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REPORT ON

GEOTECHNICAL INVESTIGATION PROPOSED RESIDENTIAL DEVELOPMENT PITT TOWN, NSW

Submitted to :

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Abrreviations / Glossary

ASS	Acid Sulfate Soils
Brown	Brown Consulting Pty Ltd
Golder	Golder Associates Pty Ltd
HCC-DCP	Hawkesbury City Council – Development Control Plan 2002
JPG	Johnson Property Group Pty Ltd
kL	Kilolitre (1,000 Litres)

1.0 INTRODUCTION

This report presents the results of a geotechnical investigation carried out by Golder Associates Pty Ltd (Golder) at the site of a proposed residential development in Pitt Town, NSW (The 'Site'). The site location is illustrated in Figure 1.

The Site consists of two large parcels of land, either side of Bootles Lane, with the northern property identified as the Bona Vista Site (about 40 Ha) and the southern property identified as the Fernadell Site (about 32 Ha). Both sites were previously used for agricultural purposes.

The Site is located within the jurisdiction of Hawkesbury Council, County of Cumberland and Parish of Pitt Town and is currently zoned as rural land. It is proposed to subdivide the land for development with primarily low-density residential and rural housing, in accordance with draft amendment No. 45 of the Hawkesbury Local Environmental Plan (1989).

Golder previously carried out a Preliminary Geotechnical and Contamination Assessment of the site in 1998 (Reference 1). The objective of the current geotechnical investigation was to obtain information to supplement the previous investigations, specifically:

- Confirmation of the subsurface conditions at the site;
- Lot classification in accordance with AS2870-1996;
- Infiltration tests to assess the feasibility of in ground stormwater disposal; and
- Assessment of subgrade conditions for preliminary pavement design.

The geotechnical investigation was carried out concurrently with a Stage II Detailed Site Contamination Investigation (DSI) (Reference 2) and Acid Sulfate Soils Investigation (Reference 3). Fieldwork for each of the investigations was combined and used the same test holes for sampling. The contamination investigation also included the installation of groundwater monitoring wells and hydrogeological studies.

The geotechnical investigation was performed in accordance with our proposals (P042225.B dated 14th October 2004, P042225C dated 3rd November 2004 and P042225.D dated 29th November 2004). The investigation was carried out following approval to proceed from Mr Paul Hedge of Johnson Property Group Pty Ltd (JPG) dated 18th February 2005.

2.0 SCOPE OF WORK

2.1 Fieldwork

The scope of fieldwork for the geotechnical investigation included:

- Excavation of 20 test pits to up to 4 m depth using a backhoe;
- Collection of bulk samples from the test pits for geotechnical laboratory testing;
- Drilling of 71 hand auger holes to a nominal depth of 1 m below the existing ground surface;
- Drilling of 3 boreholes using a truck mounted drill rig to depths of between 7.6 and 10.5 m and installation of groundwater monitoring wells; and
- Infiltration testing at 16 surface locations.

The fieldwork was carried out between 4th March 2005 and 5th May 2005 in accordance with Golder Standard Quality Procedures.

The drilling and excavation of test pits was attended by a Golder Associates Geotechnical Officer, who located the boreholes and test pits, described the soils encountered, recorded insitu test results and collected samples for laboratory testing.

A site plan and surrounding properties are illustrated on Figure 2. The borehole and test pit locations are illustrated in Figure 3.

The borehole and test pit reports and explanatory notes in Appendix A present information on the ground conditions encountered. The coordinates shown on the test pit and borehole reports were established using a hand-held GPS and are typically accurate to \pm 5 m.

2.2 Field Permeability Testing

Golder commissioned Sydney Environmental and Soil Laboratory Pty Ltd (SESL) to conduct the field infiltration / field permeability tests. The tests were carried out on 15th April 2005 by Environmental Scientists from SESL.

Infiltration testing was carried using the Talsma Hallam or shallow well permeameter method (Boesma, 1965b, Reference 4). This method was chosen over the double ring infiltration test method as the preferred method for dryland soils such as those encountered on the site. Test locations are illustrated on Figure 3.

A copy of the Infiltration Report prepared by SESL is presented in Appendix B.

2.3 Geotechnical Laboratory Testing

Samples collected from test pits were submitted to Terratest Pty Ltd (Terratest) for laboratory analysis. Terratest is NATA registered for the tests performed which included:

- Moisture Content AS 1289 2.1.1;
- Standard Compaction AS 1289 5.1.1; and
- California Bearing Ratio (CBR) AS 1289 6.1.1.

Laboratory test certificates are presented in Appendix C.

3.0 SITE INFORMATION

3.1 Geology and Hydrogeology

The Penrith Sheet 9031 of the 1:100,000 geological maps (SCS NSW, 1991) indicates that the Site is in an area underlain by the Quaternary Pitt Town Sand Formation comprising quartz sand, clay and minor pebbles. Ashfield Shale of the Wianamatta Group is shown on the geological map close to the western boundary of the Site and comprises claystone-siltstone and fine sandstone-siltstone laminates.

The previous investigations conducted at the Site by Golder (1998) included 59 test pits and indicated:

- In the western part of the site, sand (medium to coarse grained) to depths of 1 to 2.5 m below the ground level, overlaying
- clayey sand (fine to medium grained) to at least 3 m depth, and extending across the northern quarter of the Site; and
- in the eastern half of the Site, silty sand and silt up to 0.4 m depth, overlaying sandy clay, silty clay and clay to depth of at least 3 m.

The results of the geotechnical laboratory test results carried out as part of the previous investigation indicated that the majority of the soils tested were mixtures of sand, silt, and clay. For cohesive soils tested, the Liquid Limits ranged from 26% to 45% and Plastic Limits from 11% to 18% indicating that the cohesive soils are low to medium plasticity. Linear Shrinkage values of the clayey samples range from 6% to 10.5%.

Grading of sand and sandy clay samples indicated that the sand content of the soils is predominantly medium grained and the sands are poorly graded.

3.2 Topography and Soil Landscapes

The Site is located on an elevated "dome" within the Hawkesbury River Flood Plain. Slopes are generally <5% gradient with low to medium density woodland community. The Site slopes gently down from north-west to south-east. The northwestern corner of the Bona Vista Site is at a level of about 25.6m AHD and the southeastern corner of the Fernadell Site at a level of about 12.4 AHD.

The Bona Vista Site consists of open grassed paddocks on the western part of the Site with heavily vegetated bushland occupying the eastern part of the Site. The Fernadell Site is relatively clear of trees with former orchard trees having been stockpiled across various locations on the Site. The Fernadell Site was overgrown with tall grasses and weeds at the time of the investigation with several areas of general waste consisting of steel cables and hail netting previously used in the orchards.

Several drainage depressions / ditches were observed on both Sites, ranging in depth from 0.5 m to about 2.0 m depth. The major depressions / ditches were surveyed by Brown Consulting and are shown in Figure 3.

The closest watercourses to the Site are:

- Bardenerang Creek about 0.25km west of the Site,
- Pitt Town Lagoon about 0.5km south-west of the Site; and
- the Hawkesbury River about 1km north of the Site.

The Penrith 1:100,000 Series Soil Landscapes Sheet 9030 (SCS NSW, 1989) indicates that the Site is primarily on the Agnes Bank soil landscape comprising low parallel alluvial / aeolian sand dunes on a flat terrace surface of Tertiary age.

4.0 RESULTS OF THE INVESTIGATION

4.1 Subsurface Conditions

Boreholes and testpits were logged during drilling / excavation with logs provided in Appendix A. The test pits and boreholes indicate that ground conditions are relatively consistent across both the Sites and with the results of the 1998 investigation. The soils generally comprise sand and clay mixtures. Bedrock was not encountered within the depth of investigation (up to 10.6 m depth).

In the western half of the site, and extending across the northern quarter, the profile is predominantly sand with progressively greater clay content with increasing depth. The profile can be generalised as follows:

- SAND: medium to coarse grained with a trace or some silt and clay, extending to depths ranging from about 0.8m to 4.2m.
- Clayey SAND: fine to medium grained, extending to the termination depth of the test pit. In some test pits the lower material is Sandy CLAY, or contains pockets of sandy clay.

In the eastern part of the Fernadell and Bona Vista Sites (excluding the northern east corner) the profile is predominantly clay with a variable surficial layer of silt and sand. The profile can be generalised as follows:

- Silty SAND, Sandy SILT, and SILT extending to depths of up to 0.4 m (not uniform across the site).
- Sand CLAY, Silty CLAY, and CLAY generally medium plasticity, but with some high plasticity layers, extending to the termination depth of the test pits.

Fill was encountered at six locations. Three locations on the Bona Vista Site (BH125, BH126 & BH127) to a maximum depth of 0.4m adjacent to existing drainage a depression consisting of Silty SAND. The Fill material was similar to natural soil of the Site and has been attributed to excess soil associated with the exacavtion of the adjacent drainage depression. Three locations on the Fernadell Site (BH172, BH180 & BH181) to a maximum depth of 0.4m and consisting of gravely CLAY were identified within existing driveway and beneath the existing packaging shed.

4.2 Geotechnical Laboratory Test Results

Ten samples were selected for laboratory analysis. The results of geotechnical testing are presented as follows:

Test Location	Depth (m)	Soil Type	Field Moisture (%)	Standard Maximum Dry Density (t/m ³)	Standard Optimum Moisture Content (%)	CBR (%)	Swell (%)
TP21*		Silty Clay		1.85	15.0	-	-
TP33*		Sand		2.02	9.5	-	-
TP108	0.4- 0.8	Sand	2.2	1.95	9.2	20	Nil
TP109	0.4- 0.8	Sand	5.5	1.89	9.8	12	Nil
TP119	0.4- 0.8	Sand	6.9	2.00	8.7	45	Nil
TP132	0.4- 0.8	Sand	4.1	1.99	8.4	40	Nil
TP139	0.4- 0.8	Silty Clay	14.6	1.76	16.8	2.0	2.0
TP140	0.4- 0.8	Sand	5.4	2.09	8.1	35	Nil
TP146	0.4- 0.8	Silty Clay	19.1	1.78	19.9	2.5	1.5
TP157	0.4- 0.8	Sand	5.5	1.97	8.4	25	Nil
TP160	0.4- 0.8	Sandy Clay	14.3	1.80	16.5	25	Nil
TP170	0.4- 0.8	Sand	5.3	1.89	9.7	25	Nil

Table 1 :	Summary of	Geotechnical	Laboratory	Results
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Note: TP21 and TP33 were from the 1998 investigation

The results for field moisture contents and Standard Maximum Dry Densities (SMDD) were similar to those encountered during the previous investigation. The CBR results were typical of the clay and sandy clay soils (2.0 - 2.5%), however, the results obtained from the sandy soils were higher than typical ranging from (12 to 45%).

4.3 Groundwater Conditions

Groundwater observed within the test pits was limited to seepages between 1.1 m and 3.2 m depth. This water is likely to be perched water infiltrating through the relatively permeable upper sandy soils.

Groundwater was encountered in the boreholes at depths ranging from 1.9 m below ground level in BH163/MW3 (12.4 m AHD) to 8.6 m below ground level in BH172/MW2 (23.3 m AHD).

Current groundwater information derived from monitoring of the depth to groundwater and a survey of the levels suggest that the general groundwater flow at the Site is in a south to southeasterly direction towards the Pitt Town Lagoon (see Figure 4).

Monitoring Well Location / ID	Date	Depth of Well (m)	Standing Water Level – BSL (m)	Reduced Level (AHD) – Top of Casing (m)	Water Level – AHD (m)
BH101/MW1	23/03/05	9.0	4.5	25.76	21.26
BH172/MW2	23/03/05	10.5	8.6	23.30	14.7
BH172/MW2	23/03/05	10.5	8.8	23.30	14.5
BH162/MW3	05/05/05	7.6	1.9	12.40	10.5

 Table 2 :
 Groundwater Levels

4.4 Field Permeability Test Results

The results of the infiltration testing are summarised in the following table:

A #2.0	Test Location	Motorial Type	Dormochility / Koot (m/o)
Area	Test Location	Material Type	Permeability / Ksat (m/s)
Bona Vista Site	TP104	Sand	1.1 x 10 ⁻⁵
	TP109	Sand	2.1 x 10 ⁻⁶
	TP116	Sand	5.1 x 10 ⁻⁶
	TP132	Sand	4.5 x 10 ⁻⁶
	TP113	Sand	1.4 x 10 ⁻⁵
	TP108	Sand	1.5 x 10 ⁻⁵
	TP123	Sand	1.3 x 10 ⁻⁵
	TP139	Clay	7.5 x 10 ⁻⁷

Table 3 :	Field Permeameter Measurements
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Area	Test Location	Material Type	Permeability / Ksat (m/s)
Fernadell Site	TP140	Sand	4.0 x 10 ⁻⁶
	TP154	Sand	3.4 x 10 ⁻⁶
	TP157	Sand	5.9 x 10 ⁻⁶
	TP143	Sand	3.4 x 10 ⁻⁶
	TP165	Clay	1.9 x 10 ⁻⁶
	TP160	Clay	1.5 x 10 ⁻⁶
	TP146	Clay	1.1 x 10 ⁻⁶
	TP167	Sand	5.6 x 10 ⁻⁶

The results indicate that the permeability across both sites is relatively high, consistent with the results generally expected for sand soils. Tests in clay soils gave some what lower results, as expected.

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5.0 DISCUSSIONS AND RECOMMENDATIONS

5.1 Site Preparation

The Site is reasonably level and the development of residential lots is expected to involve routine earthworks practice's.

Several drainage ditches observed across the Site may need to be filled. Other surface areas containing deleterious materials such as irrigation pipes, stockpiled vegetation and general waste will need to be removed from the Site.

Low lying boggy areas were encountered during the previous investigation (1998) in the southeastern part of the Fernadell site. However, during the 2005 investigation this area was observed to be relatively dry with some small boggy areas observed. It is important to note that at the time of the investigation the site had experienced extended dry periods, which may have contributed to the area being less boggy than observed in 1998. These areas are likely to collect water draining from other parts of the site and may require grading, provision of drainage or filling to produce suitable building platform.

Topsoil containing significant amounts of organic material is of limited thickness (ranging from 100 mm to 200 mm). The average depth of stripping depth required for roadways and filling areas is likely to be in the order of 150 mm to 200 mm. Stripped topsoil would not be suitable for reuse as structural fill and reuse should be limited to landscaping. Soil containing organic material was also observed in some drainage ditches.

It may be necessary to treat other highly silty soils by:

- Excavating and replacing with less sensitive material or;
- Using good quality material such as ripped rock to form bridging layers over sensitive soils and / or ;
- Using geotextiles to form a bridging layer over sensitive material to improve the compaction of lower layers of fill.

Areas to be filled will need to be inspected by the Certifying Authority prior to placement of fill. The upper 200 mm of the natural subgrade will need to be compacted and tested in accordance with Hawkesbury City Council Development Control Plan 2002 (HCC-DCP) (Reference 4, Part II Construction Specification, Section 4.4). Poor or unsuitable materials would need to be removed and replaced with suitable structural fill as instructed by the Certifying Authority.

5.2 Filling

Filling should be carried out in accordance with AS3798 – 1996 "Guidelines on Earthworks for Commercial and Residential Developments" (Reference 5) and HCC-DCP (2002). The soils at the site, other than deleterious materials discussed above, are suitable for use as structural fill.

Imported fill should be free of deleterious or unsuitable material such as rubbish and organic material and should have a maximum particle size of 100 mm.

Clay fill should be compacted to at least 98% Standard Maximum Dry Density Ratio (SMDD), and moisture conditioned to be within 2% of Standard Optimum Moisture Content (SOMC). The layer thickness should be appropriate for the compaction plant adopted, but should be limited to a maximum of 200 mm when compacted.

Fill comprising sand and silty sand should be compacted to a minimum Density Index of 80%. Highly silty soils may be difficult to compact as their compaction characteristics can be sensitive to moisture content.

Earthworks compliance testing should be in accordance with AS3798 1996, Table 8.1 with testing to be provided by a NATA accredited testing authority.

5.3 Preliminary Pavement Thickness Design

The Preliminary Pavement Thickness Design in Table 4 has been completed to meet the requirements of Hawkesbury City Council Development Control Plan, 2002 (HCC-DCP) and our understanding of the Austroads "Pavement Design Guide 1992" (Reference 6).

Based on the results of CBR testing carried out and for the purpose of this preliminary design a CBR of 2.0% for clay soils and 10% for sandy soils has been adopted.

Design traffic loading's for various road types have been obtained from HCC-DCP (2002), Part I (Design Specifications) Table 6.8. The preliminary pavement design has been based on design traffic loading of 2 x 10^5 (minor collector) and 5 x 10^5 (medium collector).

Design CBR Value (%)	Material Type	Minor Collector	Medium Collector
2.0	Clayey Soils	525-550mm	575-600mm
10	Sandy Soils	325-345mm*	325-345mm*

Table 4 : Preliminary Pavement Thickness

Note: * denotes minimum pavement based on HCC DCP construction requirements

The pavement composition should be as follows:

- The wearing surface of 25mm (AC10) for local and collector roads increasing to 50mm (AC10) for roundabouts and cul-de-sacs;
- The basecoarse shall meet the requirements of a class "DGB20" material as specified in HCC-DCP, Section 7.3 of the Civil Specifications Part 2 Construction and a minimum compacted thickness of 100mm; and
- The sub-base shall consist of crushed or ripped sandstone, either 75mm or 100mm nominal size. Alternatively, a sub-base material satisfying RTA QA Specification 3051 Unbound and Modified Base and Sub-base Materials for Surfaced Road Pavements and RTA QA Specification 3052 – Material to be Bound for Base and Sub-base Materials for Surface Road Pavements. The Sub-base shall consist of a minimum compacted thickness of 200mm.

The preliminary pavement design has been provided in accordance with HCC-DCP and Austroad design guide, however, once proposed roads have been designed a formal pavement design should be carried out based on samples collected from the proposed road corridors. Subject to prior agreement and discussions with council a reduction in pavement thickness in areas of high CBR values may be possible using sound engineering design principles and pavement design software.

5.4 Excavation and Temporary Batters

Excavation of the soils encountered within the depth of the investigations should be possible using conventional earthworks equipment. It is unlikely that groundwater would be encountered in excavations shallower than about 1.5 m depth, with the exception of small seepages that may occur from perched water tables during and following wet weather, or in boggy areas of the Site..

Temporary unsupported batters may be cut at slopes of 1H:1V but always in accordance with NSW OH&S regulations. It is likely that shallow (<1m deep) utility trenches can be cut with steeper sides (near vertical) but construction equipment should not be allowed closer to the trenches than the equivalent depth of the trench.

5.5 Permanent Batters

Permanent batters may be constructed at slopes of 2H to 1V. The batters should be landscaped to limit the potential for erosion.

If permanent cuts are excavated for the diversion of surface water, the cuts should be formed at slopes no steeper than 3H to 1V. Erosion protection would be required, such as vegetation and/or geofabric pinned to the ground surface.

5.6 Pavement Construction

Flexible Pavements and materials shall be constructed in accordance with HCC-DCP (2002) Part II Construction Specification, Section 7.

Subgrade Preparation

The formation should be finished with boxing for the reception of the pavement. The exposed subgrade should be inspected, proof rolled by the Certifying Authority and compaction testing carried out in accordance with the requirements specified below. Where poor subgrade is encountered it shall be rendered suitable either by moisture conditioning, removed or stabilised as required. Construction of the pavement should not proceed until approval has been obtained from the Certifying Authority.

Compaction Requirements

Density testing shall be carried out by a NATA registered laboratory on the basis of one test every 50 metres of pavement taken 1.0m from the face of kerb on alternate sides of pavement. The pavement compaction requirements shall be as follows:

- All testing to be carried out in accordance with AS1289 testing procedures;
- Subgrade 100% Standard Maximum Dry Density @ 0 to –3% Standard Optimum Moisture Content;
- Sub-base 98% Modified Maximum Dry Density (MMDD) @ 0 to –3% Modified Optimum Moisture Content (MOMC); and
- Base course -98% MMDD @ 0 to -3% MOMC.

