CBR results interpreted using Dynamic Cone Penetration (DCP) tests ranged from less than 2% to about 17.5% for the depth range 0.2-0.6m.

Laboratory soaked CBR test results ranged from 1.0% to 11%. It is also noted that the field moisture content is up to 9.2% dry of Standard Optimum Moisture Content.

Based on the above, it is recommended that subgrade improvement be required. The following options may be employed:

Option 1.

In situ stabilisation of subgrade with 3% of hydrated lime to not less than 300mmmm depth. This would require about 8kg /m2. Pavement can be designed based on CBR3%. The depth of subgrade replacement should be assessed based on the pavement profile adopted.

Option 2

Subgrade replacement to not less than 300mm depth below the design subgrade level. The depth of subgrade replacement should be assessed by a geotechnical consultant at the time of construction. Select subgrade materials should have minimum CBR 10%. Pavement may be designed based on CBR3%.

It may be possible that the required subgrade compaction (100% Standard) may not be achieved in either of the above options. Deeper excavation and replacement or deeper stabilisation or both may be required if deflecting ground is encountered. Other stabilisation options may include placement of deeper granular layer and or geogrids.

Table 4 below presents the recommended pavement thickness design for the proposed Heavy Industry Access Roads in accordance with Austroads (2017) Guide to Pavement Technology Part 2 Pavement Structural Design and the requirements of Penrith City Council.

Table 9: Pavement Thickness Design

Pavement Type	Design CBR (%)	ESA	Layer	Thickness (mm)
Heavy Industry Access Road	1.0	$1x10^7$	AC10 (Pavement Surfacing)	50
			Base (DGB20 or similar)	160
			Sub-base 2 (DGS or similar)	200
			Subbase 1- Crushed sandstone or other Council approved material	240
			Select Subgrade or 3% lime stabilised subgrade compacted to 100% Standard Compaction	
			Total Pavement Thickness	650

Note:
[1] Impact of turning or stopping vehicles at end of pavement or intersections not included in assessment.

The above pavement profile may be used for preliminary costing and assessment of earthworks volumes only. It is highly recommended that a detailed pavement design should be carried out using CIRCLY software once the subgrade conditions are assessed in detail.

If another DESA value is to be used, or required by the Penrith City Council, CS should be contacted and the pavement thickness design can be revised.

It is recommended that a Geotechnical Engineer from CS inspect the subgrade following stripping and prior to laying of pavement material. This is to confirm the above pavement thickness designs are suitable.

For the sections of pavement that were subject to fill placement, the placed fill material must have a CBR value equal to or greater than the design CBR value used for the proposed carparks pavement thickness design.

Pavement and subgrade layer should be compacted to the following minimum dry density ratios (AS 1289 5.4.1) during construction.

Base	98% Modified
Subbase	98% Modified
Subgrade/Select fill	100% Standard

At the time of sampling, the field moisture content of the in-situ subgrade material was dry of standard optimum moisture content (SOMC). Subgrade improvement as discussed above may be required in order to achieve a no- deflecting pavement subgrade prior to placement of pavement layers.

It is recommended that pavement construction be targeted to a dryer period if practical.

6.5 Excavation

No major bulk excavation is expected as part of the proposed development. However, should shallow excavations (<1.5m) be required, they will mainly encounter CLAY soils. Excavation within the soils would be achievable using conventional earthmoving equipment (i.e. hydraulic excavator bucket).

Care should also be taken to ensure that there is no surcharge from stockpiled materials and building or vehicular loads near the crest of excavations.

Temporary excavation batters to 1.5m depth may be carried out no steeper than 1Horizontal :1Vertical due to the presence of firm to stiff residual CLAY layers.

Long term excavation batters to 1.5m depth may be carried out no steeper than 3Horizontal :1Vertical.

When encountered extremely weathered rock, batters to 1.5m depths may be carried out no steeper than 1Horizontal : 1Vertical.

6.6 Earthworks

All earthworks should be carried out following removal of unsuitable materials (e.g. uncontrolled fill, topsoil etc) in accordance with AS3798-2007. A qualified geotechnical engineer should inspect the condition of the exposed material to assess suitably of the prepared surface as a foundation for fill placement.

Prior to any placement of any structural fill, should it be required, the site should be proof rolled using a medium weight vibrating pad foot roller. Should isolated soft/loose/deflecting areas be encountered during this process, this material should be removed and replaced with select fill.

Measures should be adopted to ensure that clay fill material is moisture conditioned to within +/- 2% of Standard OMC and not allowed to dry out prior to the placement of succeeding layers and final covering.

It is recommended that the placement of all structural fill be inspected, tested and certified by suitably qualified geotechnical engineer or geotechnician to Level 1 requirements in accordance with AS3798-2007 during the earthworks operations to ensure that all fill is placed in a ‘controlled manner’..

Earthworks compliance testing should be carried out in accordance with Table 8.1 of AS3798 (2007), with testing to be provided by a NATA accredited testing authority. General fill should be compacted to a minimum 95% Standard within the moisture content range noted above, increasing to a minimum 100% Standard over the final 300mm to design level under pavements.

Due to the presence of high plasticity and high reactivity clay, it is recommended that all imported fill should be sources from non-reactive or slightly reactive sources such as ripped sandstone or shale, preferably with Liquid Limit less than 60%.

Lot fill should be compacted to density ratio between 98% and 102% with placement moisture content between 2% wet and 2% dry of Standard Optimum Moisture Content.

Due to the large volume of earthworks involved, it is recommended that earthworks specification be prepared and, earthworks should be subjected to geotechnical auditing based on earthworks specifications.

6.7 AS2870 Classification and Warehouse Building Footings

Based on the DCP test result, the allowable bearing pressure (ABP) in the upper 1m depth of soil where residual CLAY soils was encountered, is assessed to be about 100kPa.

Australian Standard 2870-2011 ‘Residential Slabs and Footings’ has been utilised in assessing subsurface reactivity due to changes in moisture. Based on the Field Moisture and Atterberg Limits test results on the recovered soil samples, it is assessed that the site is generally underlain by moderately reactive soil, meaning

it is prone to volume change with changes in soil moisture content. A Shrink/Swell Index in the range of 2.5% to 4.0%has been assigned for the residual and fill soils.

The reactivity was assessed using a crack depth of 0.9m, a change of suction at the surface of 1.2pF and a suction depth of 1.8m. Based on the above, the site classification in accordance with AS2870-2011 "Residential Slabs and Footings" would be M or H1 prior to earthworks. Class M and H1 sites would experience a surface movement up to 40mm and 60mm respectively.

For the proposed warehouse building, shallow footings, such as pads and strips footings may be founded on the 'stiff' residual CLAY at 0.6m depth or below. Alternatively, high level footings may be placed on controlled fill, provided earthworks are carried out in accordance with the recommendations in this report. Footings on controlled fill may be proportioned for a maximum allowable bearing pressure of 100kPa to 150kPa depending upon the fill materials used and the depth of controlled fill below the base of the footing.

However, filling in excess of 300mm depth using clay fill would require re classification. If reactive (moderately or high) fill is used, the benefit of the cracked zone would disappear and the site may become H1 or higher (H2) classification.

In order to avoid site returning H2 and E (Extremely reactive) classification, imported fill should be sourced from non/ slightly reactive sources.

Piers, if required, may be designed for the following allowable end bearing and shaft adhesion values as follows:

- Shallow Piers: 100kPa with no added shaft adhesion and 15kPa in uplift in clay only.
- Deeper Piers: 300kPa allowable end bearing when founded in very stiff to hard Sandy CLAY at an embedment of not less than five times the pier diameter and an allowable shaft adhesion of 25kPa in compression and 15kPa in uplift.
- Piers in weathered roc with allowable end bearing pressure of 700kPa and ultimate shaft friction of 50kPa within the socket depth.

All footings should be inspected by a geotechnical engineer and constructed with minimal delay following excavation. The geotechnical engineer is to confirm that the encountered conditions satisfy design assumptions and that the base of all excavations are free from loose or softened material and water prior to pouring of concrete.

6.8 Surface and Groundwater

It is considered likely that shallow excavations, should they be required, will intercept the groundwater or seepage flows. Should seepage or adverse soil moisture condition be encountered during construction, further geotechnical advice should be sought.

7 Closure

This report should be read in conjunction with the attached General Notes and Limitations.

Please do not hesitate to contact the undersigned if you have any queries or require further assistance.

For and on behalf of
Construction Sciences Pty Ltd

Report prepared by:

Nicholas Leong
Engineering Geologist

Reviewed by:

Vipul de Silva
Principal Geotechnical Engineer

8 References

Australian Standard 1289.6.3.2 (1997) *Determination of the penetration resistance of a soil - 9kg dynamic cone penetrometer test*.

Australian Standard 1726 (2017) *Geotechnical site investigations*.

Australian Standard 2870-2011 'Residential Slabs and Footings'

Australian Standard 3798-2007 'Guidelines on earthworks for commercial and residential developments'

Austroads 2017 – *Guide to Pavement Technology Part 2: Pavement Structural Design*

Proposed Warehouse Development 221-227, 289-317 Luddenham Road Orchard Hills NSW 2748

APPENDIX A

NOTES AND LIMITATIONS

Construction Sciences

Important Information about this Geotechnical Report

Scope of Work

The purpose of this report and any associated documentation is expressly stated in the document. This document does not form a complete assessment of the site, and no implicit determinations about Construction Sciences scope can be taken if not specifically referenced. Whilst this report is intended to reduce geotechnical risk, no level of detail or scope of work can entirely eliminate risk.

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The precision and reliability of interpretive assessment between discrete points is dependent on the uniformity of the subsurface strata, as well as the frequency, detail, and method of sampling or testing.

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Geotechnical information, by nature, represents an opinion and is based extensively on judgment of both data and interpretive assessments or observation. This report and its associated documentation are provided explicitly based on Construction Sciences opinion of the site at the time of inspection, and cannot be extended beyond this.

Any recommendations or design are provided as preliminary until verified on site during project implementation or construction. Inspection and verification on site shall be conducted by a suitably qualified geotechnical consultant or engineer, and where subsurface conditions or interpretations differ from those provided in this document or otherwise anticipated, Construction Sciences must be notified and be provided with an opportunity to review the recommendations.

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Information About This Report

LIMITATIONS

Scope of Services: The report has been prepared in accordance with the scope of services set out in CS's Proposal under CS's Terms of Engagement, or as otherwise agreed with the Client. The scope of services may have been limited and/or amended by a range of factors including time, budget, access and site constraints.

Specific Purpose: The report is provided for the specific development and purpose as described in the report. The report may not contain sufficient information for developments or purposes other than that described in the report.

Currency of Information: The information in this report is considered accurate at the date of issue with regard to the current conditions of the site.

Reliance on Information: In preparing the report CS has necessarily relied upon information provided by the Client and/or their Agents. Such data may include surveys, analyses, designs, maps and plans. CS has not verified the accuracy or completeness of the data except as stated in this report.

Copyright and Reproduction: The contents of this document are and remain the intellectual property of CS. This document should only be used for the purpose for which it was commissioned and should not be used for other projects or by a third party. This report shall not be reproduced either totally or in part without the permission of CS. Where information from this report is to be included in contract documents or engineering specification for the project, the entire report should be included in order to minimise the likelihood of misinterpretation.

Construction Specifications: Unless otherwise stated, the report, or sections of the report, should not be used as part of a specification for a project, without review and agreement by CS.

Report Should Not be Separated: The report must be read in conjunction with the attached Information Sheets and any other explanatory notes and should be kept in its entirety without separation of individual pages or sections.

Review by Others: CS cannot be held responsible for interpretations or conclusions from review by others of this report or test data, which are not otherwise supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

GENERAL NOTES

Geotechnical and Environmental Reporting: Geotechnical and environmental reporting relies on the interpretation of factual information based on judgment and opinion and is far less exact than other engineering or design disciplines. Geotechnical and environmental reports are for a specific purpose, development and site as described in the report and may not contain sufficient information for other purposes, developments or sites (including adjacent sites) other than that described in the report.

Subsurface Conditions: Subsurface conditions can change with time and can vary between test locations. For example, the actual interface between the materials may be far more gradual or abrupt than indicated and contaminant presence may be affected by spatial and temporal patterns. Therefore, actual conditions in areas not sampled may differ from those predicted since no subsurface investigation, no matter how comprehensive, can reveal all subsurface details and anomalies. Construction operations at or adjacent to the site and natural events such as floods, earthquakes or groundwater fluctuations can also affect subsurface conditions and thus the continuing adequacy of a geotechnical report. CS should be kept informed of any such events and should be retained to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Groundwater: Groundwater levels indicated on borehole and test pit logs are recorded at specific times. Depending on ground permeability, measured levels may or may not reflect actual levels if measured over a longer time period. Also, groundwater levels and seepage inflows may fluctuate with seasonal and environmental variations and construction activities.

Interpretation of Data: Data obtained from nominated discrete locations, subsequent laboratory testing and empirical or external sources are interpreted by trained professionals in order to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions in accordance with any relevant industry standards, guidelines or procedures.

Soil and Rock Descriptions: Soil and rock descriptions are based on AS 1726 – 2017, using visual and tactile assessment except at discrete locations where field and / or laboratory tests have been carried out. Refer to the accompanying soil and rock terms sheet for further information.

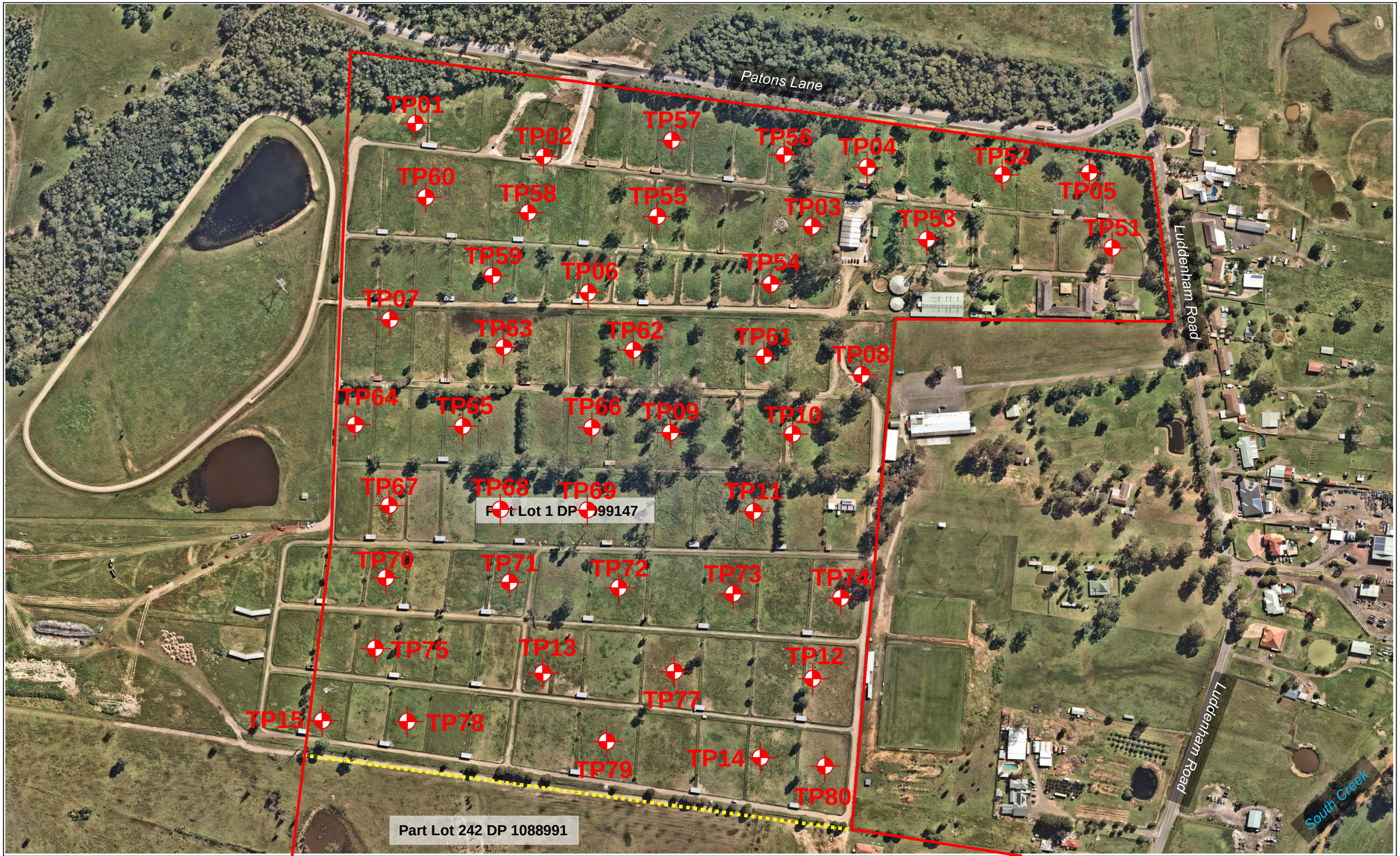
Further Advice: CS would be pleased to further discuss how any of the above issues could affect a specific project. We would also be pleased to provide further advice or assistance including:

- Assessment of suitability of designs and construction techniques;
- Contract documentation and specification;
- Construction control testing (earthworks, pavement materials, concrete);
- Construction advice (foundation assessments, excavation support).

Proposed Warehouse Development 221-227, 289-317 Luddenham Road Orchard Hills NSW 2748

APPENDIX B

SUBSURFACE LOGS AND SITE PLAN



N

LEGEND:

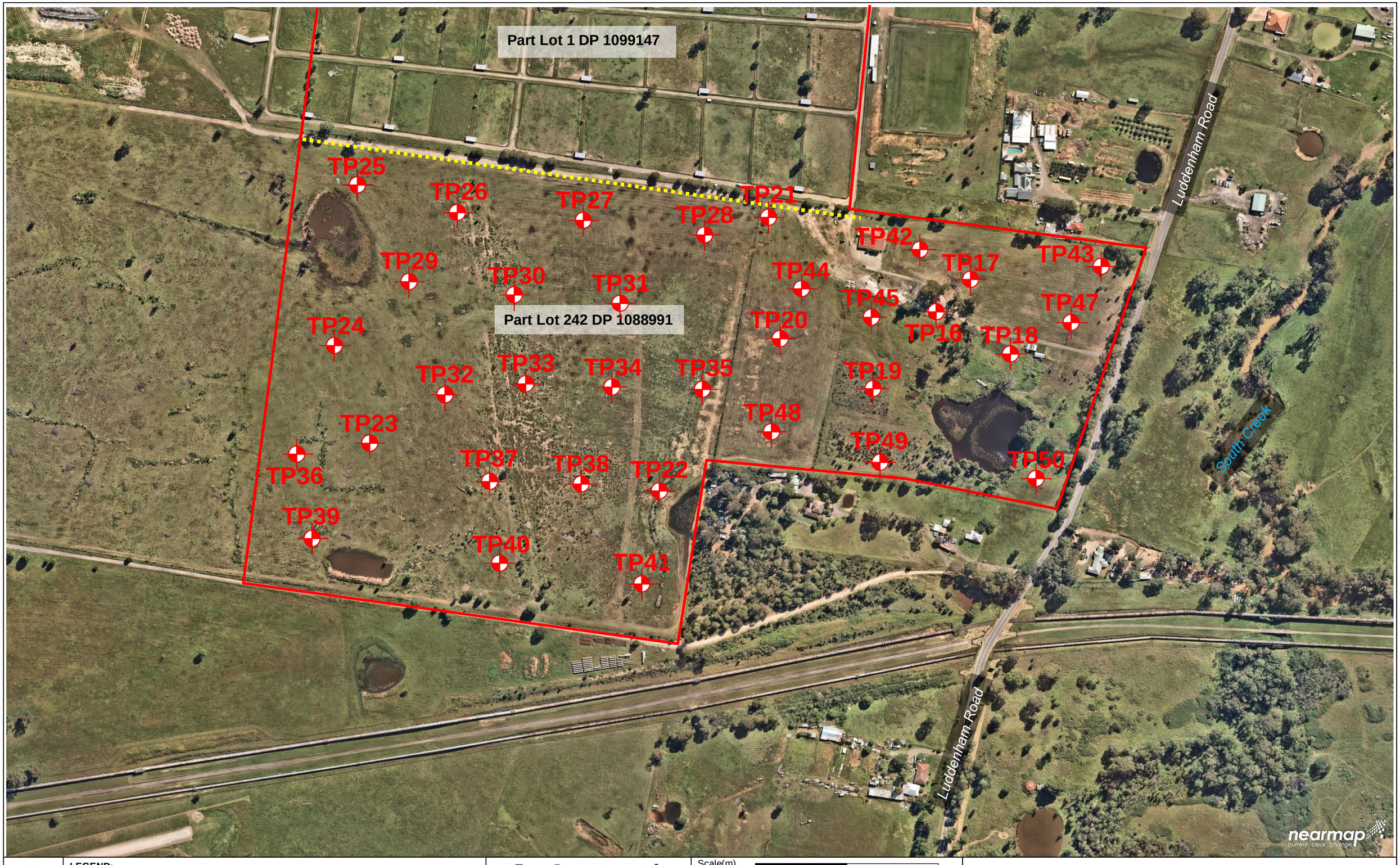
- Site Boundary
- Lot Boundary
- Test Pit Locations

Construction Sciences

31 Anvil Road
SEVEN HILLS NSW 2147
Tel: (02) 8646 2000
Fax: (02) 8646 2025
Web: www.constructionsciences.net

Scale(m) 0 200 400	Project: 5017200153
Date: 4th May 2020 to 8th May 2020	Client: HB+B Property Pty Ltd
Drawn By: Nicholas Leong	Location: Part Lot 1 in DP 1099147 Address: 221-227 and 289-311 Luddenham Road, Orchard Hills NSW 2745
Drawing No: **5017200153-A-1**	Sheet: 1 of 2

APPROXIMATE TEST PIT LOCATIONS



N

LEGEND:

- Site Boundary
- Lot Boundary
- Sample Locations

Construction Sciences

31 Anvil Road
SEVEN HILLS NSW 2147
Tel: (02) 8646 2000
Fax: (02) 8646 2025
Web: www.constructionsciences.net

Scale(m) 0 200 400	Project: 5017200153	
Date: 4th May 2020 to 8th May 2020	Client: HB+B Property Pty Ltd	
Drawn By: Nicholas Leong	Location: Part Lot 242 DP 1088991 Address: 221-227 and 289-311 Luddenham Road, Orchard Hills, NSW, 2745	
Drawing No: **5017200153-A-2**	Sheet: 2 of 2	**APPROXIMATE TEST PIT LOCATIONS**

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP01

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.81810, 150.75232 **Angle from Horizontal:** 90° **Surface Elevation:**
Machine Type: 5 tonne Excavator **Excavation Method:** EX
Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation
Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	VH	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP01 0.00m - 0.20m)	0			SILT: low plasticity, brown	M (<PL)		TOPSOIL
								0.30m			
				D 0.50 - 0.60 m	0.5		CL	CLAY: low plasticity, brown mottled grey and red	M (<PL)	H	RESIDUAL SOIL
								0.90m			
					1.0		CL	Silty CLAY: low plasticity, grey mottled brown	M (<PL)	H	
				D 1.40 - 1.50 m				1.50m			
					1.5			TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP02

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.81840, 150.75362 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP02 0.00m - 0.20m)				SILT: low plasticity, brown, trace clay with crushed sandstone on surface	M (<PL)		TOPSOIL
								0.20m			
				D 0.50 - 0.60 m	0.5		CH	Silty CLAY: high plasticity, orange brown mottled red and grey	M (≈PL)	F	RESIDUAL SOIL
				D 1.40 - 1.50 m	1.0						
					1.5			1.50m TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD

EX	Excavator bucket
R	Ripper
HA	Hand auger
PT	Push tube
SON	Sonic drilling
AH	Air hammer
PS	Percussion sampler
AS	Short spiral auger
AD/V	Solid flight auger: V-Bit
AD/T	Solid flight auger: TC-Bit
HFA	Hollow flight auger
WB	Washbore drilling
DT	Diatube

PENETRATION

VE	Very Easy (No Resistance)
E	Easy
F	Firm
H	Hard
VH	Very Hard (Refusal)

WATER

Water Level on Date shown
water inflow
water outflow

FIELD TESTS

SPT	-	Standard Penetration Test
HP	-	Hand/Pocket Penetrometer
DCP	-	Dynamic Cone Penetrometer
PSP	-	Perth Sand Penetrometer
MC	-	Moisture Content
PBT	-	Plate Bearing Test
IMP	-	Borehole Impression Test
PID	-	Photoionisation Detector
VS	-	Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES

B	-	Bulk disturbed sample
D	-	Disturbed sample
ES	-	Environmental sample
U	-	Thin wall tube 'undisturbed'

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
PL	-	Plastic limit
LL	-	Liquid limit
w	-	Moisture content

SOIL CONSISTENCY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard

RELATIVE DENSITY

VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP03

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.81913, 150.75632 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.40 m (ID: TP03 0.00m - 0.20m)	0			Gravelly SILT: low plasticity, dark brown to brown, ironstone gravel	M (<PL)		TOPSOIL
					0.40m						
				D 0.50 - 0.60 m	0.5		MH	Clayey SILT: high plasticity, brown orange mottled grey and red	M (≈PL)	F to St	RESIDUAL SOIL
					1.00m						
					1.0		CH	CLAY: high plasticity, grey mottled brown orange and red grades: trace ironstone gravel	M (≈PL)	St	
				D 1.40 - 1.50 m	1.50m						
					1.5			TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
- EX Excavator bucket
- R Ripper
- HA Hand auger
- PT Push tube
- SON Sonic drilling
- AH Air hammer
- PS Percussion sampler
- AS Short spiral auger
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- DT Diatube

PENETRATION
- VE Very Easy (No Resistance)
- E Easy
- F Firm
- H Hard
- VH Very Hard (Refusal)

WATER
- Water Level on Date shown
- water inflow
- water outflow

FIELD TESTS
- SPT - Standard Penetration Test
- HP - Hand/Pocket Penetrometer
- DCP - Dynamic Cone Penetrometer
- PSP - Perth Sand Penetrometer
- MC - Moisture Content
- PBT - Plate Bearing Test
- IMP - Borehole Impression Test
- PID - Photoionisation Detector
- VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
- B - Bulk disturbed sample
- D - Disturbed sample
- ES - Environmental sample
- U - Thin wall tube 'undisturbed'

MOISTURE
- D - Dry
- M - Moist
- W - Wet
- PL - Plastic limit
- LL - Liquid limit
- *w* - Moisture content

SOIL CONSISTENCY
- VS - Very Soft
- S - Soft
- F - Firm
- St - Stiff
- VSt - Very Stiff
- H - Hard

RELATIVE DENSITY
- VL - Very Loose
- L - Loose
- MD - Medium Dense
- D - Dense
- VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP04

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.81845, 150.75716 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP04 0.00m - 0.20m)	0			SILT: medium plasticity, dark brown, with gravel	M (≈PL)		TOPSOIL
								0.20m			
								Clayey SILT: high plasticity, brown orange mottled red and grey			RESIDUAL SOIL
				D 0.40 - 0.50 m	0.5		MH		M (≈PL)	F	
								0.90m			
					1.0			Clayey SILT: medium plasticity, grey mottled red, with ironstone gravel			
							ML		M (<PL)		
				D 1.40 - 1.50 m	1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP05

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.81847, 150.75958 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP05 0.00m - 0.20m)				SILT: low plasticity, dark brown to brown, with gravel	M (<PL)		TOPSOIL
								0.20m			
								Clayey SILT: high plasticity, orange brown mottled grey red			RESIDUAL SOIL
				D 0.50 - 0.60 m	0.5		MH		M (≈PL)	F	
								0.90m			
					1.0		CH	Silty CLAY: high plasticity, grey mottled orange brown and red	M (≈PL)	F	
								1.30m			
	H			D 1.30 - 1.40 m				SILTSTONE, pale grey, extremely weathered, low strength	D		WEATHERED ROCK
								1.40m			
					1.5			TERMINATED AT 1.40 m Refusal			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP06