Proof rolling to the satisfaction of the Certifying Authority should be conducted prior to placement of each pavement layer.

5.7 Preliminary Lot Classifications and Footing Design

Based on the results of the investigation, the following preliminary lot classification has been prepared in accordance with AS2870 – 1996, Residential Slabs and Footings.

The site generally consists of sands and sandy clays on the western and northern part of the Site with medium to high plasticity soils on the eastern and southeastern part of the Site.

An area within the eastern / southeastern part of the Fernadell Site was previously observed as boggy (Reference 1). Subsequent further investigation of the Site via the construction of three groundwater monitoring wells have identified that shallow groundwater flows in a southerly / south-easterly direction towards this area. Therefore there is potential for water from other parts of the site being directed into this low-lying area. Moderate to high reactive

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clays encountered within the area are likely to be relatively susceptible to large surface movements associated with fluctuations in moisture conditions.

A preliminary lot classification is illustrated in Figure 5.

In general residential lots should be able to be developed with footing systems suitable for:

- 'S' Class, where the near surface soils and bearing stratum soil is sand: and
- 'M' Class, where the near surface soils and bearing stratum is clay, subject to good drainage being provided refer also to our discussion on possible impacts of stormwater infiltration in Section 5.8.

Sites to be filled should be classified on the basis of the nature, thickness and level of compaction of the fill. If the fill compaction is controlled then 'S' and 'M' classification may be adopted. If uncompacted fill or boggy conditions result in weak, compressible foundation material remaining on lots then a 'P' classification would be required.

These recommendations are reasonably consistent with the lot classifications provided in our 1998 report.

5.8 Stormwater Infiltration

We understand that consideration is being given to disposal of stormwater by infiltration into the sandy soils underlying most of the site. Based on the results of the investigation we provide the following comments:

- The permeability of the sand soils is sufficiently high to make the disposal of stormwater by infiltration feasible;
- Infiltration of stormwater to the low reactivity sand soils across the western and northern parts of the Site is not likely to impact on footings and pavements;
- Infiltration of stormwater may result in local raising of the level of the shallow groundwater table beneath the site;
- It is possible that stormwater that infiltrates to the sand soils could migrate down gradient to the low lying areas of the Site. These areas are generally underlain by clays and there is the potential for these soils to react adversely due to moisture changes brought about as a result of the infiltrated stormwater. Adequate drainage would be required to divert and manage this groundwater during wet periods to avoid impacts foundations and pavements in areas of the site underlain by clay. These affects could also be managed by allowing for thicker pavements or a poorer lot classification (Class P).

5.9 Other Geotechnical Considerations

Location of gardens / plantings and the design of adequate drainage across the site will be paramount to the performance of pavements and foundations, specifically within the more reactive soil stratums. A "Guide to Home Owners on Foundation Maintenance and Footing Performance (1996)" prepared by the Commonwealth Science and Industrial Research Organisation (CSIRO) provides a guide for home owners to care for the foundation of their houses and what to expect from a well designed footing system, and is presented as Appendix D.

Where Acid Sulfate Soils are encountered precautionary measures such as the use of sulfate resistant cement should be considered for foundations in accordance with AS 2159 1995.

6.0 IMPORTANT INFORMATION

Your attention is drawn to the document - "Important Information about your Geotechnical Engineering Report", which is included in Appendix E of this report. This document has been prepared by the ASFE (*Professional Firms Practicing in the Geosciences*), of which Golder Associates is a member. The statements presented in this document are intended to advise you of what your realistic expectations of this report should be, and to present you with recommendations on how to minimise the risks associated with the groundworks for this project. The document is not intended to reduce the level of responsibility accepted by Golder Associates, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

We would be pleased to answer any questions about this important information from the reader of this report.

GOLDER ASSOCIATES PTY LTD

Glen Fuller Senior Technical Officer

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GJF/GKS:CSC/gjf

ychd

Graham Scholey Associate

7.0 REFERENCES

- Preliminary Geotechnical and Contamination Investigation, Lot 1 DP133026, Lots 13 & 14 DP865977, Pitt Town, NSW – October 1998;
- Detailed Site Investigation, Proposed Residential Development, Pitt Town, NSW May 2005;
- Preliminary Acid Sulfate Soils Investigation, Proposed Residential Development, Pitt Town, NSW – June 2005;
- 4. Boesma, 1965b Infiltration Testing
- 5. Hawkesbury City Council Development Control Plan, 2002;
- 6. Guidelines on earthworks for commercial and residential developments AS3798, 1996;
- 7. Austroads "Pavement Design Guide, A Guide to the Structural Design of Road Pavements, 1992";
- 8. Residential slabs and footings Construction AS2870, 1996.



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	Residential Development, <u>Pitt Town NSW</u> {Y LOT CLASSIFICAT	MONITORING WELL LOCATIONS, Golder Investigation 2005 (Current)	APPROXIMATE TESTPIT Golder Investigation1998	BOREHOLE TESTPIT LOCATIONS, Golder Investigation 2005 (Current)	PRELIMIN CLASSIFIC	APPROXIMATE GEOLOGY BOUI PRELIMINARY L CLASSIFICATIO	FENCE DRAINAGE LINE APPROXIMATE OF EASEMENT	SITE BOUNDARY
FIGURE Nº 5	SIFICATION	ion 2005 (Currer		STPIT LOCATION ion 2005 (Currer	PRELIMINARY LOT CLASSIFICATION 'S'	APPROXIMATE GEOLOGY BOUNDARY PRELIMINARY LOT CLASSIFICATION 'M'	FENCE DRAINAGE LINE APPROXIMATE LOCATION OF EASEMENT	NDARY
0 A3	z	ੜ ਯ	LOCATIONS,	τ, Έ			NO	

Appendix A Borehole and Test Pit Reports and Explanatory Notes

PF LC		:CT: 70N:	Pr Pit	hnson Property Gr oposed Residentia t Town 623002		elopme	COORDS: 301439 m E 6282873 m N MGAS	94	OF BOREHOLE: BH101 SHEET: 1 OF 1 DRILL RIG: Gemco 210B DRILLER: Drilitest LOGGED: GJF DATE: 4/3/05 CHECKED: LBM DATE: 26/6/05	
	1	Drilling	1	Sampling			Field Material Descr	iption ai	and Instrumentation	
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL / ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)		
ATC	↓ Groundwater encountered @ 7.2m ↓ Standing Water Level 23/3/05		020 25.56 0.50 25.26 120 24.56 1.50 24.26 320 22.86 320 22.86 320 22.26 320 20.26 20 20.26 20 20.26 20 20.26 20 20.26 20 20 20.26 20 20.26 20 20.26 20 20.26 20 20.26 20 20.26 20 20.26 20 20.26 20 20.26 20 20.26 20 20.26 20 20.26 20 20.26 20 20.26 20 20.26 20 20.26 20 20.26 20 20.26 20 20.26 20 20 20.26 20 20 20 20 20 20 20 20 20 20 20 20 20	BH1/1 DS 0.000.20m R = 0A PID = 3.6 ppm BH1/2 SPT 0.500.95m 7,10,10 N=20 R = 0A PID = 4.6 ppm BH1/3 SPT 1.501.95m 10,15,13 N=28 R = 0A PID = 3.1 ppm BH1/4 SPT 2.50-2.95m 8,15,16 N=31 R = 0A PID = 4.7 ppm BH1/5 SPT 3.50-3.95m 5,10,15 N=25 BH1/6 SPT 4.50-4.95m SPT 5.50-5.95m 5,10,12 N=22 R = 0A PID = 3.8 ppm			SAND, fine to medium gravel light brown/grey. SAND, fine to medium gravel light brown/grey. SAND, medium grained white with clay low plasticity. As above but yellowbrown. Clayey SAND, low plasticity, medium grained, brown/yellow/grey. As above but brown/yellow with coal particles/organic? Sandy CLAY, low to medium plasticity, grey/brown. CLAY, high plasticity, grey/brown/yellow. As above but yellow/grey. As above but yellow/grey. END OF BOREHOLE @ 9.00 m Reached target depth Sort of borehole must be read in conjunction with accompanying notes		Gate Cover 0 - 0.1m Concrete 0.1-0.2m Bentonite 0.2-2.8m	
							na n		GAP gINT FN. F	F05 RL2

GAP5_1.GLB WELL J:\05PROJ\001-050\ENVIRO\05623002_JOHNSON - PITT TOWN NSWLOGS.GPJ GAP5_1.GDT 06\06/2006 1:58:34 PM

Golder

Drilling		Sampling		
JOB NO:	056230	02		HOLE
	050000			
LOCATION:	Pitt Tov	vn		INCLIN
PROJECT:	Propos	ed Residential Developn	nent	SURFA
CLIENT:	Johnso	n Property Group		COOR

COORDS: 301554 m E 6282854 m N 56 MGA94 CURFACE RL: m DATUM: AHD NCLINATION: -90° IOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Au DRILLER: Golder LOGGED: GJF CHECKED: GKS

and Auge	er	
der		
=	DATE:	10/3/05
KS	DATE:	26/6/05

Ī			Dril	ling		Sampling				Field Material Descrip				
	METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
				0.0	0.30	BH102/1 DS 0.00-0.20m R = 0A PID = 4.6 ppm			SP SP	SAND, fine to medium grained, brown with day. SAND, medium to coarse grained, brown/grey with day.			TOPSOIL NATURAL.	T
	НА	L	Groundwater not Encountered	- 0.5— -	0.70	BH102/2 DS 0.40-0.60m R = 0A PID = 5.0 ppm			SP	As above but grey.	Σ			-
-			0	- - <u>1.0</u> -	1.00	BH102/3 DS 0.90-1.00m R = 0A PID = 4.3 ppm				END OF BOREHOLE @ 1.00 m Reached target depth				
				- - 1.5—										-
Md				- - 2.0										-
OWN NSW/TPLOGS.GPJ GAP5_1.GDT 06/06/2006 2:01:57 PM				- - 2.5—										-
S.GPJ GAP5_1.GDT				- - - 3.0—										
-				-										
3002_JOHNSON - PIT				3.5— - -										-
01-050/ENVIRO\05623				4.0										-
GAP5_1.GLB FULL PAGE J:\05FROJ\001-050\ENVIRO\05623002_JOHNSON - PITT				- 4.5— -										-
GAP5_1.GLB FUL				- - -5 .0 -						n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not n absence of soil or groundwater contamination.				010
														RL2

Drilling		Sampling	
JOB NO:	056230	02	
LOCATION:	Pitt Tov	vn	
PROJECT:	Propos	ed Residential Developn	nent
CLIENT:	Johnso	n Property Group	

COORDS: 301656 m E 6282838 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Au DRILLER: Golder LOGGED: GJF CHECKED: GKS

and Auge	er	
der		
=	DATE:	10/3/05
KS	DATE:	26/6/05

		Dril	ling		Sampling				Field Material Descrip				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0		BH103/1			SP	SAND, fine to medium grained, brown with silt, trace of clay.			TOPSOIL	Т
		ed	_	0.20	DS 0.00-0.20m R = 0A	_		SP				NATURAL	
		ounter	-		PID = 2.7 ppm			50	SAND, fine to medium grained, brown/light brown with day.			NATURAL	
Ä	١.	ot Eno	- 0.5		BH103/2 DS 0.40-0.60m					_			
ш		ater no	0.5		R = 0A PID = 3.9 ppm					Σ			
		Groundwater not Encountered	-	0.00	PID = 3.9 ppm								
		Ģ	-	0.80			, 	SC	As above but Clayey SAND, grey/white.				
			-1.0	1.00	BH103/3 DS 0.90-1.00m		·		END OF BOREHOLE @ 1.00 m				
			-		R = 0A PID = 3.6 ppm	Λ			Reached target depth				
			_										
			_										
			1.5										-
			-										
			-										
			-										
			2.0										-
72.12			-										
000			-										
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			3.0—										-
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			4.5—										-
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	J	L		J This n	eport of borehole must be	⊥_ erear	J <u> </u>	I unctio	I multiple accompanying notes and abbreviations. It has been prepared for	aeote	.l echnic:	L	
5				atten	npt to assess possible cor	ntam	ination.	Any r	eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	neces	sarily i	ndicate the presence or GAP gINT FN.	F01a RL2

PF LC	LIENT ROJE DCAT	CT: 10N:):			on Property Group eed Residential Dev vn 102	elopment		Coords: 301755 m e 6282822 m n 56 MGA94 Surface RL: m datum: Ahd Pit depth: 3.60 m Bucket Type: 450mm		MA CO LO	EET: 1 OF 1 .CHINE: CAT INTRACTOR: On GGED: GJF ECKED: GKS	ecali DATE: 14/3/ DATE: 26/6/
		Exca	/ation		Sampling			Field Material Descrip		5		
METHOD	EXCAVATION	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUC ADI OBSE	CTURE AND DITIONAL ERVATIONS
	L		0.0		TP104/1 DS 0.00-0.20m R = 0A PID = 3.8 ppm TP104/2 DS 0.40-0.60m R = 0A PID = 4.3 ppm		SP	SAND, fine to medium grained, brown/white with fine gravels, trace of clay.	۵		NATURAL	
		Groundwater not Encountered	- - 1.0 - -	0.80	TP104/3 DS 1.00-1.20m R = 0A PID = 3.2 ppm	* * *	SP	Silty SAND, fine grained grey/white with fine sansdstone gravels.		_		
BH		Groundwate	- 1.5 - - - - 2.0	1.90		× × × × × × × × ×	SP	As above but fine to medium grained.				
	М		2.5 - - 2.5 -		TP104/4 DS 2.00-2.20m R = 0A PID = 4.1 ppm	× × × × × × × × × ×			M-D			
			- - 3.0 - -		TP104/5 DS 3.00 3.20m R = 0A PID = 3.6 ppm	* * * * * * * *						
			- 3.5—	3.60		×××××××		TEST PIT DISCONTINUED @ 3.60 m				
			- - 4.0—					Reached target depth				
			-									
			- 4.5									
			-									

RL2

Golder

Drilling		Sampling			
JOB NO:	056230	102			HOLE DIA:
LOCATION:	Pitt Tov				INCLINATIO
PROJECT:	Propos	ed Residential Dev	/elopr	nent	SURFACE I
CLIENT:	Johnso	n Property Group			COORDS: 3

OORDS: 301845 m E 6282828 m N 56 MGA94 URFACE RL: m DATUM: AHD ICLINATION: -90° IOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

F 1 and Auger Ider F DATE: 10/3/05 KS DATE: 26/6/05

		Dri	lling		Sampling				Field Material Descrip				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0-		BH105/1 DS 0.00-0.20m		××	SP	Silty SAND, fine to medium grained, light/brown/grey.	٥		NATURAL.	Ē
		ered	-	0.20	R = 0A PID = 4.9 ppm		×	SP	SAND, fine grained, grey/white.	_	-		
		ncounte	-				· · · ·						
ЧЧ	L-M	er not E	0.5—	0.60	BH105/2 DS 0.40-0.60m R = 0A					-			-
		Groundwater not Encountered	-	0.00	PID = 3.6 ppm			SP	As above but with clay and fine to medium ironstone gravel (extremely weathered).	Ā		Ironstone cementations	
		Grot	-		BH105/3								
			- 1.0	1.00	DS 0.80-1.00m R = 0A				END OF BOREHOLE @ 1.00 m				╡.
			-	-	PID = 3.4 ppm	1			Reached target depth				
			-										
			-	-									
			1.5										-
			-	-									
			-										
5			2.0-										.
02:16 PI			-										
006 2:0			-										
06/06/2			2.5-										-
1.GDT			-										
GAP5_			-										
S.GPJ			- 3.0-										
TPLOG			- 3.0	-									
N NSW			-										
T TOW			-	-									
TIG - NO			3.5-										.
OHNSO			-	-									
23002_,			-										
20\0562			4.0-	-									-
0/ENVIE			-										
001-05			-	-									
5PROJ/			- 4.5—										.
0:r 3:/0			-										
JLL PA			-										
GLB FI			-										
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													RĽ

Drilling		Sampling		
JUD INU.	000230	02		HOLE DIA
JOB NO:	056230	00		
LOCATION:	Pitt Tov	vn		INCLINAT
PROJECT:	Propos	ed Residential Developn	nent	SURFACE
CLIENT:	Johnso	n Property Group		COORDS

OORDS: 301954 m e 6282800 m N 56 MGA94 JURFACE RL: m DATUM: AHD NCLINATION: -90° IOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

der der - DATE: 10/3/05 KS DATE: 26/6/05

		Dri	ling		Sampling				Field Material Descrip				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0		BH106/1 DS 0.00-0.20m R = 0A PID = 3.7 ppm BH106/2			SP	SAND, medium grained, grey/white.	۵		NATURAL. - Borehole collapsing.	T
Ч		Groundwater not Encountered	0.5 - - -	0.60	DS 0.40-0.60m R = 0A PID = 3.1 ppm BH106/3 DS 0.80-1.00m			SP	SAND, fine to medium grained, white.	Σ	-		-
			- <u>1.0</u>	1.00	R = 0A \PID = 3.4 ppm		<u>• • • •</u> •		END OF BOREHOLE @ 1.00 m Reached target depth				
			1.5— - -										-
06 2:02:20 PM			- 2.0— -										-
3AP5_1.GDT 06/06/20			- 2.5— - -										.
N NSW/TPLOGS.GPJ			- 3.0— -										
JOHNSON - PITT TOW			- 3.5— -										
GAP5_1.GLB_FULL_PAGE_J:05PROJ001-050ENVIRO105623002_JOHNSON - PITT TOWN NSWITPLOGS.GPJ_GAP5_1.GDT_06062006 2:02:20 PM			- 4.0— -										.
PAGE J:\05PROJ\001-			- 4.5— -										.
GLB FULL			-										
GAP5_1.	J	L	— 5.0 —	This r atten	eport of borehole must b npt to assess possible cc	⊥⊥ e read ntamir	i <u> </u>	unctio Any r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	∟ geote ieces	u <u> </u>	al purposes only, without ndicate the presence or GAP gINT FN. I	F01; RL

Golder
Associates

Drilling		Compling	
JOB NO:	056230	02	
LOCATION:	Pitt Tov	vn	
PROJECT:	Propos	ed Residential Developn	nent
CLIENT:	Johnso	n Property Group	

COORDS: 302040 m E 6282791 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

' der - DATE: 10/3/05 KS DATE: 26/6/05

		_	lling		Sampling				Field Material Descrip				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
HA		Groundwater not Encountered	0.0	0.70	BH107/1 DS 0.00-0.20m R = 0A PID = 4.0 ppm BH107/2 DS 0.40-0.60m R = 0A PID = 3.6 ppm			SP	SAND, fine to medium grained, brown/grey.	۵		NATURAL.	-
		Grou	- - 1.0	1.00	BH107/3 DS 0.80-1.00m R = 0A PID = 4.2 ppm			SP	SAND, fine grained, grey/white trace of fine gravel.	M-D			-
			- - - 1.5— - - -		(PID = 4.2 ppm	/			END OF BOKEHOLE @ 1.00 m Reached target depth				-
GAP5_1.GLB FULL PAGE J:055PR0J001-050/ENVIRO/05623002_JOHNSON - PITT TOWN NSWITPLOGS.GPJ GAP5_1.GDT 06/06/2008 2:02:25 PM			2.0— - - 2.5— -										-
TOWN NSW/TPLOGS.GPJ GA			- 3.0 - -										-
05623002_JOHNSON - PITT			3.5 - - - 4.0										-
J:\05PROJ\001-050\ENVIRO			4.0 - - 4.5—										-
25_1.GLB_FULL_PAGE 、			- - - - <u>5.0</u>						n with accompanying notes and abbreviations. It has been prepared for				
GAF				atten	npt to assess possible con	itami	ination.	Any r	In wire accompanying notes and addreviations. It has been prepared to eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	yeur Ieces	sarily i	an purposes only, without ndicate the presence or GAP gINT FN. F	01a RL