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.81968, 150.75408 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP06 0.00m - 0.20m) (ID: QC301) (ID: QC302)				SILT: low plasticity, dark brown	M (<PL)		TOPSOIL
								0.40m			
				D 0.50 - 0.60 m	0.5			Silty CLAY: medium plasticity, brown orange mottled grey			RESIDUAL SOIL
					1.0		CI	grades: trace ironstone	M (≈PL)	F to St	
								grades: with ironstone			
				D 1.40 - 1.50 m	1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP07

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82007, 150.75182 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP07 0.00m - 0.20m)				SILT: low plasticity, brown	M (<PL)		TOPSOIL
								0.20m			
								Silty CLAY: high plasticity, yellow brown			RESIDUAL SOIL
								grades: grey mottled yellow brown and pale red			
				D 0.50 - 0.60 m	0.5						
					1.0		CH		M (≈PL)	F	
				D 1.40 - 1.50 m	1.5						
								1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD

EX	Excavator bucket
R	Ripper
HA	Hand auger
PT	Push tube
SON	Sonic drilling
AH	Air hammer
PS	Percussion sampler
AS	Short spiral auger
AD/V	Solid flight auger: V-Bit
AD/T	Solid flight auger: TC-Bit
HFA	Hollow flight auger
WB	Washbore drilling
DT	Diatube

PENETRATION

VE	Very Easy (No Resistance)
E	Easy
F	Firm
H	Hard
VH	Very Hard (Refusal)

WATER

Water Level on Date shown
water inflow
water outflow

FIELD TESTS

SPT	-	Standard Penetration Test
HP	-	Hand/Pocket Penetrometer
DCP	-	Dynamic Cone Penetrometer
PSP	-	Perth Sand Penetrometer
MC	-	Moisture Content
PBT	-	Plate Bearing Test
IMP	-	Borehole Impression Test
PID	-	Photoionisation Detector
VS	-	Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES

B	-	Bulk disturbed sample
D	-	Disturbed sample
ES	-	Environmental sample
U	-	Thin wall tube 'undisturbed'

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
PL	-	Plastic limit
LL	-	Liquid limit
w	-	Moisture content

SOIL CONSISTENCY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard

RELATIVE DENSITY

VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP08

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82045, 150.75693 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP08 0.00m - 0.20m)				SILT: low plasticity, dark brown	M (<PL)		TOPSOIL 0.00 m: PID = 4.20ppm
								0.20m			
				D 0.50 - 0.60 m	0.5		ML	SILT: medium plasticity, orange brown mottled red and grey, trace gravel	M (≈PL)	F	Possibly ALLUVIUM
								0.90m			
					1.0		CH	CLAY: high plasticity, grey mottled brown	M (≈PL)	St	RESIDUAL SOIL
				D 1.40 - 1.50 m				1.50m			
					1.5			TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP09

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82109, 150.75498 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP09 0.00m - 0.20m)				Gravelly SAND: fine grained, poorly graded, rounded, brown, medium poorly graded rounded gravel	M		TOPSOIL 0.00 m: PID = 0.80ppm
								0.30m			
				D 0.50 - 0.60 m	0.5			Clayey SILT: medium plasticity, brown orange mottled red		F	RESIDUAL SOIL
					1.0		ML	grades: grey mottled red	M (≈PL)	St	
								grades: with ironstone gravel		H	
				D 1.40 - 1.50 m	1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP10

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82118, 150.75627 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP10 0.00m - 0.20m)				SILT: low plasticity, brown	M (<PL)		TOPSOIL 0.00 m: PID = 0.50ppm
								0.20m			
							CH	Silty CLAY: high plasticity, brown	M (≈PL)	F to St	RESIDUAL SOIL
								0.40m			
				D 0.50 - 0.60 m	0.5		CH	CLAY: high plasticity, grey mottled brown red	M (≈PL)	St	
								1.00m			
					1.0		CI	Sandy CLAY: medium plasticity, grey mottled brown	M (<PL)	St	
				D 1.40 - 1.50 m				1.50m			
					1.5			TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP11

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82186, 150.75599 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP11 0.00m - 0.20m)	0			SILT: low plasticity, dark brown	M (<PL)		TOPSOIL 0.00 m: PID = 0.60ppm
								0.20m			
							Cl	Silty CLAY: medium plasticity, brown	M (≈PL)	F	RESIDUAL SOIL
				D 0.40 - 0.50 m	0.5						
					1.0			1.00m			
							CH	CLAY: high plasticity, grey mottled brown red, with ironstone gravel	M (≈PL)	F	1.20 m: increasing ironstone content with depth
				D 1.40 - 1.50 m	1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP12

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.18234, 150.75650 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP12 0.00m - 0.20m)				SILT: low plasticity, dark brown, trace gravel	M (<PL)		TOPSOIL 0.00 m: PID = 0.60ppm
								0.20m			
								Silty CLAY: medium plasticity, brown orange mottled red, trace gravel	M (≈PL)		RESIDUAL SOIL
				D 0.40 - 0.50 m	0.5						
					1.0		CI	grades: grey mottled red		F to St	
									M (<PL)		
				D 1.40 - 1.50 m	1.5						
								1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
- EX Excavator bucket
- R Ripper
- HA Hand auger
- PT Push tube
- SON Sonic drilling
- AH Air hammer
- PS Percussion sampler
- AS Short spiral auger
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- DT Diatube

PENETRATION
- VE Very Easy (No Resistance)
- E Easy
- F Firm
- H Hard
- VH Very Hard (Refusal)

WATER
- Water Level on Date shown
- water inflow
- water outflow

FIELD TESTS
- SPT - Standard Penetration Test
- HP - Hand/Pocket Penetrometer
- DCP - Dynamic Cone Penetrometer
- PSP - Perth Sand Penetrometer
- MC - Moisture Content
- PBT - Plate Bearing Test
- IMP - Borehole Impression Test
- PID - Photoionisation Detector
- VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
- B - Bulk disturbed sample
- D - Disturbed sample
- ES - Environmental sample
- U - Thin wall tube 'undisturbed'

MOISTURE
- D - Dry
- M - Moist
- W - Wet
- PL - Plastic limit
- LL - Liquid limit
- *w* - Moisture content

SOIL CONSISTENCY
- VS - Very Soft
- S - Soft
- F - Firm
- St - Stiff
- VSt - Very Stiff
- H - Hard

RELATIVE DENSITY
- VL - Very Loose
- L - Loose
- MD - Medium Dense
- D - Dense
- VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP13

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82344, 150.75349 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP13 0.00m - 0.20m)				Silty CLAY: medium plasticity, dark brown	M (≈PL)		TOPSOIL 0.00 m: with grass roots PID = 0.80ppm
								0.20m			
								CLAY: high plasticity, grey mottled brown			RESIDUAL SOIL
				D 0.40 - 0.50 m	0.5						
					1.0		CH	grades: grey mottled red and brown orange	M (≈PL)	St	
				D 1.40 - 1.50 m	1.5						
								1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD

EX	Excavator bucket
R	Ripper
HA	Hand auger
PT	Push tube
SON	Sonic drilling
AH	Air hammer
PS	Percussion sampler
AS	Short spiral auger
AD/V	Solid flight auger: V-Bit
AD/T	Solid flight auger: TC-Bit
HFA	Hollow flight auger
WB	Washbore drilling
DT	Diatube

PENETRATION

VE	Very Easy (No Resistance)
E	Easy
F	Firm
H	Hard
VH	Very Hard (Refusal)

WATER

Water Level on Date shown
water inflow
water outflow

FIELD TESTS

SPT	-	Standard Penetration Test
HP	-	Hand/Pocket Penetrometer
DCP	-	Dynamic Cone Penetrometer
PSP	-	Perth Sand Penetrometer
MC	-	Moisture Content
PBT	-	Plate Bearing Test
IMP	-	Borehole Impression Test
PID	-	Photoionisation Detector
VS	-	Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES

B	-	Bulk disturbed sample
D	-	Disturbed sample
ES	-	Environmental sample
U	-	Thin wall tube 'undisturbed'

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
PL	-	Plastic limit
LL	-	Liquid limit
w	-	Moisture content

SOIL CONSISTENCY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard

RELATIVE DENSITY

VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP14

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82437, 150.75592 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 5/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP14 0.00m - 0.20m)	0			SILT: low plasticity, dark brown	M (≈PL)		TOPSOIL 0.00 m: PID = 0.40ppm
								0.20m			
								CLAY: high plasticity, red to red mottled grey			RESIDUAL SOIL
				D 0.40 - 0.50 m	0.5		CH		M (<PL)	St to VSt	
					1.0						
								1.30m			
				D 1.40 - 1.50 m	1.5		CL	CLAY: low plasticity, grey mottled red	M (<PL)	H	
								1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP15

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82398, 150.75107 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 5/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP15 0.00m - 0.20m)				SILT: low plasticity, dark brown, trace gravel	M (<PL)		TOPSOIL
								0.20m			
								CLAY: medium plasticity, grey mottled red and brown			RESIDUAL SOIL
				D 0.40 - 0.50 m	0.5		Cl		M (<PL)	St	
					1.0			1.00m			
								Silty CLAY: high plasticity, grey, trace ironstone			
							CH		M (≈PL)	F	
				D 1.40 - 1.50 m	1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
- EX Excavator bucket
- R Ripper
- HA Hand auger
- PT Push tube
- SON Sonic drilling
- AH Air hammer
- PS Percussion sampler
- AS Short spiral auger
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- DT Diatube

PENETRATION
- VE Very Easy (No Resistance)
- E Easy
- F Firm
- H Hard
- VH Very Hard (Refusal)

WATER
- Water Level on Date shown
- water inflow
- water outflow

FIELD TESTS
- SPT - Standard Penetration Test
- HP - Hand/Pocket Penetrometer
- DCP - Dynamic Cone Penetrometer
- PSP - Perth Sand Penetrometer
- MC - Moisture Content
- PBT - Plate Bearing Test
- IMP - Borehole Impression Test
- PID - Photoionisation Detector
- VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
- B - Bulk disturbed sample
- D - Disturbed sample
- ES - Environmental sample
- U - Thin wall tube 'undisturbed'

MOISTURE
- D - Dry
- M - Moist
- W - Wet
- PL - Plastic limit
- LL - Liquid limit
- *w* - Moisture content

SOIL CONSISTENCY
- VS - Very Soft
- S - Soft
- F - Firm
- St - Stiff
- VSt - Very Stiff
- H - Hard

RELATIVE DENSITY
- VL - Very Loose
- L - Loose
- MD - Medium Dense
- D - Dense
- VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP16

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82571, 150.75751 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 5/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.01 - 0.20 m (ID: TP16 0.00m - 0.20m) (ID: QC101) (ID: QC102)	0.01m			FILL: Gravelly SAND: dark brown to brown, trace silt	D		PAVEMENT FILL 0.01 m: PID = 0.50ppm
					0.30m						
				D 0.40 - 0.50 m	0.5		CL	CLAY: low plasticity, grey with brown streaks mottled red	M (<PL)	St	RESIDUAL SOIL
				D 0.90 - 1.00 m	1.0						
					1.10m		CI	Silty CLAY: medium plasticity, grey mottled red	M (<PL)	St	
				D 1.40 - 1.50 m	1.5						
					1.50m			TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP17

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82538, 150.75780 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 5/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP17 0.00m - 0.20m)				SILT: low plasticity, dark brown to brown, trace gravel PID = 0.4ppm	M (≈PL)		TOPSOIL 0.00 m: PID = 0.40ppm
								0.30m			
				D 0.40 - 0.50 m	0.5		CL	Silty CLAY: high plasticity, brown mottled red	M (≈PL)	F	RESIDUAL SOIL
				D 0.90 - 1.00 m	1.0			1.00m			
							ML	Clayey SILT: low plasticity, grey mottled brown	M (<PL) to M (≈ PL)	F	
					1.5			1.50m			
	H			D 1.50 - 1.60 m				SANDSTONE, grey, with ironstone gravel, low strength			WEATHERED ROCK
								1.60m			
								TERMINATED AT 1.60 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP18

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82630, 150.75868 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 5/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP17 0.00m - 0.20m)				FILL: Gravelly SAND: dark brown, with silt	M		FILL 0.00 m: PID = 0.40ppm
				D 0.40 - 0.50 m	0.5			grades: wet	W		
								0.80m			
				D 0.90 - 1.00 m	1.0		GC	Clayey GRAVEL: red mottled brown, ironstone gravel	M	L	RESIDUAL SOIL
				D 1.30 - 1.40 m				1.40m			
					1.5			TERMINATED AT 1.40 m Refusal			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP19

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82640, 150.75688 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.00m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 4/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP19 0.00m - 0.20m)				Sandy SILT: low plasticity, dark brown, trace gravel	M (<PL)		TOPSOIL 0.00 m: polypipe on surface PID = 0.10ppm
								0.20m			
					0.5		CH	CLAY: high plasticity, red mottled grey		St	RESIDUAL SOIL
								grades: with ironstone gravel, grey mttled brown orange	M (≈LL)	VSt to H	
								0.80m			
								TERMINATED AT 0.80 m Target depth			
					1.0						
					1.5						
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP20

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82609, 150.75635 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.00m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 4/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP20 0.00m - 0.20m)				SILT: low plasticity, dark brown	M (<PL)		TOPSOIL 0.00 m: with ceramic tiles, timber PID = 0.10ppm
				D 0.20 - 0.30 m			CL	0.20m Sandy CLAY: low plasticity, brown mottled brown orange 0.30m	M (<PL)	S to F	RESIDUAL SOIL
					0.5		CH	Silty CLAY: high plasticity, red mottled brown grades: grey mottled pale brown	M (≈PL)	St	
					1.0			1.00m TERMINATED AT 1.00 m Target depth			
					1.5						
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP21

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82504, 150.75602 **Angle from Horizontal:** 90° **Surface Elevation:**
Machine Type: 5 tonne Excavator **Excavation Method:** EX
Excavation Dimensions: 1.00m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation
Date Excavated: 4/5/20 **Logged By:** NL **Checked By:** VDS

Excavation: Method	Excavation: Resistance	Excavation: Stability	Water	Sampling & Testing: Sample or Field Test	Depth (m)	Material Description: Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.30 m (ID: TP21 0.00m - 0.20m) (ID: TP21-ACM-0.30m) (ID: Asbestos sample)				Sandy SILT: low plasticity, dark brown, trace clay	M (<PL)		TOPSOIL 0.00 m: with conrete, bricks and iron bar Abestos Containing Material at 0.30m PID = 0.20ppm
								0.30m			
							CI	CLAY: medium plasticity, red mottled grey	M (≈PL)	F to St	RESIDUAL SOIL
					0.5			0.50m			
								TERMINATED AT 0.50 m Target depth			
					1.0						
					1.5						
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP22

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82790, 150.75457 **Angle from Horizontal:** 90° **Surface Elevation:**
Machine Type: 5 tonne Excavator **Excavation Method:** EX
Excavation Dimensions: 1.00m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation
Date Excavated: 4/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP22 0.00m - 0.20m)				Sandy SILT: low plasticity, brown	M (<PL)		TOPSOIL 0.00 m: PID = 0.20ppm
								0.20m			
							CL	Sandy CLAY: low plasticity, brown, coarse poorly graded rounded sand	M (<PL)		RESIDUAL SOIL
					0.5			0.30m			
							CH	CLAY: high plasticity, brown mottled grey	M (<PL) to M (~PL)	St	
								0.70m			
								TERMINATED AT 0.70 m Target depth			
					1.0						
					1.5						
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP23

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82748, 150.75128 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.00m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 4/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.10 m (ID: TP23 0.00m - 0.10m)	0.5			SILT: low plasticity, brown 0.10m	M (<PL)		TOPSOIL 0.00 m: PID = 0.30ppm
							CH	CLAY: high plasticity, red mottled grey 0.60m	M (≈PL)	St	RESIDUAL SOIL
					1.0		CL	CLAY: low plasticity, grey mottled pale brown 1.00m	M (<PL)	St to VSt	
								TERMINATED AT 1.00 m Target depth			
					1.5						
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP24

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82586, 150.75151 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.00m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 4/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.40 m (ID: TP24 0.00m - 0.40m)	0.0			SILT: low plasticity, dark brown, trace clay	M (<PL)		TOPSOIL 0.00 m: with grass roots PID = 0.40m
								0.30m			
				D 0.40 - 0.50 m	0.5		CH	CLAY: high plasticity, red mottled grey	M (≈PL)	St	RESIDUAL SOIL 0.30 m: PID = 0.30ppm
								grades: grey mottled brown		St to VSt	
					1.0			1.00m TERMINATED AT 1.00 m Target depth			
					1.5						
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP25

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.87473, 150.75144 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 4/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	ES 0.00 - 0.20 m (ID: TP25 0.00m - 0.20m)				Sandy SILT: low plasticity, dark brown	M (<PL)		TOPSOIL 0.00 m: ceramic, plastic, metal on surface PID = 0.50ppm
								0.20m			
					0.5		CH	CLAY: high plasticity, red brown mottled grey			RESIDUAL SOIL
								grades: grey mottles pale brown	M (≈PL)	F to St	
					1.0			1.00m			
							CL	Sandy CLAY: low plasticity, grey mottled pale brown	M (<PL)	St to VSt	
								1.20m			
								TERMINATED AT 1.20 m Target depth			
					1.5						
					2.0						
					2.5						

METHOD
- EX Excavator bucket
- R Ripper
- HA Hand auger
- PT Push tube
- SON Sonic drilling
- AH Air hammer
- PS Percussion sampler
- AS Short spiral auger
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- DT Diatube

PENETRATION
- VE Very Easy (No Resistance)
- E Easy
- F Firm
- H Hard
- VH Very Hard (Refusal)

WATER
- Water Level on Date shown
- water inflow
- water outflow

FIELD TESTS
- SPT - Standard Penetration Test
- HP - Hand/Pocket Penetrometer
- DCP - Dynamic Cone Penetrometer
- PSP - Perth Sand Penetrometer
- MC - Moisture Content
- PBT - Plate Bearing Test
- IMP - Borehole Impression Test
- PID - Photoionisation Detector
- VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
- B - Bulk disturbed sample
- D - Disturbed sample
- ES - Environmental sample
- U - Thin wall tube 'undisturbed'

MOISTURE
- D - Dry
- M - Moist
- W - Wet
- PL - Plastic limit
- LL - Liquid limit
- *w* - Moisture content

SOIL CONSISTENCY
- VS - Very Soft
- S - Soft
- F - Firm
- St - Stiff
- VSt - Very Stiff
- H - Hard

RELATIVE DENSITY
- VL - Very Loose
- L - Loose
- MD - Medium Dense
- D - Dense
- VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP26

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82484, 150.75247 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 4/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			SILT: low plasticity, dark brown	M (<PL)		TOPSOIL
					0.10m						
								CLAY: high plasticity, grey mottled red			RESIDUAL SOIL
				D 0.40 - 0.50 m					M (≈PL)		
					0.5						
							CH			St	
					1.0			grades: less moist	M (<PL)		
				D 1.40 - 1.50 m							
					1.5						
					1.50m			TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
- EX Excavator bucket
- R Ripper
- HA Hand auger
- PT Push tube
- SON Sonic drilling
- AH Air hammer
- PS Percussion sampler
- AS Short spiral auger
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- DT Diatube

PENETRATION
- VE Very Easy (No Resistance)
- E Easy
- F Firm
- H Hard
- VH Very Hard (Refusal)

WATER
- Water Level on Date shown
- water inflow
- water outflow

FIELD TESTS
- SPT - Standard Penetration Test
- HP - Hand/Pocket Penetrometer
- DCP - Dynamic Cone Penetrometer
- PSP - Perth Sand Penetrometer
- MC - Moisture Content
- PBT - Plate Bearing Test
- IMP - Borehole Impression Test
- PID - Photoionisation Detector
- VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
- B - Bulk disturbed sample
- D - Disturbed sample
- ES - Environmental sample
- U - Thin wall tube 'undisturbed'

MOISTURE
- D - Dry
- M - Moist
- W - Wet
- PL - Plastic limit
- LL - Liquid limit
- *w* - Moisture content

SOIL CONSISTENCY
- VS - Very Soft
- S - Soft
- F - Firm
- St - Stiff
- VSt - Very Stiff
- H - Hard

RELATIVE DENSITY
- VL - Very Loose
- L - Loose
- MD - Medium Dense
- D - Dense
- VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP27

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82481, 150.75399 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 4/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing		Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test	DCP (blows per 100 mm) 1 2 4 8		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		1	0.0			SILT: low plasticity, dark brown	M (<PL)		TOPSOIL
						0.20m						
				D 0.40 - 0.50 m	2	0.5		CH	CLAY: high plasticity, grey mottled red and brown orange, trace ironstone gravel	M (≈PL)	St	RESIDUAL SOIL
					3	1.0						
					4 7				grades: grey mottled red			
				D 1.40 - 1.50 m	8 7							
						1.5						
					6				TERMINATED AT 1.50 m Target depth			
						2.0						
						2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP28

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82509, 150.75517 **Angle from Horizontal:** 90° **Surface Elevation:**
Machine Type: 5 tonne Excavator **Excavation Method:** EX
Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation
Date Excavated: 4/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered					SILT: low plasticity, dark brown	M (<PL)		TOPSOIL
								0.20m			
							SC	Clayey SAND: brown, low plasticity clay	M	L	RESIDUAL SOIL
								0.30m			
				D 0.40 - 0.50 m				CLAY: high plasticity, red mottled grey			
					0.5				M (≈PL)	St	
							CH				
					1.0			grades: grey mottled brown orange, low plasticity			
									M (<PL)	St to VSt	
				D 1.40 - 1.50 m							
					1.5						
								1.60m			
								TERMINATED AT 1.60 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP29

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82565, 150.75196 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 4/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			SILT: low plasticity, dark brown	M (<PL)		TOPSOIL
								0.20m			
				D 0.40 - 0.50 m	0.5		CH	CLAY: high plasticity, grey mottled brown	M (≈PL)	St	RESIDUAL SOIL
					1.0						
								1.30m			
	H			D 1.40 - 1.50 m				SHALE, grey, very low strength	D		WEATHERED ROCK
					1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP30

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82592, 150.75363 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 4/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered					Clayey SILT: high plasticity, dark brown	M (≈PL)		TOPSOIL
								0.20m			
				D 0.40 - 0.50 m	0.5		CH	CLAY: high plasticity, grey mottled brown and red, trace gravel	M (≈PL)	St	RESIDUAL SOIL 0.30 m: with tree root 0.30m to 0.50m
				D 1.40 - 1.50 m	1.0						
					1.5			1.50m			
								SHALE, pale brown and grey, with clay, very low strength	D		WEATHERED ROCK
								1.80m			
					2.0			TERMINATED AT 1.80 m Target depth			
					2.5						

METHOD
- EX Excavator bucket
- R Ripper
- HA Hand auger
- PT Push tube
- SON Sonic drilling
- AH Air hammer
- PS Percussion sampler
- AS Short spiral auger
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- DT Diatube

PENETRATION
- VE Very Easy (No Resistance)
- E Easy
- F Firm
- H Hard
- VH Very Hard (Refusal)

WATER
- Water Level on Date shown
- water inflow
- water outflow

FIELD TESTS
- SPT - Standard Penetration Test
- HP - Hand/Pocket Penetrometer
- DCP - Dynamic Cone Penetrometer
- PSP - Perth Sand Penetrometer
- MC - Moisture Content
- PBT - Plate Bearing Test
- IMP - Borehole Impression Test
- PID - Photoionisation Detector
- VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
- B - Bulk disturbed sample
- D - Disturbed sample
- ES - Environmental sample
- U - Thin wall tube 'undisturbed'

MOISTURE
- D - Dry
- M - Moist
- W - Wet
- PL - Plastic limit
- LL - Liquid limit
- *w* - Moisture content

SOIL CONSISTENCY
- VS - Very Soft
- S - Soft
- F - Firm
- St - Stiff
- VSt - Very Stiff
- H - Hard

RELATIVE DENSITY
- VL - Very Loose
- L - Loose
- MD - Medium Dense
- D - Dense
- VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP31

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82606, 150.75510 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 4/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			SILT: low plasticity, dark brown	M (<PL)		TOPSOIL
					0.30m						
				D 0.40 - 0.50 m	0.5		CH	CLAY: high plasticity, brown mottled red	M (≈PL)	St	RESIDUAL SOIL
								grades: grey mottled red and brown			
				D 0.90 - 1.00 m	1.0						
				D 1.40 - 1.50 m	1.5						
					1.50m			TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP32

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82680, 150.75231 **Angle from Horizontal:** 90° **Surface Elevation:**
Machine Type: 5 tonne Excavator **Excavation Method:** EX
Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation
Date Excavated: 8/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	D 0.00 - 0.20 m				Clayey SILT: medium plasticity, dark brown	M (≈PL)		TOPSOIL
								0.20m			
								CLAY: high plasticity, red mottled grey			RESIDUAL SOIL
				D 0.40 - 0.50 m							
					0.5			grades: grey mottled pale brown	M (≈PL)		
							CH			St	
					1.0				M (<PL)		
								1.30m			
							CL	CLAY: low plasticity, grey, with extremely weatherd shale, inferred very low strength	M (<PL) to D	St	
				D 1.40 - 1.50 m				1.50m			
					1.5			TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP33

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82705, 150.75333 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 5/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			SILT: low plasticity, dark brown	M (<PL)	S	TOPSOIL
								0.20m			
				D 0.40 - 0.50 m	0.5			CLAY: high plasticity, brown orange mottled red	M (<PL)		RESIDUAL SOIL
					1.0		CH	grades: trace ironstone, grey mottled red, low plasticity	D to M (<PL)	St to VSt	
				D 1.40 - 1.50 m							
					1.5			1.50m TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
- EX Excavator bucket
- R Ripper
- HA Hand auger
- PT Push tube
- SON Sonic drilling
- AH Air hammer
- PS Percussion sampler
- AS Short spiral auger
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- DT Diatube

PENETRATION
- VE Very Easy (No Resistance)
- E Easy
- F Firm
- H Hard
- VH Very Hard (Refusal)

WATER
- Water Level on Date shown
- water inflow
- water outflow

FIELD TESTS
- SPT - Standard Penetration Test
- HP - Hand/Pocket Penetrometer
- DCP - Dynamic Cone Penetrometer
- PSP - Perth Sand Penetrometer
- MC - Moisture Content
- PBT - Plate Bearing Test
- IMP - Borehole Impression Test
- PID - Photoionisation Detector
- VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
- B - Bulk disturbed sample
- D - Disturbed sample
- ES - Environmental sample
- U - Thin wall tube 'undisturbed'

MOISTURE
- D - Dry
- M - Moist
- W - Wet
- PL - Plastic limit
- LL - Liquid limit
- *w* - Moisture content

SOIL CONSISTENCY
- VS - Very Soft
- S - Soft
- F - Firm
- St - Stiff
- VSt - Very Stiff
- H - Hard

RELATIVE DENSITY
- VL - Very Loose
- L - Loose
- MD - Medium Dense
- D - Dense
- VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP34

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82706, 150.75412 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 5/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing		Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test	DCP (blows per 100 mm) 1 2 4 8		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	B 0.20 - 0.50 m CBR D 0.20 - 0.30 m	1 2	0.5			SILT: medium plasticity, dark brown, with clay	M (≈PL)		TOPSOIL
				D 0.40 - 0.50 m	1 2 3				0.20m CLAY: high plasticity, brown red mottled grey			RESIDUAL SOIL
				D 0.90 - 1.00 m	9 10 7 9	1.0		CH		M (≈PL)	St	
				D 1.40 - 1.50 m	10 12	1.5			1.20m Silty CLAY: medium plasticity, grey mottled red and brown orange, with ironstone gravel			
				D 1.90 - 2.00 m		2.0		CI		M (<PL)	St	
						2.5			2.00m TERMINATED AT 2.00 m Target depth			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP35

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82712, 150.75520 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 4/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered					SILT: low plasticity, brown grey, trace gravel	M (<PL)		TOPSOIL
								0.30m			
				D 0.40 - 0.50 m	0.5		CI	Silty CLAY: medium plasticity, brown mottled red	M (≈PL)	St	RESIDUAL SOIL
					1.0			1.00m			
							SC	Sandy CLAY: low plasticity, grey mottled red	M (<PL)	VSt	
				D 1.40 - 1.50 m	1.5			1.50m			
								SANDSTONE, fine grained, pale brown, very low strength	D		WEATHERED ROCK
								1.70m			
								TERMINATED AT 1.70 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP36

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82722, 150.75070 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 8/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered					Clayey SILT: medium plasticity, dark brown	M (≈PL)		TOPSOIL
								0.20m			
								CLAY: high plasticity, red mottled grey and pale brown			RESIDUAL SOIL
				D 0.40 - 0.50 m	0.5		CH		M (≈PL)	St	
					1.0			grades: grey mottled pale red	M (<PL)		
								1.40m			
				D 1.40 - 1.50 m			CL	CLAY: low plasticity, grey, with extremely weatherd shale, inferred very low strength	D	St	
					1.5			1.50m TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP37

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82747, 150.75290 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 8/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			SILT: medium plasticity, dark brown, with gravel	M (≈PL)		TOPSOIL
								0.10m			
								CLAY: high plasticity, red mottled grey			RESIDUAL SOIL
				D 0.40 - 0.50 m	0.5		CH		M (<PL)	S	
								0.90m			
					1.0			Silty CLAY: low plasticity, grey			
							CL-ML		M (<PL) to D	H	
				D 1.40 - 1.50 m							
					1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP38

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82755, 150.75408 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 8/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			Sandy SILT: low plasticity, brown to orange brown	M (<PL)		TOPSOIL
								0.20m			
								CLAY: high plasticity, pale red mottled grey			RESIDUAL SOIL
				D 0.40 - 0.50 m	0.5		CH		M (≈PL)	St	
								0.90m			
					1.0		CH	Silty CLAY: high plasticity, grey mottled red, trace ironstone gravel	M (<PL) to D	H	
				D 1.40 - 1.50 m							
					1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP39

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82830, 150.75082 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 8/5/20 **Logged By:** NL **Checked By:** VDS

Excavation				Sampling & Testing		Depth (m)	Material Description					
Method	Resistance	Stability	Water	Sample or Field Test	DCP (blows per 100 mm) 1 2 4 8		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	B 0.20 - 0.50 m	3				SILT: low plasticity, brown	M (<PL)		TOPSOIL
				D 0.40 - 0.50 m	2 1 2 3	0.5			0.10m CLAY: medium plasticity, pale red mottled grey	M (≈PL)	St	RESIDUAL SOIL
				D 0.90 - 1.00 m	4 7 11	1.0		CI	grades: trace EW shale fragments	M (<PL)		
	H			D 1.40 - 1.50 m	12 15	1.5			1.20m SHALE, pale grey, with clay, extremely weathered, very low strength	D		WEATHERED ROCK
				D 1.90 - 2.00 m		2.0			2.00m TERMINATED AT 2.00 m Target depth			
						2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP40

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82843, 150.75290 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 8/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered					SILT: low plasticity, dark brown	M (<PL)		TOPSOIL
								0.20m			
				D 0.40 - 0.50 m	0.5		CH	CLAY: high plasticity, grey mottled red and orange brown	M (≈PL)	St	RESIDUAL SOIL
								1.00m			
	H				1.0			SILTSTONE, grey mottled brown and dark red, extremely weathered, very low strength	D		WEATHERED ROCK
				D 1.40 - 1.50 m				1.50m			
					1.5			TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP41

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82855, 150.75460 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 8/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			SILT: low plasticity, dark brown, with gravel	M (<PL)		TOPSOIL
								0.10m			
								CLAY: high plasticity, brown mottled grey and red			RESIDUAL SOIL
				D 0.40 - 0.50 m	0.5						
					1.0		CH		M (≈PL)	F	
				D 1.40 - 1.50 m	1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD

EX	Excavator bucket
R	Ripper
HA	Hand auger
PT	Push tube
SON	Sonic drilling
AH	Air hammer
PS	Percussion sampler
AS	Short spiral auger
AD/V	Solid flight auger: V-Bit
AD/T	Solid flight auger: TC-Bit
HFA	Hollow flight auger
WB	Washbore drilling
DT	Diatube

PENETRATION

VE	Very Easy (No Resistance)
E	Easy
F	Firm
H	Hard
VH	Very Hard (Refusal)

WATER

Water Level on Date shown
water inflow
water outflow

FIELD TESTS

SPT	-	Standard Penetration Test
HP	-	Hand/Pocket Penetrometer
DCP	-	Dynamic Cone Penetrometer
PSP	-	Perth Sand Penetrometer
MC	-	Moisture Content
PBT	-	Plate Bearing Test
IMP	-	Borehole Impression Test
PID	-	Photoionisation Detector
VS	-	Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES

B	-	Bulk disturbed sample
D	-	Disturbed sample
ES	-	Environmental sample
U	-	Thin wall tube 'undisturbed'

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
PL	-	Plastic limit
LL	-	Liquid limit
w	-	Moisture content

SOIL CONSISTENCY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard

RELATIVE DENSITY

VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP42

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82527, 150.75761 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 5/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			SILT: low plasticity, dark brown, trace gravel	M (<PL)		TOPSOIL
								0.30m			
				D 0.40 - 0.50 m	0.5		CH	CLAY: high plasticity, grey mottled red	M (≈PL)	St	RESIDUAL SOIL 0.40 m: PP 140kPa, 120kPa, 100kPa
					1.0			1.20m			
							CI	Silty CLAY: medium plasticity, grey mottled red and brown orange	M (<PL)	St	
				D 1.40 - 1.50 m	1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP43

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82555, 150.75989 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 5/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			SILT: medium plasticity, dark brown, trace gravel	M (<PL) to M (≈PL)		TOPSOIL
					0.20m						
				D 0.40 - 0.50 m	0.5		CH	CLAY: high plasticity, grey mottled pale red	M (≈PL)	F	RESIDUAL SOIL
				D 0.90 - 1.00 m	1.0						
					1.20m			CLAY: medium plasticity, grey mottled red and brown orange, with ironstone gravel			
				D 1.40 - 1.50 m	1.5		CI		M (<PL)	St	
				D 1.90 - 2.00 m	2.0						
					2.00m			TERMINATED AT 2.00 m Target depth			
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP44

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82575, 150.75637 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 5/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing		Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test	DCP (blows per 100 mm) 1 2 4 8		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	B 0.20 - 0.60 m CBR	2 3 2 3	0.0			SILT: dark brown, with gravel	M (<PL)		TOPSOIL
				D 0.40 - 0.50 m	4 12 5	0.5			0.30m Silty CLAY: brown orange mottled red and grey			RESIDUAL SOIL
				D 1.40 - 1.50 m	8 15 14 12 20	1.0		CI	grades: grey mottled red	M (≈PL)	F	1.00 m: PP 300kPa, 350kPa, 300kPa
						1.5			1.50m with ironstone gravel TERMINATED AT 1.50 m Target depth			
						2.0						
						2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP45

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82606, 150.75724 **Angle from Horizontal:** 90° **Surface Elevation:**
Machine Type: 5 tonne Excavator **Excavation Method:** EX
Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation
Date Excavated: 5/5/20 **Logged By:** NL **Checked By:** VDS

Excavation: Method	Excavation: Resistance	Excavation: Stability	Water	Sampling & Testing: Sample or Field Test	Depth (m)	Material Description: Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX								Sandy SILT: low plasticity, dark brown, trace gravel	M (≈PL)		TOPSOIL
								0.10m			
	F	Stable	Not Encountered	D 0.40 - 0.50 m	0.5		CH	Silty CLAY: high plasticity, grey mottled red, trace gravel	M (≈PL)	F	RESIDUAL SOIL
					1.0			1.10m			
	H			D 1.20 - 1.30 m				SILTSTONE, pale grey, highly weathered, low strength	M		ROCK
								1.30m			
								TERMINATED AT 1.30 m Refusal			
					1.5						
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP46

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82630, 150.75799 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 5/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered					Gravelly SILT: low plasticity, dark brown	M (<PL)		TOPSOIL
								0.20m			
				D 0.40 - 0.50 m	0.5		CL	Sandy CLAY: low plasticity, red brown	M (<PL)	F	RESIDUAL SOIL
								0.70m			
	H			D 0.70 - 0.80 m			CH	Silty CLAY: high plasticity, grey	M (≈PL)	F	
								0.80m			
								TERMINATED AT 0.80 m Refusal			
					1.0						
					1.5						
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP47

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82632, 150.75913 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 5/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Groundwater Observed	D 0.40 - 0.50 m	0.5		MH	Sandy SILT: low plasticity, dark brown black 0.20m Clayey SILT: high plasticity, brown, with gravel 0.80m	M to W M (≈PL)	F	TOPSOIL RESIDUAL SOIL 0.50 m: observed water
				D 1.40 - 1.50 m	1.0		CH	CLAY: high plasticity, grey mottled red 1.50m	M (≈PL)	F	0.95 m: water inflow
					1.5			TERMINATED AT 1.50 m Target depth			1.50 m: visible water
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP48

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82729, 150.75596 **Angle from Horizontal:** 90° **Surface Elevation:**
Machine Type: 5 tonne Excavator **Excavation Method:** EX
Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation
Date Excavated: 5/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered					Sandy SILT: low plasticity, brown to pale brown, with gravel	M (<PL)		TOPSOIL
					0.30m						
				D 0.40 - 0.50 m	0.5		Cl	Silty CLAY: medium plasticity, brown orange mottled grey and red	M (≈PL)	St	RESIDUAL SOIL
					1.0						
					1.10m			Sandy CLAY: low plasticity, grey mottled brown orange, trace ironstone gravel			
				D 1.40 - 1.50 m			CL		M (<PL)	St	
					1.5						
					1.60m			TERMINATED AT 1.60 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP49

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82746, 150.75691 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 8/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered					SILT: low plasticity, dark brown, with gravel	M (≈PL)		TOPSOIL
								0.20m			
							CH	FILL: Silty CLAY: high plasticity, orange brown	M (<PL) to M (≈PL)	S	FILL
								0.40m			
				D 0.40 - 0.50 m	0.5		CH	CLAY: high plasticity, grey mottled pale red	M (≈PL) to M (<LL)	S	RESIDUAL SOIL
					1.0			1.20m			
							CI	CLAY: medium plasticity, grey mottled pale brown and red, with ironstone gravel	M (<PL)	F	
				D 1.40 - 1.50 m	1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
- EX Excavator bucket
- R Ripper
- HA Hand auger
- PT Push tube
- SON Sonic drilling
- AH Air hammer
- PS Percussion sampler
- AS Short spiral auger
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- DT Diatube

PENETRATION
- VE Very Easy (No Resistance)
- E Easy
- F Firm
- H Hard
- VH Very Hard (Refusal)

WATER
- Water Level on Date shown
- water inflow
- water outflow

FIELD TESTS
- SPT - Standard Penetration Test
- HP - Hand/Pocket Penetrometer
- DCP - Dynamic Cone Penetrometer
- PSP - Perth Sand Penetrometer
- MC - Moisture Content
- PBT - Plate Bearing Test
- IMP - Borehole Impression Test
- PID - Photoionisation Detector
- VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
- B - Bulk disturbed sample
- D - Disturbed sample
- ES - Environmental sample
- U - Thin wall tube 'undisturbed'

MOISTURE
- D - Dry
- M - Moist
- W - Wet
- PL - Plastic limit
- LL - Liquid limit
- *w* - Moisture content

SOIL CONSISTENCY
- VS - Very Soft
- S - Soft
- F - Firm
- St - Stiff
- VSt - Very Stiff
- H - Hard

RELATIVE DENSITY
- VL - Very Loose
- L - Loose
- MD - Medium Dense
- D - Dense
- VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP50

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82767, 150.75886 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 8/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			Gravelly SILT: low to medium plasticity, dark brown	M (≈PL)		TOPSOIL
					0.10m						
				D 0.40 - 0.50 m	0.5		ML	Gravelly SILT: low plasticity, orange brown mottled grey, ironstone gravel	M (<PL)	St	RESIDUAL SOIL
					1.0			grades: grey mottled red			
				D 1.40 - 1.50 m	1.5						
					1.50m			TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP51

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.81923, 150.75964 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing		Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test	DCP (blows per 100 mm) 1 2 4 8		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		3 4 2				SILT: low plasticity, dark brown, trace gravel	M (<PL)		TOPSOIL
				B 0.20 - 0.50 m CBR					0.20m CLAY: high plasticity, red mottled grey			RESIDUAL SOIL
				D 0.40 - 0.50 m	2 3 2 1 2	0.5		CH		M (≈PL)	St	
				D 0.90 - 1.00 m	3 5 8 11 20	1.0			grades: trace ironstone, grey mottled red			
				D 1.40 - 1.50 m		1.5			1.30m Silty CLAY: medium plasticity, grey mottled red, trace ironstone			
				D 1.90 - 2.00 m				CI		M (≈PL)	St	
						2.0			2.00m TERMINATED AT 2.00 m Target depth			
						2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP52

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.81853, 150.75856 **Angle from Horizontal:** 90° **Surface Elevation:**
Machine Type: 5 tonne Excavator **Excavation Method:** EX
Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation
Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			SILT: low plasticity, dark brown	M (<PL)		TOPSOIL
					0.25m						
				D 0.40 - 0.50 m	0.5		MH	SILT: high plasticity, orange brown mottled grey and red	M (≈PL)	F	RESIDUAL SOIL
					1.0						
					1.10m		CH	CLAY: high plasticity, grey mottled brown and red	M (≈PL) to M (<LL)	F	
				D 1.40 - 1.50 m	1.5						
					1.50m			TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

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TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP53

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.81918, 150.75782 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			SILT: low plasticity, red brown, with gravel	M (<PL)		TOPSOIL
					0.30m						
				D 0.40 - 0.50 m	0.5		CH	CLAY: high plasticity, brown mottled red and grey tree root	M (<PL)	VSt to H	RESIDUAL SOIL
					1.0						
					1.20m			Silty CLAY: high plasticity, grey mottled red and brown			
				D 1.40 - 1.50 m			CH		M (<PL)	VSt	
					1.5						
					1.50m			TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP54

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.81965, 150.75602 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			SILT: low plasticity, brown	M (≈PL)		TOPSOIL
					0.20m						
				D 0.40 - 0.50 m	0.5		CH	Silty CLAY: high plasticity, brown mottled red and grey	M (≈PL)	S	RESIDUAL SOIL
					1.0						
					1.10m		CH	CLAY: high plasticity, pale grey mottled red and brown orange	M (≈PL) to M (<LL)	F	
				D 1.40 - 1.50 m	1.5						
					1.50m			TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP55

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.81899, 150.75498 **Angle from Horizontal:** 90° **Surface Elevation:**
Machine Type: 5 tonne Excavator **Excavation Method:** EX
Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation
Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX								SILT: low plasticity, brown	M (<PL)		TOPSOIL
								0.20m			
	F	Stable	Not Encountered	D 0.40 - 0.50 m	0.5		CH	CLAY: high plasticity, brown mottled grey	M (≈PL)	F	RESIDUAL SOIL
					1.0			grades: grey mottled yellow brown and red			
								1.10m			
							CH-MH	Silty CLAY: high plasticity, grey mottled yellow brown and red	M (≈PL)	F	
								1.40m			
	H			D 1.40 - 1.50 m	1.5		CH	Gravelly CLAY: high plasticity, grey mottled red, ironstone gravel gravel	M (≈PL)	St	
								1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP56

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.81836, 150.75623 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered					SILT: low plasticity, dark brown, with gravel	M (<PL)		TOPSOIL
								0.30m			
				D 0.40 - 0.50 m	0.5		ML	FILL: Gravelly SILT: medium plasticity, brown orange, ironstone gravel	M (<PL) to M (≈PL)	F	FILL
					1.0			1.00m			
							CH	Silty CLAY: high plasticity, brown orange mottled red and grey, with ironstone gravel	M (≈PL)	F	RESIDUAL SOIL
								1.30m			
				D 1.40 - 1.50 m	1.5		CH	CLAY: high plasticity, grey mottled red and brown orange, with ironstone gravel tree root at 1.30m	M (≈PL)	St	
								1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP57

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.81825, 150.75497 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered					SILT: high plasticity, brown grey, trace gravel	M (≈PL)		TOPSOIL
								0.30m			
				D 0.40 - 0.50 m	0.5		CH	Silty CLAY: high plasticity, grey mottled brown	M (≈PL)	S to F	RESIDUAL SOIL
					1.0			1.10m			
				D 1.40 - 1.50 m			ML	Clayey SILT: low to medium plasticity, grey mottled brown	M (<PL)	F	
					1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP58

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.81891, 150.75356 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing		Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test	DCP (blows per 100 mm) 1 2 4 8		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	B 0.20 - 0.60 m CBR	4 2 1	0.5			SILT: low plasticity, brown, trace gravel	M (≈PL)		TOPSOIL
				D 0.40 - 0.50 m	3				0.20m CLAY: high plasticity, yellow brown			RESIDUAL SOIL
				D 0.90 - 1.00 m	4	1.0		CH	grades: yellow brown mottled grey	M (≈PL)	F	
				D 1.40 - 1.50 m	5 6	1.5			1.10m Silty CLAY: high plasticity, grey mottled yellow brown			
				D 1.90 - 2.00 m	5 8	2.0		CH-MH	grades: trace ironstone	M (<PL) to M (≈ PL)	St	
						2.5			2.00m TERMINATED AT 2.00 m Target depth			

METHOD
- EX Excavator bucket
- R Ripper
- HA Hand auger
- PT Push tube
- SON Sonic drilling
- AH Air hammer
- PS Percussion sampler
- AS Short spiral auger
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- DT Diatube

PENETRATION
- VE Very Easy (No Resistance)
- E Easy
- F Firm
- H Hard
- VH Very Hard (Refusal)

WATER
- Water Level on Date shown
- water inflow
- water outflow

FIELD TESTS
- SPT - Standard Penetration Test
- HP - Hand/Pocket Penetrometer
- DCP - Dynamic Cone Penetrometer
- PSP - Perth Sand Penetrometer
- MC - Moisture Content
- PBT - Plate Bearing Test
- IMP - Borehole Impression Test
- PID - Photoionisation Detector
- VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
- B - Bulk disturbed sample
- D - Disturbed sample
- ES - Environmental sample
- U - Thin wall tube 'undisturbed'

MOISTURE
- D - Dry
- M - Moist
- W - Wet
- PL - Plastic limit
- LL - Liquid limit
- *w* - Moisture content

SOIL CONSISTENCY
- VS - Very Soft
- S - Soft
- F - Firm
- St - Stiff
- VSt - Very Stiff
- H - Hard

RELATIVE DENSITY
- VL - Very Loose
- L - Loose
- MD - Medium Dense
- D - Dense
- VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP59

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.81968, 150.75321 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			SILT: high plasticity, dark brown, trace gravel	M (≈PL)		TOPSOIL
								0.20m			
				D 0.40 - 0.50 m	0.5		CH	CLAY: high plasticity, yellow brown mottled grey	M (≈PL) to M (<LL)	S	RESIDUAL SOIL
					1.0			1.10m			
				D 1.40 - 1.50 m	1.5		CH-MH	Silty CLAY: high plasticity, grey mottled yellow brown	M (≈PL)	S	
								1.50m			
					2.0			TERMINATED AT 1.50 m Target depth			
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP60

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.81885, 150.75255 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered					SILT: low plasticity, dark brown	M (≈PL)		TOPSOIL
								0.25m			
				D 0.40 - 0.50 m	0.5		CH	CLAY: high plasticity, yellow brown mottled grey	M (≈PL) to M (<LL)	S	RESIDUAL SOIL
					1.0			1.10m			
				D 1.40 - 1.50 m			CH-MH	Silty CLAY: high plasticity, grey mottled yellow brown	M (≈PL)	F	
					1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD

EX	Excavator bucket
R	Ripper
HA	Hand auger
PT	Push tube
SON	Sonic drilling
AH	Air hammer
PS	Percussion sampler
AS	Short spiral auger
AD/V	Solid flight auger: V-Bit
AD/T	Solid flight auger: TC-Bit
HFA	Hollow flight auger
WB	Washbore drilling
DT	Diatube

PENETRATION

VE	Very Easy (No Resistance)
E	Easy
F	Firm
H	Hard
VH	Very Hard (Refusal)

WATER

- Water Level on Date shown
- water inflow
- water outflow

FIELD TESTS

SPT	-	Standard Penetration Test
HP	-	Hand/Pocket Penetrometer
DCP	-	Dynamic Cone Penetrometer
PSP	-	Perth Sand Penetrometer
MC	-	Moisture Content
PBT	-	Plate Bearing Test
IMP	-	Borehole Impression Test
PID	-	Photoionisation Detector
VS	-	Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES

B	-	Bulk disturbed sample
D	-	Disturbed sample
ES	-	Environmental sample
U	-	Thin wall tube 'undisturbed'

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
PL	-	Plastic limit
LL	-	Liquid limit
w	-	Moisture content

SOIL CONSISTENCY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard

RELATIVE DENSITY

VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP61

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82025, 150.75616 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing		Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test	DCP (blows per 100 mm) 1 2 4 8		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	B 0.20 - 0.60 m CBR	3	0.0			SILT: low plasticity, dark brown, trace gravel	M (<PL)		TOPSOIL
				D 0.40 - 0.50 m	5	0.20m		CH-MH	Clayey SILT: medium plasticity, brown orange mittled red	M (≈PL)	F	RESIDUAL SOIL
					4	0.5			CLAY: high plasticity, grey with pale red streaks			
				D 0.90 - 1.00 m	2	1.0		CH		M (≈PL) to M (<LL)	St	
				D 1.40 - 1.50 m	3	1.5			grades: trace ironstone, pale grey mottled brown orange and dark red			
				D 1.90 - 2.00 m		2.00m						
						2.0			TERMINATED AT 2.00 m Target depth			
						2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP62

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82028, 150.75449 **Angle from Horizontal:** 90° **Surface Elevation:**
Machine Type: 5 tonne Excavator **Excavation Method:** EX
Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation
Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			Silty Gravelly SAND: brown	M (<PL)		TOPSOIL
								0.30m			
								Gravelly SILT: low plasticity, brown red, ironstone gravel, with clay	M (≈PL)	St	RESIDUAL SOIL
				D 0.40 - 0.50 m	0.5		ML				
					1.0			grades: grey mottled red	M (<PL)	VSt	
								1.40m			
				D 1.40 - 1.50 m			CH	CLAY: high plasticity, grey mottled red and brown	M (≈PL)	VSt	
					1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP63

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82023, 150.75323 **Angle from Horizontal:** 90° **Surface Elevation:**
Machine Type: 5 tonne Excavator **Excavation Method:** EX
Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation
Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered					SILT: low plasticity, brown	M (<PL)		TOPSOIL
								0.30m			
				D 0.40 - 0.50 m	0.5		CH	Silty CLAY: high plasticity, yellow brown	M (≈PL)	F	RESIDUAL SOIL
								0.80m			
					1.0		CH	CLAY: high plasticity, grey mottled yellow brown	M (≈PL)	F	
				D 1.40 - 1.50 m							
					1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP64

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82103, 150.75155 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing		Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test	DCP (blows per 100 mm) 1 2 4 8		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0 1 5				Sandy SILT: low plasticity, brown pale red	M (≈PL)		TOPSOIL
									0.40m			
				B 0.40 - 0.60 m CBR D 0.40 - 0.50 m	3	0.5			Silty CLAY: medium to high plasticity, yellow brown			RESIDUAL SOIL
				D 0.90 - 1.00 m		1.0			grades: high plasticity, yellow brown mottled grey			
					4			CH		M (≈PL)	St	
				D 1.40 - 1.50 m	5	1.5						
				D 1.90 - 2.00 m	6							
						2.0			2.00m TERMINATED AT 2.00 m Target depth			
						2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP65

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82112, 150.75263 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 7/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered					SILT: low plasticity, dark brown	M (<PL)		TOPSOIL
								0.25m			
				D 0.40 - 0.50 m	0.5		ML	Clayey SILT: low plasticity, brown mottled red and grey, with ironstone gravel	M (≈PL)	F	RESIDUAL SOIL
					1.0			1.10m			
				D 1.40 - 1.50 m			CH	CLAY: high plasticity, grey mottled red, with ironstone gravel	M (≈PL)	St	
					1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP66

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82108, 150.75408 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered					SILT: low plasticity, dark brown	M (<PL)		TOPSOIL
								0.30m			
				D 0.40 - 0.50 m	0.5		CH	CLAY: high plasticity, brown orange mottled red	M (<PL)	F	RESIDUAL SOIL
								0.90m			
					1.0		CH	Silty CLAY: high plasticity, grey mottled red	M (≈PL)	St to VSt	
				D 1.40 - 1.50 m				1.50m			
					1.5			TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP67

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82196, 150.75186 **Angle from Horizontal:** 90° **Surface Elevation:**
Machine Type: 5 tonne Excavator **Excavation Method:** EX
Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation
Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			SILT: low plasticity, dark brown, trace gravel	M (<PL)		TOPSOIL
					0.30m						
				D 0.40 - 0.50 m	0.5		CI	Silty CLAY: medium plasticity, brown orange mottled red and grey	M (≈PL)	F	RESIDUAL SOIL
					1.00m						
					1.0		CH	CLAY: high plasticity, grey mottled red and brown	M (≈PL)	St	
				D 1.40 - 1.50 m	1.50m						
					1.5			TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP68

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82189, 150.75305 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			SILT: low plasticity, dark brown	M (<PL)		TOPSOIL
								0.20m			
				D 0.40 - 0.50 m	0.5		CI	Silty CLAY: medium plasticity, red, trace ironstone gravel	M (≈PL)	F	RESIDUAL SOIL
					1.0			1.00m			
							ML	Clayey SILT: medium plasticity, grey mottled red and brown, with ironstone gravel	M (≈PL)	F	
				D 1.40 - 1.50 m	1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP69

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82185, 150.75400 **Angle from Horizontal:** 90° **Surface Elevation:**
Machine Type: 5 tonne Excavator **Excavation Method:** EX
Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation
Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			SILT: low plasticity, dark brown	M (<PL)		TOPSOIL
								0.20m			
				D 0.40 - 0.50 m	0.5		ML	Clayey SILT: medium plasticity, red brown	M (≈PL)	F	RESIDUAL SOIL
					1.0		CH	1.00m CLAY: high plasticity, grey with brown and red orange streaks	M (≈PL)	F	
				D 1.40 - 1.50 m				1.30m SILTSTONE, grey with brown orange, with Silty CLAY, extremely weathered, very low strength	M (≈PL)		WEATHERED ROCK
					1.5			1.50m TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP70

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82245, 150.75201 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing		Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test	DCP (blows per 100 mm) 1 2 4 8		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		2 3				SILT: low plasticity, dark brown	M (<PL)		TOPSOIL
				B 0.20 - 0.50 m CBR					0.20m			
				D 0.40 - 0.50 m	5 7 8 6	0.5			Clayey SILT: high plasticity, brown red, with ironstone gravel			RESIDUAL SOIL
					7 9 14	1.0		MH		M (≈PL)	F	
									grades: grey mottled red			
				D 1.40 - 1.50 m	16	1.5			1.50m			
									TERMINATED AT 1.50 m Target depth			
						2.0						
						2.5						

METHOD
- EX Excavator bucket
- R Ripper
- HA Hand auger
- PT Push tube
- SON Sonic drilling
- AH Air hammer
- PS Percussion sampler
- AS Short spiral auger
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- DT Diatube