PF	LENT	CT:		Johnsc Propos	I CS In Property Group ed Residential Dev	elopm	ent		Coords: 302133 m e 6282772 m N 56 MGA94 Surface RL: m Datum: Ahd		MA CO	EET: 1 OF 1 CHINE: CAT NTRACTOR: One	
	DCAT DB NO			Pitt Tov 056230					PIT DEPTH: 3.00 m BUCKET TYPE: 450mm			GGED: GJF ECKED: GKS	DATE: 14/3/0 DATE: 26/6/0
			/ation		Sampling				Field Material Descr	iption			
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION		CONSISTENCY DENSITY	ADD	TURE AND ITTIONAL RVATIONS
	L		0.0— - - 0.5— -	0.80	TP108/1 DS 0.00-0.20m R = 0A PID = 8.6 ppm TP108/2 DS 0.40-0.80m R = 0A PID = 6.4 ppm BS 0.4 - 0.8			SP	SAND, fine to medium grained, white/brown.			NATURAL	
BH		Groundwater not Encountered	- 1.0 - - 1.5		TP108/3 DS 1.00-1.20m R = 0A PID = 4.9 ppm			SP	SAND, fine grained, grey mottled yellow/orange.	D-M			
	мн	0	- - 2.0 -	1.80	TP108/4 DS 1.80-0.20m R = 0A PID = 5.4 ppm	- - - - - - - - - - - - - - - - - - -		SP	SAND, fine to medium grained, yellow/white/brown with fine ironstone gravels.	e	-		
			- 2.5— - -		TP108/5								
			- 	3.00	DS 2.80-3.00m R = 0A PID = 3.6 ppm	_/			TEST PIT DISCONTINUED @ 3.00 m Reached target depth				
			- 3.5— -										
			- 4.0 -										
			- 4.5 -										

' gi RĽ

		A	SSC	cia	tes						SH	ET: 1 OF 1		
LCCATION: Pit Town PPT DepTH: 4.00 m LOCGED: G.F DATE USBNO: 0652002 BUCKET TYPE: 450mm COCGED: G.F DATE Town Sampling Sampling Sampling CALCATON: Pitel Material Description Town Sampling						elopn	nent						call	
Excavation Sampling Field Material Description Excavation grad by the provided of the provided o	ТЮ	ION:		Pitt Tow	ľ				PIT DEPTH: 4.00 m		LO	GGED: GJF	DATE: 14/3	
Status The Source of the second				056230							СН	ECKED: GKS	DATE: 26/	6/05
0.0 0.0 0.0 0.00020m R = 0.0 R = 0.0 R = 0.0 R = 0.0 PD = 64.gcm SP SMD, fire to medium grained, brownighty, SP NATURAL 0.5 0.500200m R = 0.0 PD = 64.gcm SP SMD, fire to medium grained, brownighty, SP NATURAL NATURAL 0.6 0.600 PD = 64.gcm SP SMD, fire to medium grained, gray model orange/selow with day weathered, externely to stranging NATURAL 1.0 10 10 10 SS 10.0120m PD = 36.gcm SP SMD, fire to medium grained, gray model orange/selow with day weathered, externely to stranging NATURAL 1.0 10 10 10 SE SMD, fire to medium grained, gray model orange/selow with day weathered, externely to stranging NATURAL 1.0 10	Т	=xca	ation		Sampling				Field Material Descrip		λ			
1 10103 220 10103		WATER	DEPTH (metres)	<i>DEPTH</i> RL		RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTEN DENSITY	ADD	ITIONAL	
u 0.20 PI-0.6 figm V: 3 SP SAND, fire to medum grained, brownigtey. Interview	T		0.0				×	SP	Silty SAND, fine to medium grained, brown.			TOPSOIL		
u 0.6 0.040,400,80m 1.0 R=0.4, PD=6.4 ppm 1.0 0.00 1.0 <td></td> <td></td> <td>-</td> <td>0.20</td> <td>R = 0A</td> <td></td> <td>×</td> <td></td> <td>SAND, fine to medium grained, brown/grey.</td> <td></td> <td></td> <td>NATURAL</td> <td></td> <td></td>			-	0.20	R = 0A		×		SAND, fine to medium grained, brown/grey.			NATURAL		
0.5 0.64 PD = 6.4 ppm a.00 0.7 0.64 PD = 6.4 ppm a.00 0.7			-				· · · ·							
u 10 0.00 PD = 64 pm BS04 - 0.8 10<		0.5—		DS 0.40-0.80m										
L 20 TP1003 TP1003 TS 100-120n R = 0.4 PD = 3.6 ppm TP 0034 TS 200-220n R = 0.4 PD = 5.1 ppm TP1005 TS 300-220n R = 0.4 PD = 5.1 ppm TP1005 TP1005 TS 300-220n R = 0.4 PD = 5.1 ppm TP1005 TP105		-		PID = 6.4 ppm		• •								
L 20 15- 15- 15- 16- 190 15- 190 15- 190 15- 190 15- 190 15- 190 15- 190 15- 190 15- 190 190 190 190 190 190 190 190		@1.1m	-	0.80	DO U.4 - U.8		Ĺ		SAND find to modium grained are unatted are set allowed at					
L 20 R=0A PD=3.6 ppm 15- 15- 15- 15- 15- 15- 15- 15-		page (-					I SP	and fine to medium ironstained sandstone gravel (extremely					
L 20 15- 15- 15- 16- 190 15- 190 15- 190 15- 190 15- 190 15- 190 15- 190 15- 190 15- 190 190 190 190 190 190 190 190		Å See	1.0						weak lated, exiter hay low such guil)					
L 20- 15- 190 100 190 190 190 190 190 190			-	1.20	R = 0A			SC	Clavey SAND, fine to medium grained, orange/grey with medium					
L 20 190 20 190 20 190 20 190 20 190 20 1 190 20 1 190 20 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			-		1.5 0.0 pp		- '							
L 20- TP1094 DS 200-220m R=0A PD=51 ppm TP1095 DS 300-320m R=0A PD=51 ppm TP1095 DS 300-320m R=0A PD=4.4 ppm TP1095 DS 300-320m TP1095 DS 300-320m R=0A PD=4.4 ppm TP1095 DS 300-320m R=0A PD=4.4 ppm TP1095 DS 300-320m R=0A PD=4.4 ppm TP1095 DS 300-320m R=0A PD=4.4 ppm TP1095 DS 300-320m R=0A PD=4.4 ppm TP1095 DS 300-320m R=0A PD=4.4 ppm TP1095 DS 300-320m R=0A PD=4.4 ppm TEST PT DISCONTINUED @ 4.00 m			- 1.5—				[
L 20- TP1094 DS 200-220m R=0A PD=51 ppm TP1095 DS 300-320m R=0A PD=51 ppm TP1095 DS 300-320m R=0A PD=4.4 ppm TP1095 DS 300-320m TP1095 DS 300-320m R=0A PD=4.4 ppm TP1095 DS 300-320m R=0A PD=4.4 ppm TP1095 DS 300-320m R=0A PD=4.4 ppm TP1095 DS 300-320m R=0A PD=4.4 ppm TP1095 DS 300-320m R=0A PD=4.4 ppm TP1095 DS 300-320m R=0A PD=4.4 ppm TP1095 DS 300-320m R=0A PD=4.4 ppm TEST PT DISCONTINUED @ 4.00 m			-											
L 20- TP1094 DS200-220m R=0A PD=51 ppm TP1095 DS300-320m R=0A PD=51 ppm TP1095 DS300-320m R=0A PD=44 ppm PD=44 ppm PD			-											
L 20 TP1094 DS 200-200m R=0A PID = 5.1 ppm TP1095 DS 300-320m R=0A PID = 4.4 ppm TP1095 DS 300-320m R=0A PID = 4.4 ppm TP1095 DS 300-320m R=0A PID = 4.4 ppm TP1095 DS 300-4 PID = 4.4 ppm			-	1.90				<u>e</u>	Sandy CLAV/Clayory SAND law plasticity from to modium aminod					
R = 0A PID = 5.1 ppm 2.5 PID = 5.1 ppm 3.0 TP1095 DS 300 320m R = 0A R = 0A PID = 4.4 ppm 3.5 360 3.60 TOP CONFINENCIAL PROVINCIAL PR			2.0—				<u> </u>		orange motiled grey.	Σ				
3.0 TP1095 3.0 TP1095 0 3.0- 3.5 3.60 3.5 3.60 3.60 3.60 3.60 3.60 3.60 3.60 3.60 3.60 </td <td></td> <td></td> <td>-</td> <td></td> <td>R = 0A</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>			-		R = 0A									
30- TP1095 DS 300-320m R = 0A PID = 4.4 ppm -			-		PID = 5.1 ppm									
30- TP1095 DS 300-320m R = 0A PID = 4.4 ppm -			-					1						
1 1			2.5											
1 1			-											
1 1			-				<u> </u>	1						
3.5- 3.60 3.5- 3.60 3.60 3.60 3.60 3.80 3.80 4.0 4.0			3.0-		TP100/5			4						
3.5 3.60 PID = 4.4 ppm Image: state stat			-		DS 3.00-3.20m									
360 -<			-				<u> </u>	1						
3.60 -			-					ł						
3.80 -			3.5—	3.60			<u></u>							
4.0 CLAY, high plasticity, yellow/grey.			-				L=_	CI	CLAY, medium plasticity, brown/yellow trace sand.		ŭ			
4.0 4.0 m TEST PIT DISCONTINUED @ 4.00 m			-	3.80			<u> </u>	СН	CLAY, high plasticity, yellow/grey.		ŭ			
			-4.0	4.00		\perp	<u> -</u> -	·[^-tS			
			-											
45-			- - 4.5—											
			-											
			-											
CLIEN	T:		Johnso	n Property Group			(С						
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PROJE	CT:		Propos	ed Residential Devel	opn	nent	5	S						
LOCAT	FION:		Pitt Tov	vn			I	IN						
JOB N	0:		056230	02			I	Н						
	Dri	lling		Sampling										
								_						

COORDS: 301633 m E 6282738 m N 56 MGA94 SURFACE RL: m DATUM: AHD NCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m

and Aug	er	
lder		
F	DATE:	10/3/05
KS	DATE:	26/6/05

ľ			Dril	lling		Sampling				Field Material Descrip				
	METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
				0.0		BH110/1 DS 0.00-0.20m			SP	SAND, fine to medium grained, brown with silt.			TOPSOIL	T
			ered	-	0.20	R = 0A PID = 2.0 ppm			SP	SAND, fine to medium grained, grey with brown clay.			NATURAL.	-
			ncounte	-				· · · ·						
	НA	L	er not E	0.5—		BH110/2 DS 0.40-0.60m R = 0A					Σ			-
			Groundwater not Encountered	-		PID = 2.7 ppm								
			Grot	-	0.80				SP	As above but with ironstone gravel.				.
				- 	1.00	100/3 DS 0.90-1.00m		<u>•</u>		END OF BOREHOLE @ 1.00 m				
				-		R = 0A PID = 3.0 ppm	Ι			Reached target depth				
				-										
				-										
				1.5										
				-										
				-										
W				2.0										-
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GS.GP.				- 3.0—										-
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итт то				- 3.5										
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VIRO\0				4.0										-
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GAP£					This r atten	eport of borehole must b npt to assess possible co	e read ntami	d in conj ination.	junctio Any r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not n absence of soil or groundwater contamination.	geote ieces	echnica sarily i	al purposes only, without ndicate the presence or GAP gINT FN. F	[:] 01a RL2

Golder

Drilling		Sampling	
JOB NO:	056230	02	
LOCATION:	Pitt Tov	vn	
PROJECT:	Propos	ed Residential Developm	ent
CLIENT:	Johnsc	n Property Group	

COORDS: 301734 m E 6282723 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m

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and Auge	er	
der		
=	DATE:	10/3/05
KS	DATE:	26/6/05

		_	ling		Sampling	_			Field Material Descrip				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
_			0.0-		BH111/1		××	SP	Sitty SAND, fine to medium grained, brown/light brown.			TOPSOIL	Т
		7	-	0.20	DS 0.00-0.20m R = 0A		×						
		ntereo	_		PID = 2.6 ppm			SP	SAND, fine to medium grained, brown/grey with clay.			NATURAL.	
		Encou	-		BH111/2		· · ·	t					
ЧA	L	r not E	0.5-		DS 0.40-0.60m			ł		Σ			-
		dwate	-	0.70	R = 0A PID = 2.8 ppm			1					
		Groundwater not Encountered	-	0.10				SP	Aa above but with ironstone gravel.	1			
			-					1					
			-1.0	1.00	BH111/3 DS 0.90-1.00m	-	••••		END OF BOREHOLE @ 1.00 m				
			-		R = 0A PID = 2.7 ppm	Ι			Reached target depth				
			-		·	1							
			-										
			1.5-										.
			-										
			-										
			-										
			2.0-										.
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J GAF			-										
S.GP			- 3.0—										
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LVMSN			-										
NMO			-										
			- 3.5—										
- NO			- 0.0										
OHNS			-										
002_J			-										
05623			- 4.0										
VIRO			4.0-										
50/EN			-										
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PROJ			45										
30/:L :			4.5										
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GAP5_1.1.GLB FULL PAGE J:05PR0J1001-050ENVIRO105623002_JOHNSON - PITT			-5.0-	This r atter	report of borehole must be npt to assess possible co	e read	d in conj iination.	unctic Any r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not n absence of soil or groundwater contamination.	geote	echnica sarily i	al purposes only, without ndicate the presence or GAP gINT FN. I	F01:
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Golder
V Associates

CLIENT:	Johnson F
PROJECT:	Proposed
LOCATION:	Pitt Town
JOB NO:	05623002

hnson Property Group oposed Residential Development t Town

COORDS: 301834 m E 6282708 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

and Auger der = DATE: 10/3/05 KS DATE: 26/6/05

		Dril	ling		Sampling				Field Material Descrip				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
	1		0.0-		BH112/1		×	SP	Silty SAND, fine to medium grained brown/light brown			TOPSOIL	
			-	0.10	DS 0.00-0.10m	_	×				4		4
		g	-		R=0A			SP	SAND, fine to medium grained, brown/grey.			NATURAL.	
		ntere	_	0.30	PID = 4.0 ppm		· · · ·						
		cour						SP	As above but grey.				
-		ΕŪ	-		BH112/2			ł					'
ΗA	L	er no	0.5		DS 0.40-0.60m R = 0A					Σ			-
		wate	-		PID = 3.0 ppm			t					1
		Groundwater not Encountered	-					1					·
		õ	-	0.80	BH112/3			SP	As above but trace of fine ironstone gravels.				
			-		DS 0.80-1.00m			ľ					
_			-1.0	1.00	R=0A		۰.	<u> </u>					-
			-		PID = 2.0 ppm	1			END OF BOREHOLE @ 1.00 m Reached target depth				
			_						······				
			_										
1	1		45										
			1.5—										-
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			-										·
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			-										
			2.0-										-
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80.2			-										-
2.7			-										
			-										
00/0			2.5-										-
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200	1		4.0-										-
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2016			-										1
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NO.			-										
			4.5-										-
~ -	1		_										
10Y			_										
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	1		_										
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			— 5.0 —	This r	eport of borehole must be	read	d in coni	unctic	n with accompanying notes and abbreviations. It has been prepared for	geote	echnica		
5									references to potential contamination are for information only and do not r			indicate the presence or	04-
									absence of soil or groundwater contamination.			GAP gINT FN. FI	ula RL2
													_

CLIENT: PROJECT: OCATION: OB NO:	Johnson Property Grou Proposed Residential I Pitt Town 05623002		450mm	M/ CC LC C+	HEET: 1 OF 1 ACHINE: CAT DNTRACTOR: Onecall DGGED: GJF DATE: 14/3/03 HECKED: GKS DATE: 26/6/03
Excavation	Sampling		Field Material Descriptio		
EXCAVATION RESISTANCE WATER 0 DEPTH (metres)	SAMPLE OF FIELD TEST RL	VIIOS Symbol USC Symbol	ROCK MATERIAL DESCRIPTION	MOISTURE CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
L L Performance 10-	Image: Text of the second s	SP SAND, fine grained,	Im grained, grey/yellow/orange with day.		NATURAL

Drilling		Sampling		
				-
JOB NO:	056230	02		HO
LOCATION:	Pitt Tov		INC	
PROJECT:	Propos	nent	SU	
CLIENT:	Johnsc		CO	

COORDS: 302029 m E 6282687 m N 56 MGA94 CURFACE RL: m DATUM: AHD NCLINATION: -90° IOLE DIA: 75 mm HOLE DEPTH: 1.00 m

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der		
-	DATE:	10/3/05
<s< td=""><td>DATE:</td><td>26/6/05</td></s<>	DATE:	26/6/05

			Dril	ling		Sampling				Field Material Descrip				
	METHOD	PENEI KA I ION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
	HA	L	Groundwater not Encountered	0.0— - - 0.5— -	0.80	BH114/1 DS 0.00-0.20m R = 0A PID = 4.8 ppm BH114/2 DS 0.40-0.60m R = 0A PID = 3.6 ppm BH114/3			SP	SAND, fine to medium grained, brown/grey.	۵	-	- Slow progress.	
GAP5_1.GLB FULL PAGE J:05PR0J1001-050/ENVIRO/05623002_JOHNSON - PITT TOWN NSWTPLOGS.GPJ GAP5_1.GDT 06/06/2006 2:02:44 PM		Μ				DS 080-1.00m R = 0A PID = 3.4 ppm				END OF BOREHOLE @ 1.00 m Reached target depth	D-M			
P5_1.GLB FULL PAGE				- - - - <u>5.</u> 0	This n					n with accompanying notes and abbreviations. It has been prepared for		echnic	al ourposes only, without	
GA					atten	npt to assess possible cor	ntam	ination.	Any r	eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	ieces	sarily i	ndicate the presence or GAP gINT FN. FI)1a RL2

Golder
MASSOCIATES

CLIENT: PROJECT: LOCATION:	Johnson Property Group Proposed Residential Development Pitt Town
JOB NO:	05623002

COORDS: 302126 m E 6282684 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m

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der		
=	DATE:	10/3/05
KS	DATE:	26/6/05

			Dri	ling		Sampling				Field Material Descrip				
	ME I HOU	PENETRATION	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
				0.0		BH115/1		××	SP	Silty SAND, fine to medium grained, brown.			TOPSOIL.	Т
				-	0.20	DS 0.00-0.20m		×		,				
			ered	-	0.20	R = 0A PID = 5.1 ppm			SP	SAND, fine to medium grained, brown/grey.	1		NATURAL	1
		L	ounte	-										
			Groundwater not Encountered	-		BH115/2								
-	ЧA		r not	0.5—	0.00	DS 0.40-0.60m								-
	ŀ		wate	-	0.60	R = 0A PID = 5.3 ppm			SP	SAND, fine to medium grained, white.		1	- Slow progress.	
			puno	-									1 0	
		MH	Ģ	-		BH115/3					Σ			
				-	1.00	DS 0.80-1.00m								
				1.0	1.00	R = 0A PID = 4.8 ppm				END OF BOREHOLE @ 1.00 m				1-
				-			1			Reached target depth				
				-										
				-										
				-										
				1.5										-
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06 2				-										
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06/0				2.5—										-
GDT				-										
P5_1.				-										
GAF				-										
.GPJ				-										
OGS				3.0-										-
MTPL				-										
NSV				-										
NMO				-										
				-										
⊿ '				3.5—										-
NSO														
P P														
3002														
0562				4.0										
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VEN/				_										
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SAP5					This r	eport of borehole must be	eread	d in conj	unctio	n with accompanying notes and abbreviations. It has been prepared for	geote	chnica	al purposes only, without	
0					atten	ILPLIC ASSESS POSSIBLE COL	nam	ii iation.	ANY I	eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	ieces	saniy i	GAP gINT FN. F	01a
										-			-	RĽź