PENETRATION
- VE Very Easy (No Resistance)
- E Easy
- F Firm
- H Hard
- VH Very Hard (Refusal)

WATER
- Water Level on Date shown
- water inflow
- water outflow

FIELD TESTS
- SPT - Standard Penetration Test
- HP - Hand/Pocket Penetrometer
- DCP - Dynamic Cone Penetrometer
- PSP - Perth Sand Penetrometer
- MC - Moisture Content
- PBT - Plate Bearing Test
- IMP - Borehole Impression Test
- PID - Photoionisation Detector
- VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
- B - Bulk disturbed sample
- D - Disturbed sample
- ES - Environmental sample
- U - Thin wall tube 'undisturbed'

MOISTURE
- D - Dry
- M - Moist
- W - Wet
- PL - Plastic limit
- LL - Liquid limit
- *w* - Moisture content

SOIL CONSISTENCY
- VS - Very Soft
- S - Soft
- F - Firm
- St - Stiff
- VSt - Very Stiff
- H - Hard

RELATIVE DENSITY
- VL - Very Loose
- L - Loose
- MD - Medium Dense
- D - Dense
- VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP71

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82260, 150.75315 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered					SILT: low plasticity, dark brown	M (≈PL)		TOPSOIL
								0.20m			
				D 0.40 - 0.50 m	0.5		CH	CLAY: high plasticity, grey mottled red and brown	M (≈PL)	St	RESIDUAL SOIL
					1.0			grades: with ironstone gravel			
				D 1.40 - 1.50 m	1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD

EX	Excavator bucket
R	Ripper
HA	Hand auger
PT	Push tube
SON	Sonic drilling
AH	Air hammer
PS	Percussion sampler
AS	Short spiral auger
AD/V	Solid flight auger: V-Bit
AD/T	Solid flight auger: TC-Bit
HFA	Hollow flight auger
WB	Washbore drilling
DT	Diatube

PENETRATION

VE	Very Easy (No Resistance)
E	Easy
F	Firm
H	Hard
VH	Very Hard (Refusal)

WATER

Water Level on Date shown
water inflow
water outflow

FIELD TESTS

SPT	-	Standard Penetration Test
HP	-	Hand/Pocket Penetrometer
DCP	-	Dynamic Cone Penetrometer
PSP	-	Perth Sand Penetrometer
MC	-	Moisture Content
PBT	-	Plate Bearing Test
IMP	-	Borehole Impression Test
PID	-	Photoionisation Detector
VS	-	Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES

B	-	Bulk disturbed sample
D	-	Disturbed sample
ES	-	Environmental sample
U	-	Thin wall tube 'undisturbed'

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
PL	-	Plastic limit
LL	-	Liquid limit
w	-	Moisture content

SOIL CONSISTENCY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard

RELATIVE DENSITY

VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP72

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82264, 150.75430 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered					SILT: low plasticity, dark brown	M (<PL)		TOPSOIL
								0.20m			
				D 0.40 - 0.50 m	0.5		Cl	Silty CLAY: medium plasticity, brown orange mottled red	M (≈PL)	F	RESIDUAL SOIL
					1.0			grades: grey mottled brown and red			
								1.30m			
				D 1.40 - 1.50 m				SANDSTONE, pale grey brown, with clay, extremely weathered, very low strength	M		WEATHERED ROCK
					1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP73

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82272, 150.75551 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			SILT: low plasticity, brown	M (<PL)		TOPSOIL
								0.20m			
				D 0.40 - 0.50 m	0.5		ML	Clayey SILT: medium plasticity, orange brown with grey, with gravel	M (≈PL)	F	RESIDUAL SOIL
					1.0			grades: grey mottled red			
								1.10m			
							SC	Clayey SAND: fine grained, poorly graded, rounded, grey mottled brown, low plasticity clay	M	MD	
								1.40m			
				D 1.40 - 1.50 m	1.5			SANDSTONE, fine grained, grey mottled brown, extremely weathered, low strength	M		ROCK
								1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP74

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82275, 150.75673 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			SILT: low plasticity, dark brown grey, trace gravel	M (<PL)		TOPSOIL
					0.20m						
								CLAY: high plasticity, grey mottled brown	M (≈PL)	St	RESIDUAL SOIL
				D 0.40 - 0.50 m	0.5						
								grades: grey mottled red, low plasticity			
					1.0		CH		M (<PL)	H	
				D 1.40 - 1.50 m							
					1.5						
					1.50m			TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
- EX Excavator bucket
- R Ripper
- HA Hand auger
- PT Push tube
- SON Sonic drilling
- AH Air hammer
- PS Percussion sampler
- AS Short spiral auger
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- DT Diatube

PENETRATION
- VE Very Easy (No Resistance)
- E Easy
- F Firm
- H Hard
- VH Very Hard (Refusal)

WATER
- Water Level on Date shown
- water inflow
- water outflow

FIELD TESTS
- SPT - Standard Penetration Test
- HP - Hand/Pocket Penetrometer
- DCP - Dynamic Cone Penetrometer
- PSP - Perth Sand Penetrometer
- MC - Moisture Content
- PBT - Plate Bearing Test
- IMP - Borehole Impression Test
- PID - Photoionisation Detector
- VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
- B - Bulk disturbed sample
- D - Disturbed sample
- ES - Environmental sample
- U - Thin wall tube 'undisturbed'

MOISTURE
- D - Dry
- M - Moist
- W - Wet
- PL - Plastic limit
- LL - Liquid limit
- *w* - Moisture content

SOIL CONSISTENCY
- VS - Very Soft
- S - Soft
- F - Firm
- St - Stiff
- VSt - Very Stiff
- H - Hard

RELATIVE DENSITY
- VL - Very Loose
- L - Loose
- MD - Medium Dense
- D - Dense
- VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP75

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82315, 150.75164 **Angle from Horizontal:** 90° **Surface Elevation:**
Machine Type: 5 tonne Excavator **Excavation Method:** EX
Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation
Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
								Clayey SILT: medium plasticity, dark brown	M (≈PL)		TOPSOIL
								0.20m			
EX	F	Stable	Not Encountered	D 0.40 - 0.50 m	0.5		CH	CLAY: high plasticity, grey mottled red	M (≈PL)	St	RESIDUAL SOIL
				D 1.40 - 1.50 m	1.0						
					1.5			1.50m			
								TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP77

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82347, 150.75502 **Angle from Horizontal:** 90° **Surface Elevation:**
Machine Type: 5 tonne Excavator **Excavation Method:** EX
Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation
Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0			Silty CLAY: medium plasticity, dark brown	M (≈PL)		TOPSOIL
					0.20m						
				D 0.40 - 0.50 m	0.5		CH	CLAY: high plasticity, brown mottled grey	M (≈PL)	St	RESIDUAL SOIL
					1.0			grades: grey mottled red	M (<PL)	VSt	
				D 1.40 - 1.50 m	1.5						
					1.50m			TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
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IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
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PL - Plastic limit
LL - Liquid limit
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SOIL CONSISTENCY
VS - Very Soft
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H - Hard

RELATIVE DENSITY
VL - Very Loose
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MD - Medium Dense
D - Dense
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Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP78

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82384, 150.75217 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 5/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered					SILT: low plasticity, dark brown, with clay	M (<PL)		TOPSOIL
								0.20m CLAY: high plasticity, grey mottled brown			RESIDUAL SOIL
				D 0.40 - 0.50 m	0.5		CH		M (≈PL)	St	
					1.0			grades: with ironstone gravel			
				D 1.40 - 1.50 m				1.40m SHALE, pale brown and grey, with clay and ironstone staining, extremely weathered, low strength	D		WEATHERED ROCK
					1.5			1.50m TERMINATED AT 1.50 m Target depth			
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
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PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
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DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
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PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
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St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP79

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82420, 150.75418 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing	Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX		Stable	Not Encountered		0			SILT: low plasticity, brown, trace gravel	M (<PL)		TOPSOIL
					0.20m						
	F			D 0.40 - 0.50 m	0.5		CH	CLAY: high plasticity, brown mottled grey red	M (≈PL)	F	RESIDUAL SOIL
					1.00m						
	H			D 1.10 - 1.20 m	1.0			SILTSTONE, pale grey, highly weathered, low strength	D		WEATHERED ROCK
					1.20m			TERMINATED AT 1.20 m Refusal			
					1.5						
					2.0						
					2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
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U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
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LL - Liquid limit
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SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Construction Sciences

TEST PIT LOG SHEET

Client: HB+B Property
Project: Geotechnical Assessment, Proposed Industrial Land Development
Location: 221-227 and 289-317 Luddenham Road

Hole No: TP80

Job No: 5017200153 **Sheet:** 1 of 1

Position: -33.82440, 150.75656 **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** EX

Excavation Dimensions: 1.50m LONG AND 0.30m WIDE **Contractor:** Platinum Excavation

Date Excavated: 6/5/20 **Logged By:** NL **Checked By:** VDS

Excavation			Water	Sampling & Testing		Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test	DCP (blows per 100 mm) 1 2 4 8		Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered	B 0.20 - 0.60 m CBR D 0.20 - 0.30 m	3 4	0.5			SILT: low plasticity, dark brown	M (<PL)		TOPSOIL
				D 0.40 - 0.50 m	5 4 2				0.20m CLAY: high plasticity, red mottled grey			RESIDUAL SOIL
				D 0.90 - 1.00 m	3 4 5 10 13	1.0		CH		M (≈PL)	St	
				D 1.40 - 1.50 m	19	1.5			grades: trace ironstone			
				D 1.90 - 2.00 m		2.0			2.00m TERMINATED AT 2.00 m Target depth			
						2.5						

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
DT Diatube

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
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DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
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VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
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St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Explanatory Notes

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS1726-2017 Geotechnical Site Investigations. Material descriptions are deduced from field observation or engineering examination, and may be appended or confirmed by in situ or laboratory testing. The information is dependent on the scope of investigation, the extent of sampling and testing, and the inherent variability of the conditions encountered.

Subsurface investigation may be conducted by one or a combination of the following methods.

Method	
Test Pitting: excavation/trench	
BH	Backhoe bucket
EX	Excavator bucket
R	Ripper
H	Hydraulic Hammer
X	Existing excavation
N	Natural exposure
Manual drilling: hand operated tools	
HA	Hand Auger
Continuous sample drilling	
PT	Push tube
PS	Percussion sampling
SON	Sonic drilling
Hammer drilling	
AH	Air hammer
AT	Air track
Spiral flight auger drilling	
AS	Auger screwing
AD/V	Continuous flight auger: V-bit
AD/T	Continuous spiral flight auger: TC-Bit
HFA	Continuous hollow flight auger
Rotary non-core drilling	
WB	Washbore drilling
RR	Rock roller
Rotary core drilling	
PQ	85mm core (wire line core barrel)
HQ	63.5mm core (wire line core barrel)
NMLC	51.94mm core (conventional core barrel)
NQ	47.6mm core (wire line core barrel)
DT	Diatube (concrete coring)

Sampling is conducted to facilitate further assessment of selected materials encountered.

Sampling method	
Soil sampling	
B	Bulk disturbed sample
D	Disturbed sample
C	Core sample
ES	Environmental soil sample
SPT	Standard Penetration Test sample
U	Thin wall tube ‘undisturbed’ sample
Water sampling	
WS	Environmental water sample

Field testing may be conducted as a means of assessment of the in situ conditions of materials.

Field testing	
SPT	Standard Penetration Test
HP/PP	Hand/Pocket Penetrometer
Dynamic Penetrometers (blows per noted increment)	
DCP	Dynamic Cone Penetrometer
PSP	Perth Sand Penetrometer
MC	Moisture Content
VS	Vane Shear
PBT	Plate Bearing Test
IMP	Borehole Impression Test
PID	Photo Ionization Detector

If encountered, refusal (R), virtual refusal (VR) or hammer bouncing (HB) of penetrometers may be noted.

The quality of the rock can be assessed by the degree of natural defects/fractures and the following.

Rock quality description	
TCR	Total Core Recovery (%) (length of core recovered divided by the length of core run)
RQD	Rock Quality Designation (%) (sum of axial lengths of core greater than 100mm long divided by the length of core run)

Notes on groundwater conditions encountered may include.

Groundwater	
Not Encountered	Excavation is dry in the short term
Not Observed	Water level observation not possible
Seepage	Water seeping into hole
Inflow	Water flowing/flooding into hole

Perched groundwater may result in a misleading indication of the depth to the true water table. Groundwater levels are also likely to fluctuate with variations in climatic and site conditions.

Notes on the stability of excavations may include.

Excavation conditions	
Stable	No obvious/gross short term instability noted
Spalling	Material falling into excavation (minor/major)
Unstable	Collapse of the majority, or one or more face of the excavation

Explanatory Notes: General Soil Description

The methods of description and classification of soils used in this report are based on Australian Standard AS1726-2017 Geotechnical Site Investigations. In practice, a material is described as a soil if it can be remoulded by hand in its field condition or in water. The dominant component is shown in upper case, with secondary components in lower case. In general descriptions cover: soil type, plasticity or particle size/shape, colour, strength or density, moisture and inclusions.

In general, soil types are classified according to the dominant particle on the basis of the following particle sizes.

Soil Classification		Particle Size (mm)
CLAY		< 0.002
SILT		0.002 0.075
SAND	fine	0.075 to 0.21
	medium	0.21 to 0.6
	coarse	0.6 to 2.36
GRAVEL	fine	2.36 to 6.7
	medium	6.7 to 19
	coarse	19 to 63
COBBLES		63 to 200
BOULDERS		> 200

Soil types may be qualified by the presence of minor components on the basis of field examination methods and/or the soil grading.

Terminology	In coarse grained soils		In fine soils
	% fines	% coarse	% coarse
Trace	≤5	≤15	≤15
With	>5, ≤12	>15, ≤30	>15, ≤30

The strength of cohesive soils is classified by engineering assessment or field/lab testing as follows.

Strength	Symbol	Undrained shear strength
Very Soft	VS	≤12kPa
Soft	S	12kPa to ≤25kPa
Firm	F	25kPa to ≤50kPa
Stiff	St	50kPa to ≤100kPa
Very Stiff	VSt	100kPa to ≤200kPa
Hard	H	>200kPa

Cohesionless soils are classified on the basis of relative density as follows.

Relative Density	Symbol	Density Index
Very Loose	VL	<15%
Loose	L	15% to ≤35%
Medium Dense	MD	35% to ≤65%
Dense	D	65% to ≤85%
Very Dense	VD	>85%

The plasticity of cohesive soils is defined by the Liquid Limit (LL) as follows.

Plasticity	Silt LL	Clay LL
Low plasticity	≤ 35%	≤ 35%
Medium plasticity	N/A	> 35% ≤ 50%
High plasticity	> 50%	> 50%

The moisture condition of soil (*w*) is described by appearance and feel and may be described in relation to the Plastic Limit (PL), Liquid Limit (LL) or Optimum Moisture Content (OMC).

Moisture condition and description	
Dry	Cohesive soils: hard, friable, dry of plastic limit. Granular soils: cohesionless and free-running
Moist	Cool feel and darkened colour: Cohesive soils can be moulded. Granular soils tend to cohere
Wet	Cool feel and darkened colour: Cohesive soils usually weakened and free water forms when handling. Granular soils tend to cohere

The structure of the soil may be described as follows.

Zoning	Description
Layer	Continuous across exposure or sample
Lens	Discontinuous layer (lenticular shape)
Pocket	Irregular inclusion of different material

The structure of soil layers may include: defects such as softened zones, fissures, cracks, joints and root-holes; and coarse grained soils may be described as strongly or weakly cemented.

The soil origin may also be noted if possible to deduce.

Soil origin and description	
Fill	Anthropogenic deposits or disturbed material
Topsoil	Zone of soil affected by roots and root fibres
Peat	Significantly organic soils
Colluvial	Transported down slopes by gravity/water
Aeolian	Transported and deposited by wind
Alluvial	Deposited by rivers
Estuarine	Deposited in coastal estuaries
Lacustrine	Deposited in freshwater lakes
Marine	Deposits in marine environments
Residual soil	Soil formed by in situ weathering of rock, with no structure/fabric of parent rock evident
Extremely weathered material	Formed by in situ weathering of geological formations, with the structure/fabric of parent rock intact but with soil strength properties

The origin of the soil generally cannot be deduced solely on the appearance of the material and the inference may be supplemented by further geological evidence or other field observation. Where there is doubt, the terms ‘possibly’ or ‘probably’ may be used

Explanatory Notes: General Rock Description

The methods of description and classification of rocks used in this report are based on Australian Standard AS1726-2017 Geotechnical Site Investigations. In practice, if a material cannot be remoulded by hand in its field condition or in water, it is described as a rock. In general, descriptions cover: rock type, grain size, structure, colour, degree of weathering, strength, minor components or inclusions, and where applicable, the defect types, shape, roughness and coating/infill.

Rock types are generally described according to the predominant grain or crystal size, and in groups for each rock type as follows.

Rock type	Groups
Sedimentary	Deposited, carbonate (porous or non), volcanic ejection
Igneous	Felsic (much quartz, pale), Intermediate, or mafic (little quartz, dark)
Metamorphic	Foliated or non-foliated
Duricrust	Cementing minerology (iron oxides or hydroxides, silica, calcium carbonate, gypsum)

Reference should be made to AS1726 for details of the rock types and methods of classification.

The classification of rock weathering is described based on definitions in AS1726 and summarised as follows.

Term and symbol		Definition
Residual Soil	RS	Soil developed on rock with the mass structure and substance of the parent rock no longer evident
Extremely weathered	XW	Weathered to such an extent that the rock has 'soil-like' properties. Mass structure and substance still evident
Distinctly weathered	DW	The strength is usually changed and may be highly discoloured. Porosity may be increased by leaching, or decreased due to deposition in pores. May be distinguished into MW (Moderately Weathered) and HW (Highly Weathered).
Slightly weathered	SW	Slightly discoloured; little or no change of strength from fresh rock
Fresh Rock	FR	The rock shows no sign of decomposition or staining

The rock material strength can be defined based on the point load index as follows.

Term and symbol		Point Load Index I_s50 (MPa)
Very Low	VL	0.03 to 0.1
Low	L	0.1 to 0.3
Medium	M	0.3 to 1.0
High	H	1.0 to 3
Very High	VH	3 to 10
Extremely High	EH	> 10

It is important to note that the rock material strength as above is distinct from the rock mass strength which can be significantly weaker due to the effect of defects.

A preliminary assessment of rock strength may be made using the field guide detailed in AS1726, and this is conducted in the absence of point load testing.

The defect spacing measured normal to defects of the same set or bedding, is described as follows.

Definition	Defect Spacing (mm)
Thinly laminated	< 6
Laminated	6 to 20
Very thinly bedded	20 to 60
Thinly bedded	60 to 200
Medium bedded	200 to 600
Thickly bedded	600 to 2000
Very thickly bedded	> 2000

Terms for describing rock and defects are as follows.

Defect Terms			
Joint	JT	Sheared zone	SZ
Bedding Parting	BP	Seam	SM
Foliation	FL	Vein	VN
Cleavage	CL	Drill Lift	DL
Crushed Seam	CS	Handling Break	HB
Fracture Zone	FZ	Drilling Break	DB

The shape and roughness of defects in the rock mass are described using the following terms.

Planarity		Roughness	
Planar	PR	Very Rough	VR
Curved	CU	Rough	RF
Undulose	UN	Smooth	S
Irregular	IR	Slickensided	SL
Stepped	ST	Polished	POL
Discontinuous	DIS		

The coating or infill associated with defects in the rock mass are described as follows.

Infill and Coating		
Clean	CN	
Stained	SN	
Carbonaceous	X	
Minerals	MU	Unidentified mineral
	MS	Secondary mineral
	KT	Chlorite
	CA	Calcite
	Fe	Iron Oxide
	Qz	Quartz
Veneer	VNR	Thin or patchy coating
Coating	CT	Infill up to 1mm

Construction Sciences

Graphic Symbols Index


CLAY


Silty CLAY


Sandy CLAY


Gravelly CLAY


Silty Gravelly CLAY


Silty Sandy CLAY


Sandy Gravelly


CLAY SILT


Clayey SILT


Sandy SILT Gravelly


SILT


Clayey Sandy SILT


Clayey Gravelly SILT


Sandy Gravelly SILT


SAND


Clayey SAND


Silty SAND


Gravelly SAND


Clayey Silty SAND


Clayey Gravelly SAND


Silty Gravelly SAND


GRAVEL


Clayey GRAVEL


Silty GRAVEL


Sandy GRAVEL


Clayey Silty GRAVEL


Clayey Sandy GRAVEL


Silty Sandy GRAVEL


COBBLES & BOULDERS


PEAT, highly organic soil


TOPSOIL


FILL


FILL: Asphalt or Bituminous Seal


FILL: Ballast


FILL: Concrete


FILL: Roadbase


Sedimentary rock: fine, mostly clay (CLAYSTONE)


Sedimentary rock: fine, mostly silt (SILTSTONE)


Sedimentary rock: fine, silt and clay (MUDSTONE, SHALE, LAMINITE)


Sedimentary rock: medium (SANDSTONE, GREYWACKE)


Sedimentary rock: fine to coarse, angular (BRECCIA)


Sedimentary rock: coarse, rounded (CONGLOMERATE)


Sedimentary rock: Organic (COAL)


Sedimentary rock: Carbonate (LIMESTONE, DOLOMITE)


Sedimentary rock: Volcanic (TUFF, VOLCANIC BRECCIA, AGGLOMERATE)


Igneous rock: Felsic, fine (RHYOLITE)


Igneous rock: Felsic, coarse (GRANITE)


Igneous rock: Mafic, fine to medium (BASALT, DOLERITE)


Igneous rock: Mafic, coarse (GABBRO)


Metamorphic rock: Foliated, fine to medium (SLATE, PHYLLITE, SHIST)


Metamorphic rock: Foliated, coarse (GNEISS)


Metamorphic rock: Non-foliated (QUARTZITE, HORNFELS, MARBLE)

Proposed Warehouse Development 221-227, 289-317 Luddenham Road Orchard Hills NSW 2748

APPENDIX C

LABORATORY TEST RESULTS

ATTACHMENT - 1 - SOIL EXPOSURE CLASSIFICATION REPORT

Project: 221-227, 289-317 Luddenham Road Orchard Hills NSW 2748

Job No: 5017200153
Report Date: 1/06/2020

Project Manager: VDS
Sampled by: NL
Tested By: CS/EUROFINS

Sample ID	Date Sampled	Field Texture	Multiplication Factor	EC (µS/cm)	Ece	Salinity Rating	pH	Exposure Classification
TP01 **0.50-0.60**	7/5/2020	HEAVY CLAY	6	890	5.3	MS	**5.8**	A1
TP01 **1.40-1.50**	7/5/2020	HEAVY CLAY	6	950	5.7	MS	**5.3**	A2
TP02 **0.50-0.60**	7/5/2020	HEAVY CLAY	6	120	0.7	NS	**5.6**	A1
TP02 **1.40-1.50**	7/5/2020	HEAVY CLAY	6	800	4.8	MS	**6.2**	A1
TP03 **0.50-0.60**	7/5/2020	HEAVY CLAY	6	130	0.8	NS	**5.5**	A2
TP03 **1.40-1.50**	7/5/2020	HEAVY CLAY	6	470	2.8	SS	**4.8**	A2
TP04 **0.40-0.50**	7/5/2020	HEAVY CLAY	6	330	2.0	NS	**5.3**	A2
TP04 **1.40-1.50**	7/5/2020	HEAVY CLAY	6	470	2.8	SS	**4.3**	A2
TP05 **0.50-0.60**	7/5/2020	HEAVY CLAY	6	93	0.6	NS	**5.5**	A2
TP05 **1.30-1.50**	7/5/2020	HEAVY CLAY	6	72	0.4	NS	**5.8**	A1
TP06 **0.50-0.60**	7/5/2020	HEAVY CLAY	6	580	3.5	SS	**6**	A1
TP06 **1.40-1.50**	7/5/2020	HEAVY CLAY	6	990	5.9	MS	**6.3**	A1
TP07 **0.50-0.60**	7/5/2020	HEAVY CLAY	6	140	0.8	NS	**5.5**	A2
TP07 **1.40-1.50**	7/5/2020	HEAVY CLAY	6	890	5.3	MS	**4.9**	A2
TP08 **0.50-0.60**	6/5/2020	HEAVY CLAY	6	150	0.9	NS	**5.4**	A2
TP08 **1.40-1.50**	6/5/2020	HEAVY CLAY	6	230	1.4	NS	**5.3**	A2
TP09 **0.50-0.60**	6/5/2020	LIGHT CLAY	9	79	0.7	NS	**5.3**	A2
TP09 **1.40-1.50**	6/5/2020	LIGHT CLAY	9	33	0.3	NS	**5.5**	A2
TP10 **0.50-0.60**	6/5/2020	HEAVY CLAY	6	400	2.4	SS	**5.4**	A2
TP10 **1.40-1.50**	6/5/2020	SANDY LOAM	9	430	3.9	SS	**5.5**	A2
TP11 **0.40-0.50**	6/5/2020	LIGHT CLAY	9	53	0.5	NS	**5.8**	A1
TP11 **1.40-1.50**	6/5/2020	HEAVY CLAY	6	360	2.2	SS	**4.9**	A2
TP12 **0.40-0.50**	6/5/2020	MEDIUM CLAY	7	53	0.4	NS	**5.8**	A1
TP12 **1.40-1.50**	6/5/2020	MEDIUM CLAY	7	140	1.0	NS	**5.1**	A2
TP13 **0.40-0.50**	6/5/2020	HEAVY CLAY	6	200	1.2	NS	**4.9**	A2
TP13 **1.40-1.50**	6/5/2020	HEAVY CLAY	6	280	1.7	NS	**5.8**	A1
TP14 **0.40-0.50**	5/5/2020	HEAVY CLAY	6	410	2.5	SS	**5.1**	A2
TP14 **1.40-1.50**	5/5/2020	HEAVY CLAY	6	230	1.4	NS	**5**	A2
TP15 **0.40-0.50**	5/5/2020	HEAVY CLAY	6	150	0.9	NS	**4.9**	A2
TP15 **1.40-1.50**	5/5/2020	MEDIUM CLAY	7	730	5.1	MS	**4.7**	A2
TP16 **0.40-0.50**	5/5/2020	HEAVY CLAY	6	210	1.3	NS	**4.9**	A2
TP16 **0.90-1.00**	5/5/2020	HEAVY CLAY	6	310	1.9	NS	**4.7**	A2
TP16 **1.40-1.50**	5/5/2020	MEDIUM CLAY	7	500	3.5	SS	**4.5**	A2
TP17 **0.40-0.50**	5/5/2020	MEDIUM CLAY	7	65	0.5	NS	**5.2**	A2
TP17 **0.90-1.00**	5/5/2020	MEDIUM CLAY	7	56	0.4	NS	**5.2**	A2
TP17 **1.50-1.60**	5/5/2020	SANDY LOAM	9	160	1.4	NS	**5.1**	A2
TP18 **0.40-0.50**	5/5/2020	SANDY LOAM	9	19	0.2	NS	**5.3**	A2
TP18 **0.90-1.00**	5/5/2020	SANDY LOAM	9	25	0.2	NS	**5.2**	A2
TP18 **1.30-1.40**	5/5/2020	SANDY LOAM	9	28	0.3	NS	**5.1**	A2
TP26 **0.40-0.50**	4/5/2020	HEAVY CLAY	6	220	1.3	NS	**4.6**	A2
TP26 **1.40-1.50**	4/5/2020	HEAVY CLAY	6	780	4.7	MS	**4**	A2
TP27 **0.40-0.50**	4/5/2020	HEAVY CLAY	6	360	2.2	SS	**4.8**	A2
TP27 **1.40-1.50**	4/5/2020	HEAVY CLAY	6	480	2.9	SS	**4.8**	A2
TP28 **0.40-0.50**	4/5/2020	HEAVY CLAY	6	270	1.6	NS	**4.7**	A2
TP28 **1.40-1.50**	4/5/2020	HEAVY CLAY	6	300	1.8	NS	**4.9**	A2
TP29 **0.40-0.50**	4/5/2020	HEAVY CLAY	6	450	2.7	SS	**4.9**	A2
TP29 **1.40-1.50**	4/5/2020	SANDY LOAM	9	690	6.2	MS	**5.6**	A1
TP30 **0.40-0.50**	4/5/2020	HEAVY CLAY	6	210	1.3	NS	**4.8**	A2
TP30 **1.40-1.50**	4/5/2020	HEAVY CLAY	6	270	1.6	NS	**5.6**	A1
TP31 **0.40-0.50**	4/5/2020	HEAVY CLAY	6	42	0.3	NS	**5.7**	A1
TP31 **1.40-1.50**	4/5/2020	HEAVY CLAY	6	48	0.3	NS	**5.1**	A2
TP32 **0.00-0.20**	8/5/2020	LIGHT CLAY	9	31	0.3	NS	**5.9**	A1
TP32 **0.40-0.50**	8/5/2020	HEAVY CLAY	6	340	2.0	SS	**5**	A2
TP32 **1.40-1.50**	8/5/2020	MEDIUM CLAY	7	460	3.2	SS	**5.7**	A1
TP33 **0.40-0.50**	5/5/2020	HEAVY CLAY	6	400	2.4	SS	**4.8**	A2
TP33 **1.40-1.50**	5/5/2020	HEAVY CLAY	6	520	3.1	SS	**4.7**	A2
TP34 **0.20-0.30**	5/5/2020	HEAVY CLAY	6	220	1.3	NS	**5.2**	A2
TP34 **0.40-0.50**	5/5/2020	HEAVY CLAY	6	270	1.6	NS	**5.1**	A2
TP34 **0.90-1.00**	5/5/2020	HEAVY CLAY	6	320	1.9	NS	**5**	A2
TP34 **1.40-1.50**	5/5/2020	MEDIUM CLAY	7	280	2.0	NS	**4.9**	A2
TP34 **1.90-2.00**	5/5/2020	MEDIUM CLAY	7	370	2.6	SS	**4.6**	A2
TP35 **0.40-0.50**	4/5/2020	MEDIUM CLAY	7	57	0.4	NS	**5.3**	A2

TP35 **1.40-1.50**	4/5/2020	SANDY LOAM	9	60	0.5	NS	**5.1**	A2
TP36 **0.40-0.50**	8/5/2020	HEAVY CLAY	6	260	1.6	NS	**4.8**	A2
TP36 **1.40-1.50**	8/5/2020	MEDIUM CLAY	7	420	2.9	SS	**5.3**	A2
TP37 **0.40-0.50**	8/5/2020	HEAVY CLAY	6	290	1.7	NS	**5.3**	A2
TP37 **1.40-1.50**	8/5/2020	MEDIUM CLAY	7	470	3.3	SS	**5.8**	A1
TP38 **0.40-0.50**	8/5/2020	HEAVY CLAY	6	420	2.5	SS	**5.3**	A2
TP38 **1.40-1.50**	8/5/2020	MEDIUM CLAY	7	540	3.8	SS	**5.3**	A2
TP39 **0.40-0.50**	8/5/2020	HEAVY CLAY	6	270	1.6	NS	**5.1**	A2
TP39 **0.90-1.00**	8/5/2020	HEAVY CLAY	6	270	1.6	NS	**5**	A2
TP39 **1.40-1.50**	8/5/2020	SANDY LOAM	9	300	2.7	SS	**5.3**	A2
TP39 **1.90-2.00**	8/5/2020	SANDY LOAM	9	600	5.4	MS	**5**	A2
TP40 **0.40-0.50**	8/5/2020	HEAVY CLAY	6	56	0.3	NS	**5.4**	A2
TP40 **1.40-1.50**	8/5/2020	SANDY LOAM	9	140	1.3	NS	**5.1**	A2
TP41 **0.40-0.50**	8/5/2020	HEAVY CLAY	6	360	2.2	SS	**5.5**	A2
TP41 **1.40-1.50**	8/5/2020	HEAVY CLAY	6	530	3.2	SS	**5.8**	A1
TP42 **0.40-0.50**	5/5/2020	HEAVY CLAY	6	320	1.9	NS	**4.8**	A2
TP42 **1.40-1.50**	5/5/2020	MEDIUM CLAY	7	260	1.8	NS	**4.9**	A2
TP43 **0.40-0.50**	5/5/2020	HEAVY CLAY	6	230	1.4	NS	**5**	A2
TP43 **0.90-1.00**	5/5/2020	HEAVY CLAY	6	370	2.2	SS	**5**	A2
TP43 **1.40-1.50**	5/5/2020	HEAVY CLAY	6	370	2.2	SS	**4.7**	A2
TP43 **1.90-2.00**	5/5/2020	HEAVY CLAY	6	400	2.4	SS	**4.9**	A2
TP44 **0.40-0.50**	5/5/2020	MEDIUM CLAY	7	67	0.5	NS	**5.6**	A1
TP44 **1.40-1.50**	5/5/2020	MEDIUM CLAY	7	46	0.3	NS	**5.5**	A2
TP45 **0.40-0.50**	5/5/2020	MEDIUM CLAY	7	40	0.3	NS	**5.3**	A2
TP45 **1.20-1.30**	5/5/2020	SANDY LOAM	9	52	0.5	NS	**5**	A2
TP46 **0.40-0.50**	5/5/2020	SANDY LOAM	9	100	0.9	NS	**4.3**	A2
TP46 **0.70-0.80**	5/5/2020	MEDIUM CLAY	7	63	0.4	NS	**5.2**	A2
TP47 **0.40-0.50**	5/5/2020	LIGHT CLAY	9	49	0.4	NS	**5.4**	A2
TP47 **1.40-1.50**	5/5/2020	HEAVY CLAY	6	51	0.3	NS	**5.4**	A2
TP48 **0.40-0.50**	5/5/2020	LIGHT CLAY	9	80	0.7	NS	**5.6**	A1
TP48 **1.40-1.50**	5/5/2020	SANDY LOAM	9	250	2.3	SS	**5.1**	A2
TP49 **0.40-0.50**	8/5/2020	HEAVY CLAY	6	200	1.2	NS	**5.1**	A2
TP49 **1.40-1.50**	8/5/2020	HEAVY CLAY	6	720	4.3	MS	**4.6**	A2
TP50 **0.40-0.50**	8/5/2020	SANDY LOAM	9	51	0.5	NS	**5.4**	A2
TP50 **1.40-1.50**	8/5/2020	SANDY LOAM	9	43	0.4	NS	**5.2**	A2
TP51 **0.40-0.50**	7/5/2020	HEAVY CLAY	6	680	4.1	MS	**5.1**	A2
TP51 **0.90-1.00**	7/5/2020	HEAVY CLAY	6	910	5.5	MS	**4.8**	A2
TP51 **1.40-1.50**	7/5/2020	MEDIUM CLAY	7	820	5.7	MS	**4.7**	A2
TP51 **1.90-2.00**	7/5/2020	MEDIUM CLAY	7	930	6.5	MS	**3.7**	A2
TP52 **0.40-0.50**	7/5/2020	LIGHT CLAY	9	130	1.2	NS	**5.7**	A1
TP52 **1.40-1.50**	7/5/2020	HEAVY CLAY	6	570	3.4	SS	**5.6**	A1
TP53 **0.40-0.50**	7/5/2020	HEAVY CLAY	6	910	5.5	MS	**5.5**	A2
TP53 **1.40-1.50**	7/5/2020	HEAVY CLAY	6	660	4.0	SS	**5.1**	A2
TP54 **0.40-0.50**	7/5/2020	MEDIUM CLAY	7	170	1.2	NS	**6.5**	A1
TP54 **1.40-1.50**	7/5/2020	HEAVY CLAY	6	250	1.5	NS	**5.2**	A2
TP55 **0.40-0.50**	7/5/2020	HEAVY CLAY	6	330	2.0	NS	**5.4**	A2
TP55 **1.40-1.50**	7/5/2020	LIGHT CLAY	9	560	5.0	MS	**4.9**	A2
TP56 **0.40-0.50**	7/5/2020	LIGHT CLAY	9	32	0.3	NS	**5.9**	A1
TP56 **1.40-1.50**	7/5/2020	HEAVY CLAY	6	450	2.7	SS	**4.8**	A2
TP57 **0.40-0.50**	7/5/2020	MEDIUM CLAY	7	600	4.2	MS	**5.5**	A2
TP57 **1.40-1.50**	7/5/2020	LIGHT CLAY	9	680	6.1	MS	**5.9**	A1
TP58 **0.40-0.50**	7/5/2020	HEAVY CLAY	6	360	2.2	SS	**5.6**	A1
TP58 **0.90-1.00**	7/5/2020	HEAVY CLAY	6	460	2.8	SS	**5.7**	A1
TP58 **1.40-1.50**	7/5/2020	MEDIUM CLAY	7	530	3.7	SS	**5.9**	A1
TP58 **1.90-2.00**	7/5/2020	MEDIUM CLAY	7	620	4.3	MS	**5.7**	A1
TP59 **0.40-0.50**	7/5/2020	HEAVY CLAY	6	600	3.6	SS	**6.4**	A1
TP59 **1.40-1.50**	7/5/2020	MEDIUM CLAY	7	450	3.2	SS	**7.1**	A1
TP60 **0.40-0.50**	7/5/2020	HEAVY CLAY	6	81	0.5	NS	**6**	A1
TP60 **1.40-1.50**	7/5/2020	MEDIUM CLAY	7	860	6.0	MS	**5.9**	A1
TP61 **0.40-0.50**	7/5/2020	MEDIUM CLAY	7	150	1.1	NS	**5.7**	A1
TP61 **0.90-1.00**	7/5/2020	HEAVY CLAY	6	300	1.8	NS	**5.2**	A2
TP61 **1.40-1.50**	7/5/2020	HEAVY CLAY	6	310	1.9	NS	**5.3**	A2
TP61 **1.90-2.00**	7/5/2020	HEAVY CLAY	6	280	1.7	NS	**5.4**	A2
TP62 **0.40-0.50**	7/5/2020	LIGHT CLAY	9	34	0.3	NS	**5.7**	A1
TP62 **1.40-1.50**	7/5/2020	HEAVY CLAY	6	49	0.3	NS	**5.5**	A2
TP63 **0.40-0.50**	7/5/2020	LIGHT CLAY	9	250	2.3	SS	**5.7**	A1
TP63 **1.40-1.50**	7/5/2020	HEAVY CLAY	6	1000	6.0	MS	**6**	A1
TP64 **0.40-0.50**	7/5/2020	MEDIUM CLAY	7	440	3.1	SS	**6.5**	A1
TP64 **0.90-1.00**	7/5/2020	MEDIUM CLAY	7	730	5.1	MS	**6.1**	A1
TP64 **1.40-1.50**	7/5/2020	MEDIUM CLAY	7	720	5.0	MS	**6.7**	A1
TP64 **1.90-2.00**	7/5/2020	MEDIUM CLAY	7	590	4.1	MS	**6.4**	A1
TP65 **0.40-0.50**	7/5/2020	LIGHT CLAY	9	47	0.4	NS	**5.8**	A1

TP65 **1.40-1.50**	7/5/2020	HEAVY CLAY	6	100	0.6	NS	**5.4**	A2
TP66 **0.40-0.50**	6/5/2020	LIGHT CLAY	9	90	0.8	NS	**5.7**	A1
TP66 **1.40-1.50**	6/5/2020	MEDIUM CLAY	7	140	1.0	NS	**5.2**	A2
TP67 **0.40-0.50**	6/5/2020	LIGHT CLAY	9	110	1.0	NS	**5.8**	A1
TP67 **1.40-1.50**	6/5/2020	HEAVY CLAY	6	760	4.6	MS	**4.2**	A2
TP68 **0.40-0.50**	6/5/2020	MEDIUM CLAY	7	41	0.3	NS	**5.7**	A1
TP68 **1.40-1.50**	6/5/2020	LIGHT CLAY	9	51	0.5	NS	**4.8**	A2
TP69 **0.40-0.50**	6/5/2020	LIGHT CLAY	9	56	0.5	NS	**5.6**	A1
TP69 **1.40-1.50**	6/5/2020	SANDY LOAM	9	44	0.4	NS	**5.5**	A2
TP70 **0.40-0.50**	6/5/2020	LIGHT CLAY	9	40	0.4	NS	**5.4**	A2
TP70 **1.40-1.50**	6/5/2020	LIGHT CLAY	9	43	0.4	NS	**5.1**	A2
TP71 **0.40-0.50**	6/5/2020	HEAVY CLAY	6	460	2.8	SS	**4.9**	A2
TP71 **1.40-1.50**	6/5/2020	HEAVY CLAY	6	1400	8.4	VS	**4.5**	A2
TP72 **0.40-0.50**	6/5/2020	MEDIUM CLAY	7	48	0.3	NS	**5.7**	A1
TP72 **1.40-1.50**	6/5/2020	SANDY LOAM	9	28	0.3	NS	**5.5**	A2
TP73 **0.40-0.50**	6/5/2020	LIGHT CLAY	9	44	0.4	NS	**5.8**	A1
TP73 **1.40-1.50**	6/5/2020	SANDY LOAM	9	29	0.3	NS	**5.7**	A1
TP74 **0.40-0.50**	6/5/2020	HEAVY CLAY	6	300	1.8	NS	**5.6**	A1
TP74 **1.40-1.50**	6/5/2020	HEAVY CLAY	6	540	3.2	SS	**5.1**	A2
TP75 **0.40-0.50**	6/5/2020	HEAVY CLAY	6	290	1.7	NS	**5.1**	A2
TP75 **1.40-1.50**	6/5/2020	HEAVY CLAY	6	530	3.2	SS	**4.8**	A2
TP77 **0.40-0.50**	6/5/2020	HEAVY CLAY	6	490	2.9	SS	**5.1**	A2
TP77 **1.40-1.50**	6/5/2020	HEAVY CLAY	6	420	2.5	SS	**5.2**	A2
TP78 **0.40-0.50**	5/5/2020	HEAVY CLAY	6	100	0.6	NS	**5.1**	A2
TP78 **1.40-1.50**	5/5/2020	SANDY LOAM	9	690	6.2	MS	**4.3**	A2
TP79 **0.40-0.50**	6/5/2020	HEAVY CLAY	6	57	0.3	NS	**5.3**	A2
TP79 **1.10-1.20**	6/5/2020	SANDY LOAM	9	39	0.4	NS	**5.6**	A1
TP80 **0.40-0.50**	6/5/2020	HEAVY CLAY	6	190	1.1	NS	**5.2**	A2
TP80 **0.90-1.00**	6/5/2020	HEAVY CLAY	6	150	0.9	NS	**5**	A2
TP80 **1.40-1.50**	6/5/2020	HEAVY CLAY	6	89	0.5	NS	**5.4**	A2
TP80 **1.90-2.00**	6/5/2020	HEAVY CLAY	6	79	0.5	NS	5.4	A2

Salinity:	Non Saline (NS)	96	58.2%	**pH:**	pH_{MAX}	7.1	
	Slightly Saline (SS)	42	25.5%		pH_{MIN}	3.7	
	Moderately Saline (MS)	26	15.8%		pH≤4.5	6	
	Highly Saline (HS)	0	0.0%		pH>4.5	110	pH≤5.5
	Very Saline (VS)	1	0.6%		pH>5.5	49	

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2/4 Kellogg Rd
Glendenning
NSW 2761

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The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Vipul DeSilva**

Report **718184-S**
Project name LUDDENHAM ROAD ORCHARD HILLS HBB
Project ID 501700153
Received Date May 07, 2020

Client Sample ID			**TP26 0.50M**	**TP26 1.50M**	**TP27 0.50M**	**TP27 1.50M**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S20-My10605**	**S20-My10606**	**S20-My10607**	**S20-My10608**
Date Sampled			**May 04, 2020**	**May 04, 2020**	**May 04, 2020**	**May 04, 2020**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	220	780	360	480
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	4.6	4.0	4.8	4.8

Client Sample ID			**TP28 0.50M**	**TP28 1.50M**	**TP29 0.50M**	**TP29 1.50M**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S20-My10609**	**S20-My10610**	**S20-My10611**	**S20-My10612**
Date Sampled			**May 04, 2020**	**May 04, 2020**	**May 04, 2020**	**May 04, 2020**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	270	300	450	690
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	4.7	4.9	4.9	5.6
% Moisture	1	%	-	13	21	-

Client Sample ID			**TP30 0.50M**	**TP30 1.50M**	**TP31 0.50M**	**TP31 1.50M**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S20-My10613**	**S20-My10614**	**S20-My10615**	**S20-My10616**
Date Sampled			**May 04, 2020**	**May 04, 2020**	**May 04, 2020**	**May 04, 2020**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	210	270	42	48
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	4.8	5.6	5.7	5.1
% Moisture	1	%	-	10	-	-

Client Sample ID			TP35 0.50M	TP35 1.50M	TP14 0.50M	TP14 1.50M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10617	S20-My10618	S20-My10619	S20-My10620
Date Sampled			May 04, 2020	May 04, 2020	May 05, 2020	May 05, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	57	60	410	230
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.3	5.1	5.1	5.0
% Moisture	1	%	14	-	-	-

Client Sample ID			TP15 0.50M	TP15 1.50M	TP16 0.50M	TP16 1.00M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10621	S20-My10622	S20-My10623	S20-My10624
Date Sampled			May 05, 2020	May 05, 2020	May 05, 2020	May 05, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	150	730	210	310
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	4.9	4.7	4.9	4.7
% Moisture	1	%	-	-	14	-

Client Sample ID			TP16 1.50M	TP17 0.50M	TP17 1.00M	TP17 1.50M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10625	S20-My10626	S20-My10627	S20-My10628
Date Sampled			May 05, 2020	May 05, 2020	May 05, 2020	May 05, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	500	65	56	160
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	4.5	5.2	5.2	5.1

Client Sample ID			TP18 0.50M	TP18 1.00M	TP18 1.40M	TP33 0.50M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10629	S20-My10630	S20-My10631	S20-My10632
Date Sampled			May 05, 2020	May 05, 2020	May 05, 2020	May 05, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	19	25	28	400
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.3	5.2	5.1	4.8
% Moisture	1	%	-	12	-	-

Client Sample ID			TP33 1.50M	TP34 0.30M	TP34 0.50M	TP34 1.00M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10633	S20-My10634	S20-My10635	S20-My10636
Date Sampled			May 05, 2020	May 05, 2020	May 05, 2020	May 05, 2020
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	-	320	-	-
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	520	220	270	320
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	4.7	5.2	5.1	5.0
Sulphate (as SO4)	10	mg/kg	-	280	-	-
% Moisture	1	%	11	21	-	-

Client Sample ID			TP33 1.50M	TP34 0.30M	TP34 0.50M	TP34 1.00M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10633	S20-My10634	S20-My10635	S20-My10636
Date Sampled			May 05, 2020	May 05, 2020	May 05, 2020	May 05, 2020
Test/Reference	LOR	Unit				
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	12	-	-

Client Sample ID			TP34 1.50M	TP34 2.00M	TP42 0.50M	TP42 1.50M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10637	S20-My10638	S20-My10639	S20-My10640
Date Sampled			May 05, 2020	May 05, 2020	May 05, 2020	May 05, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	280	370	320	260
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	4.9	4.6	4.8	4.9

Client Sample ID			TP43 0.50M	TP43 1.00M	TP43 1.50M	TP43 2.00M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10641	S20-My10642	S20-My10643	S20-My10644
Date Sampled			May 05, 2020	May 05, 2020	May 05, 2020	May 05, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	230	370	370	400
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.0	5.0	4.7	4.9

Client Sample ID			TP44 0.50M	TP44 1.50M	TP45 0.50M	TP45 1.30M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10645	S20-My10646	S20-My10647	S20-My10648
Date Sampled			May 05, 2020	May 05, 2020	May 05, 2020	May 05, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	67	46	40	52
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.6	5.5	5.3	5.0
% Moisture	1	%	11	-	-	-

Client Sample ID			TP46 0.50M	TP46 0.80M	TP47 0.50M	TP47 1.50M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10649	S20-My10650	S20-My10651	S20-My10652
Date Sampled			May 05, 2020	May 05, 2020	May 05, 2020	May 05, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	100	63	49	51
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	4.3	5.2	5.4	5.4
% Moisture	1	%	-	-	-	15

Client Sample ID			TP48 0.50M	TP48 1.50M	TP78 0.50M	TP78 1.50M
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S20-My10653**	**S20-My10654**	**S20-My10655**	**S20-My10656**
Date Sampled			**May 05, 2020**	**May 05, 2020**	**May 05, 2020**	**May 05, 2020**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	80	250	100	690
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.6	5.1	5.1	4.3
% Moisture	1	%	10	-	-	-

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

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

Description	Testing Site	Extracted	Holding Time
Chloride	Sydney	May 13, 2020	28 Days
- Method: E045 /E047 Chloride			
pH (1:5 Aqueous extract at 25°C as rec.)	Sydney	May 14, 2020	7 Days
- Method: LTM-GEN-7090 pH in soil by ISE			
Sulphate (as SO4)	Sydney	May 13, 2020	28 Days
- Method: E045 Anions by Ion Chromatography			
Conductivity (1:5 aqueous extract at 25°C as rec.)	Sydney	May 14, 2020	7 Days
- Method: LTM-INO-4030 Conductivity			
Cation Exchange Capacity	Melbourne	May 18, 2020	180 Days
- Method: LTM-MET-3060 Cation Exchange Capacity by bases & Exchangeable Sodium Percentage			
% Moisture	Sydney	May 07, 2020	14 Days
- Method: LTM-GEN-7080 Moisture			

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Company Name: Construction Sciences Pty Ltd
Address: 2/4 Kellogg Rd
Glendenning
NSW 2761

Project Name: LUDDENHAM ROAD ORCHARD HILLS HBB
Project ID: 501700153

Order No.: 501700153
Report #: 718184
Phone: 02 9854 1700
Fax:

Received: May 7, 2020 9:31 AM
Due: May 18, 2020
Priority: 1 Day
Contact Name: Vipul DeSilva

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Chloride	Conductivity (1:5 aqueous extract at 25°C as rec.)	pH (1:5 Aqueous extract at 25°C as rec.)	Sulphate (as SO4)	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254 & 14271											X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
Perth Laboratory - NATA Site # 23736											
External Laboratory											
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**						
1	TP26 0.50M	May 04, 2020		Soil	S20-My10605		X	X			
2	TP26 1.50M	May 04, 2020		Soil	S20-My10606		X	X			
3	TP27 0.50M	May 04, 2020		Soil	S20-My10607		X	X			
4	TP27 1.50M	May 04, 2020		Soil	S20-My10608		X	X			
5	TP28 0.50M	May 04, 2020		Soil	S20-My10609		X	X			
6	TP28 1.50M	May 04, 2020		Soil	S20-My10610		X	X		X	
7	TP29 0.50M	May 04, 2020		Soil	S20-My10611		X	X		X	
8	TP29 1.50M	May 04, 2020		Soil	S20-My10612		X	X			
9	TP30 0.50M	May 04, 2020		Soil	S20-My10613		X	X			
10	TP30 1.50M	May 04, 2020		Soil	S20-My10614		X	X		X	

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Melbourne Laboratory - NATA Site # 1254 & 14271											X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
Perth Laboratory - NATA Site # 23736											
11	TP31 0.50M	May 04, 2020		Soil	S20-My10615		X	X			
12	TP31 1.50M	May 04, 2020		Soil	S20-My10616		X	X			
13	TP35 0.50M	May 04, 2020		Soil	S20-My10617		X	X		X	
14	TP35 1.50M	May 04, 2020		Soil	S20-My10618		X	X			
15	TP14 0.50M	May 05, 2020		Soil	S20-My10619		X	X			
16	TP14 1.50M	May 05, 2020		Soil	S20-My10620		X	X			
17	TP15 0.50M	May 05, 2020		Soil	S20-My10621		X	X			
18	TP15 1.50M	May 05, 2020		Soil	S20-My10622		X	X			
19	TP16 0.50M	May 05, 2020		Soil	S20-My10623		X	X		X	
20	TP16 1.00M	May 05, 2020		Soil	S20-My10624		X	X			
21	TP16 1.50M	May 05, 2020		Soil	S20-My10625		X	X			
22	TP17 0.50M	May 05, 2020		Soil	S20-My10626		X	X			
23	TP17 1.00M	May 05, 2020		Soil	S20-My10627		X	X			

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Sample Detail						Chloride	Conductivity (1:5 aqueous extract at 25°C as rec.)	pH (1:5 Aqueous extract at 25°C as rec.)	Sulphate (as SO4)	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254 & 14271											X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
Perth Laboratory - NATA Site # 23736											
24	TP17 1.50M	May 05, 2020		Soil	S20-My10628		X	X			
25	TP18 0.50M	May 05, 2020		Soil	S20-My10629		X	X			
26	TP18 1.00M	May 05, 2020		Soil	S20-My10630		X	X		X	
27	TP18 1.40M	May 05, 2020		Soil	S20-My10631		X	X			
28	TP33 0.50M	May 05, 2020		Soil	S20-My10632		X	X			
29	TP33 1.50M	May 05, 2020		Soil	S20-My10633		X	X		X	
30	TP34 0.30M	May 05, 2020		Soil	S20-My10634	X		X	X	X	X
31	TP34 0.50M	May 05, 2020		Soil	S20-My10635		X	X			
32	TP34 1.00M	May 05, 2020		Soil	S20-My10636		X	X			
33	TP34 1.50M	May 05, 2020		Soil	S20-My10637		X	X			
34	TP34 2.00M	May 05, 2020		Soil	S20-My10638		X	X			
35	TP42 0.50M	May 05, 2020		Soil	S20-My10639		X	X			
36	TP42 1.50M	May 05, 2020		Soil	S20-My10640		X	X			

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Melbourne Laboratory - NATA Site # 1254 & 14271											X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
Perth Laboratory - NATA Site # 23736											
37	TP43 0.50M	May 05, 2020		Soil	S20-My10641		X	X			
38	TP43 1.00M	May 05, 2020		Soil	S20-My10642		X	X			
39	TP43 1.50M	May 05, 2020		Soil	S20-My10643		X	X			
40	TP43 2.00M	May 05, 2020		Soil	S20-My10644		X	X			
41	TP44 0.50M	May 05, 2020		Soil	S20-My10645		X	X		X	
42	TP44 1.50M	May 05, 2020		Soil	S20-My10646		X	X			
43	TP45 0.50M	May 05, 2020		Soil	S20-My10647		X	X			
44	TP45 1.30M	May 05, 2020		Soil	S20-My10648		X	X			
45	TP46 0.50M	May 05, 2020		Soil	S20-My10649		X	X			
46	TP46 0.80M	May 05, 2020		Soil	S20-My10650		X	X			
47	TP47 0.50M	May 05, 2020		Soil	S20-My10651		X	X			
48	TP47 1.50M	May 05, 2020		Soil	S20-My10652		X	X		X	
49	TP48 0.50M	May 05, 2020		Soil	S20-My10653		X	X		X	

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Sample Detail						Chloride	Conductivity (1:5 aqueous extract at 25°C as rec.)	pH (1:5 Aqueous extract at 25°C as rec.)	Sulphate (as SO4)	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254 & 14271											X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
Perth Laboratory - NATA Site # 23736											
50	TP48 1.50M	May 05, 2020		Soil	S20-My10654		X	X			
51	TP78 0.50M	May 05, 2020		Soil	S20-My10655		X	X			
52	TP78 1.50M	May 05, 2020		Soil	S20-My10656		X	X			
Test Counts						1	51	52	1	11	1

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Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