CLIENT: Johnson Property Group PROJECT: Proposed Residential Development LOCATION: Pitt Town JOB NO: 05623002					elopn	nent	:	Coords: 301415 m e 6282662 m n 56 Mga94 Surface RL: m datum: Ahd Pit depth: 4.00 m Bucket Type: 450mm	EET: 1 OF 1 CHINE: CAT NTRACTOR: One GGED: GJF ECKED: GKS	call DATE: 14/3/0 DATE: 26/6/0		
	Exca	/ation		Sampling	_			Field Material Descrip				
EXCAVATION	WATER	DEPTH (metres)	<i>DEPTH</i> RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	ADD	TURE AND ITIONAL RVATIONS
		0.0		TP116/1 DS 0.00-0.20m		××	SP	Silty SAND, fine to medium grained, brown.			TOPSOIL	
		-	0.20	R = 0A PID = 8.4 ppm		×	SP	SAND, fine to medium grained, brown/grey.			NATURAL	
		-		TRACO								
		0.5—		TP116/2 DS 0.40-0.80m R = 0A								
		-		PID = 6.3 ppm BS 0.4 - 0.8								
		-	0.80				SP	SAND, fine to medium grained, grey mottled yellow with clay.				
		- 1.0—										
		-	1.20	TP116/3 DS 1.00-1.20m R = 0A								
		-	1.20	PID = 4.9 ppm			sc	Clayey SAND, fine to medium grained.				
		-										
		1.5										
	ered	-	1.70				CL	Sandy CLAY/Clayey SAND, low plasticity, orange/grey/yellow.				
	Groundwater not Encountered	-					sc					
L	r not E	2.0—		TP116/4			l		Σ			
	Indwate	-		DS 2.00-2.20m R = 0A								
	Grou	-		PID = 6.3 ppm		+ + 						
		- 2.5										
		-	2.60				CL	As above with ironstained medium sandstone gravels.				
		-					sc					
		-										
		3.0		TP116/5 DS 3.00-3.20m			ł					
		-	3.20	R = 0A PID = 4.1 ppm			СН	CLAY, high plasticity, grey with fine to medium sand.				
		-		TP116/6 DS 3.20-3.40m		t	ļ					
		3.5—		R = 0A PID = 5.8 ppm			I			ŭ		
		-				<u> </u>						
		-	3.80	TP116/7			СН	CLAY, mediun to high plasticity, brown/yellow trace of fine ironstone		Ş		
		4.0	4.00	DS 3.80-4.00m R = 0A PID = 5.4 ppm				gravels. TEST PIT DISCONTINUED @ 4.00 m		St-VSt		
		-		<u>1 10 – 3.4 ppm</u>	1			Reached target depth				
		-										
		- 4.5—										
		4.5										
		-										
		_										

Golder
V Associates

CLIENT:	Johnson F
PROJECT:	Proposed
LOCATION:	Pitt Town
JOB NO:	05623002

hnson Property Group oposed Residential Development tt Town

COORDS: 301506 m E 6282662 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m

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der		
=	DATE:	10/3/05
KS	DATE:	26/6/05

	× ki iii > □ RL L 0.0 - 0.20 L particular - 0.20 L 0.5 - M 0 -			Sampling	_			Field Material Descrip					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0		BH117/1 DS 0.00-0.20m			SP	SAND, fine to medium with silt, brown.	M-D		TOPSOIL	Τ
		Itered	-	0.20	R = 0A PID = 3.6 ppm			SP	SAND, fine to medium with day, brown/brown grey		1	NATURAL.	-
7	L-M	t Encoul	-		BH117/2		r						
Η		water no	0.5	0.60	DS 0.40-0.60m R = 0A PID = 4.0 ppm			 	As above but grey with fine to medium ironstone gravels.	Σ			-
	м	Ground	-	-				I					
			-	1.00	BH117/3 DS 0.80-1.00m R = 0A								
			-	-	PID = 2.1 ppm	1			END OF BOREHOLE @ 1.00 m Reached target depth				
			-										
			- 1.5—										.
			-										
			-										
			- 2.0—										.
12:54 PM			-	-									
2006 2:0			-										
L 06/06/2			2.5—	-									-
'5_1.GD1			-										
SPJ GAF			-										
PLOGS.0			3.0										-
NSW/T			-										
TTOW			-										
SON - PI			3.5 -										-
2_JOHN			-										
0562300			- 4.0—										
ENVIRO			4.0										
001-050\			-										
15PROJ(- 4.5										.
AGE J:\0			-										
FULL P			-										
5_1.GLB			- 	1		<u> </u> _]	<u> </u>			<u> </u>	l	
GAP									In with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.			ndicate the presence or GAP gINT FN. I	F01a RL2

Golder

Drilling		Sampling	
JOB NO:	056230	02	
LOCATION:	Pitt Tov	vn	
PROJECT:	Propos	ed Residential Developn	nent
CLIENT:	Johnso	n Property Group	

COORDS: 301415 m E 6282643 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m

and Auge	er	
lder		
F	DATE:	10/3/05
KS	DATE:	26/6/05

		Dri	lling		Sampling				Field Material Descrip				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
	L		0.0		BH118/1 DS 0.00-0.10m			SP	SAND, fine to medium with silt, brown.	0		TOPSOIL	Γ
		tered	-	0.20	R = 0A PID = 3.4 ppm			SP	SAND, fine to medium with day, brown/brown grey.		{	NATURAL.	
		Groundwater not Encountered	_		BH118/2								
НA	L-M	ater not	0.5	0.60	DS 0.40-0.60m R = 0A					N-D			
		roundw	-	0.80	PID = 3.8 ppm			SP	As above but grey.				
		U	-		BH118/3 DS 0.80-1.00m			SP	As above trace of fine ironstone gravels				
			- <u>1.0</u>	1.00	R = 0A PID = 2.9 ppm				END OF BOREHOLE @ 1.00 m Reached target depth				.
			-										
			-										
			1.5										.
			-										
			-										
W			2.0										•
TOWN NSWITPLOGS.GPJ GAP5_1.GDT 06/06/2006 2:03:00 PM			-	-									
6/2006			-										
DT 06/0			2.5										•
P5_1.GI			-	-									
GPJ GA			-										
PLOGS.			3.0										.
I NSWT			-										
T TOWN			-										
TIG - NO			3.5										.
SNHOL			-	-									
623002			-										
VIRO\05			4.0										ŀ
-050\EN			-	-									
ROJ/001			-										
J:\05P			4.5										•
L PAGE			-										
GAP5_1.GLB FULL PAGE J:05PROJ001-050ENVIRO05623002_JOHNSON - PITT			-										
AP5_1.6	┛— -	L		J This r	eport of borehole must b	⊥⊥ e read	l <u> </u>	iunctic	I In with accompanying notes and abbreviations. It has been prepared for	L_ geote	_l echnic	L	I _
9				atten	npt to assess possible co	ntam	ination.	Any r	eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	ieces	sarily i	GAP gINT FN. F	01; RL:

CLIENT: Johnson Property Group PROJECT: Proposed Residential Developme LOCATION: Pitt Town JOB NO: 05623002						elopr	nent	COORDS: 301713 m E 6282628 m N 56 MGA94 MACHINE: CAT ent SURFACE RL: m DATUM: AHD CONTRACTOR: Oneca PIT DEPTH: 4.00 m LOGGED: GJF BUCKET TYPE: 450mm CHECKED: GKS							
_	Excavation Sampling									TE: 26/6/05					
	EXCAVATION RESISTANCE		DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	Field Material Descrip		CONSISTENCY DENSITY	ADDITIONAL	STRUCTURE AND ADDITIONAL OBSERVATIONS		
			0.0	0.20	TP119/1 DS 0.000.20m R = 0A PID = 6.4 ppm TP119/2 DS 0.40-0.80m R = 0A PID = 5.3 ppm BS 0.4 - 0.8		× ×	SP			-	TOPSOIL			
			- 1.0— - - - 1.5—	1.00	TP119/3 DS 1.00-1.20m R = 0A PID = 2.6 ppm			SP	As above but yellow mottled orange with medium iron stained sandstone gravel (extremely weathered, extremely low strength)trace of clay.						
	L		- - 20- - - - - - - - - - - - - - - - -	2.00	TP119/4 DS 2:00-2:20m R = 0A PID = 4:9 ppm			sc	As above but motiled grey.	×					
		\bigwedge Minorwater seepage @3.2m	- - - 30 - - -	2.80				SC cl	Clayey SAND/Sandy CLAY, orange/grey, trace of fine to medium iron stained sandstone gravel.		F-St				
			3.5— - - - - <u>4.0</u> — - -	4.00	TP1196 DS 3.80-4.00m R = 0A PID = 4.6 ppm				TEST PIT DISCONTINUED @ 4.00 m Reached target depth						
			- 4.5— - -	•											

Golder

CLIENT: PROJECT:		n Property Group ed Residential Developm	nent
LOCATION:	Pitt Tov	<i>n</i>	
JOB NO:	056230	02	
Drillin a		Sampling	
Drillina		Sampling	

COORDS: 301818 m E 6282608 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

and Auger der - DATE: 10/3/05 <S DATE: 26/6/05

					Sampling				Field Material Descrip	iterial Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS			
			0.0	0.30	BH120/1 DS 0.00-0.20m R = 0A PID = 1.6 ppm		× × ×	SP	Silty SAND, fine to medium grained, light brown/grey.	٥		NATURAL.	T		
НA	L-M	Groundwater not Encountered	- 0.5	0.60	BH120/2 DS 0.40-0.60m R = 0A			SP	SAND, fine grained, grey/white.				-		
		Groundwate	-	0.00	PID = 2.8 ppm BH120/3			SP	As above but with day and fine ironstone gravel.	M-D		- Ironstone cementations			
			- 	1.00	DS 0.80-1.00m R = 0A PID = 2.4 ppm				END OF BOREHOLE @ 1.00 m Reached target depth				-		
			-												
			1.5										-		
MH 60:50:2			-												
00/00/2000			- 2.5										-		
GAP5_1.GUI			-												
10WN NSW/17L0GS.GFJ GAPS_1.GD1 06/06/2006 2:03:05 PM			- 3.0										-		
I LOWN NSW			-												
III - NOSNHO			3.5										-		
002823002_0			- - 4.0												
1-050/ENVIRC			-												
NU/LOAReu/:L			- 4.5—										-		
			-												
GAP5_1.GLE]	L_	- 	This r	eport of borehole must be	read	d in conj ination.	unctic Any r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r	geote	echnica sarily ir	ndicate the presence or]_		
								,	absence of soil or groundwater contamination.			GAP gINT FN. F	i01a RL2		

Golder

CLIENT:

PROJECT:

LOCATION:

JOB NO:

REPORT OF BOREHOLE: BH121

	Sampling			Field Material							
056230	02		H	HOLE DIA: 75 mm HOLE DEPTH: 1.00 m							
Pitt Tov	vn		I	INCLINATION: -90°							
Propos	ed Residential Develo	opmen	nt S	SURFACE RL: m DATUM: AHD							
Johnso	n Property Group		(COORDS: 301925 m E 6282576 m N 56 MGA94							
	-										

SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

	Drilling Sampling							Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS			
F			0.0-		BH121/1			SP	SAND, fine to medium grained, grey/brown.			NATURAL.	Т		
	L	red	-		DS 0.00-0.20m R = 0A PID = 2.9 ppm										
		counte	-	0.40				1							
ЧЧ	L-M	not En	0.5-		BH121/2 DS 0.40-0.60m			SP	SAND, fine to medium grained, grey.]		.		
		Groundwater not Encountered	-	0.60	R = 0A PID = 2.9 ppm			SP	SAND, medium grained, grey/white.						
	м	Groune	-							Σ					
			-	1.00	BH121/3 DS 0.80-1.00m			Ī							
			<u>-1.0</u>	1.00	R = 0A PID = 3.4 ppm		••••	-	END OF BOREHOLE @ 1.00 m				1.		
			-						Reached target depth						
			-												
			- 1.5—										.		
			-	-											
			-												
			-												
_			2.0-										.		
8:09 PN			-												
16 2:03			-												
/06/200			- 2.5—												
DT 06			2.5-												
^{55_} 1.G			-												
oJ GAI			-												
DGS.GI			3.0-										.		
MTPLO			-												
NN NS			-												
TT T0/			-												
II - NO			3.5												
SNHO			-												
3002_J			-												
J\0562			4.0										.		
ENVIRG			-												
1-050\			-												
ROJ/00			-												
J:\05P			4.5—												
PAGE			-												
FULL			-												
1.GLB			- — 5.0 —	_	L						<u> </u>	L			
GAP5_1.GLB FULL PAGE_J:05PROJ/001-050/ENVIRO/05623002_JOHNSON - PITT TOWN NSWTPLOGS GPJ GAP5_1.GDT 06/06/2006 2:03:09 PM			5.0						n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.			ndicate the presence or GAP gINT FN. F	=01a RL2		

Golder
V Associates

CLIENT: PROJECT: LOCATION:	Johnson Property Group Proposed Residential Development Pitt Town
JOB NO:	05623002

COORDS: 301020 m E 6282560 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m

Cold Material D

гі		
and Auge	r	
lder		
F	DATE:	10/3/05
KS	DATE:	26/6/05

		Drii	mig		Sampling				Field Material Descrip				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0		BH122/1 DS 0.00-0.20m		××	SP	Silty SAND, fine to medium grained, brown/brown grey.			TOPSOIL.	Τ
		eq	_	0.20	R = 0A		×	SP	SAND for to made on grained brown/grav			NATURAL	4
	L	ounter	-		PID = 2.7 ppm			5P	SAND, fine to medium grained, brown/grey.				
∢		ot Enc	-		BH122/2 DS 0.40-0.60m								
НA		ater no	0.5	0.60	R = 0A			05		Σ			
		Groundwater not Encountered	-		PID = 2.9 ppm			SP	SAND, medium grained, grey/white.				
	м	Ū	-		BH122/3 DS 0.80-1.00m								
			-1.0	1.00	R = 0A PID = 1.6 ppm			-	END OF BOREHOLE @ 1.00 m				
			-			1			Reached target depth				
			_										
			-										
			1.5—										-
			-										
			-										
			- 2.0										
Σ			2.0										
T TOWN NSWTPLOGS.GPJ GAP5_1.GDT 06/06/2006 2:03:14 PM			-										
006 2			-										
06/06/2			2.5—										-
GDT (-										
AP5_1.			-										
GPJ G			-										
-0GS.0			3.0—										-
SWITPI			-										
SN NM			-										
			-										
- NO			3.5										
SNHO			-										
3002_			-										
0\0562			4.0-										-
INVIRG			-										
1-050\E			-										
00\ro;			-										
J:\05PF			4.5										-
AGE .	1		-										
ULL P			-										
GLBF			-										
GP5_1.GLB_FULL_PAGE_J;05PRQJ001-050/ENVIRO/05523002_JOHNSON - PIT	- <u> </u>	<u> </u>	— 5.0 —	This n atten	eport of borehole must be npt to assess possible cor	reac	l in conj nation.	unctic Any r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	geote neces	, <u> </u>	al purposes only, without ndicate the presence or GAP gINT FN. F	

CLIENT: Johnson Property Group PROJECT: Proposed Residential Development LOCATION: Pitt Town JOB NO: 05623002				elop	ment		Coords: 302103 m e 6282555 m n 56 MGA94 Surface RL: m datum: Ahd Pit depth: 3.00 m Bucket Type: 450mm	MA CO LO	IEET: 1 OF 1 ACHINE: CAT ONTRACTOR: Onecall IGGED: GJF DATE: 14/3/05 IECKED: GKS DATE: 26/6/05				
		Exca	/ation		Sampling	_			Field Material Descrip	otion			
METHOD	EXCAVATION	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	ADD	TURE AND ITIONAL RVATIONS
			0.0		TP123/1 DS 0.00-0.20m R = 0A PID = 4.8 ppm TP123/2 DS 0.40-0.80m			SP	SAND, fine to medium grained grey/white.	0		NATURAL	
	L-M		-	0.80	R = 0A PID = 6.4 ppm BS 0.4 - 0.8			sc	Clayey SAND, low plasticity, fine to medium grained, yellow with fine iron stained sandstone.				
		Encountered	1.0— - - -	1.30	TP123/3 DS 1.00-1.20m R = 0A PID = 4.2 ppm			SP SC	Clayey SAND, fine to medium grained grey mottled orange/red with medium iron stained sandstone.	-			
BH		Groundwater not Encountered	1.5 - - -		TP123/4 DS 1.80-2.00m					Σ	MD		
	мн		2.0		R = 0A PID = 5.6 ppm						~		
			- 25 - -		TP123/5								
			- 	3.00	DS 2.80-3.00m R = 0A PID = 5.3 ppm	_			TEST PIT DISCONTINUED @ 3.00 m Reached target depth				
			- 3.5— -										
			- - 4.0 -										
			- 4.5— -										
			-										

CLIENT: PROJECT:	Johnson F Proposed
LOCATION:	Pitt Town
JOB NO:	05623002

on Property Group ed Residential Development m

COORDS: 301402 m E 6282571 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m

and Aug	ger	
der		
	DATE:	10/3/05
s	DATE:	26/6/05

		Dri	lling		Sampling				Field Material Descrip				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0		BH124/1		×	ML	Sandy SILT, low plasticity, brown.			TOPSOIL	Ē
	L	q	-	0.20	DS 0.00-0.15m R = 0A	_	××						
	м	Groundwater not Encountered	-		PID = 5.3 ppm DUP04		××	SP	Silty SAND, fine grained, light brown.			NATURAL.	
		Enco	-	0.40	BH124/2		~	SP	SAND, fine to medium grained, brown/grey with fine to medium			Cemented? slow progress	
НA		ter not	0.5-	0.60	DS 0.40-0.60m R = 0A				ironstone gravel.				•
	мн	undwa	-		PID = 4.0 ppm			GI	Sandy CLAY, low plasticity, brown/yellow with ironstone gravel.	Σ			
		Grot	-		BH124/3						τ		
			-	1.00	DS 0.80-1.00m R = 0A		+ +						
			-1.0		PID = 4.3 ppm	ſ			END OF BOREHOLE @ 1.00 m Reached target depth				
			-										
			-										
			- 1.5										
			-										
			-										
			-										
			2.0-										
			-										
7.00.1			-										
0007			_										
5			2.5-										.
201			_										
10 MM NSWI LCOSS 61 9412 1901 00005000 2.03:18 LW			_										
			-										
			3.0-										•
			_										
			-										
2			-										
			3.5										
			_										
400			-										
04000			- 4.0										.
000			-										
- 10000			-										
			4.5-										.
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2			-										
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5				This n atten	eport of borehole must be npt to assess possible con	reac itami	a in conji ination.	unctic Any r	In with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	geote neces	echnica sarily i	ndicate the presence or GAP gINT FN. F(01a RL2

Golder
Associates

Drilling		Sampling			
JOB NO:	056230	02			
LOCATION:	Pitt Tov	vn			
PROJECT:	Proposed Residential Developmen				
CLIENT:	Johnsc	n Property Group			

COORDS: 301489 m E 6282561 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m

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and Auge	er	
der		
-	DATE:	10/3/05
٨S	DATE:	26/6/05

			ling		Sampling				Field Material Descrip			
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0	0.30	BH125/1 DS 0.00-0.20m R = 0A PID = 3.8 ppm				FILL:Sandy SILT, low plasticity, brown.	٥		FILL
	L	coun		0.40			×	ML		Σ- Δ		TOPSOIL
ЧA		ot Er	0.5-		BH125/2 DS 0.40-0.60m			SC	SAND, fine to medium grained, brown/grey.			NATURAL.
Т		Groundwater not Encountered	-	0.60	R = 0A PID = 3.1 ppm			sc	As above but with clay and fine to medium ironstone gravel.	Σ		
	М	Grou	-	0.80	BH125/3 DS 0.80-1.00m			SC	Clayey SAND, fine to medium grained, with fine to medium ironstone gravel.			
_	_		-1.0	1.00	R=0A		·		END OF BOREHOLE @ 1.00 m			
			-		PID = 4.3 ppm	1			Reached target depth			
			-									
			-									
			-									
			1.5—									· · · · · · · · · · · · · · · · · · ·
			-									
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0/00			2.5—									· · · · · · · · · · · · · · · · · · ·
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2			-									
5												
5.0			3.0-									
IVAC			-									
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2			-									
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0-100			-									
	1		-									
100/1			4.5—									
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2												
	<u> _</u> _	$\lfloor _ floor$	- -5:0-	_	L	\bot]		l	L_	<u> _</u> _	└┘
GAP3_19LD FULL FAGE J.WOFROJWOFGORENVIROU0922002_JUHNOON FILL LUWIN NOWLFLOGS.GFJ GAF9_1.901 U0002000 2.33.24 FM				This n atten	eport of borehole must be npt to assess possible cor	e read	d in conj ination.	unctic Any r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	geote neces	echnic isarily i	al purposes only, without indicate the presence or GAP gINT FN. F01. RL

Golder

CLIENT:

PROJECT:

LOCATION:

REPORT OF BOREHOLE: BH126

	n Property Group ed Residential Devel	lopn	nent		COORDS: 301596 m E 6282545 m N 56 MGA94 SURFACE RL: m DATUM: AHD
Pitt Tow					NCLINATION: -90°
056230	02				HOLE DIA: 75 mm HOLE DEPTH: 1.00 m
	Sampling				Field Material I
	SAMPLE OR	RED	0	Ibol	

- 1		
and Auge	er	
der		
-	DATE:	10/3/05
٨S	DATE:	26/6/05

JOE	3 NC	NO: 05623002 HOLE DIA: 75 mm HOLE DEPTH: 1.00 m CHECKED: GKS DATE: 26/6/05											
		Dril	ling		Sampling	_			Field Material Descrip	tion	ı.		
METHOD	RESISTANCE	WATER	DEPTH (metres)	<i>DEPTH</i> RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
	м	Itered	0.0		BH126/1 DS 0.00-0.20m R = 0A PID = 2.6 ppm				FILL:Silty SAND, fine to medium grained, brown/light brown.	0		FILL	
НА	L	Groundwater not Encountered	- 0.5— - -	0.40	BH126/2 DS 0.40-0.60m R = 0A PID = 3.0 ppm BH126/3			SP	SAND, fine grained, brown/yellow/grey trace of clay and silt.	Σ	-	NATURAL.	
			- 	1.00	DS 0.80-1.00m R = 0A PID = 2.9 ppm				END OF BOREHOLE @ 1.00 m Reached target depth				
			-										
			1.5 -										-
			- - 2.0										-
NSWITLUGS.0FJ 64FS_1.0FJ 00/00/2000 2.03.28 FM			-										
1.90/00/20			- 2.5—										-
0.6PJ 6AP0_													
			- 3.5—										-
			-										
			4.0										-
			- - 4.5—										-
			-										
			- 					L			<u> </u>		
L CANDO			0.0 -						n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.			allocka the process of an	INT FN. F01a RL2

Golder
Associates

 CLIENT:
 Johnson F

 PROJECT:
 Proposed

 LOCATION:
 Pitt Town

 JOB NO:
 05623002

Johnson Property Group Proposed Residential Development Pitt Town

COORDS: 301700 m E 6282529 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m

and Aug	jer	
der		
-	DATE:	10/3/05
<s< td=""><td>DATE:</td><td>26/6/05</td></s<>	DATE:	26/6/05

		_	ling		Sampling				Field Material Descrip				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0		BH127/1 DS 0.00-0.20m				FILL:Silty SAND, fine grained, brown/light brown.	∑- □		FILL	Τ.
		ntered	-	0.20	R = 0A PID = 4.0 ppm		*****	SP	SAND, fine to medium grained, with silt, brown, trace of organic matter.		1	NATURAL	
_		Groundwater not Encountered	-		BH127/2								.
НA	L-M	vater no	0.5 —	0.60	DS 0.40-0.60m R = 0A PID = 3.1 ppm			SP	SAND, fine to medium grained, with silt, light brown.	Σ		- Organic odour	
		Groundv	-	0.80									
		0	-	1.00	BH127/3 DS 0.80-1.00m R = 0A			SP	SAND, fine grained, brown/grey.				.
					PID = 2.7 ppm				END OF BOREHOLE @ 1.00 m Reached target depth				1-
			-										
			-										.
			1.5—										-
			-										
			-										.
			2.0										-
			-										
			-										.
			2.5										-
			-										-
			-										.
			3.0 —										-
			-										
			-										-
			3.5—										-
			-										
			-										.
			4.0										-
			-										-
			-										.
			4.5										-
			-										
													.
	۰ <u> </u>	<u> </u>	— <u>5.</u> 0—						n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.			ndicate the presence or GAP gINT FN. I	F01a RL2

Golder	s
Golder	5

Drilling		Sampling							
000110.	000200								
JOB NO:	056230	02		HO					
LOCATION:	Pitt Tov	Pitt Town							
PROJECT:	Propos	ed Residential Developn	nent	SU					
CLIENT:	Johnso	n Property Group		CO					

COORDS: 301798 m E 6282515 m N 56 MGA94 CURFACE RL: m DATUM: AHD NCLINATION: -90° IOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

, and Auger der = DATE: 10/3/05 KS DATE: 26/6/05

		Dril	ling		Sampling				Field Material Descrip	tion			
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0		BH128/1		×	SP	Silty SAND, fine grained, light brown/grey.			NATURAL.	
			-		DS 0.00-0.20m		×						-
	L-M	eq	-		R = 0A	-	^ ×						-
		unter	-		PID = 2.6 ppm		××			₽- D			
		ncot	-		DI 1400 D		×						
ЧA	L	10t E	0.5		BH128/2 DS 0.40-0.60m		××						_
-		Groundwater not Encountered	_	0.60	R = 0A		×				1		.
		:wpu	_		PID = 2.8 ppm			SP	SAND, fine grained with fine to medium gravel., light brown/grey				.
	м	Brou	_	0.80						Σ			
		Ũ	_		BH128/3 DS 0.80-1.00m			SP	As above but trace of ironstone gravels.	2			
			-1.0	1.00	R=0A								
			1.0		PID = 2.0 ppm	\square			END OF BOREHOLE @ 1.00 m				1
			-						Reached target depth				.
			-										
			-										
			-			1							1
			1.5			1							-
			-										'
			-			1							1
			-										·
			-										
			2.0-										-
			-										.
			-										.
			-										.
			-										.
			2.5—										-
			-										.
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			-										.
			-										.
			3.0										_
			_										.
			_										.
			_										.
			_			1							.
			3.5—										_
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			_			1							
			-										
			40										'
			4.0										
			-										1
			_			1							1
			-										1
			-										1
			4.5—										-
			-			1							1
			-										·
			-										·
			-										•
	J	L _	— 5.0 —	I _ ∣	L	1_	I	I	L	L_	<u> </u>	L	1_
				This re	eport of borehole must be	reac tami	d in conji ination	unctio Anv r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not n	geote	echnica sarily i	ndicate the presence or	
				anon					absence of soil or groundwater contamination.		y "	GAP gINT FN. F	01a
												I	rL2

Golder
Associates

CLIENT:	Johnson F
PROJECT:	Proposed
LOCATION:	Pitt Town
JOB NO:	05623002

ohnson Property Group roposed Residential Development tt Town

COORDS: 301910 m E 6282461 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

nd Auger der DATE: 11/3/05 (S DATE: 26/6/05

	Drilling			Sampling				Field Material Descrip					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0		BH129/1		××	SP	Silty SAND, fine to medium grained, brown/white.			TOPSOIL	Т
		-	-	0.20	DS 0.00-0.20m R = 0A		×						
		Itered	_		PID = 3.4 ppm		××	SP	Silty SAND, fine to medium grained, white.			NATURAL.	7
	L	ncou	-				× ×			_			
		not E	0.5-		BH129/2 DS 0.40-0.60m		××			₽- 2			.
		vater	-		R = 0A PID = 4.1 ppm	-	×						
	-	Groundwater not Encountered	-	0.70	· · · · · · · · · · · · · · · · · · ·		× .	SP	SAND, fine grained, light brown/white trace of fine gravels.		1		
	м	ō	-	•	BH129/3			ľ		Σ			
			-	1.00	DS 0.80-1.00m R = 0A			•					
			-1.0		PID = 2.8 ppm	Γ			END OF BOREHOLE @ 1.00 m Reached target depth				1
			-						r ceau ieu laigel uepin				
			-	-									
			-	-									
			1.5	•									·
			-	1									
			-										
			-										
			2.0-										.
Z				-									
TOWN NSWIPLOGS.GPJ GAPS_1.GDT 06/06/2006 2:03:42 PM			-	-									
6 2:0			-	-									
07.700			-	-									
06/0			2.5—										·
1.6.01			-										
- GAA			-										
2			-	-									
5.55			3.0-	-									.
			-										
NSN			-	-									
CWN			-										
			3.5-										
- N													
NNN NN			-	-									
02_JC			-	-									
96230			-										
KO/06			4.0										·
ENVI			-	1									
1-050			_										
00/00			-	-									
05PR			4.5-										.
			-										
PAG			-	1									
FUL			-	1									
.GLB			-	1									
GAPS_1.GLB FULL PAGE J:05PR0J/001-050/ENVIRO/05623002_JOHNSON - PITT			-5.0-	This r	eport of borehole must be	e read	d in conj	unctic	n with accompanying notes and abbreviations. It has been prepared for	geote	chnic	al purposes only, without	
U				atten	npt to assess possible co	ntam	ination.	Any r	eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	neces	sarily i	indicate the presence or GAP gINT FN.	F01
									-			-	RĽ

CLIENT:	Johnson F
PROJECT:	Proposed
LOCATION:	Pitt Town
JOB NO:	05623002

nnson Property Group oposed Residential Development : Town

COORDS: 302001 m E 6282469 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

nd Auger der DATE: 11/3/05 (S DATE: 26/6/05

Drilling					Sampling	-			Field Material Descrip				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0		BH130/1 DS 0.00-0.20m		×	SP	Silty SAND, fine to medium grained, brown/light brown.	M-D		TOPSOIL.	
НA	L	Groundwater not Encountered	- - 0.5 -	0.20	R = 0A PID = 2.9 ppm BH130/2 DS 0.40-0.60m		x x x x x x x	SP	Silty SAND, fine to medium grained, white.		0	NATURAL	-
		roundwater	-	0.60	R = 0A PID = 2.3 ppm		X	SP	SAND, fine grained, brown/white.	Σ			
	М	U	- - - <u>1.0</u>	1.00	BH130/3 DS 0.80-1.00m R = 0A								
			-		PID = 1.8 ppm				END OF BOREHOLE @ 1.00 m Reached target depth				
			-										
			1.5 -										
			-										
			2.0										-
			-										
			2.5										-
			-										
			3.0										-
			3.5 — -										-
			-										
			- 4.0—										-
			-										
			- 4.5—										-
			-										
L _			- 										
				This re atten	eport of borehole must be npt to assess possible con	read itami	t in conju nation.	unctio Any re	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not n absence of soil or groundwater contamination.	geote ieces:	echnica sarily i	ndicate the presence or GAP gINT FN. F	01a RL2

CLIENT:

PROJECT:

LOCATION:

JOB NO:

REPORT OF BOREHOLE: BH131

na		Sampling	
	056230	02	HOLE DIA: 75 n
	Pitt Tov	vn	INCLINATION: -
	Propos	ed Residential Development	SURFACE RL:
	Johnso	n Property Group	COORDS: 30209

OORDS: 302091 m E 6282465 m N MGA94 URFACE RL: m DATUM: AHD ICLINATION: -90° IOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: HA DRILLER: Golder LOGGED: DD CHECKED: GKS

	Drilling					Sampling								
	METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
F		L		0.0		HA131/1 DS 0.00-0.20m		× × × , ×	ML	SILT, low plasticity, grey/brown, with clay	0		TOPSOIL	
	-		ncountered	-	0.20	R = 0A PID = 1.6 ppm		× × ×	СН	CLAY, high plasticity, brown - red/brown	M-D		NATURAL.	
	НА	м	Groundwater not Encountered	0.5	0.60	HA131/2 DS 0.40-0.60m R = 0A PID = 2.1 ppm			СН	As above but yellow/brown		St-VSt		
			Grou	- - 1.0	1.00	HA131/3 DS 0.80-1.00m R = 0A					Σ			-
				-		PID = 2.2 ppm				END OF BOREHOLE @ 1.00 m Reached target depth				
				- 1.5—										-
				-										
Z PM				2.0										-
TOWN NSW/LOGS.GPJ GAP5_1.GDT 06/06/2006 1:57:17 PM				- - 2.5—										-
LOGS.GPJ GAP5_1.GI				- - 3.0										-
				- - 3.5—										-
GAP5_1.GLB_FULL_PAGE_J:\05PROJ\001-050\ENVIRO\05623002_JOHNSON - PITT T				-										
1-050/ENVIRO/(4.0— - -										-
SE J:\05PROJ\00				- 4.5—										-
GLB FULL PAG				-										
3AP5_1.0]		L	-5.0-	J	L	⊥_ This≀	I <u> </u>	f bore	L hole must be read in conjunction with accompanying notes and abbrevia	L	_	L	-
Ŭ													GAP gINT FN. F0	1a

PR(CT: ION:			n Property Group ed Residential Devi vn	elopr	nent		Coords: 301387 m e 6282477 m N 56 MGA94 Surface RL: m datum: Ahd Pit depth: 4.00 m Bucket type: 450mm		MA CO LO	EET: 1 OF 1 CHINE: CAT NTRACTOR: Onecall GGED: GJF DATE: 14/3 ECKED: GKS DATE: 26/6	
	E	Exca	/ation		Sampling				Field Material Descrip	tion			
	RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0		TP132/1		××	SP	Silty SAND, fine to medium grained, brown.			NATURAL	
	L		-		DS 0.00-0.20m R = 0A		× ×						
-	_		-	0.30	PID = 4.8 ppm		×	SP	SAND, medium grained grey/white with medium to coarse ironstone				
			- 0.5—		TP132/2 DS 0.40-0.80m				gravels.				
			0.5		R = 0A PID = 5.4 ppm								
			-	0.80	BS 0.4 - 0.8 m								
	M		-	0.00				CI	Sandy CLAY, medium plasticity.				
			1.0		TP132/3						t l		
			-		DS 1.00-1.20m R = 0A		+ +				St		
			-	1.30	PID = 4.9 ppm								
			-					SC	Clayey SAND, fine to medium grained grained/yellow/red with iron stained sandstone gravel.				
			1.5—										
		p	-										
		untere	-										
_		t Enco	-				<u> </u>						
5		Groundwater not Encountered	2.0		TP132/4 DS 2.00-2.20m		Ĺ			Σ			
		wpunc	-		R = 0A PID = 6.4 ppm		F						
		Ğ	-		- 11		[]						
			- 2.5—				[]						
	м		-	2.60			<u> </u>	СН	CLAY, high plasticity, grey trace of fine sand.				
			-								ß		
			-								5		
			3.0—	3.00	TP132/5		[==]	SC	Clayey SAND, fine to medium grained grey/orange with iron stained				
			-		DS 3.00-3.20m R = 0A				fine to medium sandstone gravels.				
			-		PID = 4.2 ppm		[
			-	3.40				CI	CLAY, medium to high plasticity, yellow- brown mottled grey, trace of				
			3.5				[=_]	СН	fine to medium sandstone gravels.				
			-				<u> </u>				ŭ		
			-		TP132/6			ļ					
			-4.0	4.00	DS 3.80-4.00m R = 0A			-					
			-		PID = 5.2 ppm	-1			TEST PIT DISCONTINUED @ 4.00 m Reached target depth				
			-										
			-										
			4.5—										
			-										
			-										
			_			1							

RL2

Golder
MASSOCIATES

Drilling		Sampling	
JOB NO:	056230	02	
LOCATION:	Pitt Tov	vn	
PROJECT:	Propos	ed Residential Developm	nent
CLIENT:	Johnso	n Property Group	

COORDS: 301478 m E 6282461 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

and Auger der 5 DATE: 10/3/05 KS DATE: 26/6/05

	Drilling			Sampling	Field Material Description								
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0	0.25	BH133/1 DS 0.00-0.20m R = 0A PID = 1.9 ppm		× × × ×	SP SP	Silty SAND, fine to meidum grained, brown/light brown.	M-D		NATURAL.	
НA	L	Groundwater not Encountered		0.60	BH133/2 DS 0.40-0.60m R = 0A					Σ			-
		Groundw	-	<u>0.80</u> 1.00	PID = 2.9 ppm BH133/3 DS 0.80-1.00m R = 0A			SP SP	As above but grey/light brown. As above but yellow mottles and fine ironstone gravels.	2			
			- <u>1.0</u>	1.00	PID = 3.4 ppm				END OF BOREHOLE @ 1.00 m Reached target depth				
			- 1.5										-
MIL 10:00.7 0			-										
			- 2.5										-
10 WM NAW11 FLOGS. 013 6413_1.601 000012000 2.03.31 FM			- - 3.0										-
			-										
			3.5										-
			- - 4.0										-
			-										
			4.5										-
]		- 	 This r	eport of borehole must be	read	d in conji	unctic	n with accompanying notes and abbreviations. It has been prepared for	geote	echnica	al purposes only, without	
0				atten	npt to assess possible cor	ntami	ination.	Any r	eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	ieces	isarily ir	ndicate the presence or GAP gINT FN. F	=01a RL2

Golder

REPORT OF BOREHOLE: BH134

Drilling	Sampling	Field Material D
JOB NO:	05623002	HOLE DIA: 75 mm HOLE DEPTH: 1.00 m
LOCATION:	Pitt Town	INCLINATION: -90°
PROJECT:	Proposed Residential Developm	ment SURFACE RL: m DATUM: AHD
CLIENT:	Johnson Property Group	COORDS: 301579 m E 6282448 m N 56 MGA94

SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

		Dril	ling		Sampling				Field Material Descrip	tion		
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0		BH134/1 DS 0.00-0.20m		× ×	SP	Sity SAND, fine to medium grained, brown.	M-D		NATURAL.
	L	Groundwater not Encountered	-	0.20	R = 0A PID = 1.6 ppm		*	SP	SAND, medium grained, brown/grey.		1	
∢		not Enc	-	-	BH134/2							
НA		ndwater	0.5	0.60	DS 0.40-0.60m R = 0A PID = 2.4 ppm			SP	As above but grey.	Σ		
	L-M	Grou	-	0.80	BH134/3			SP	As above but trace of ironstone gravels.			
			- <u>-1.0</u>	1.00	DS 0.80-1.00m R = 0A							
			-		PID = 1.8 ppm	1			END OF BOREHOLE @ 1.00 m Reached target depth			
			-									
			- 1.5—									
			-	-								
			-									
			2.0-	-								
03:56 PM			-	-								
2006 2:0			-	-								
T 06/06/			2.5									
P5_1.GD			-									
GPJ GA			-									
PLOGS.			3.0									
N NSW/I			-									
MOLILI			-	-								
SON - PI			3.5									
2_JOHN			-									
0562300			- 4.0—									
ENVIRO			-	-								
001-050\			-									
15PROJ			- 4.5—	-								
AGE J:\(-									
FULL P.			-									
GAP5_1.GLB_FULL PAGE_J:05PR0J001-050ENVIRO105623002_JOHNSON - PITT TOWN NSWITPLOGS.GPJ_GAP5_1.GDT_06062006_2:03:56 PM	<u> </u>		-] _	L			L	l		<u> _</u> _	l
GAP									on with accompanying notes and abbreviations. It has been prepared for references to potential contamination are for information only and do not r absence of soil or groundwater contamination.			