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

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

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

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

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Chloride	mg/kg	< 10			10	Pass	
Conductivity (1:5 aqueous extract at 25°C as rec.)	uS/cm	< 10			10	Pass	
Sulphate (as SO4)	mg/kg	< 10			10	Pass	
LCS - % Recovery							
Chloride	%	106			70-130	Pass	
Conductivity (1:5 aqueous extract at 25°C as rec.)	%	108			70-130	Pass	
Sulphate (as SO4)	%	106			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My10609	CP	uS/cm	270	290	5.7	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My10609	CP	pH Units	4.7	4.8	Pass	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S20-My10617	CP	%	14	18	25	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My10619	CP	uS/cm	410	410	1.5	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My10619	CP	pH Units	5.1	5.0	Pass	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My10629	CP	uS/cm	19	20	5.6	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My10629	CP	pH Units	5.3	5.4	Pass	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My10639	CP	uS/cm	320	290	10	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My10639	CP	pH Units	4.8	5.0	Pass	30%	Pass	

Comments

Sample Integrity

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

Authorised By

Ursula Long	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Gabriele Cordero	Senior Analyst-Inorganic (NSW)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

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

Construction Sciences Pty Ltd
2/4 Kellogg Rd
Glendenning
NSW 2761

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Vipul DeSilva**

Report **718188-S**
Project name LUDDENHAM ROAD ORCHARD HILLS HBB
Project ID 5017200153
Received Date May 07, 2020

Client Sample ID			**TP08 0.50M**	**TP08 1.50M**	**TP09 0.50M**	**TP09 1.50M**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S20-My10657**	**S20-My10658**	**S20-My10659**	**S20-My10660**
Date Sampled			**May 06, 2020**	**May 06, 2020**	**May 06, 2020**	**May 06, 2020**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	150	230	79	33
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.4	5.3	5.3	5.5
% Moisture	1	%	23	-	22	-

Client Sample ID			**TP10 0.50M**	**TP10 1.50M**	**TP11 0.50M**	**TP11 1.50M**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S20-My10661**	**S20-My10662**	**S20-My10663**	**S20-My10664**
Date Sampled			**May 06, 2020**	**May 06, 2020**	**May 06, 2020**	**May 06, 2020**
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	-	-	71	-
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	400	430	53	360
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.4	5.5	5.8	4.9
Sulphate (as SO4)	10	mg/kg	-	-	19	-
% Moisture	1	%	19	-	21	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	13	-

Client Sample ID			**TP12 0.50M**	**TP12 1.50M**	**TP13 0.50M**	**TP13 1.50M**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S20-My10665**	**S20-My10666**	**S20-My10667**	**S20-My10668**
Date Sampled			**May 06, 2020**	**May 06, 2020**	**May 06, 2020**	**May 06, 2020**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	53	140	200	280
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.8	5.1	4.9	5.8
% Moisture	1	%	22	-	21	21
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	16	-

Client Sample ID			TP66 0.50M	TP66 1.50M	TP67 0.50M	TP67 1.50M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10669	S20-My10670	S20-My10671	S20-My10672
Date Sampled			May 06, 2020	May 06, 2020	May 06, 2020	May 06, 2020
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	-	-	-	1900
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	90	140	110	760
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.7	5.2	5.8	4.2
Sulphate (as SO4)	10	mg/kg	-	-	-	< 10
% Moisture	1	%	-	10	-	17
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	15	-	6.7

Client Sample ID			TP68 0.50M	TP68 1.50M	TP69 0.50M	TP69 1.50M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10673	S20-My10674	S20-My10675	S20-My10676
Date Sampled			May 06, 2020	May 06, 2020	May 06, 2020	May 06, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	41	51	56	44
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.7	4.8	5.6	5.5
% Moisture	1	%	-	16	-	19

Client Sample ID			TP70 0.50M	TP70 1.50M	TP71 0.50M	TP71 1.50M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10677	S20-My10678	S20-My10679	S20-My10680
Date Sampled			May 06, 2020	May 06, 2020	May 06, 2020	May 06, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	40	43	460	1400
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.4	5.1	4.9	4.5
% Moisture	1	%	30	-	15	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	8.5	-	-	-

Client Sample ID			TP72 0.50M	TP72 1.50M	TP73 0.50M	TP73 1.50M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10681	S20-My10682	S20-My10683	S20-My10684
Date Sampled			May 06, 2020	May 06, 2020	May 06, 2020	May 06, 2020
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	28	-	-	-
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	48	28	44	29
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.7	5.5	5.8	5.7
Sulphate (as SO4)	10	mg/kg	50	-	-	-
% Moisture	1	%	19	-	21	14
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	-	9.1

Client Sample ID			TP74 0.50M	TP74 1.50M	TP75 0.50M	TP75 1.50M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10685	S20-My10686	S20-My10687	S20-My10688
Date Sampled			May 06, 2020	May 06, 2020	May 06, 2020	May 06, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	300	540	290	530
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.6	5.1	5.1	4.8
% Moisture	1	%	23	-	-	16

Client Sample ID			TP77 0.50M	TP77 1.50M	TP79 0.50M	TP79 1.20M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10689	S20-My10690	S20-My10691	S20-My10692
Date Sampled			May 06, 2020	May 06, 2020	May 06, 2020	May 06, 2020
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	-	-	-	32
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	490	420	57	39
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.1	5.2	5.3	5.6
Sulphate (as SO4)	10	mg/kg	-	-	-	26
% Moisture	1	%	-	16	-	11

Client Sample ID			TP80 0.50M	TP80 1.00M	TP80 1.50M	TP80 2.00M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10693	S20-My10694	S20-My10695	S20-My10696
Date Sampled			May 06, 2020	May 06, 2020	May 06, 2020	May 06, 2020
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	-	-	93	-
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	190	150	89	79
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.2	5.0	5.4	5.4
Sulphate (as SO4)	10	mg/kg	-	-	40	-
% Moisture	1	%	-	16	14	13
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	-	16

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

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

Description	Testing Site	Extracted	Holding Time
Chloride	Sydney	May 12, 2020	28 Days
- Method: E045 /E047 Chloride			
pH (1:5 Aqueous extract at 25°C as rec.)	Sydney	May 13, 2020	7 Days
- Method: LTM-GEN-7090 pH in soil by ISE			
Sulphate (as SO4)	Sydney	May 12, 2020	28 Days
- Method: E045 Anions by Ion Chromatography			
Conductivity (1:5 aqueous extract at 25°C as rec.)	Sydney	May 13, 2020	7 Days
- Method: LTM-INO-4030 Conductivity			
Cation Exchange Capacity	Melbourne	May 14, 2020	180 Days
- Method: LTM-MET-3060 Cation Exchange Capacity by bases & Exchangeable Sodium Percentage			
% Moisture	Sydney	May 08, 2020	14 Days
- Method: LTM-GEN-7080 Moisture			

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Company Name: Construction Sciences Pty Ltd
Address: 2/4 Kellogg Rd
Glendenning
NSW 2761

Project Name: LUDDENHAM ROAD ORCHARD HILLS HBB
Project ID: 5017200153

Order No.: 5017200153
Report #: 718188
Phone: 02 9854 1700
Fax:

Received: May 7, 2020 9:31 AM
Due: May 14, 2020
Priority: 5 Day
Contact Name: Vipul DeSilva

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Chloride	Conductivity (1:5 aqueous extract at 25°C as rec.)	pH (1:5 Aqueous extract at 25°C as rec.)	Sulphate (as SO4)	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254 & 14271										X	X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
Perth Laboratory - NATA Site # 23736											
External Laboratory											
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**						
1	TP08 0.50M	May 06, 2020		Soil	S20-My10657		X	X		X	
2	TP08 1.50M	May 06, 2020		Soil	S20-My10658		X	X			
3	TP09 0.50M	May 06, 2020		Soil	S20-My10659		X	X		X	
4	TP09 1.50M	May 06, 2020		Soil	S20-My10660		X	X			
5	TP10 0.50M	May 06, 2020		Soil	S20-My10661		X	X		X	
6	TP10 1.50M	May 06, 2020		Soil	S20-My10662		X	X			
7	TP11 0.50M	May 06, 2020		Soil	S20-My10663	X		X	X	X	X
8	TP11 1.50M	May 06, 2020		Soil	S20-My10664		X	X			
9	TP12 0.50M	May 06, 2020		Soil	S20-My10665		X	X		X	
10	TP12 1.50M	May 06, 2020		Soil	S20-My10666		X	X			

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Project ID: 5017200153

Order No.: 5017200153
Report #: 718188
Phone: 02 9854 1700
Fax:

Received: May 7, 2020 9:31 AM
Due: May 14, 2020
Priority: 5 Day
Contact Name: Vipul DeSilva

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Chloride	Conductivity (1:5 aqueous extract at 25°C as rec.)	pH (1:5 Aqueous extract at 25°C as rec.)	Sulphate (as SO4)	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254 & 14271										X	X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
Perth Laboratory - NATA Site # 23736											
11	TP13 0.50M	May 06, 2020		Soil	S20-My10667			X		X	X
12	TP13 1.50M	May 06, 2020		Soil	S20-My10668		X	X		X	
13	TP66 0.50M	May 06, 2020		Soil	S20-My10669		X	X			
14	TP66 1.50M	May 06, 2020		Soil	S20-My10670			X		X	X
15	TP67 0.50M	May 06, 2020		Soil	S20-My10671		X	X			
16	TP67 1.50M	May 06, 2020		Soil	S20-My10672	X		X	X	X	X
17	TP68 0.50M	May 06, 2020		Soil	S20-My10673		X	X			
18	TP68 1.50M	May 06, 2020		Soil	S20-My10674		X	X		X	
19	TP69 0.50M	May 06, 2020		Soil	S20-My10675		X	X			
20	TP69 1.50M	May 06, 2020		Soil	S20-My10676		X	X		X	
21	TP70 0.50M	May 06, 2020		Soil	S20-My10677			X		X	X
22	TP70 1.50M	May 06, 2020		Soil	S20-My10678		X	X			
23	TP71 0.50M	May 06, 2020		Soil	S20-My10679		X	X		X	

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Project ID: 5017200153

Order No.: 5017200153
Report #: 718188
Phone: 02 9854 1700
Fax:

Received: May 7, 2020 9:31 AM
Due: May 14, 2020
Priority: 5 Day
Contact Name: Vipul DeSilva

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Chloride	Conductivity (1:5 aqueous extract at 25°C as rec.)	pH (1:5 Aqueous extract at 25°C as rec.)	Sulphate (as SO4)	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254 & 14271										X	X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
Perth Laboratory - NATA Site # 23736											
24	TP71 1.50M	May 06, 2020		Soil	S20-My10680		X	X			
25	TP72 0.50M	May 06, 2020		Soil	S20-My10681	X	X	X	X	X	
26	TP72 1.50M	May 06, 2020		Soil	S20-My10682		X	X			
27	TP73 0.50M	May 06, 2020		Soil	S20-My10683		X	X		X	
28	TP73 1.50M	May 06, 2020		Soil	S20-My10684			X		X	X
29	TP74 0.50M	May 06, 2020		Soil	S20-My10685		X	X		X	
30	TP74 1.50M	May 06, 2020		Soil	S20-My10686		X	X			
31	TP75 0.50M	May 06, 2020		Soil	S20-My10687		X	X			
32	TP75 1.50M	May 06, 2020		Soil	S20-My10688		X	X		X	
33	TP77 0.50M	May 06, 2020		Soil	S20-My10689		X	X			
34	TP77 1.50M	May 06, 2020		Soil	S20-My10690		X	X		X	
35	TP79 0.50M	May 06, 2020		Soil	S20-My10691		X	X			
36	TP79 1.20M	May 06, 2020		Soil	S20-My10692	X	X	X	X	X	

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NSW 2761

Project Name: LUDDENHAM ROAD ORCHARD HILLS HBB
Project ID: 5017200153

Order No.: 5017200153
Report #: 718188
Phone: 02 9854 1700
Fax:

Received: May 7, 2020 9:31 AM
Due: May 14, 2020
Priority: 5 Day
Contact Name: Vipul DeSilva

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Chloride	Conductivity (1:5 aqueous extract at 25°C as rec.)	pH (1:5 Aqueous extract at 25°C as rec.)	Sulphate (as SO4)	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254 & 14271										X	X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
Perth Laboratory - NATA Site # 23736											
37	TP80 0.50M	May 06, 2020		Soil	S20-My10693		X	X			
38	TP80 1.00M	May 06, 2020		Soil	S20-My10694		X	X		X	
39	TP80 1.50M	May 06, 2020		Soil	S20-My10695	X	X	X	X	X	
40	TP80 2.00M	May 06, 2020		Soil	S20-My10696			X		X	X
Test Counts						5	33	40	5	23	7

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

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

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

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

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

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Chloride	mg/kg	< 10			10	Pass	
Conductivity (1:5 aqueous extract at 25°C as rec.)	uS/cm	< 10			10	Pass	
Sulphate (as SO4)	mg/kg	< 10			10	Pass	
LCS - % Recovery							
Chloride	%	101			70-130	Pass	
Conductivity (1:5 aqueous extract at 25°C as rec.)	%	108			70-130	Pass	
Sulphate (as SO4)	%	99			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My10657	CP	uS/cm	150	150	1.1	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My10657	CP	pH Units	5.4	5.4	Pass	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My10660	CP	uS/cm	33	36	7.2	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My10660	CP	pH Units	5.5	5.4	Pass	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My10670	CP	uS/cm	140	140	2.1	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My10670	CP	pH Units	5.2	5.1	Pass	30%	Pass	
% Moisture	S20-My10670	CP	%	10	12	17	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My10680	CP	uS/cm	1400	1400	4.3	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My10680	CP	pH Units	4.5	4.6	Pass	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	S20-My10681	CP	mg/kg	28	24	14	30%	Pass	
Sulphate (as SO4)	S20-My10681	CP	mg/kg	50	58	15	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My10688	CP	uS/cm	530	550	3.9	30%	Pass	
% Moisture	S20-My10688	CP	%	16	17	9.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My10690	CP	uS/cm	420	410	2.1	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My10690	CP	pH Units	5.2	5.2	Pass	30%	Pass	

Comments

Sample Integrity

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

Authorised By

Ursula Long	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Gabriele Cordero	Senior Analyst-Inorganic (NSW)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

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

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NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Vipul DeSilva**

Report **718228-S**
Project name LUDDENHAM RD ORCHARD HILLS HBB
Project ID 5017200153
Received Date May 07, 2020

Client Sample ID			**TP01 0.50M**	**TP01 1.50M**	**TP02 0.50M**	**TP02 1.50M**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S20-My10924**	**S20-My10925**	**S20-My10926**	**S20-My10927**
Date Sampled			**May 07, 2020**	**May 07, 2020**	**May 07, 2020**	**May 07, 2020**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	890	950	120	800
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.8	5.3	5.6	6.2
% Moisture	1	%	-	20	-	-

Client Sample ID			**TP03 0.50M**	**TP03 1.50M**	**TP04 0.50M**	**TP04 1.50M**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S20-My10928**	**S20-My10929**	**S20-My10930**	**S20-My10931**
Date Sampled			**May 07, 2020**	**May 07, 2020**	**May 07, 2020**	**May 07, 2020**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	130	470	330	470
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.5	4.8	5.3	4.3
% Moisture	1	%	-	-	23	-

Client Sample ID			**TP05 0.50M**	**TP05 1.50M**	**TP06 0.50M**	**TP06 1.50M**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S20-My10932**	**S20-My10933**	**S20-My10934**	**S20-My10935**
Date Sampled			**May 07, 2020**	**May 07, 2020**	**May 07, 2020**	**May 07, 2020**
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	-	51	-	-
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	93	72	580	990
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.5	5.8	6.0	6.3
Sulphate (as SO4)	10	mg/kg	-	12	-	-
% Moisture	1	%	6.2	-	-	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	13	-	-

Client Sample ID			TP07 0.50M	TP07 1.50M	TP51 0.50M	TP51 1.00M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10936	S20-My10937	S20-My10938	S20-My10939
Date Sampled			May 07, 2020	May 07, 2020	May 07, 2020	May 07, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	140	890	680	910
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.5	4.9	5.1	4.8
% Moisture	1	%	-	-	-	27

Client Sample ID			TP51 1.50M	TP51 2.00M	TP52 0.50M	TP52 1.50M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10940	S20-My10941	S20-My10942	S20-My10943
Date Sampled			May 07, 2020	May 07, 2020	May 07, 2020	May 07, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	820	930	130	270
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	4.7	3.7	5.7	5.6
% Moisture	1	%	-	15	-	-

Client Sample ID			TP53 0.50M	TP53 1.50M	TP54 0.50M	TP54 1.50M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10944	S20-My10945	S20-My10946	S20-My10947
Date Sampled			May 07, 2020	May 07, 2020	May 07, 2020	May 07, 2020
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	-	-	-	270
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	910	660	170	250
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.5	5.1	6.5	5.2
Sulphate (as SO4)	10	mg/kg	-	-	-	35
% Moisture	1	%	-	-	15	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	-	21

Client Sample ID			TP55 0.50M	TP55 1.50M	TP56 0.50M	TP56 1.50M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10948	S20-My10949	S20-My10950	S20-My10951
Date Sampled			May 07, 2020	May 07, 2020	May 07, 2020	May 07, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	330	560	32	450
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.4	4.9	5.9	4.8
% Moisture	1	%	-	10	-	-

Client Sample ID			TP57 0.50M	TP57 1.50M	TP58 0.50M	TP58 1.00M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10952	S20-My10953	S20-My10954	S20-My10955
Date Sampled			May 07, 2020	May 07, 2020	May 07, 2020	May 07, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	600	680	360	460
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.5	5.9	5.6	5.7
% Moisture	1	%	-	18	-	-

Client Sample ID			TP58 1.50M	TP58 2.00M	TP59 0.50M	TP59 1.50M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10956	S20-My10957	S20-My10958	S20-My10959
Date Sampled			May 07, 2020	May 07, 2020	May 07, 2020	May 07, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	530	620	600	450
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.9	5.7	6.4	7.1
% Moisture	1	%	-	-	14	-

Client Sample ID			TP60 0.50M	TP60 1.50M	TP61 0.50M	TP61 1.50M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10960	S20-My10961	S20-My10962	S20-My10963
Date Sampled			May 07, 2020	May 07, 2020	May 07, 2020	May 07, 2020
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	16	-	-	-
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	81	860	150	310
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	6.0	5.9	5.7	5.3
Sulphate (as SO4)	10	mg/kg	36	-	-	-
% Moisture	1	%	-	9.9	-	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	14	-	-	-

Client Sample ID			TP62 0.50M	TP62 1.50M	TP63 0.50M	TP63 1.50M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10964	S20-My10965	S20-My10966	S20-My10967
Date Sampled			May 07, 2020	May 07, 2020	May 07, 2020	May 07, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	34	49	250	1000
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.7	5.5	5.7	6.0

Client Sample ID			TP64 0.50M	TP64 1.00M	TP64 1.50M	TP64 2.00M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10968	S20-My10969	S20-My10970	S20-My10971
Date Sampled			May 07, 2020	May 07, 2020	May 07, 2020	May 07, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	440	730	720	590
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	6.5	6.1	6.7	6.4

Client Sample ID			TP65 0.50M	TP65 1.50M	TP61 1.00	TP61 2.00
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My10972	S20-My10973	S20-My11388	S20-My11389
Date Sampled			May 07, 2020	May 07, 2020	May 07, 2020	May 07, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	47	100	300	280
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.8	5.4	5.2	5.4

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

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

Description	Testing Site	Extracted	Holding Time
Chloride	Sydney	May 13, 2020	28 Days
- Method: E045 /E047 Chloride			
pH (1:5 Aqueous extract at 25°C as rec.)	Sydney	May 14, 2020	7 Days
- Method: LTM-GEN-7090 pH in soil by ISE			
Sulphate (as SO4)	Sydney	May 13, 2020	28 Days
- Method: E045 Anions by Ion Chromatography			
Conductivity (1:5 aqueous extract at 25°C as rec.)	Melbourne	May 14, 2020	7 Days
- Method: LTM-INO-4030 Conductivity			
Cation Exchange Capacity	Melbourne	May 14, 2020	180 Days
- Method: LTM-MET-3060 Cation Exchange Capacity by bases & Exchangeable Sodium Percentage			
% Moisture	Sydney	May 08, 2020	14 Days
- Method: LTM-GEN-7080 Moisture			

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Company Name: Construction Sciences Pty Ltd
Address: 2/4 Kellogg Rd
Glendenning
NSW 2761

Project Name: LUDDENHAM RD ORCHARD HILLS HBB
Project ID: 5017200153

Order No.:
Report #: 718228
Phone: 02 9854 1700
Fax:

Received: May 7, 2020 8:56 PM
Due: May 14, 2020
Priority: 5 Day
Contact Name: Vipul DeSilva

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Chloride	Conductivity (1:5 aqueous extract at 25°C as rec.)	pH (1:5 Aqueous extract at 25°C as rec.)	Sulphate (as SO4)	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254 & 14271											X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
Perth Laboratory - NATA Site # 23736											
External Laboratory											
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**						
1	TP01 0.50M	May 07, 2020		Soil	S20-My10924		X	X			
2	TP01 1.50M	May 07, 2020		Soil	S20-My10925		X	X		X	
3	TP02 0.50M	May 07, 2020		Soil	S20-My10926		X	X			
4	TP02 1.50M	May 07, 2020		Soil	S20-My10927		X	X			
5	TP03 0.50M	May 07, 2020		Soil	S20-My10928		X	X			
6	TP03 1.50M	May 07, 2020		Soil	S20-My10929		X	X			
7	TP04 0.50M	May 07, 2020		Soil	S20-My10930		X	X		X	
8	TP04 1.50M	May 07, 2020		Soil	S20-My10931		X	X			
9	TP05 0.50M	May 07, 2020		Soil	S20-My10932		X	X		X	
10	TP05 1.50M	May 07, 2020		Soil	S20-My10933	X		X	X		X

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IANZ # 1290

Company Name: Construction Sciences Pty Ltd
Address: 2/4 Kellogg Rd
Glendenning
NSW 2761

Project Name: LUDDENHAM RD ORCHARD HILLS HBB
Project ID: 5017200153

Order No.:
Report #: 718228
Phone: 02 9854 1700
Fax:

Received: May 7, 2020 8:56 PM
Due: May 14, 2020
Priority: 5 Day
Contact Name: Vipul DeSilva

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Chloride	Conductivity (1:5 aqueous extract at 25°C as rec.)	pH (1:5 Aqueous extract at 25°C as rec.)	Sulphate (as SO4)	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254 & 14271											X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
Perth Laboratory - NATA Site # 23736											
11	TP06 0.50M	May 07, 2020		Soil	S20-My10934		X	X			
12	TP06 1.50M	May 07, 2020		Soil	S20-My10935		X	X			
13	TP07 0.50M	May 07, 2020		Soil	S20-My10936		X	X			
14	TP07 1.50M	May 07, 2020		Soil	S20-My10937		X	X			
15	TP51 0.50M	May 07, 2020		Soil	S20-My10938		X	X			
16	TP51 1.00M	May 07, 2020		Soil	S20-My10939		X	X		X	
17	TP51 1.50M	May 07, 2020		Soil	S20-My10940		X	X			
18	TP51 2.00M	May 07, 2020		Soil	S20-My10941		X	X		X	
19	TP52 0.50M	May 07, 2020		Soil	S20-My10942		X	X			
20	TP52 1.50M	May 07, 2020		Soil	S20-My10943		X	X			
21	TP53 0.50M	May 07, 2020		Soil	S20-My10944		X	X			
22	TP53 1.50M	May 07, 2020		Soil	S20-My10945		X	X			
23	TP54 0.50M	May 07, 2020		Soil	S20-My10946		X	X		X	

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Eurofins Analytical Services Manager : Ursula Long

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Melbourne Laboratory - NATA Site # 1254 & 14271											X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
Perth Laboratory - NATA Site # 23736											
24	TP54 1.50M	May 07, 2020		Soil	S20-My10947	X		X	X		X
25	TP55 0.50M	May 07, 2020		Soil	S20-My10948		X	X			
26	TP55 1.50M	May 07, 2020		Soil	S20-My10949		X	X		X	
27	TP56 0.50M	May 07, 2020		Soil	S20-My10950		X	X			
28	TP56 1.50M	May 07, 2020		Soil	S20-My10951		X	X			
29	TP57 0.50M	May 07, 2020		Soil	S20-My10952		X	X			
30	TP57 1.50M	May 07, 2020		Soil	S20-My10953		X	X		X	
31	TP58 0.50M	May 07, 2020		Soil	S20-My10954		X	X			
32	TP58 1.00M	May 07, 2020		Soil	S20-My10955		X	X			
33	TP58 1.50M	May 07, 2020		Soil	S20-My10956		X	X			
34	TP58 2.00M	May 07, 2020		Soil	S20-My10957		X	X			
35	TP59 0.50M	May 07, 2020		Soil	S20-My10958		X	X		X	
36	TP59 1.50M	May 07, 2020		Soil	S20-My10959		X	X			

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Project ID: 5017200153

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Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Chloride	Conductivity (1:5 aqueous extract at 25°C as rec.)	pH (1:5 Aqueous extract at 25°C as rec.)	Sulphate (as SO4)	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254 & 14271											X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
Perth Laboratory - NATA Site # 23736											
37	TP60 0.50M	May 07, 2020		Soil	S20-My10960	X		X	X		X
38	TP60 1.50M	May 07, 2020		Soil	S20-My10961		X	X		X	
39	TP61 0.50M	May 07, 2020		Soil	S20-My10962		X	X			
40	TP61 1.50M	May 07, 2020		Soil	S20-My10963		X	X			
41	TP62 0.50M	May 07, 2020		Soil	S20-My10964		X	X			
42	TP62 1.50M	May 07, 2020		Soil	S20-My10965		X	X			
43	TP63 0.50M	May 07, 2020		Soil	S20-My10966		X	X			
44	TP63 1.50M	May 07, 2020		Soil	S20-My10967		X	X			
45	TP64 0.50M	May 07, 2020		Soil	S20-My10968		X	X			
46	TP64 1.00M	May 07, 2020		Soil	S20-My10969		X	X			
47	TP64 1.50M	May 07, 2020		Soil	S20-My10970		X	X			
48	TP64 2.00M	May 07, 2020		Soil	S20-My10971		X	X			
49	TP65 0.50M	May 07, 2020		Soil	S20-My10972		X	X			

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Contact Name: Vipul DeSilva

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Chloride	Conductivity (1:5 aqueous extract at 25°C as rec.)	pH (1:5 Aqueous extract at 25°C as rec.)	Sulphate (as SO4)	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254 & 14271											X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
Perth Laboratory - NATA Site # 23736											
50	TP65 1.50M	May 07, 2020		Soil	S20-My10973		X	X			
51	TP61 1.00	May 07, 2020		Soil	S20-My11388		X	X			
52	TP61 2.00	May 07, 2020		Soil	S20-My11389		X	X			
Test Counts						3	49	52	3	10	3

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

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

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

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

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

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Chloride	mg/kg	< 10			10	Pass	
Conductivity (1:5 aqueous extract at 25°C as rec.)	uS/cm	< 10			10	Pass	
Sulphate (as SO4)	mg/kg	< 10			10	Pass	
LCS - % Recovery							
Chloride	%	101			70-130	Pass	
Conductivity (1:5 aqueous extract at 25°C as rec.)	%	108			70-130	Pass	
Sulphate (as SO4)	%	99			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My10924	CP	uS/cm	890	790	12	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My10924	CP	pH Units	5.8	5.8	Pass	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S20-My10925	CP	%	20	18	13	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	S20-My10681	NCP	mg/kg	28	24	14	30%	Pass	
Sulphate (as SO4)	S20-My10681	NCP	mg/kg	50	58	15	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My10936	CP	uS/cm	140	150	2.5	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My10936	CP	pH Units	5.5	5.5	Pass	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My10949	CP	uS/cm	560	570	<1	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My10949	CP	pH Units	4.9	4.9	Pass	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My10954	CP	uS/cm	360	350	2.9	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My10954	CP	pH Units	5.6	5.9	Pass	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My10956	CP	uS/cm	530	480	9.6	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My10956	CP	pH Units	5.9	5.9	Pass	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My10965	CP	uS/cm	49	55	10	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My10965	CP	pH Units	5.5	5.4	Pass	30%	Pass	

Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My10967	CP	uS/cm	1000	1000	2.7	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My10967	CP	pH Units	6.0	6.2	Pass	30%	Pass	

Comments

Sample Integrity

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

Authorised By

Ursula Long	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Gabriele Cordero	Senior Analyst-Inorganic (NSW)
Scott Beddoes	Senior Analyst-Inorganic (VIC)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

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

Construction Sciences Pty Ltd
2/4 Kellogg Rd
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NSW 2761

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Vipul DeSilva**

Report **718526-S**
Project name LUDDENHAM ROAD ORCHARD HILLS HBB
Project ID 5017200153
Received Date May 08, 2020

Client Sample ID			**TP32 0.20M**	**TP32 0.50M**	**TP32 1.50M**	**TP36 0.50M**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S20-My13360**	**S20-My13361**	**S20-My13362**	**S20-My13363**
Date Sampled			**May 06, 2020**	**May 06, 2020**	**May 06, 2020**	**May 06, 2020**
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	12	-	-	-
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	31	340	460	260
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.9	5.0	5.7	4.8
Sulphate (as SO4)	10	mg/kg	< 10	-	-	-
% Moisture	1	%	15	19	15	22
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	5.5	-	-	-

Client Sample ID			**TP36 1.50M**	**TP39 0.50M**	**TP39 1.00M**	**TP39 1.50M**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S20-My13364**	**S20-My13365**	**S20-My13366**	**S20-My13367**
Date Sampled			**May 06, 2020**	**May 06, 2020**	**May 06, 2020**	**May 06, 2020**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	420	270	270	300
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.3	5.1	5.0	5.3
% Moisture	1	%	14	22	20	14

Client Sample ID			**TP39 2.00M**	**TP37 0.50M**	**TP37 1.50M**	**TP38 0.50M**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S20-My13368**	**S20-My13369**	**S20-My13370**	**S20-My13371**
Date Sampled			**May 06, 2020**	**May 06, 2020**	**May 06, 2020**	**May 06, 2020**
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	600	290	470	420
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.0	5.3	5.8	5.3
% Moisture	1	%	17	17	13	23

Client Sample ID			TP38 1.50M	TP40 0.50M	TP40 1.50M	TP41 0.50M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My13372	S20-My13373	S20-My13374	S20-My13375
Date Sampled			May 06, 2020	May 06, 2020	May 06, 2020	May 06, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	540	56	140	360
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.3	5.4	5.1	5.5
% Moisture	1	%	10	26	13	19

Client Sample ID			TP41 1.50M	TP49 0.50M	TP49 1.50M	TP50 0.50M
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-My13376	S20-My13377	S20-My13378	S20-My13379
Date Sampled			May 06, 2020	May 06, 2020	May 06, 2020	May 06, 2020
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	530	200	720	51
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.8	5.1	4.6	5.4
% Moisture	1	%	19	26	16	15

Client Sample ID			TP50 1.50M
Sample Matrix			Soil
Eurofins Sample No.			S20-My13380
Date Sampled			May 06, 2020
Test/Reference	LOR	Unit	
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	43
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.2
% Moisture	1	%	17

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

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

Description	Testing Site	Extracted	Holding Time
Chloride	Sydney	May 13, 2020	28 Days
- Method: E045 /E047 Chloride			
pH (1:5 Aqueous extract at 25°C as rec.)	Sydney	May 13, 2020	7 Days
- Method: LTM-GEN-7090 pH in soil by ISE			
Sulphate (as SO4)	Sydney	May 13, 2020	28 Days
- Method: E045 Anions by Ion Chromatography			
Conductivity (1:5 aqueous extract at 25°C as rec.)	Sydney	May 13, 2020	7 Days
- Method: LTM-INO-4030 Conductivity			
Cation Exchange Capacity	Melbourne	May 13, 2020	180 Days
- Method: LTM-MET-3060 Cation Exchange Capacity by bases & Exchangeable Sodium Percentage			
% Moisture	Sydney	May 11, 2020	14 Days
- Method: LTM-GEN-7080 Moisture			

eurofins | Environment Testing

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Site # 1254 & 14271

Sydney
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Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
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Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

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NATA # 1261
Site # 23736

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IANZ # 1327

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Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name: Construction Sciences Pty Ltd
Address: 2/4 Kellogg Rd
Glendenning
NSW 2761

Project Name: LUDDENHAM ROAD ORCHARD HILLS HBB
Project ID: 5017200153

Order No.:
Report #: 718526
Phone: 02 9854 1700
Fax:

Received: May 8, 2020 4:25 PM
Due: May 15, 2020
Priority: 5 Day
Contact Name: Vipul DeSilva

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Chloride	Conductivity (1:5 aqueous extract at 25°C as rec.)	pH (1:5 Aqueous extract at 25°C as rec.)	Sulphate (as SO4)	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254 & 14271											X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
Perth Laboratory - NATA Site # 23736											
External Laboratory											
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**						
1	TP32 0.20M	May 06, 2020		Soil	S20-My13360	X		X	X	X	X
2	TP32 0.50M	May 06, 2020		Soil	S20-My13361		X	X		X	
3	TP32 1.50M	May 06, 2020		Soil	S20-My13362		X	X		X	
4	TP36 0.50M	May 06, 2020		Soil	S20-My13363		X	X		X	
5	TP36 1.50M	May 06, 2020		Soil	S20-My13364		X	X		X	
6	TP39 0.50M	May 06, 2020		Soil	S20-My13365		X	X		X	
7	TP39 1.00M	May 06, 2020		Soil	S20-My13366		X	X		X	
8	TP39 1.50M	May 06, 2020		Soil	S20-My13367		X	X		X	
9	TP39 2.00M	May 06, 2020		Soil	S20-My13368		X	X		X	
10	TP37 0.50M	May 06, 2020		Soil	S20-My13369		X	X		X	

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Received: May 8, 2020 4:25 PM
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Contact Name: Vipul DeSilva

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Chloride	Conductivity (1:5 aqueous extract at 25°C as rec.)	pH (1:5 Aqueous extract at 25°C as rec.)	Sulphate (as SO4)	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254 & 14271											X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794											
Perth Laboratory - NATA Site # 23736											
11	TP37 1.50M	May 06, 2020		Soil	S20-My13370		X	X		X	
12	TP38 0.50M	May 06, 2020		Soil	S20-My13371		X	X		X	
13	TP38 1.50M	May 06, 2020		Soil	S20-My13372		X	X		X	
14	TP40 0.50M	May 06, 2020		Soil	S20-My13373		X	X		X	
15	TP40 1.50M	May 06, 2020		Soil	S20-My13374		X	X		X	
16	TP41 0.50M	May 06, 2020		Soil	S20-My13375		X	X		X	
17	TP41 1.50M	May 06, 2020		Soil	S20-My13376		X	X		X	
18	TP49 0.50M	May 06, 2020		Soil	S20-My13377		X	X		X	
19	TP49 1.50M	May 06, 2020		Soil	S20-My13378		X	X		X	
20	TP50 0.50M	May 06, 2020		Soil	S20-My13379		X	X		X	
21	TP50 1.50M	May 06, 2020		Soil	S20-My13380		X	X		X	
Test Counts						1	20	21	1	21	1

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

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

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

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

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

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Chloride	mg/kg	< 10			10	Pass	
Conductivity (1:5 aqueous extract at 25°C as rec.)	uS/cm	< 10			10	Pass	
Sulphate (as SO4)	mg/kg	< 10			10	Pass	
Method Blank							
Cation Exchange Capacity							
Cation Exchange Capacity	meq/100g	< 0.05			0.05	Pass	
LCS - % Recovery							
Chloride	%	105			70-130	Pass	
Conductivity (1:5 aqueous extract at 25°C as rec.)	%	108			70-130	Pass	
Sulphate (as SO4)	%	107			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
				Result 1					
Chloride	S20-My14203	NCP	%	104			70-130	Pass	
Sulphate (as SO4)	S20-My14203	NCP	%	103			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
Chloride	S20-My14203	NCP	mg/kg	< 10	< 10	<1	30%	Pass	
Sulphate (as SO4)	S20-My14203	NCP	mg/kg	23	22	2.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My13363	CP	uS/cm	260	270	1.6	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My13363	CP	pH Units	4.8	4.7	Pass	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S20-My13364	CP	%	14	19	27	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My13369	CP	pH Units	5.3	5.4	Pass	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My13373	CP	uS/cm	56	59	4.8	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My13373	CP	pH Units	5.4	5.4	Pass	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S20-My13374	CP	%	13	13	2.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-My13379	CP	uS/cm	51	45	12	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-My13379	CP	pH Units	5.4	5.6	Pass	30%	Pass	

Comments

Sample Integrity

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

Authorised By

Ursula Long	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Gabriele Cordero	Senior Analyst-Inorganic (NSW)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

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

Construction Sciences

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ABN: 74 128 806 735

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Laboratory: **Glendenning Laboratory**
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Email: Sydney@constructionsciences.net

ATTERBERG LIMITS REPORT

Client:	Construction Sciences - Professional Services	Report Number:	12385/R/212511-1
Client Address:	31 Anvil Road, Seven Hills	Project Number:	12385/P/1320
Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 1 of 9

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.2.1.1			
Sample Number	12385/S/783540	Sample Location		
Sampling Method	Tested As Received	Location		20200507
Date Sampled	7/05/2020	Test Pit		TP20
Sampled By	Client Sampled	Depth	m	0.20m-0.30m
Date Tested	15/05/2020			Foundation
Att. Drying Method	Oven Dried	Material Source	Existing	
Atterberg Preparation	Dry Sieved	Material Type	In-Situ	
Material Description	Brown Sandy Silty CLAY			

Atterberg Limits Results

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**36**	
Plastic Limit (%)		**14**	
Plasticity Index (%)		**22**	
Linear Shrinkage (%)			
Linear Shrinkage Defects:			

Remarks	Results apply to the sample/s as received.

NATA

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
Accredited for compliance with ISO/IEC 17025 - Testing

Accreditation Number: 1986
Corporate Site Number: 12385

Approved Signatory: Nigel Byrne
Form ID: W11bRep Rev 1

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Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 2 of 9

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.2.1.1			
Sample Number	12385/S/783541	Sample Location		
Sampling Method	Tested As Received	Location		20200507
Date Sampled	7/05/2020	Test Pit		TP24
Sampled By	Client Sampled	Depth	m	0.40m-0.50m
Date Tested	15/05/2020			Foundation
Att. Drying Method	Air Dried	Material Source	Existing	
Atterberg Preparation	Dry Sieved	Material Type	In-Situ	
Material Description	Red/Brown Silty CLAY			

Atterberg Limits Results

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**80**	
Plastic Limit (%)		**23**	
Plasticity Index (%)		**57**	
Linear Shrinkage (%)			
Linear Shrinkage Defects:			

Remarks	Results apply to the sample/s as received.

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Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 3 of 9

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.2.1.1		
Sample Number	12385/S/783542	Sample Location	
Sampling Method	Tested As Received	Location	20200508
Date Sampled	8/05/2020	Test Pit	TP16
Sampled By	Client Sampled	Depth m	0.50m
Date Tested	22/05/2020		Foundation
Att. Drying Method	Oven Dried	Material Source	Existing
Atterberg Preparation	Dry Sieved	Material Type	In-Situ
Material Description	Brown Silty Clay		

Atterberg Limits Results

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**66**	
Plastic Limit (%)		**20**	
Plasticity Index (%)		**46**	
Linear Shrinkage (%)			
Linear Shrinkage Defects:			

Remarks	Results apply to the sample/s as received.

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Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 4 of 9

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.2.1.1			
Sample Number	12385/S/783543	Sample Location		
Sampling Method	Tested As Received	Location		20200508
Date Sampled	8/05/2020	Test Pit		TP15
Sampled By	Client Sampled	Depth	m	1.50m
Date Tested	15/05/2020			Foundation
Att. Drying Method	Oven Dried	Material Source	Existing	
Atterberg Preparation	Dry Sieved	Material Type	In-Situ	
Material Description	Grey Silty CLAY			

Atterberg Limits Results

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**68**	
Plastic Limit (%)		**20**	
Plasticity Index (%)		**48**	
Linear Shrinkage (%)			
Linear Shrinkage Defects:			

Remarks	Results apply to the sample/s as received.

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Client Address:	31 Anvil Road, Seven Hills	Project Number:	12385/P/1320
Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 5 of 9

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.2.1.1		
Sample Number	12385/S/783547	Sample Location	
Sampling Method	Tested As Received	Location	20200506
Date Sampled	6/05/2020	Test Pit	TP80
Sampled By	Client Sampled	Depth m	0.30m
Date Tested	15/05/2020		Foundation
Att. Drying Method	Oven Dried	Material Source	Existing
Atterberg Preparation	Dry Sieved	Material Type	In-Situ
Material Description	Red/Brown CLAY		

Atterberg Limits Results

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**75**	
Plastic Limit (%)		**23**	
Plasticity Index (%)		**52**	
Linear Shrinkage (%)			
Linear Shrinkage Defects:			

Remarks	Results apply to the sample/s as received.

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Email: Sydney@constructionsciences.net

ATTERBERG LIMITS REPORT

Client:	Construction Sciences - Professional Services	Report Number:	12385/R/212511-1
Client Address:	31 Anvil Road, Seven Hills	Project Number:	12385/P/1320
Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 6 of 9

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.2.1.1			
Sample Number	12385/S/783548	Sample Location		
Sampling Method	Tested As Received	Location		20200506
Date Sampled	6/05/2020	Test Pit		TP74
Sampled By	Client Sampled	Depth	m	1.50m
Date Tested	22/05/2020			Foundation
Att. Drying Method	Oven Dried	Material Source	Existing	
Atterberg Preparation	Dry Sieved	Material Type	In-Situ	
Material Description	Brown Silty Clay			

Atterberg Limits Results

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**70**	
Plastic Limit (%)		**21**	
Plasticity Index (%)		**49**	
Linear Shrinkage (%)			
Linear Shrinkage Defects:			

Remarks	Results apply to the sample/s as received.

NATA

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Accreditation Number: 1986
Corporate Site Number: 12385

Approved Signatory: Nigel Byrne
Form ID: W11bRep Rev 1

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ATTERBERG LIMITS REPORT

Client:	Construction Sciences - Professional Services	Report Number:	12385/R/212511-1
Client Address:	31 Anvil Road, Seven Hills	Project Number:	12385/P/1320
Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 7 of 9

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.2.1.1			
Sample Number	12385/S/783549	Sample Location		
Sampling Method	Tested As Received	Location		20200506
Date Sampled	6/05/2020	Test Pit		TP66
Sampled By	Client Sampled	Depth	m	0.50m
Date Tested	15/05/2020			Foundation
Att. Drying Method	Oven Dried	Material Source	Existing	
Atterberg Preparation	Dry Sieved	Material Type	In-Situ	
Material Description	Brown Sandy Silty CLAY			

Atterberg Limits Results

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**71**	
Plastic Limit (%)		**24**	
Plasticity Index (%)		**47**	
Linear Shrinkage (%)			
Linear Shrinkage Defects:			

Remarks	Results apply to the sample/s as received.

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ATTERBERG LIMITS REPORT

Client:	Construction Sciences - Professional Services	Report Number:	12385/R/212511-1
Client Address:	31 Anvil Road, Seven Hills	Project Number:	12385/P/1320
Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 8 of 9

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.2.1.1			
Sample Number	12385/S/783552	Sample Location		
Sampling Method	Tested As Received	Location		20200505
Date Sampled	5/05/2020	Test Pit		TP54
Sampled By	Client Sampled	Depth	m	0.50m
Date Tested	15/05/2020			Foundation
Att. Drying Method	Oven Dried	Material Source	Existing	
Atterberg Preparation	Dry Sieved	Material Type	In-Situ	
Material Description	Brown Silty CLAY			

Atterberg Limits Results

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**59**	
Plastic Limit (%)		**21**	
Plasticity Index (%)		**38**	
Linear Shrinkage (%)			
Linear Shrinkage Defects:			

Remarks	Results apply to the sample/s as received.

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ATTERBERG LIMITS REPORT

Client:	Construction Sciences - Professional Services	Report Number:	12385/R/212511-1
Client Address:	31 Anvil Road, Seven Hills	Project Number:	12385/P/1320
Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 9 of 9

Test Procedures:	AS1289.3.1.1, AS 1289.3.3.1, AS1289.3.2.1, AS1289.2.1.1			
Sample Number	12385/S/783558	Sample Location		
Sampling Method	Tested As Received	Location		20200504
Date Sampled	4/05/2020	Test Pit		TP38
Sampled By	Client Sampled	Depth	m	1.50m
Date Tested	22/05/2020			Foundation
Att. Drying Method	Oven Dried	Material Source	Existing	
Atterberg Preparation	Dry Sieved	Material Type	In-Situ	
Material Description	Brown Silty Clay			

Atterberg Limits Results

Atterberg Limit	Specification Minimum	Test Result	Specification Maximum
Liquid Limit (%)		**71**	
Plastic Limit (%)		**21**	
Plasticity Index (%)		**50**	
Linear Shrinkage (%)			
Linear Shrinkage Defects:			

Remarks	Results apply to the sample/s as received.

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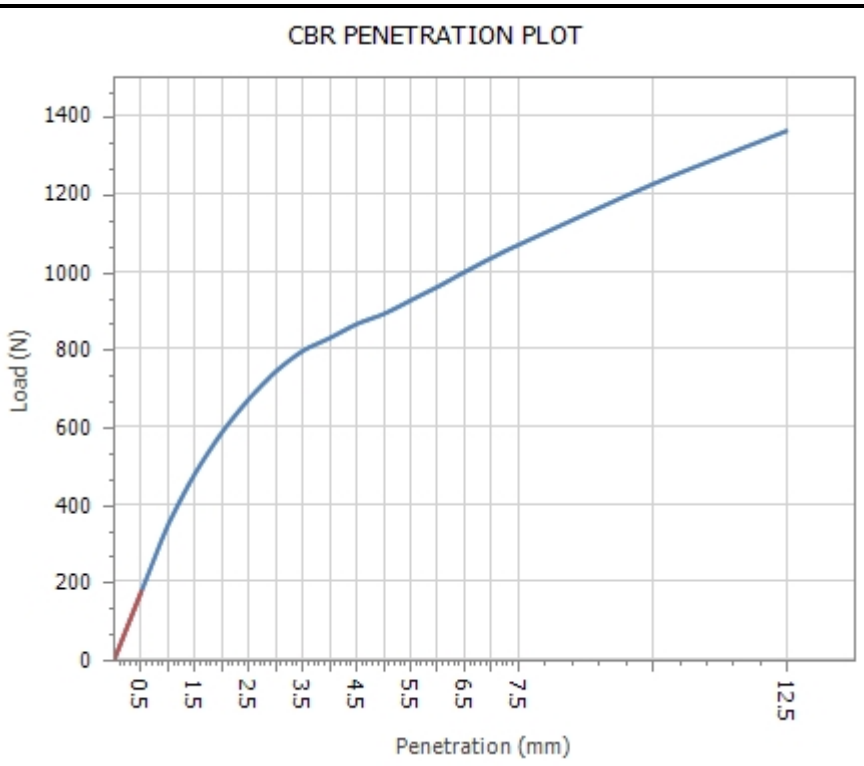
CALIFORNIA BEARING RATIO REPORT

Client:	Construction Sciences - Professional Services	Report Number:	12385/R/212518-1
Client Address:	31 Anvil Road, Seven Hills	Project Number:	12385/P/1320
Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 1 of 10

Test Procedures	AS1289.6.1.1, AS1289.5.1.1, AS1289.2.1.1			
Sample Number	12385/S/783544	Sample Location		
Sampling Method	Tested As Received	Location		20200507
Date Sampled	7/05/2020	Test Pit		TP44
Sampled By	Client Sampled	Depth	m	0.20m-0.60m
Date Tested	18/05/2020			Foundation
Material Source	Existing	Material Limit Start		-
Material Type	In-Situ	Material Limit End		-
Client Reference	-	Compactive Effort		Standard
Material Description	Red Silty Clay			

Maximum Dry Density (t/m³):	1.55
Optimum Moisture Content (%):	21.0
Field Moisture Content (%):	17.8
Sample Percent Oversize (%)	1.0
Oversize Included / Excluded	Excluded
Target Density Ratio (%):	100
Target Moisture Ratio (%):	100
Placement Dry Density (t/m³):	1.55
Placement Dry Density Ratio (%):	100.0
Placement Moisture Content (%):	20.7
Placement Moisture Ratio (%):	99.5
Test Condition / Soaking Period:	Soaked / 4 Days
CBR Surcharge (kg)	9.0
Dry Density After Soak (t/m³):	1.51
Total Curing Time (hrs)	n/a
Liquid Limit Method	n/a
Moisture (top 30mm) After Soak (%)	28.3
Moisture (remainder) After Soak (%)	25.0
CBR Swell (%):	3.0
Minimum CBR Specification (%):	-
CBR Value @ 2.5mm (%):	**5**



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CALIFORNIA BEARING RATIO REPORT

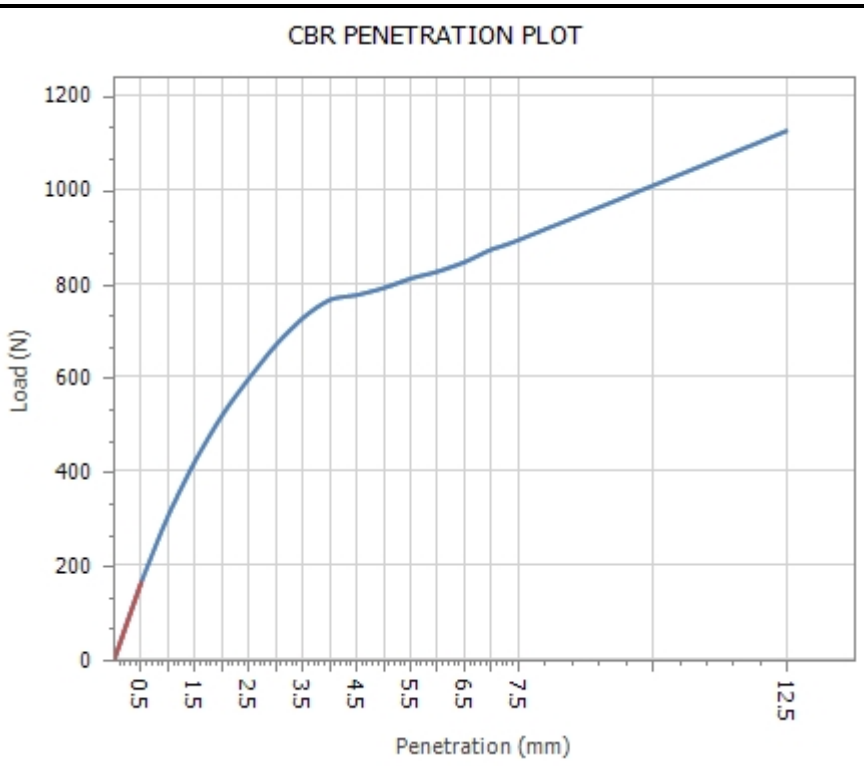
Client:	Construction Sciences - Professional Services	Report Number:	12385/R/212518-1
Client Address:	31 Anvil Road, Seven Hills	Project Number:	12385/P/1320
Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 2 of 10

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

		Sample Location		
Sample Number	12385/S/783545	Location		20200507
Sampling Method	Tested As Received	Test Pit		TP47
Date Sampled	7/05/2020	Depth	m	0.20m-0.60m
Sampled By	Client Sampled			Foundation
Date Tested	16/05/2020			
Material Source	Existing	Material Limit Start		-
Material Type	In-Situ	Material Limit End		-
Client Reference	-	Compactive Effort		Standard

Material Description	Brown Silty Gravelly Clay

Maximum Dry Density (t/m³):	1.54
Optimum Moisture Content (%):	22.5
Field Moisture Content (%):	19.4
Sample Percent Oversize (%)	2.0
Oversize Included / Excluded	Excluded
Target Density Ratio (%):	100
Target Moisture Ratio (%):	100
Placement Dry Density (t/m³):	1.53
Placement Dry Density Ratio (%):	99.5
Placement Moisture Content (%):	22.5
Placement Moisture Ratio (%):	100.0
Test Condition / Soaking Period:	Soaked / 4 Days
CBR Surcharge (kg)	9.0
Dry Density After Soak (t/m³):	1.47
Total Curing Time (hrs)	n/a
Liquid Limit Method	n/a
Moisture (top 30mm) After Soak (%)	37.3
Moisture (remainder) After Soak (%)	32.1
CBR Swell (%):	4.0
Minimum CBR Specification (%):	-
CBR Value @ 2.5mm (%):	**4.5**



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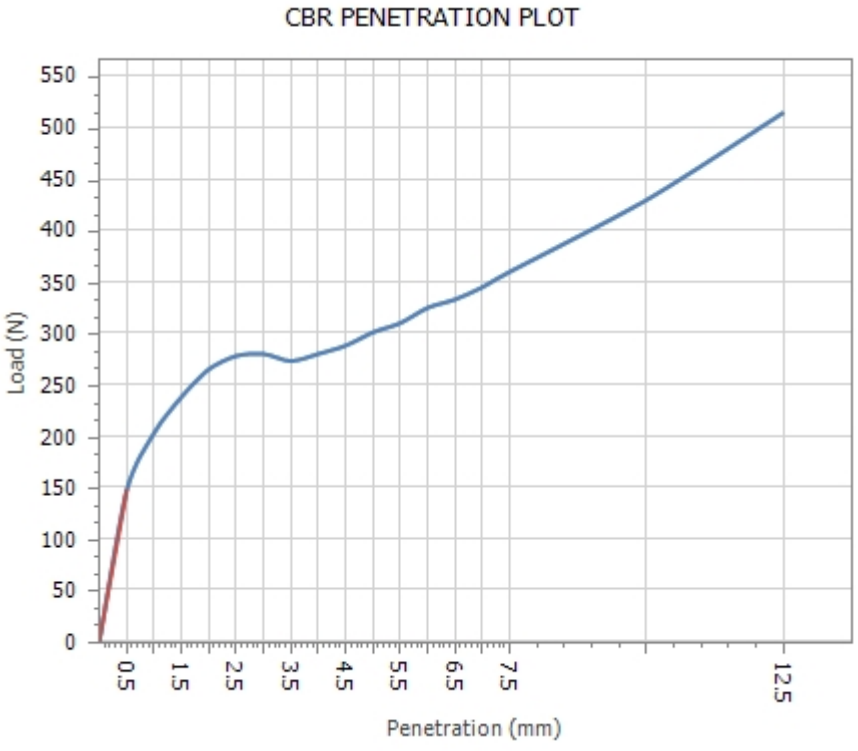
CALIFORNIA BEARING RATIO REPORT

Client:	Construction Sciences - Professional Services	Report Number:	12385/R/212518-1
Client Address:	31 Anvil Road, Seven Hills	Project Number:	12385/P/1320
Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 3 of 10

Test Procedures	AS1289.6.1.1, AS1289.5.1.1, AS1289.2.1.1		
Sample Number	12385/S/783546	Sample Location	
Sampling Method	Tested As Received	Location	20200507
Date Sampled	7/05/2020	Test Pit	TP34
Sampled By	Client Sampled	Depth m	0.20m-0.60m
Date Tested	18/05/2020		Foundation
Material Source	Existing	Material Limit Start	-
Material Type	In-Situ	Material Limit End	-
Client Reference	-	Compactive Effort	Standard
Material Description	Brown clay		

Maximum Dry Density (t/m³):	1.68
Optimum Moisture Content (%):	16.0
Field Moisture Content (%):	6.8
Sample Percent Oversize (%)	0.0
Oversize Included / Excluded	Excluded
Target Density Ratio (%):	100
Target Moisture Ratio (%):	100
Placement Dry Density (t/m³):	1.68
Placement Dry Density Ratio (%):	100.5
Placement Moisture Content (%):	16.1
Placement Moisture Ratio (%):	99.5
Test Condition / Soaking Period:	Soaked / 4 Days
CBR Surcharge (kg)	9.0
Dry Density After Soak (t/m³):	1.60
Total Curing Time (hrs)	25
Liquid Limit Method	Estimation
Moisture (top 30mm) After Soak (%)	29.1
Moisture (remainder) After Soak (%)	22.2
CBR Swell (%):	5.0
Minimum CBR Specification (%):	-
CBR Value @ 2.5mm (%):	**2.0**



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CALIFORNIA BEARING RATIO REPORT

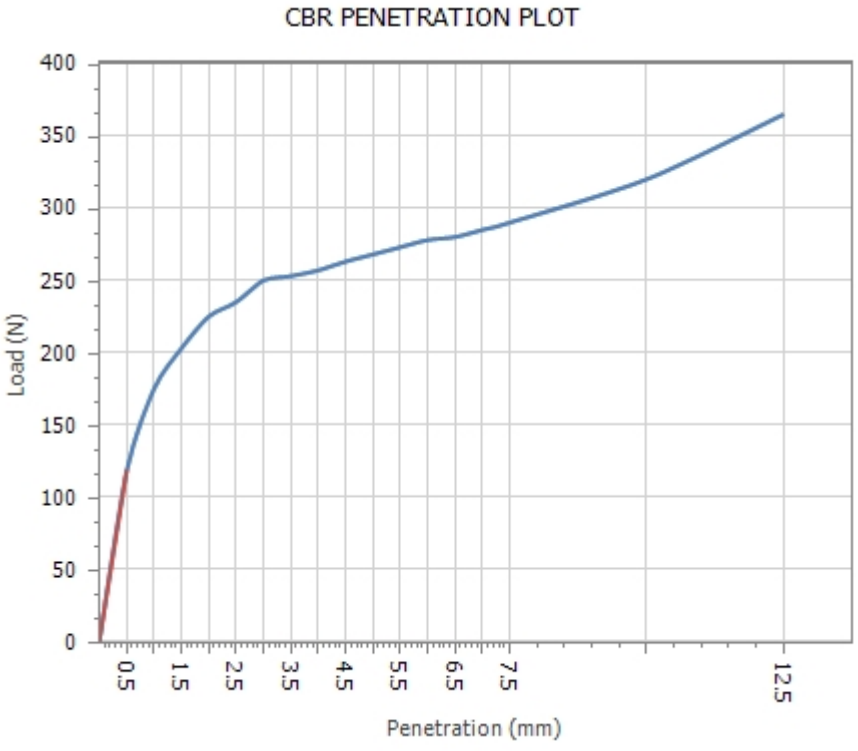
Client:	Construction Sciences - Professional Services	Report Number:	12385/R/212518-1
Client Address:	31 Anvil Road, Seven Hills	Project Number:	12385/P/1320
Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 4 of 10

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

		Sample Location		
Sample Number	12385/S/783550	Location		20200506
Sampling Method	Tested As Received	Test Pit		TP80
Date Sampled	6/05/2020	Depth	m	0.20m-0.60m
Sampled By	Client Sampled			Foundation
Date Tested	18/05/2020	Material Limit Start		-
Material Source	Existing	Material Limit End		-
Material Type	In-Situ	Compactive Effort		Standard
Client Reference	-			

Material Description	Red Silty Clay

Maximum Dry Density (t/m³):	1.63
Optimum Moisture Content (%):	20.0
Field Moisture Content (%):	17.3
Sample Percent Oversize (%)	0.0
Oversize Included / Excluded	Excluded
Target Density Ratio (%):	100
Target Moisture Ratio (%):	100
Placement Dry Density (t/m³):	1.63
Placement Dry Density Ratio (%):	100.0
Placement Moisture Content (%):	20.3
Placement Moisture Ratio (%):	100.5
Test Condition / Soaking Period:	Soaked / 4 Days
CBR Surcharge (kg)	9.0
Dry Density After Soak (t/m³):	1.55
Total Curing Time (hrs)	n/a
Liquid Limit Method	n/a
Moisture (top 30mm) After Soak (%)	33.7
Moisture (remainder) After Soak (%)	24.1
CBR Swell (%):	5.5
Minimum CBR Specification (%):	-
CBR Value @ 2.5mm (%):	**2.0**



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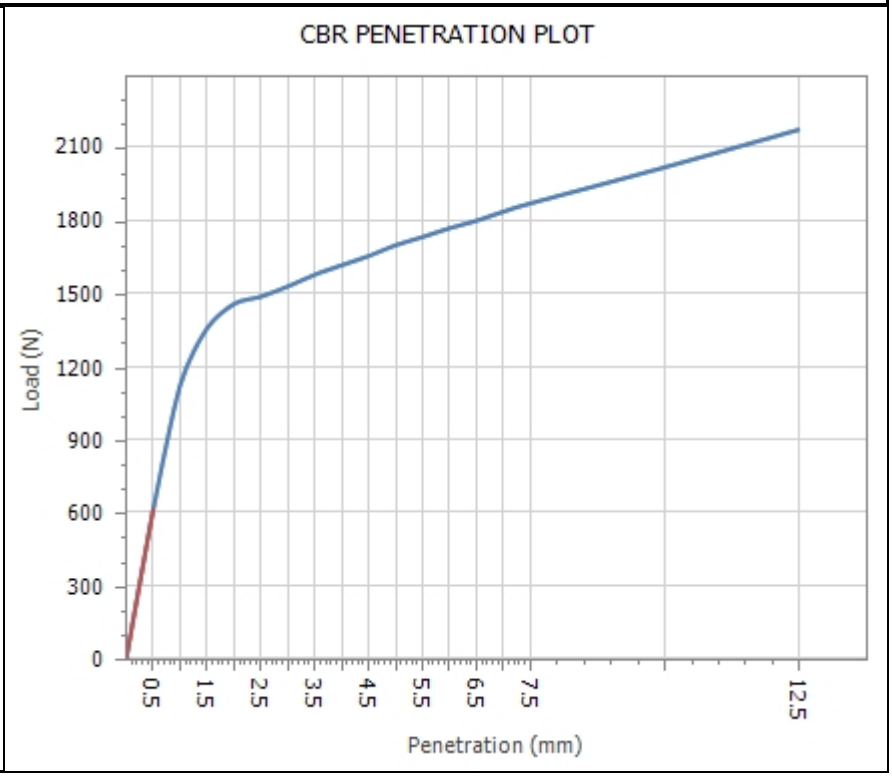
CALIFORNIA BEARING RATIO REPORT

Client:	Construction Sciences - Professional Services	Report Number:	12385/R/212518-1
Client Address:	31 Anvil Road, Seven Hills	Project Number:	12385/P/1320
Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 5 of 10

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

		Sample Location		
Sample Number	12385/S/783551	Location		20200506
Sampling Method	Tested As Received	Test Pit		TP70
Date Sampled	6/05/2020	Depth	m	0.20m-0.50m
Sampled By	Client Sampled			Foundation
Date Tested	18/05/2020			
Material Source	Existing	Material Limit Start		-
Material Type	In-Situ	Material Limit End		-
Client Reference	-	Compactive Effort		Standard
Material Description	Red clay			

Maximum Dry Density (t/m³):	1.53
Optimum Moisture Content (%):	27.5
Field Moisture Content (%):	21.0
Sample Percent Oversize (%)	0.0
Oversize Included / Excluded	Excluded
Target Density Ratio (%):	100
Target Moisture Ratio (%):	100
Placement Dry Density (t/m³):	1.53
Placement Dry Density Ratio (%):	100.0
Placement Moisture Content (%):	27.5
Placement Moisture Ratio (%):	100.5
Test Condition / Soaking Period:	Soaked / 4 Days
CBR Surcharge (kg)	9.0
Dry Density After Soak (t/m³):	1.53
Total Curing Time (hrs)	24
Liquid Limit Method	Estimation
Moisture (top 30mm) After Soak (%)	-
Moisture (remainder) After Soak (%)	-
CBR Swell (%):	0.5
Minimum CBR Specification (%):	-
CBR Value @ 2.5mm (%):	**11**



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CALIFORNIA BEARING RATIO REPORT

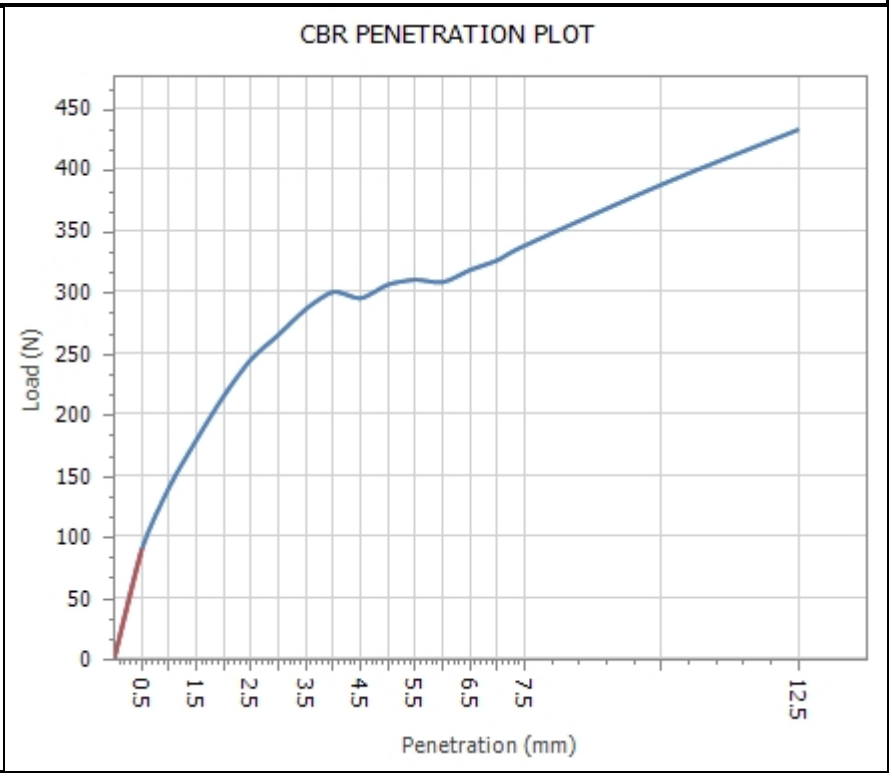
Client:	Construction Sciences - Professional Services	Report Number:	12385/R/212518-1
Client Address:	31 Anvil Road, Seven Hills	Project Number:	12385/P/1320
Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 6 of 10

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

		Sample Location		
Sample Number	12385/S/783553	Location		20200505
Sampling Method	Tested As Received	Test Pit		TP64
Date Sampled	5/05/2020	Depth	m	0.40m-0.60m
Sampled By	Client Sampled			Foundation
Date Tested	16/05/2020			
Material Source	Existing	Material Limit Start		-
Material Type	In-Situ	Material Limit End		-
Client Reference	-	Compactive Effort		Standard

Material Description	Brown Silty Slightly Gravelly Clay

Maximum Dry Density (t/m³):	1.65
Optimum Moisture Content (%):	16.0
Field Moisture Content (%):	14.2
Sample Percent Oversize (%)	0.0
Oversize Included / Excluded	Excluded
Target Density Ratio (%):	100
Target Moisture Ratio (%):	100
Placement Dry Density (t/m³):	1.65
Placement Dry Density Ratio (%):	100.5
Placement Moisture Content (%):	15.7
Placement Moisture Ratio (%):	99.5
Test Condition / Soaking Period:	Soaked / 4 Days
CBR Surcharge (kg)	9.0
Dry Density After Soak (t/m³):	1.57
Total Curing Time (hrs)	n/a
Liquid Limit Method	n/a
Moisture (top 30mm) After Soak (%)	30.4
Moisture (remainder) After Soak (%)	23.2
CBR Swell (%):	5.0
Minimum CBR Specification (%):	-
CBR Value @ 2.5mm (%):	**2.0**



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CALIFORNIA BEARING RATIO REPORT

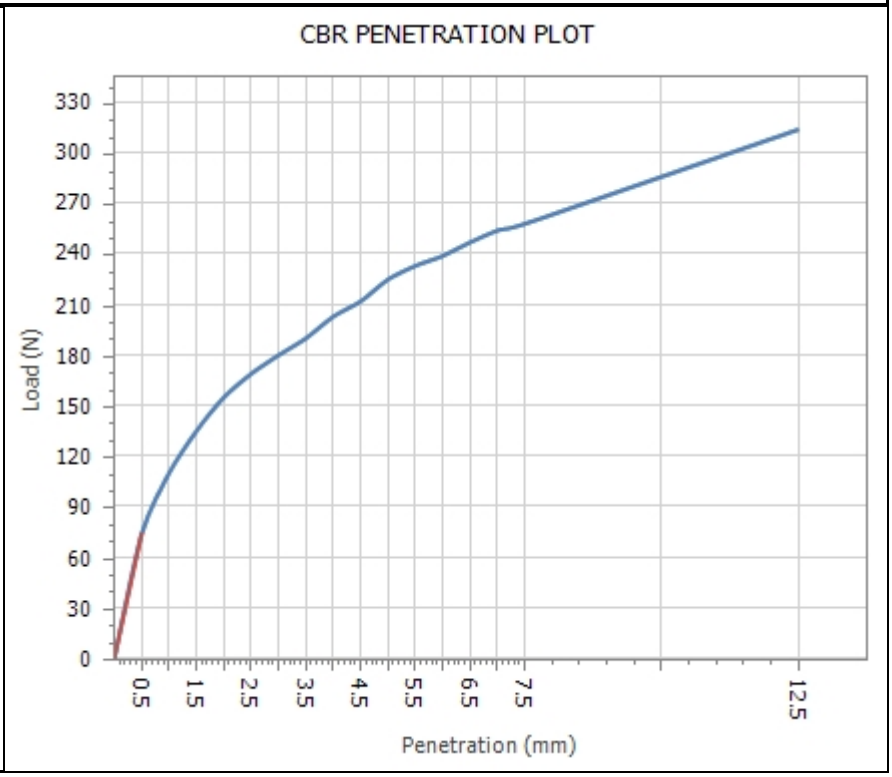
Client:	Construction Sciences - Professional Services	Report Number:	12385/R/212518-1
Client Address:	31 Anvil Road, Seven Hills	Project Number:	12385/P/1320
Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 7 of 10

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

		Sample Location		
Sample Number	12385/S/783554	Location		20200505
Sampling Method	Tested As Received	Test Pit		TP61
Date Sampled	5/05/2020	Depth	m	0.20m-0.60m
Sampled By	Client Sampled			Foundation
Date Tested	16/05/2020			
Material Source	Existing	Material Limit Start		-
Material Type	In-Situ	Material Limit End		-
Client Reference	-	Compactive Effort		Standard

Material Description	Brown Silty Slightly Gravelly Clay

Maximum Dry Density (t/m³):	1.67
Optimum Moisture Content (%):	17.5
Field Moisture Content (%):	15.1
Sample Percent Oversize (%)	0.0
Oversize Included / Excluded	Excluded
Target Density Ratio (%):	100
Target Moisture Ratio (%):	100
Placement Dry Density (t/m³):	1.68
Placement Dry Density Ratio (%):	100.5
Placement Moisture Content (%):	17.7
Placement Moisture Ratio (%):	100.5
Test Condition / Soaking Period:	Soaked / 4 Days
CBR Surcharge (kg)	9.0
Dry Density After Soak (t/m³):	1.59
Total Curing Time (hrs)	n/a
Liquid Limit Method	n/a
Moisture (top 30mm) After Soak (%)	35.5
Moisture (remainder) After Soak (%)	29.4
CBR Swell (%):	5.5
Minimum CBR Specification (%):	-
CBR Value @ 2.5mm (%):	**1.5**



Remarks	Results apply to the sample/s as received.

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Accredited for compliance with ISO/IEC 17025 - Testing

Accreditation Number: 1986
Corporate Site Number: 12385

Approved Signatory: Nigel Byrne
Form ID: W2ASRep Rev2

Construction Sciences

Construction Sciences Pty Ltd
ABN: 74 128 806 735

Address:
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Laboratory: **Glendenning Laboratory**
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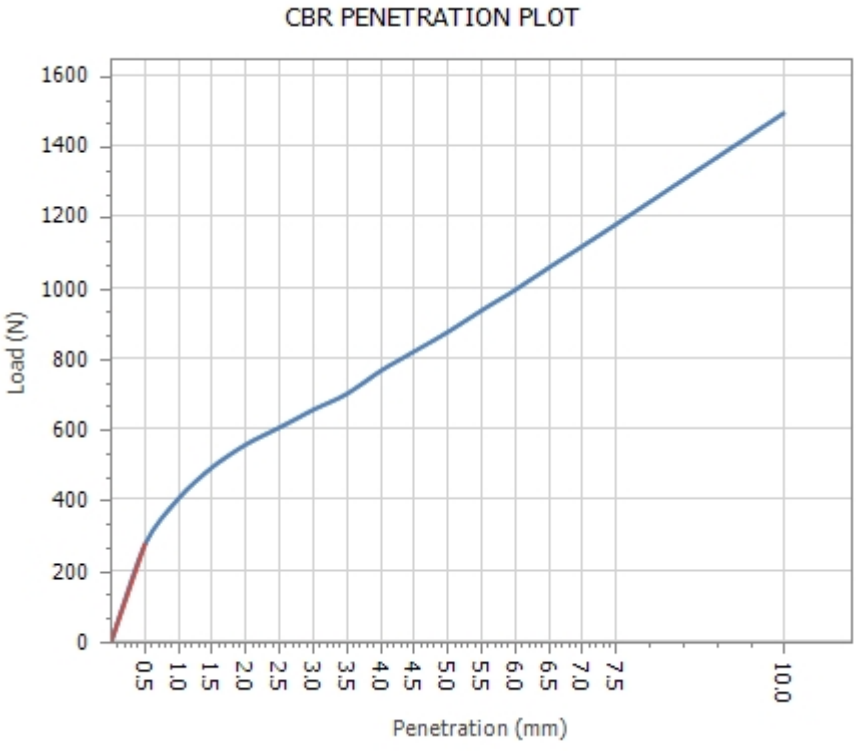
CALIFORNIA BEARING RATIO REPORT

Client:	Construction Sciences - Professional Services	Report Number:	12385/R/212518-1
Client Address:	31 Anvil Road, Seven Hills	Project Number:	12385/P/1320
Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 8 of 10

Test Procedures	AS1289.6.1.1, AS1289.5.1.1, AS1289.2.1.1		
Sample Number	12385/S/783555	Sample Location	
Sampling Method	Tested As Received	Location	20200505
Date Sampled	5/05/2020	Test Pit	TP58
Sampled By	Client Sampled	Depth m	0.20m-0.60m
Date Tested	18/05/2020		Foundation
Material Source	Existing	Material Limit Start	-
Material Type	In-Situ	Material Limit End	-
Client Reference	-	Compactive Effort	Standard
Material Description	Brown Silty Garvelly Clay		

Maximum Dry Density (t/m³):	1.71
Optimum Moisture Content (%):	16.0
Field Moisture Content (%):	13.5
Sample Percent Oversize (%)	1.0
Oversize Included / Excluded	Excluded
Target Density Ratio (%):	100
Target Moisture Ratio (%):	100
Placement Dry Density (t/m³):	1.71
Placement Dry Density Ratio (%):	100.0
Placement Moisture Content (%):	15.9
Placement Moisture Ratio (%):	100.0
Test Condition / Soaking Period:	Soaked / 4 Days
CBR Surcharge (kg)	9.0
Dry Density After Soak (t/m³):	1.65
Total Curing Time (hrs)	n/a
Liquid Limit Method	n/a
Moisture (top 30mm) After Soak (%)	24.4
Moisture (remainder) After Soak (%)	21.0
CBR Swell (%):	3.5
Minimum CBR Specification (%):	-
CBR Value @ 2.5mm (%):	**4.5**



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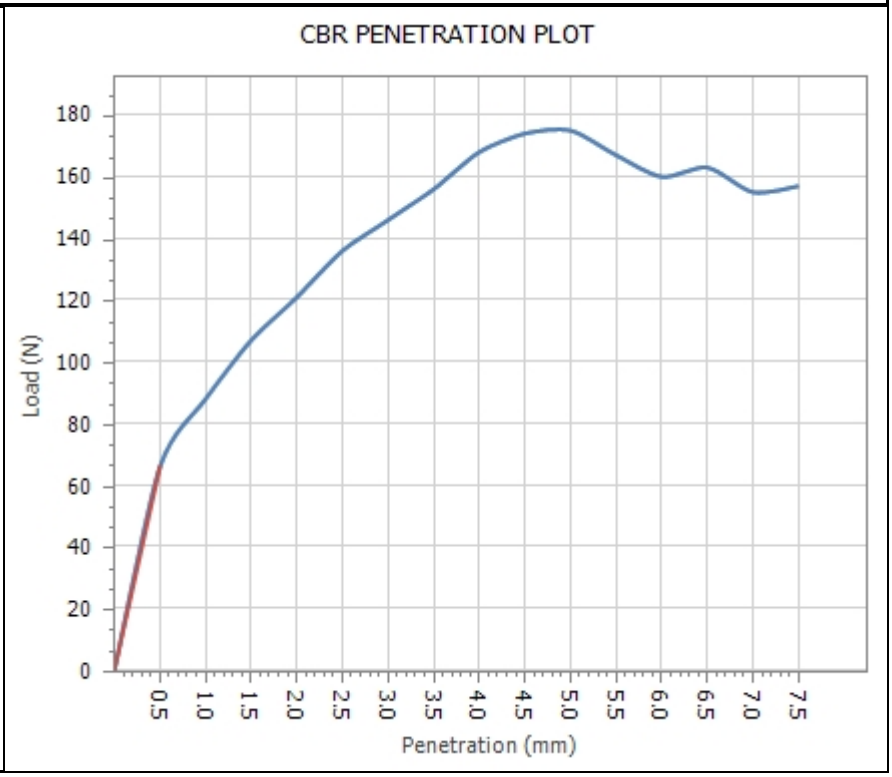
CALIFORNIA BEARING RATIO REPORT

Client:	Construction Sciences - Professional Services	Report Number:	12385/R/212518-1
Client Address:	31 Anvil Road, Seven Hills	Project Number:	12385/P/1320
Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 9 of 10

Test Procedures	AS1289.6.1.1, AS1289.5.1.1, AS1289.2.1.1		
Sample Number	12385/S/783556	Sample Location	
Sampling Method	Tested As Received	Location	20200505
Date Sampled	5/05/2020	Test Pit	TP51
Sampled By	Client Sampled	Depth m	0.20m-0.50m
Date Tested	16/05/2020		Foundation
Material Source	Existing	Material Limit Start	-
Material Type	In-Situ	Material Limit End	-
Client Reference	-	Compactive Effort	Standard
Material Description	Brown Silty Gravelly Clay		

Maximum Dry Density (t/m³):	1.57
Optimum Moisture Content (%):	15.5
Field Moisture Content (%):	11.6
Sample Percent Oversize (%)	2.0
Oversize Included / Excluded	Excluded
Target Density Ratio (%):	100
Target Moisture Ratio (%):	100
Placement Dry Density (t/m³):	1.57
Placement Dry Density Ratio (%):	100.5
Placement Moisture Content (%):	15.3
Placement Moisture Ratio (%):	99.5
Test Condition / Soaking Period:	Soaked / 4 Days
CBR Surcharge (kg)	9.0
Dry Density After Soak (t/m³):	1.45
Total Curing Time (hrs)	n/a
Liquid Limit Method	n/a
Moisture (top 30mm) After Soak (%)	37.5
Moisture (remainder) After Soak (%)	31.5
CBR Swell (%):	8.5
Minimum CBR Specification (%):	-
CBR Value @ 2.5mm (%):	**1.0**



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CALIFORNIA BEARING RATIO REPORT

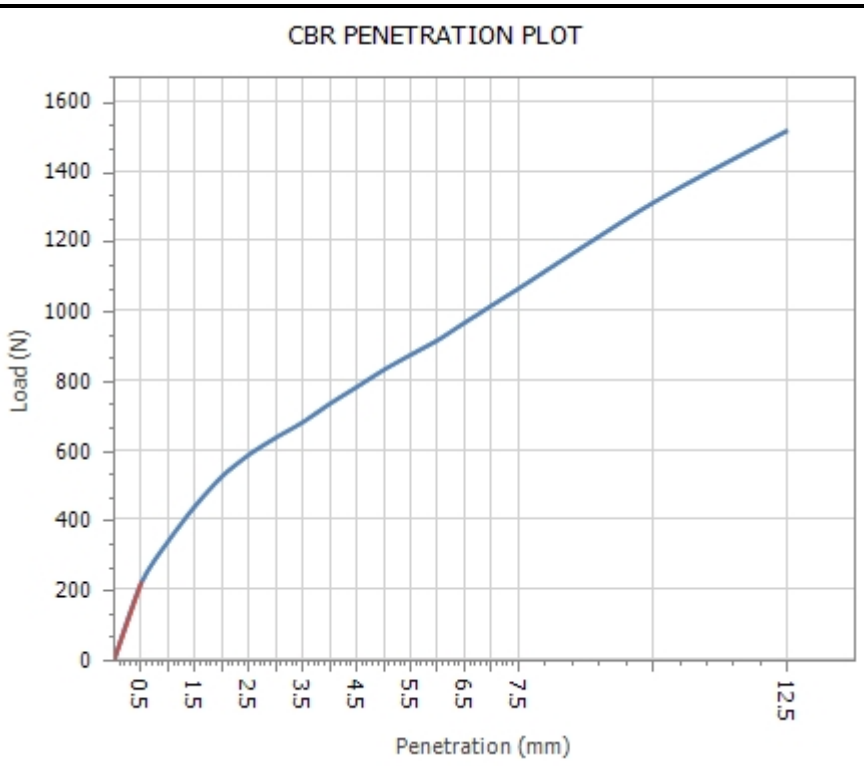
Client:	Construction Sciences - Professional Services	Report Number:	12385/R/212518-1
Client Address:	31 Anvil Road, Seven Hills	Project Number:	12385/P/1320
Project:	Luddenham Road, Orchard Hills HBB	Lot Number:	
Location:	Luddenham Road, Orchard Hills HBB	Internal Test Request:	12385/T/97794
Component:	Foundation	Client Reference/s:	5017200153
Area Description:	Insitu Foundation Testing	Report Date / Page:	25/05/2020 Page 10 of 10

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

		Sample Location		
Sample Number	12385/S/783557	Location		20200504
Sampling Method	Tested As Received	Test Pit		TP39
Date Sampled	4/05/2020	Depth	m	0.20m-0.50m
Sampled By	Client Sampled			Foundation
Date Tested	18/05/2020			
Material Source	Existing	Material Limit Start		-
Material Type	In-Situ	Material Limit End		-
Client Reference	-	Compactive Effort		Standard

Material Description	Brown Silty Gravelly Clay

Maximum Dry Density (t/m³):	1.66
Optimum Moisture Content (%):	16.5
Field Moisture Content (%):	15.5
Sample Percent Oversize (%)	1.0
Oversize Included / Excluded	Excluded
Target Density Ratio (%):	100
Target Moisture Ratio (%):	100
Placement Dry Density (t/m³):	1.66
Placement Dry Density Ratio (%):	100.0
Placement Moisture Content (%):	16.3
Placement Moisture Ratio (%):	100.0
Test Condition / Soaking Period:	Soaked / 4 Days
CBR Surcharge (kg)	9.0
Dry Density After Soak (t/m³):	1.60
Total Curing Time (hrs)	n/a
Liquid Limit Method	n/a
Moisture (top 30mm) After Soak (%)	26.5
Moisture (remainder) After Soak (%)	20.3
CBR Swell (%):	3.5
Minimum CBR Specification (%):	-
CBR Value @ 2.5mm (%):	**4.5**



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