CLIENT: Johnson Property Group PROJECT: Proposed Residential Development LOCATION: Pitt Town JOB NO: 05623002							nent		Coords: 301687 m e 6282435 m n 56 MGA94 Surface RL: m datum: Ahd Pit depth: 3.20 m Bucket Type: 450mm	EET: 1 OF 1 .CHINE: CAT INTRACTOR: Onecall GGED: GJF DATE: 14/3 .ECKED: GKS DATE: 26/6			
_		Exca	vation	1	Sampling				Field Material Descrip			I	
	RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
T			0.0 - -	0.30	TP135/1 DS 0.00-0.20m R = 0A PID = 6.4 ppm		× × ×	SP	Silty SAND, fine to medium grained brown/grey. SAND, fine grained grey/white with silt.			NATURAL	
	L		- 0.5— - -		TP135/2 DS 0.40-0.80m R = 0A PID = 5.8 ppm BS 0.4 - 0.8 m					٥			
	мн	sred	- 1.0— - -	1.20	TP135/3 DS 1.00-1.20m R = 0A PID = 2.8 ppm			SC	Clayey SAND, fine grained, grey/red/orange, (extremely weathered sandstone).				
		Groundwater not Encountered	- 1.5 - -	1.90									
	м		2.0— - - 2.5—		TP135/4 DS 2.00-2.20m R = 0.A PID = 5.6 ppm			CH	CLAY, high plasticity, grey/brown/yellow with fine to medium iron stained sandstone gravel.	×	St-VSt		
			- - 3.0—	320	TP135/5 DS 3.00-3.20m R = 0A \PID = 4.7 ppm			- - - - -	TEST PIT DISCONTINUED @ 3.20 m				
			- 3.5— -			-			Reached target depth				
			- 4.0 - -										
			- 4.5— - -										

CLIENT: PROJECT: LOCATION: JOB NO: Drilli	John Propo Pitt To 0562		lopme	nt	:	COORDS: 301784 m E 6282420 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 0.90 m Field Material Desc	ription	DR DR LO	IEET: 1 OF 1 RILL RIG: Hand Aug RILLER: Golder GGED: GJF IECKED: GKS	per DATE: 10/3 DATE: 26/6
ATION NCE	DEPTH (metres) Ldad Tdad	SAMPLE OR FIELD TEST	RECOVERED	LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION		CONSISTENCY DENSITY	STRUCT ADDI OBSER	TURE AND TIONAL 2VATIONS
HA T Groundwater not Encountered	0.0	BH1362 DS 0.40-0.60m R = 0A PID = 3.4 ppm	x x x= x: , , , , , , , , ,	× × · · · · · · · · · · · · · · · · · ·	ML SP CI	Sandy SILT, low plasticity, brown/grey. Silty SAND, fine grained, brown/grey. CLAY, medium plasticity, brown/yellow, traces of sand.	Q W-Q W	St	NATURAL	
		R=0A PID=30ppm				END OF BOREHOLE @ 0.90 m Reached target depth				

GAP gINT FN. F01a RL2

CLIENT: PROJECT: LOCATION: Pitt Town 05623002 JOB NO:

Johnson Property Group Proposed Residential Development COORDS: 301891 m E 6282406 m N MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m

SHEET: 1 OF 1 DRILL RIG: HA DRILLER: Golder LOGGED: DD CHECKED: GKS

		Dri	ling		Sampling				Field Material Descrip			
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
	L		0.0-		HA137/1 DS 0.00-0.15m		×	SP	Silty SAND, fine to medium grained, brown			TOPSOIL
		incountered	-	0.15	R = 0A PID = 2.9 ppm		* * × × ×	CI	Silty CLAY, medium plasticity, brown/yellow	D-M-D		NATURAL.
ЧA	м	Groundwater not Encountered	0.5		HA137/2 DS 0.40-0.60m R = 0A PID = 2.6 ppm		× × × × ×			0	ŭ	- @ 0.5m root (living)
		9	- - 1.0	1.00	HA137/3 DS 0.80-1.00m R = 0A PID = 3.4 ppm				END OF BOREHOLE @ 1.00 m Reached target depth			
			- - 1.5									
			-									
107.33 PM			2.0									
GUI 00/00/2000			- 2.5 -									
10WN NSWLDGS.GFJ GAP3_1.GUT U6/06/2006 1:37:33 FM			- - 3.0									
			- - 3.5—									
			-									
			4.0									
1:000FK03/00			- 4.5									
			- - 									
GAPO						This r	report of	f bore	hole must be read in conjunction with accompanying notes and abbrevia	itions.		GAP gINT FN. F01 RI

Golder

 CLIENT:
 Johnson Property Group

 PROJECT:
 Proposed Residential Development

 LOCATION:
 Pitt Town

 JOB NO:
 05623002

COORDS: 301995 m E 6282384 m N MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: HA DRILLER: Golder LOGGED: DD CHECKED: GKS

			ling		Sampling				Field Material Descrip			
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
	L		0.0		HA138/1 DS 0.00-0.15m R = 0A		× × × ×	SP	Silty SAND, fine to medium grained, brown	_		TOPSOIL
ЧA		Groundwater not Encountered	- - 0.5	0.25	PID = 3.4 ppm HA138/2 DS 0.40-0.60m			CI	Silty CLAY, medium plasticity, brown to red/brown	M-D		NATURAL.
Ξ	м	broundwater n			R = 0A PID = 3.2 ppm					Σ	St	
		0	- - 1.0	1.00	HA138/3 DS 0.80-1.00m R = 0A PID = 1.6 ppm				END OF BOREHOLE @ 1.00 m			
			-						Reached target depth			
			- 1.5									
			-									
M			2.0									
6:/c:1_0007/0												
0/00 I 09/1			-									
10WN NSWLUGS.GFJ GAP3_1.GU1 UBUD/2006 1:37:38 FM			- 3.0									
			-									
			- 3.5—									
HUL_2006200			-									
			4.0									
1-100/00/00/00			- - 4.5									
			-									
]		- 	_	 	his r	report of	bore	hole must be read in conjunction with accompanying notes and abbrevia	tions		l
ξĐ					·		JUGICO					GAP gINT FN. F01 RL

V	E	A	Gol sso	CIA	tes							FEST PIT: TP1;	
PR					on Property Group ved Residential Dev	elopr	ment		Coords: 302077 m e 6282374 m N 56 MGA94 Surface RL: m datum: Ahd Pit depth: 3.20 m		MA CO	CHINE: CAT NTRACTOR: Onecall GGED: GJF DATE: ^	14/3/04
	BN			056230					BUCKET TYPE: 450mm			ECKED: GKS DATE: 2	
		Exca	vation		Sampling				Field Material Descr				
METHOD	EXCAVATION	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0		TP139/1		× —	ML	Silty CLAY, low pasticity, brown.			TOPSOIL	
				0.20	DS 0.00-0.20m R = 0A		<u> </u>		CLAY, medium plasticity, brown/yellow mottled grey, trace of fine		-	RESIDUAL	
			-		PID = 8.1 ppm		<u> </u>		ironstone gravels.			RESIDUAL	
	L-M		- 0.5—		TP139/2 DS 0.40-0.80m		[I					
	L-IVI		0.5		R = 0A		[ļ					
			-		PID = 2.6 ppm BS 0.4 - 0.8		<u> </u>	ļ					
			-				F	ţ		Σ- Δ	St		
			1.0-		TD4000		[ł					
			-		TP139/3 DS 1.00-1.20m		[-]						
			-		R = 0A PID = 4.9 ppm		<u> </u>	ł					
		ered]				[ļ					
		Groundwater not Encountered	1.5	1.50			=_	СН	CLAY, high plasticity, grey/brown mottled yellow.				
6		r not E	_				<u>t=</u> _	ł					
		dwatei	_	1.80			<u> -</u>	СН	As above with fine to medium ironstone gravels (extremely weathered	-			
		Groun	-				F			'			
	м		2.0-		TP139/4 DS 2.00-2.20m		t						
			-		R = 0A PID = 6.3 ppm		<u>t-</u> _						
			-		i i B olo ppini		<u>t=</u> _	ŀ		Σ	t-VSt		
			- 2.5—				<u> </u>	ł			St-		
			-					ļ					
			-				F	ł					
			_				[RELIC ROCK STRUCTURE	
			3.0-		TP139/5		<u> </u>	ł					
			-	3.20	DS 3.00-3.20m R = 0A		[ł					
			-		PID = 4.3 ppm	-/			TEST PIT DISCONTINUED @ 3.20 m Reached target depth				
			-										
			3.5										
			-										
			-										
			- 4.0										
			-										
			4.5										
			-										
			_										

PF LC		CT: 10N:		Johnso Propos Pitt Tov		pn	nent		Coords: 301203 m e 6282378 m N 56 MGA94 Surface RL: m datum: Ahd Pit depth: 4.00 m		MA CC LO	EET: 1 OF 1 CHINE: CAT NTRACTOR: One GGED: GJF	DA
JC)B N(vation	056230	Sampling				BUCKET TYPE: 450mm Field Material Descri	ntion		ECKED: GKS	DA
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL		RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	C√	STRUC ADD OBSE	CTURE A DITIONAL RVATIO
			0.0	0.30	TP140/1 DS 0.00-0.20m R = 0.A PID = 5.4 ppm		× × ×	SP SC	SAND/Sity SAND, fine to medium grained. Clayey SAND/SAND, fine to medium grained, red/brown with clay.			NATURAL	
			0.5— - - -		TP140/2 DS 0.40-0.60m R = 0.A PID = 3.4 ppm BS 0.4 - 0.8m								
			1.0— - - -		TP140/3 DS 1.00-1.20m R = 0.A PID = 5.7 ppm								
BH		Groundwater not Encountered	1.5										
Η		Groundwater	- - - 2.5—	2.50	TP140/4 DS2.00-220m R = 0A PID = 2.8 ppm					Σ			
			- - - 3.0—					SC	As above but red with brown mottling.				
			- - - 3.5—	3.20	TP140/5 DS 3.00-3.20m R = 0.4 PID = 4.7 ppm			SC	Clayey SAND, fine to medium grained, yellow/light brown /red with medium to coarse iron stained sandstone.				
			- - - 4.0	4.00	TP140/3 DS 3.80-4.00m R = 0.4 PID = 5.3 ppm			-	TEST PIT DISCONTINUED @ 4.00 m				
			- - - 4.5—	•					Reached target depth				

TP140

GAP5_1.GLB_FULL_PAGE_J:05PROJ/001-050IENVIRO/05623002_JOHNSON - PITT_TOWN NSWILOGS.GPJ_GAP5_1.GDT_06/06/2006_1:57:42 PM

REPORT OF BOREHOLE: BH141

PROJECT: Proposed Residential Development LOCATION: Pitt Town							۶ ا	Coords: 301300 m e 628265 m n Mga94 Surface RL: m Datum: Ahd Nclination: -90° Hole DIA: 75 mm Hole Depth: 1.00 m	SHEET: 1 OF 1 DRILL RIG: HA DRILLER: Golder LOGGED: DD DATE: 14/3/05 CHECKED: GKS DATE: 26/6/05			
	Dri	illing		Sampling				Field Material Descrip	tion			
METHOD PENETRATION DESISTANCE	_	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL/ROCK MATERIAL DESCRIPTION		CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
	Intered	0.0	-	BH141/1 DS 0.00-0.20m R = 0A PID = 2.4 ppm		× × × × ×	SP	Sity SAND, fine to medium grained, brown/grey	۵		NATURAL	
AH L	Coundwater not Encountered	0.5-	0.40 0.65	BH141/2 DS 0.40-0.60m R = 0A PID = 3.0 ppm		× × × × × ×	SP		M-D		-	
L-N	Ground	- - - 1.0	1.00	BH141/3 DS 0.80-1.00m R = 0A		^ × × × × ×	SP	As above but with fine to medium ironstone gravels.				
				PID = 2.1 ppm				END OF BOREHOLE @ 1.00 m Reached target depth				

CLIENT:

PROJECT:

LOCATION:

JOB NO:

REPORT OF BOREHOLE: BH142

_		-					
		n Property Group ed Residential Develo <i>i</i> n	pment	;	Coords: 301389 m e 6282361 m N Surface RL: m datum: Ahd Nclination: -90°	MGA94	
	056230	02			HOLE DIA: 75 mm HOLE DEPTH:	1.00 m	
		Sampling				Field Material Descript	ti
			_	_			

SHEET: 1 OF 1 DRILL RIG: HA DRILLER: Golder LOGGED: DD CHECKED: GKS

		_	ling		Sampling				Field Material Descrip	tion			
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0-		BH142/1		×	SP	Sity SAND, fine to medium grained, grey/brown			NATURAL.	T
			-		DS 0.00-0.20m		×	J JF				NATORAL.	
		ered	-		R = 0A PID = 0.8 ppm		Ĉ×						
		ounte	-				××	1					
7		t Enc	-		BH142/2		××]					
НA	L	ter nc	0.5-		DS 0.40-0.60m R = 0A		××	1		>			-
		Groundwater not Encountered	_		PID = 1.8 ppm		××	Ī		M-M			
		Grou	-	0.80			~			ļ			
			-		BH142/3 DS 0.80-1.00m		××	SP	As above but with fine to medium ironstone gravels.				
_			-1.0	1.00	R = 0A PID = 3.1 ppm		× .		END OF BOREHOLE @ 1.00 m				-
			-			Ί			Reached target depth				
			-										
			-										
			- 1.5—										
			-										
			-										
			-										
			-										
			2.0—										-
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06 1:			-										
06/20			2.5-										-
T 06/			-										
1.GD			-										
SAP5			-										
5 fag			-										
0.65.0			3.0										-
SWILC			-										
Z Z			-										
T TO			-										
- PIT			3.5-										-
NSON			-										
HOr			-										
3002			_										
0/0562			4.0										.
VIRC			-										
50/EP			-										
001-0			-										
PROJ			-										
J:\05			4.5-	1									-
AGE			_										
ULL P			_										
E B			-										
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GAP					-	This	report o	t bore	hole must be read in conjunction with accompanying notes and abbrevia	tions.			
												GAP gINT FN. F	01a

PROJECT: Proposed Residential Development LOCATION: Pitt Town							ent		Coords: 30183 m e 6282339 m n 56 MGA94 Surface RL: m datum: Ahd Pit depth: 3.60 m Bucket Type: 450mm	MA CO LO	EET: 1 OF 1 CHINE: CAT NTRACTOR: Onecall GGED: GJF DATE: 14 ECKED: GKS DATE: 26							
		Exca	/ation	<u> </u>	Sampling	+			Field Material Descri	ption	≻							
METHOD	EXCAVATION	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS						
			0.0-	0.20	TP143/1 DS 0.00-0.20m R = 0A	X - X	×	SP	Silty SAND, fine to medium grained brown.	٥		TOPSOIL						
			-	0.20	PID = 6.2 ppm			CI	CLAY, medium plasticity, brown/yellow/grey trace of fine ironstone.			NATURAL						
	L	Groundwater not Encountered							0.5-		TP143/2 DS 0.40-0.80m R = 0A PID = 4.3 ppm BS 0.4 - 0.8m			- - - -			F-St	
			1.0	0.90	TP143/3 DS 1.00-1.20m R = 0A PID = 3.8 ppm			CI	As above but yellow/grey.									
	м	Groundwater n							Σ	ŭ								
H								- 2.0— -	2.10	TP143/4 DS 2.00-2.20m R = 0A PID = 4.9 ppm			CI	As above but with fine to medium iron stained sandstone.				
			- 25	-	riD = 4.5 μμπ						St-VSt							
			2.5— - - -	2.50				SC	Clayey SAND, fine to medium grained, orange/grey with medium to coarse iron stained sandstone gravels.			WEATHERED BEDROCK						
	мн		3.0		TP143/5 DS 3.00-3.20m R = 0A PID = 4.4 ppm					M-M								
			3.5—	3.60														
			- - 4.0—						TEST PIT DISCONTINUED @ 3.60 m Reached target depth									
			-	•														
			4.5— -															

GAP gINT FN. F01e RL2

Golder

CLIENT:	Johnson F
PROJECT:	Proposed
LOCATION:	Pitt Town
JOB NO:	05623002

hnson Property Group oposed Residential Development t Town COORDS: 301583 m E 6282321 m N MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: HA DRILLER: Golder LOGGED: DD CHECKED: GKS

Drilling		Sampling			tion								
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
	L-M		0.0	0.25	BH144/1 DS 0.00-0.20m R = 0A		* ×	CI	Silty CLAY, medium plasticity, brown	M-D	F-St	NATURAL.	Γ
НА		Groundwater not Encountered	- - 0.5	0.25	PID = 4.8 ppm BH144/2 DS 0.40-0.60m R = 0A			СІ	CLAY, medium plasticity, brown		t t		-
	мн	Groundwate	-		PID = 2.6 ppm BH144/3			-		Σ	St-VSt		
			-1.0	1.00	DS 0.80-1.00m R = 0A PID = 2.9 ppm			-	END OF BOREHOLE @ 1.00 m Reached target depth				
			-										
			- 1.5										-
			-										
			2.0-										-
MIL 00: /0.1			-										
00/2/00/00			- 2.5										.
AF9_1.GU			-										
1000 N NOWLOGS.GFJ GAF9_1.GUT 00002000 1.57.50 FM			- 3.0 —										-
			-										
			- 3.5 — -										-
			-										
			4.0										-
			-										
			4.5										-
			-										
0.1-01-00	J	L	— 5.0 —	l _	 י	 This r	report of	f bore	hole must be read in conjunction with accompanying notes and abbrevia	L_ tions.		L]_
												GAP gINT FN. F	01a RL2

 CLIENT:
 Johnson Property Group

 PROJECT:
 Proposed Residential Development

 LOCATION:
 Pitt Town

 JOB NO:
 05623002

COORDS: 301694 m E 6282311 m N MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: HA DRILLER: Golder LOGGED: DD CHECKED: GKS

Drilling					Sampling								
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
_			0.0-		BH145/1			ML	Clayey SILT, low plasticity, brown		1	TOPSOIL	
	L-M		-	•	DS 0.00-0.20m R = 0A					N-D			
		tered	-	0.30	PID = 4.1 ppm		×	ł					
		unoor	_					CI	CLAY, medium plasticity, brown/red			NATURAL.	
ЧЧ		not Ei	0.5-	-	BH145/2 DS 0.40-0.60m		[-]	ł			ti Ti		
-	м	vater	-		R = 0A PID = 3.8 ppm		t=_	Į		Σ			
	IVI	Groundwater not Encountered	-	0.75			<u> </u>			2			
		ū	-		BH145/3		t	CI	As above but brown mottled grey				
				1.00	DS 0.80-1.00m R = 0A								
			-	-	PID = 4.4 ppm	4			END OF BOREHOLE @ 1.00 m Reached target depth				
			-	-									
			-										
			-	•									
			1.5—										
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10.10			-										
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TO L			-	1									
-00L			4.5-	1									
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	J	∟_	-5.0-	J	L	⊥_ ┺?-		 { h		L	J	L	
50						INS	report o	DOLE	hole must be read in conjunction with accompanying notes and abbrevia	uUNS.			
												GAP gINT	FN. F01
PF LC	IENT CJE CAT B NC	CT: ION:			on Property Group ed Residential Dev vn	relopr	nent	:	Coords: 301867 m e 6282297 m n 56 Mga94 Surface RL: m datum: Ahd Pit depth: 3.60 m Bucket Type: 450mm		MA CO LO	EET: 1 OF 1 CHINE: CAT NTRACTOR: Onecall GGED: GJF DATE: 14/3 ECKED: GKS DATE: 26/6	
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		Exca	ation		Sampling				Field Material Descrip				
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
	L		0.0		TP146/1 DS 0.00-0.20m		× ×	ML	Sandy SILT, low plasticity, brown.	0		TOPSOIL	
			-	0.20	R = 0A PID = 3.8 ppm		^_× 	CL	CLAY, low to medium plasticity, brown/grey mottled yellow.			RESIDUAL	
			0.5		TP146/2 DS 0.40-0.60m R = 0A PID = 4.4 ppm			CI			F-St		
			-	0.80			 	СІ	CLAY, medium plasticity, red/grey trace of fine to medium ironstone gravels.				
		Itered	1.0		TP146/3 DS 1.00-1.20m		 		graves.				
		Groundwater not Encountered	-	-	R = 0A PID = 4.0 ppm		 						
		dwater no	-				[[
		Ground	1.5	1.60					As above with fine to medium iron stained Siltstone/Sandstone and				
표			-	-			 		trace of sand.				
	м		- 2.0—	-				ļ		Σ			
			-		TP146/4 DS 2.00-2.20m R = 0A						to to		
			-	2.30	PID = 5.3 ppm			СН	CLAY, high plasticity, grey with red mottlings and medium iron				
			- 2.5—					ļ	stained Siltstone/Sandstone gravels.				
			-	-									
			-	-			 	Į					
			3.0-		TP146/5 DS 3.00-3.20m		[
			-	-	R = 0A PID = 4.9 ppm		 	ļ					
			-				[
			3.5—	3.60				[TEST PIT DISCONTINUED @ 3.60 m				
			-	-					Reached target depth				
			- 4.0—										
			-										
			-										
			- 4.5—										
			-										
			-										

gINT FN. F01e RL2

Golder
V Associates

PROJECT:

LOCATION:

JOB NO:

REPORT OF BOREHOLE: BH147

1	Sampling	Field Materia
	05623002	HOLE DIA: 75 mm HOLE DEPTH: 1.00 m
	Pitt Town	INCLINATION: -90°
	Proposed Residential Developme	ent SURFACE RL: m DATUM: AHD
	Johnson Property Group	COORDS: 301192 m E 6282287 m N MGA94

SHEET: 1 OF 1 DRILL RIG: HA DRILLER: Golder LOGGED: DD CHECKED: GKS

DATE: 14/3/05 DATE: 26/6/05

				Sampling									
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
	1		0.0-		HA147/1			SP	Silty SAND, fine grained, red/brown with traces of clay			NATURAL	1
			-		DS 0.00-0.20m		××	SP	Sity SAND, line grained, red/brown with traces of day			NATORAL.	
		eq	-		R = 0A PID = 4.3 ppm		××			<u>۷</u> -۵	1		
		unter	-		PID = 4.5 ppm		××				4		
		incol	-		HA147/2		×						
٩H	L	not E	0.5-		DS 0.40-0.60m		×						-
		vater	-		R = 0A PID = 3.8 ppm		××						
		Groundwater not Encountered	-		1 12 - 0.0 ppm		×			Σ			
		Gro	-		HA147/3		×						
			-		DS 0.80-1.00m		× ×						
-			1.0	1.00	R = 0A PID = 4.1 ppm		×		END OF BOREHOLE @ 1.00 m		-		-
			-			Ί			Reached target depth				
1			-										1
			-										1
1			-										
			1.5-										-
			-										·
			-										<u> </u>
			-										
			-										
			2.0—										-
2			-										
10W1N13W1L065.9F1 64F3_1.9D1 09/09/2008 1.57.36 FW			-										
			_										
007/			- 2.5—										
			2.5-										
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			_										
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5			3.0—										_
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L			3.5-										-
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r			-										.
0520			-										
60/02			4.0-										-
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1-1 000			-										.
DY Y			-										1
1005			4.5—										-
с Ц 5			-										1
ξ L			-										
			-										1
e le			-										1
GAP2_1.GLB FULL FAGE_J:USFKUJIUUT-USULENVIKUUB823002_JUFINSON - FILI	۔ ۔ <i>ا</i>	L	— 5.0 —	· _		⊥_ Thie '	report d	i	L	tions	J		_
Ś							i yon U	5010	non maan oo taabiintaan jurinan tiyniintaad tiyniintaad yn general yn yn talso ei 10 efwlleydd	arUt 10.		GAP gINT FN. F	01a RI 2

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2.0-

2.5

3.0-

3.5-

4.0-

4.5

REPORT OF BOREHOLE: BH148

											SH	EET: 1 OF 1			
CL	JENT	Г:		Johnsc	n Property Group				COORDS: 301288 m E 6282274 m N MGA94		DR	ILL RIG: HA			
PF	ROJE	CT:		Propos	ed Residential Develo	nqa	nent		SURFACE RL: m DATUM: AHD DRILLER: Golder						
LC	LOCATION: Pitt Town								INCLINATION: -90°		LO	GGED: DD	DATE:		
-	BN	-		056230					HOLE DIA: 75 mm HOLE DEPTH: 1.00 m		-	ECKED: GKS	DATE:		
				000200	-										
		Dri	lling		Sampling				Field Material Descrip	tion					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTU ADDITI OBSERV	ONAL		
			0.0-		HA148/1		×···	SP	Silty SAND, fine to medium grained, grey/brown			NATURAL.			
НА	M	Groundwater not Encountered	- - - 0.5 - - - - - - 10	0.60	DS 0.000.20m R = 0A PID = 3.1 ppm HA148/2 DS 0.400.60m R = 0A PID = 3.3 ppm HA148/3 DS 0.80-1.00m R = 0A		× × × × × × × ×	SP	As above but with fine to medium ironstone gravels.	M-D					
			-		\PID = 3.0 ppm				END OF BOREHOLE @ 1.00 m Reached target depth						

This report of borehole must be read in conjunction with accompanying notes and abbreviations.

1:58:02 PM	
06/06/2006	
1.GDT	
GAP5_	
T TOWN NSW/LOGS.GPJ GAP5_1.GDT 06	
- NOSNHOL	
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L PAGE	
SLB FULI	
GAP5_1.G	

GAP gINT FN. F01a RL2

DATE: 14/3/05 DATE: 26/6/05

Golder

PROJECT:

LOCATION:

JOB NO:

REPORT OF BOREHOLE: BH149

ing		Sampling	_						
	056230	02			1	Hole Dia: 75	5 mm		
	Pitt Tov	vn	I	INCLINATION: -9					
	Propos	ed Residential Devel	;	SURFACE RL: m					
	Johnso	n Property Group	(COORDS: 301386 r					

OORDS: 301386 m E 6282263 m N 56 MGA94 URFACE RL: m DATUM: AHD ICLINATION: -90° IOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

Drilling Sampling						Sampling			Field Material Description							
		RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS			
F				0.0-		HA149/1			SP	SAND, fine to medium grained, grey/brown.			NATURAL.	Τ		
			pe	-		DS 0.00-0.20m R = 0A										
			Groundwater not Encountered	-	0.30	PID = 5.7 ppm			SP	SAND, fine to medium grained, grey.						
	НA	L	tot Enc	- 0.5		HA149/2 DS 0.40-0.60m								.		
	-		water r	-	0.70	R = 0A PID = 4.8 ppm					Σ					
			Bround	-	0.70			0	GP	Gravelly SAND, fine to medium grained, white/grey, with medium ironstone gravel.						
		м	Ũ	-		HA149/3 DS 0.80-1.00m		0 dr		ilonsione gravel.						
				1.0-	1.00	R = 0A PID = 3.7 ppm				END OF BOREHOLE @ 1.00 m				-		
				-						Reached target depth						
				-	-											
				- 1.5—										.		
				-	-											
				-												
				-	-											
5				2.0-										-		
4:10 PN				-												
06 2:0				-	-											
6/06/20				- 2.5—										-		
GDT 0				-												
OWN NSW/TPLOGS.GPJ GAP5_1.GDT 06/06/2006 2:04:10 PM				-												
GPJ G				-												
LOGS.				3.0-										-		
SWITP				-												
OWN N				-												
-				- 3.5—										-		
- NOSh				-	-											
NHOL_3				-												
623002				-												
/IRO/05				4.0										-		
50\EN\				-	-											
J\001-0				-	-											
J5PRO.				- 4.5—										-		
GE J:\C				-												
JLL PA(-												
BLB FL				-												
GAP5_1.GLB FULL PAGE J:05PROJ(001-050)ENVIRO(05623002_JOHNSON - PITT] .	⊥	L I	-5.0-						I n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.			ndicate the presence or GAP gINT FN. F			

Golder

PROJECT:

LOCATION:

JOB NO:

REPORT OF BOREHOLE: BH150

	Γ				
Sampling					Field Material
02				IDEE DIA. 73 MINI TIDEE DEFITI.	1.00 111
102				HOLE DIA: 75 mm HOLE DEPTH:	100 m
vn			I	NCLINATION: -90°	
ed Residential Devel	opr	nent	:	SURFACE RL: m DATUM: AHD	
n Property Group			(COORDS: 301470 m E 6282244 m N	1 56 MGA94
	vn 102	ed Residential Developn vn 102	ed Residential Development vn 102	ed Residential Development	wn SURFACE RL: m DATUM: AHD NO2 HOLE DIA: 75 mm

SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

			ling		Sampling				Field Material Descrip	tion			
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0— - -	0.40	HA150/1 DS 0.00-0.20m R = 0A PID = 4.2 ppm		× × × × × ×		SAND/Silty SAND, fine to medium grained, brown.	M-D		NATURAL.	
ЧЧ	L	Groundwater not Encountered	0.5— - -	0.80	HA150/2 DS 0.40-0.60m R = 0A PID = 4.4 ppm HA150/3			SP	SAND, fine to medium grained, grey/brown.	Σ			-
			- - <u>1.0</u> -	1.00	R=0A PID=3.6 ppm				END OF BOREHOLE @ 1.00 m Reached target depth				-
			- - 1.5— -										-
15 PM			- - 2.0—										-
T TOWN NSWITPLOGS.GPJ GAP5_1.GDT 06/06/2006 2:04:15 PM			- - 2.5— -										-
SW/TPLOGS.GPJ GAP5			- - 3.0— -										-
HNSON - PITT TOWN NS			- - 3.5— -										-
GAP5_1.GLB FULL PAGE J:\05PROJ\001-050\ENVIRO\05623002_JOHNSON - PIT			- - 4.0										-
SE J:\05PROJ\001-050			- - 4.5—										
P5_1.GLB FULL PAG			- - 				1 in com		n with accompanying notes and abbreviations. It has been prepared for				
GAI				atten	pt to assess possible con	itami	ination.	Any r	If will accompanying induses and adouteviations. It has been prepared to eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	IECES	sarily i	an purposes of ing, will load indicate the presence or GAP gINT FN. F(F)1a ₹L2

Golder

JOB NO:	056230	02				
LOCATION:	Pitt Tow	vn				
PROJECT:	Proposed Residential Development					
CLIENT:	Johnso	n Property Group				

COORDS: 301569 m E 6282231 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

			ling		Sampling	_		Field Material Description								
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS				
			0.0		HA151/1		××	SP	Silty SAND, fine to medium grained, brown.	Σ		NATURAL.	Γ			
		7	-	0.20	DS 0.00-0.20m R = 0A		×			M-D						
		ntere	-		PID = 3.9 ppm			SP	SAND, fine to medium grained, grey/brown.				.			
		Encou	-		HA151/2		· · · ·									
ЧA	L	r not E	0.5		DS 0.40-0.60m		• • • •	•					-			
		dwate	-	0.60	R = 0A PID = 4.5 ppm		× *	SP	Silty SAND, fine to medium grained, grey/yellow.	Σ			·			
		Groundwater not Encountered	-				××	R.								
		0	_	0.90	HA151/3 DS 0.80-1.00m		×	CL		-			.			
			1.0-	1.00	R = 0A PID = 4.2 ppm	/	· · ·	UL	Sandy CLAY, low plasticity, grey/yellow with fine to medium iron stained sandstone gravel.	┢	S					
			-		<u></u>	ή			END OF BOREHOLE @ 1.00 m Reached target depth				·			
			_													
			_													
			1.5										-			
			-										·			
			_													
			_													
			2.0-										-			
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			2.5-										-			
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			4.0										-			
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			4.5										-			
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				This n atten	eport of borehole must be npt to assess possible cor	e reac ntami	d in conji ination.	unctic Any r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not absence of soil or groundwater contamination.	geote	echnica sarily ir	al purposes only, without ndicate the presence or GAP gINT FN. F	01a RL2			

Golder

Drilling	
JOB NO:	05623002
LOCATION:	Pitt Town
PROJECT:	Proposed Res
CLIENT:	Johnson Prop

nnson Property Group oposed Residential Development Town COORDS: 301683 m E 6282221 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Au DRILLER: Golder LOGGED: GJF CHECKED: GKS

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and Aug	jer	
der		
-	DATE:	21/3/05
<s< td=""><td>DATE:</td><td>26/6/05</td></s<>	DATE:	26/6/05

METHOD METHOD METROD RESISTANCE MATER MATER MATER MATER MATER 000	SAMPLE OR FIELD TEST HA152/1 DS 0.00-020m R = 0A PID = 5.4 ppm	X IX GRAPHIC		SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
	DS 0.00-0.20m R = 0A		- -					
0.20	R = 0A	¥	ML	Clayey SILT, low plasticity, brown trace of sand.		S	TOPSOIL	Т
		~_× × —		Silty CLAY, low to medium plasticity, brown/yellow trace of fine sand.			NATURAL	_
- counter		; ;						
H H H	HA152/2 DS 0.40-0.60m	 	×		Σ			.
Pealer Peale	R = 0A PID = 4.3 ppm	 	k			st		
	444520	^ _, * _		As above but yellow/brown mottled grey.				
	HA152/3 DS 0.80-1.00m R = 0A	; ;		As above but yellow/biowithiolited grey.				
1.0	PID = 4.4 ppm			END OF BOREHOLE @ 1.00 m Reached target depth				1
1.5								.
2.0-								.
ह								
2:04:2								
MI 12002 0002 0002 0002 0002 0002 0002 00								-
-								
3.0-								.
								.
- 562300								
100/1-(
4.5-								-
AGE L:								
This	eport of borehole must be rea npt to assess possible contar	ad in con nination.	ijunctio Any r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	geote ieces	ichnica sarily ir	al purposes only, without ndicate the presence or GAP gINT FN. f	=01a RL:

Golder

Drilling		Sampling					
JOB NO:	056230	05623002					
LOCATION:	Pitt Tov	Pitt Town					
PROJECT:	Proposed Residential Development						
CLIENT:	Johnson Property Group						

COORDS: 301766 m E 6282210 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Au DRILLER: Golder LOGGED: GJF CHECKED: GKS

ind Auge	ər	
ler		
	DATE:	21/3/05
S	DATE:	26/6/05

Drilling			ling		Sampling		Field Material Description								
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS			
			0.0-		HA153/1		×	ML	Clayey SILT, low plasticity, brown trace of fine sand.			TOPSOIL	Г		
	L		-		DS 0.00-0.20m		×	ł			S				
		ered	-	0.25	R = 0A PID = 3.6 ppm		<u>x</u>								
		ounte	-				*	CL CI	Silty CLAY, low to medium plasticity, brown/yellow.			NATURAL.			
		t Enc	-		HA153/2		× _								
ΗA		er no	0.5—		DS 0.40-0.60m R = 0A		×	1		Σ			·		
	L-M	dwate	-	0.70	PID = 2.4 ppm		×	ŧ.			ŭ				
		Groundwater not Encountered	-	0.70			*-	CI	As above but medium plasticity.						
		G	-		HA153/3		× _	Į							
				1.00	DS 0.80-1.00m R = 0A		×								
			1.0		PID = 3.7 ppm	\square			END OF BOREHOLE @ 1.00 m Reached target depth						
			_												
			_												
			_												
			1.5-										.		
			-												
			-												
			-												
			-												
			2.0-										-		
			-												
00.40			-												
2			-												
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2			-												
0020			-										1		
500			4.0-										.		
			-										1		
1000			-										1		
			-												
32			-										1		
1007			4.5—										•		
			-										1		
			-										1		
			-										1		
			-												
			-5.0-	This r	eport of borehole must be	read	d in coni	unctic	n with accompanying notes and abbreviations. It has been prepared for	geote	chnica				
5									eferences to potential contamination are for information only and do not r			ndicate the presence or	01,		
1									absence of soil or groundwater contamination.			GAP gINT FN. F	RĽ		

CLIEN PRO. LOC/ JOB I	IECT: TION:				elopment		COORDS: 301180 m E 6282191 m N 56 MGA94 SURFACE RL: m DATUM: AHD PIT DEPTH: 4.00 m		MA CC LO	EET: 1 OF 1 CHINE: CAT NTRACTOR: On GGED: GJF ECKED: GKS	ecall DATE: 14/3/0 DATE: 26/6/0	
JOB		vation	000230	Sampling			BUCKET TYPE: 450mm Field Material Descri	otion	СП	ECKED. GKS	DATE. 20/0/0	0
METHOD EXCAVATION		DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	·	CONSISTENCY DENSITY	AD	CTURE AND DITIONAL ERVATIONS	
		0.0	0.20	TP154/1 DS 0.00-0.20m R = 0A PID = 5.4 ppm	× ×	SP SP	Sity SAND, fine to medium grained, brown with fine to medium gravel.			TOPSOIL		
		- 0.5 - - -	0.90	TP154/2 DS 0.400.80m R = 0A PID = 4.8 ppm BS 0.4 - 0.8		·	sandstone gravel.	M-D				
			0.90	TP154/3 DS 1.00-1.20m R = 0A PID = 4.9 ppm		SP	SAND, fine to medium grained, light brown/grey with medium to coarse sandstone gravels.					
<u>5</u> L-№	 Groundwater not Encountered 	1.5 - - 2.0 - - - - -	1.60	TP154/4 DS 2.00-2.20m R = 0A PID = 5.4 ppm		SP	As above but brown/yellow mottled grey.					
		- 2.5	2.60				Sandy CLAY, medium plasticity, grey mottled yellow with medium to coarse iron stained sandstone gravel.	Σ				
		3.0	3.30	TP154/5 DS 3.00-3.20m R = 0A PID = 5.1 ppm		ч • • - ГСН	CLAY, high plasticity, yellow/grey trace of fine to medium sandstone	_	F-St			
		- 3.5— - -		TP154/6		-1 -1 -1 -1 -1 -1 -1 -1 -1 -1	gravel.		ζ			
		- <u>- 4.0 -</u> - -	4.00	DS 3.80-4.00m R = 0A VPID = 4.1 ppm	/	-	TEST PIT DISCONTINUED @ 4.00 m Reached target depth					
		- 4.5 -										

Golder

JOB NO:	05623002
LOCATION:	Pitt Town
PROJECT:	Proposed Residential Development
CLIENT:	Johnson Property Group

COORDS: 301277 m E 6282179 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m

SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

DATE: 21/3/05 DATE: 26/6/05

			lling		Sampling				Field Material Descrip				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
	L		0.0	0.35	HA155/1 DS 0.00-0.20m R = 0A PID = 6.1 ppm		× × × ×	SP	Silty SAND, fine to medium grained, brown/brown yellow.	M-D		NATURAL.	Γ
НА		Groundwater not Encountered	- 0.5 -	0.70	HA155/2 DS 0.40-0.60m R = 0A PID = 3.8 ppm		о	SP	Gravelly SAND, fine grained, brown/grey mottled yellow with iron stained sandstone gravels.	Σ			.
	м	Grou	- - - <u>1.0</u>	1.00	HA155/3 DS 0.80-1.00m R = 0A PID = 4.4 ppm			SP	SAND, fine to medium grained, grey/white with gravel.				-
			-						Reached target depth				
			1.5 - -										
			- 2.0										
			- - 2.5										.
			-										
			3.0— - -										
			- 3.5— -										.
			- 4.0										.
			-										
			4.5										-
]		 	This r atten	eport of borehole must be port to assess possible con	reac	l in conji nation.	unctio Any r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	geote leces	echnica sarily i	al purposes only, without ndicate the presence or GAP gINT FN. F	01:

Golder
Associates

PROJECT:

LOCATION:

JOB NO:

REPORT OF BOREHOLE: BH156

	Sampling	Field Material I
05623	002	HOLE DIA: 75 mm HOLE DEPTH: 1.00 m
Pitt To		INCLINATION: -90°
Propos	sed Residential Developmen	t SURFACE RL: m DATUM: AHD
Johnso	on Property Group	COORDS: 301374 m E 6282168 m N 56 MGA94

SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF I CHECKED: GKS I

		_	lling		Sampling	Sampling Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
НА	L	Groundwater not Encountered	0.0	0.30 0.40 0.70	HA156/1 DS 0.00-0.20m R = 0A PID = 3.2 ppm HA156/2 DS 0.40-0.60m R = 0A PID = 3.6 ppm		× × × × ×	SP SP	Silty SAND, fine to medium grained, brown. As above with day. SAND, fine grained, brown/white.	D-M		NATURAL.	.
		Grou	- - - <u>1.0</u>	1.00	HA156/3 DS 0.80-1.00m R = 0A PID = 5.1 ppm		о 0-	SP	Gravelly SAND, fine to medium grained, grey/white with medium iron stained gravel. END OF BOREHOLE @ 1.00 m Reached target depth	Σ			
			- - 1.5 - - -										
GAP5_1.GLB FULL PAGE_J:05PFKQJ001-050ENVIRO105623002_JOHNSON - PITT TOWN NSWIPLOGS.GPJ GAP5_1.GDT 06062006 2:04:38 PM			20— - - 25— -										
PITT TOWN NSWIPLOGS.GPJ G			- 3.0— - - 3.5—										
VIR.0\05623002_JOHNSON - P			3.3 - - - 4.0 -										
L PAGE J:\05PK0J\001-050\EN			- - 4.5— -										
GAP5_1.GLB FUL]		- - 	 This r atten	eport of borehole must be npt to assess possible cor	reac	d in conj ination.	unctic Any r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	geote	echnica sarily i	al purposes only, without ndicate the presence or GAP gINT FN. F	-01; RI

CLIEN PROJE LOCAT	CT: TON:				opn	nent	:	Coords: 301461 m e 6282160 m n 56 Mga94 Surface RL: m Datum: Ahd Pit Depth: 4.00 m Bucket Type: 450mm		MA CO LO(EET: 1 OF 1 CHINE: CAT NTRACTOR: Onecc GGED: GJF ECKED: GKS	all DATE: 14/3/03 DATE: 26/6/03
_	Exca	ation/		Sampling				Field Material Descrip				
EXCAVATION RESISTANCE	WATER	DEPTH (metres)	<i>DEPTH</i> RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTU ADDITI OBSERV	IONAL
Τ		0.0-		TP157/1 DS 0.00-0.20m		×	SP	Silty SAND, fine grained, brown.			NATURAL	
		-	0.20	R = 0A PID = 4.8 ppm		× 0	SP	Gravelly SAND, fine to medium grained light brown with medium to				
		-		1 ID = 4.0 ppm		. 0		coarse crushed gravel.				
L		- 0.5		TP157/2 DS 0.40-0.80m		0	1					
		-		R = 0A PID = 5.2 ppm		•	1					
		1		BS 0.4 - 0.8		.0						
		-	0.90			•	GP	Sandy GRAVEL, medium to coarse grained, brown/grev, gravel is	Ā			
		1.0		TP157/3		10.0		Sandy GRAVEL, medium to coarse grained, brown/grey, gravel is iron stained Sandstone/Ironstone.				
		-		DS 1.00-1.20m R = 0A PID = 3.2 ppm								
М		-		1 ID = 0.2 ppm		۵ <u>)</u> ۵ ک ک				ΔΛ		
		- 1.5				\$ C . 0						
		-	1.60			\$ <u>`0`</u> .0	CI	CLAY, medium plaskticity, brown/yellow.				
	ntered	-										
	Groundwater not Encountered	-										
	er not	2.0-		TP157/4						MD		
	undwat	-		DS 2.00-2.20m R = 0A		[
	Gro	-		PID = 3.9 ppm								
		- 2.5										
		-										
		-							_			
L-M		-					-		Σ			
		3.0 —		TP157/5			-					
		-		DS 3.00-3.20m R = 0A		[]				ŭ		
		-		PID = 4.1 ppm		==						
		- 3.5	3.50					L				
		- 0.0					CI	As above but mottled grey with medium iron stained sandstone.				
		-				==	•					
		-				===						
		4.0	4.00		Н			TEST PIT DISCONTINUED @ 4.00 m		\square		
		-						Reached target depth				
		-										
		- 4.5										
		-										
		-										

Golder
Associates

PROJECT:

LOCATION:

JOB NO:

REPORT OF BOREHOLE: BH158

MGA94

Sampling	Field Mat
05623002	HOLE DIA: 75 mm HOLE DEPTH: 1.00 m
Pitt Town	INCLINATION: -90°
Proposed Residential Development	SURFACE RL: m DATUM: AHD
Johnson Property Group	COORDS: 301553 m E 6282144 m N 56 MG

SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

		_	ling		Sampling				Field Material Descrip				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0 - - -	0.40	HA158/1 DS 0.00-0.20m R = 0A PID = 3.6 ppm			SP	SAND, fine grained, brown.	M-D		TOPSOIL	T
ΗA	L	Groundwater not Encountered	0.5— - -	0.90	HA158/2 DS 0.40-0.60m R = 0A PID = 4.7 ppm HA158/3			SP	SAND, fine to medium grained, grey/brown/white.	Σ		NATURAL.	-
			- - <u>1.0</u> -	1.00	DS 0.80-1.00m R = 0A PID = 2.6 ppm			SP	SAND, fine to medium grained, yellow/brown. END OF BOREHOLE @ 1.00 m Reached target depth				
			- 1.5— - -										
2:04:43 PM			- 2.0— - -										
AP5_1.GDT 06/06/2006			- 2.5— -										-
GAP5_1.GLB_FULL_PAGE_J:05PROJ:001-050/ENVIRO/05623002_JOHNSON - PITT TOWN NSWITPLOGS.GPJ_GAP5_1.GDT_06/06/2006_2:04:43 PM			- 3.0— -										
JOHNSON - PITT TOWN			- 3.5— -										.
50/ENVIR0\05623002_			- - 4.0 -										-
AGE J:\05PROJ\001-0			- - 4.5—										-
P5_1.GLB FULL P			- - <u>5.0</u>	 This n			 d in coni	unctic	n with accompanying notes and abbreviations. It has been prepared for	geote	chnic	al purposes only, without	
GP				atten	npt to assess possible cor	ntami	ination.	Any r	eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	neces	sarily i	ndicate the presence or GAP gINT FN. F	=01a RL2

Golder

CLIENT: Johnson Pro PROJECT: Proposed R LOCATION: Pitt Town JOB NO: 05623002

Johnson Property Group Proposed Residential Development Pitt Town COORDS: 301665 m E 6282121 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

		Dri	ling		Sampling				Field Material Descrip				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0-		HA159/1		××	SP	Silty SAND, fine to medium grained, brown.			TOPSOIL.	Г
		_	-	0.20	DS 0.00-0.20m R = 0A		××						
		itered	_		PID = 3.9 ppm			SC	Clayey SAND, fine to medium grained, brown/grey.			NATURAL.	1
		ncoun	_	0.40			· :						
ЧA	L	not Ei	0.5-		HA159/2 DS 0.40-0.60m		•••	CL	Sandy CLAY, low plasticity, brown/yellow.	Σ			.
		vater I	-		R = 0A PID = 4.3 ppm		<u>. </u>	ļ			ш		
		Groundwater not Encountered	-	0.70	- но ррп			CL	As above but low to medium plasticity, less sand.		-		
		Ģ	-		HA159/3			I CI			ti ti		
				1.00	DS 0.80-1.00m R = 0A		• • •						
			-		PID = 2.5 ppm	ſ			END OF BOREHOLE @ 1.00 m Reached target depth				1
			-										
			-										
			-										
			1.5—										ŀ
			-										
			_										
			-										
			2.0-										.
-			-										
1.10			-										
2000			_										
4000			2.5-										.
5													
2			-										
5			-										
2.0.0			-										
5			3.0										.
			-										
			-										
2			-										
			3.5—										ŀ
000			_										
2			_										
			-										
			4.0-										.
			-										
600-			-										
			-										
			4.5-										.
			-										
			-										
L C			-										
			-										
		!		This re	eport of borehole must be	read	d in conji	unctio	n with accompanying notes and abbreviations. It has been prepared for	geote	echnic		
D				atterr	npt to assess possible con	ntami	nation.	Any r	eferences to potential contamination are for information only and do not n absence of soil or groundwater contamination.	ieces	sarily i	indicate the presence or GAP gINT FN. Fi I	01a RĽ

PR LO	IENT OJE CAT B NO	CT: 10N:		Johnsc		elopment		Coords: 301767 m e 6282100 m n 56 MGA94 Surface RL: m datum: Ahd Pit depth: 3.50 m Bucket Type: 450mm	MA CO LO	HEET: 1 OF 1 ACHINE: CAT DNTRACTOR: Onecall DGGED: GJF DATE: 14/3/05 HECKED: GKS DATE: 26/6/05		
METHOD	EXCAVA I ON RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sampling SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	USC Symbol	Field Material Descr		CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
Σí	лĸ	3	0.0	RL 0.25	TP160/1 DS 0.00-0.20m R = 0A PID = 4.3 ppm		ML	Clayey SILT, low plasticity, brown.		DO L-MD	TOPSOIL	
			- 0.5 -	0.80	TP160/2 DS 0.40-0.80m R = 0A PID = 5.1 ppm BS 0.4 - 0.8		CI	CLAY, medium plasticity, brown/yellow.			NATURAL.	
		ountered	- 1.0 - -		TP160/3 DS 1.00-1.20m R = 0A PID = 2.9 ppm		CI	As above but yellow mottled grey.				
BH	L-M	Groundwater not Encountered	- 1.5— - -	1.90	1.90 TP160/4 DS 2.00-2.20m R = 0A PID = 3.1 ppm		· · · · · ·		Σ	St		
			2.0				CH	CLAY, high plasticity, yellow/grey trace of fine to medium siltstone.				
			2.5— - - -	2.70			CH	H As above but grey motiled yellow.	_			
			3.0	3.50	TP1605 DS 3.00-3.20m R = 0A PID = 4.7 ppm		· · · · ·					
			- 3.5 - - - 4.0					TEST PIT DISCONTINUED @ 3.50 m Reached target depth				
			 - - 4.5-									

RL2

Golder

CLIENT:	Johnson F
PROJECT:	Proposed
LOCATION:	Pitt Town
JOB NO:	05623002

ohnson Property Group roposed Residential Development tt Town

COORDS: 301737 m E 6281993 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

		Dri	ling		Sampling			Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS			
			0.0		HA161/1 DS 0.00-0.20m		Ĭ,	ML	Clayey SILT, low plasticity, brown/dark brown.	M-D		TOPSOIL	T		
		ered	-	0.20	R = 0A PID = 3.4 ppm		^	CI	CLAY, medium plasticity, brown/yellow.			NATURAL.	-		
		Encount	-		HA161/2			l							
Η	L	ter not E	0.5—		DS 0.40-0.60m R = 0A		[ŭ		-		
		Groundwater not Encountered	-		PID = 4.1 ppm		F	ł		Σ					
		G	-	0.80	HA161/3 DS 0.80-1.00m			СН	CLAY, high plasticity, yellow/brown mottled grey.		St-VSt				
-			1.0	1.00	R = 0A PID = 3.0 ppm		[-	END OF BOREHOLE @ 1.00 m		ŭ		-		
			-						Reached target depth						
			-												
			1.5—										-		
			-												
			-												
			2.0-										-		
4:52 PM			-												
TOWN NSWITPLOGS.GPJ GAP5_1.GDT 06/06/2006 2:04:52 PM			-												
06/06/2			- 2.5										-		
1.GDT			-												
GAP5			-												
GS.GP.			- 3.0—										-		
WTPLC			-												
NWN NS			-												
			- 3.5—										-		
- NOSN			-												
102_JOH			-												
1056230			- 4.0—										.		
ENVIRO			-												
01-050			-												
SPROJVC			- 4.5—												
3E J:/0			- 0.7												
ULL PAC			-												
GAP5_1.GLB FULL PAGE J:05PROJ1001-050ENVIRO105623002_JOHNSON - PITT			-												
GAP5_1		'	— 5.0 —	This r atten	eport of borehole must be npt to assess possible cor	e reac	d in conji ination.	unctic Any i	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	geote neces	: sarily i	al purposes only, without ndicate the presence or GAP gINT FN.	F01a RL2		

Golder

CLIENT:	Johnson F
PROJECT:	Proposed
LOCATION:	Pitt Town
JOB NO:	05623002

Johnson Property Group Proposed Residential Development Pitt Town

COORDS: 301651 m E 6282015 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Aug DRILLER: Golder LOGGED: GJF CHECKED: GKS

- 1		
and Auge	r	
der		
	DATE:	21/3/05
(S	DATE:	26/6/05

	Drilling			Sampling				Field Material Descrip					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0		HA162/1 DS 0.00-0.20m		<u>× –</u>	ML CL	Silty CLAY, Clayey SILT, low plasticity, brown.		s	TOPSOIL	T
		ed	_	0.20	R = 0A		,		Sandy CLAY, low plasticity, brown/yellow.			NATURAL	-
		ounter	-		PID = 4.6 ppm								
ЧA	Ι.	ot Enc	-0.5		HA162/2 DS 0.40-0.60m		•			Σ	ъ Ч		
Т		/ater n	- 0.5	0.60	R = 0A PID = 3.8 ppm		<u>.</u>	CI	CLAY, medium plasticity, yellow mottled grey with fine to medium	2			
		Groundwater not Encountered	-		- 5.0 ppm				SAND.				
		ē	-		HA162/3 DS 0.80-1.00m		[ш		
			-1.0	1.00	R = 0A PID = 5.1 ppm				END OF BOREHOLE @ 1.00 m				-
			-						Reached target depth				
			_										
			-										
			1.5—										·
			-										
			-										
			-										
5			2.0										
10 WW NOW (15 LOGS. 95 9 47 9 1.0 1 00 00 2000 2.04.30 FW			-										
000 2.			-										
7/00/01			2.5-										.
			-										
			-										
D C			-										
2.000			3.0-										.
			-										
			-										
2			-										
-			3.5										
DONELO			-										
			-										
07000			4.0-										.
			-										
			-										
			-										
NJ60/-			4.5										-
			-										
			-										
			-										
	J	L	— 5.0 —	This r atten	eport of borehole must be i npt to assess possible cont	reac tami	i <u> </u>	unctio Any r	L In with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	geote neces	ı <u> </u>	L	⊐ – [≂] 01a RĽ

Pi LC	LIEN ROJE DCAT	:CT: TON:	Jo Pri Pit	intes hnson Property Gr oposed Residentia t Town 623002		Coords: 301718 m E 6281907 m N MGA: ent Surface RL: 12.4 m Datum: Ahd Inclination: -90° Hole DIA: 125 mm Hole Depth: 7.60 m	SHEET: 1 OF 1 DRILL RIG: Gemco 210B DRILLER: Drilltest LOGGED: GJF DATE: 4/3/05 CHECKED: LBM DATE: 26/6/05		
		Drilling		Sampling		Field Material Desc	ription an	nd Instrumentation	
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	SOIL / ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION	
ATC	K Groundwater encountered @ 5.6m during drilling Katanding Water Level 23/3/05		12.40 0.25 12.15 12.15 10.20 10.20 3.80 8.60 6.40 6.40 7.60 4.80	BH63/1 SPT 0.00-0.20m R = 0A PID = 4.1 ppm BH63/2 SPT 0.50-0.95m 2,4,7 N=11 R = 0A PID = 3.4 ppm BH63/3 SPT 1.50-1.95m 3,4,6 N=10 R = 0A PID = 2.0 ppm BH63/4 SPT 2.50-2.95m 4,5,8 N=13 R = 0A PID = 3.6 ppm BH63/5 SPT 3.50-3.95m 4,7,8 N=15 R = 0A PID = 2.1 ppm BH63/6 SPT 4.50-4.95m 5,8,15 N=23 R = 0A PID = 1.6 ppm BH63/7 SPT 5.50-5.95m 4,7,15 N=22 R = 0A PID = 3.6 ppm		Clayer SILT, low plasticity, brown. CLAY, medium plasticity, brown/yellow tace of fine ironstone gravel. CLAY, high plasticity, grey/brown. As above but grey/brown/yellow with ironstone gravels. As above but grey/brown/yellow with ironstone banding. As above but gravels with increasing ironstone banding. END OF BOREHOLE @ 7.60 m Reached target depth		Class 18 uPVC 0.5mm (1.6-7.6m)	-
]	_ 1	_	L	 This re	port of borehole must be read in conjunction with accompanying notes	and abbr	reviations.	L.

Golder

 CLIENT:
 Johnson Property Group

 PROJECT:
 Proposed Residential Development

 LOCATION:
 Pitt Town

 JOB NO:
 05623002

COORDS: 301629 m E 6281925 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

	Drilling				Sampling			Field Material Description										
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS						
	L		0.0	0.00	HA164/1 DS 0.00-0.20m R = 0A PID = 3.4 ppm			SC CL	Clayey SAND/Sandy CLAY,low plasticity, fine grained, brown.	M-D	D-DM	TOPSOIL	Γ					
НA		Groundwater not Encountered	- - 0.5	0.30	HA164/2 DS 0.40-0.60m			CI	CLAY, medium plasticity, brown/yellow.		ß	NATURAL.	.					
	L-M	Groundwate	-	0.65	R = 0A PID = 4.3 ppm HA164/3			СН	As above but high plasticity, yellow mottled grey.	Σ	St-VSt							
			- 1.0	1.00	DS 0.80-1.00m R = 0A PID = 4.1 ppm				END OF BOREHOLE @ 1.00 m Reached target depth		50 TO		-					
			-															
			1.5 -										.					
			- 2.0															
TOWN NSWITFLOGS.GFJ GAPS_T.GUT USUD/ZUDB Z.US.TU FM			-															
100/00/109			- 2.5															
0.0FJ 0AP9_1			-															
			3.0— -															
			-															
			4.0										.					
			- - 4.5															
			4.3 - -															
			- - -5 .0						n with accompanying notes and abbreviations. It has been prepared for									
GAI				atten	ppt to assess possible con	tami	nation.	Any r	In will account any ing induces and addreviations. It has been prepared to eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	IECES	sarily i	an purposes of ing, with bolt indicate the presence or GAP gINT FN. F	-01; RL:					

r: CT: 10N: D:		Propos Pitt Tov	02	elopment	:	BUCKET TYPE: 450mm		MA CO LO										
Excav	vation		Sampling			Field Material Descr		≻										
WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENC DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS									
	0.0	0.25	TP165/1 DS 0.00-0.20m R = 0A PID = 4.6 ppm	× * × • * * ×	GP	Gravelly SILT/Silty GRAVEL, medium grained, brown.			NATURAL									
	- - 0.5 -	0.70	TP165/2 DS 0.40-0.80m R = 0A PID = 3.8 ppm	0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,	GP	Sandy GRAVEL, fine to medium grained, brown/grey.												
	- - 1.0		TP165/3		SP	SAND, medium grained, brown/grey/yellow trace of day.												
Encountered	- <u>1.30</u> - 1.5 	1.30	R = 0A PID = 4.2 ppm		SC	Clayey SAND, fine to medium grained, grey/brown mottled yeloow with coarse cemented sand.	-											
Groundwater not			TP165/4 DS 2:00-2:20m R = 0A PID = 4.1 ppm TP165/5 DS 2:30-2:50m R = 0A PID = 5.0 ppm TP165/6 DS 3:00-3:20m R = 0A PID = 3.4 ppm				Σ											
	- - - 2.5-	2.20		R = 0A PID = 4.1 ppm TP165/5 DS 2.30-2.50m R = 0A	R = 0A PID = 4.1 ppm TP165/5 DS 2.30-2.50m R = 0A	R = 0A PID = 4.1 ppm TP165/5 DS 2.30-2.50m R = 0A	R = 0A PID = 4.1 ppm TP165/5 DS 2.30-2.50m R = 0A	R = 0A PID = 4.1 ppm TP165/5 DS 2.30-2.50m R = 0A	R = 0A PID = 4.1 ppm TP165/5 DS 2.30-2.50m R = 0A	R = 0A PID = 4.1 ppm TP165/5 DS 2.30-2.50m R = 0A	R = 0A PID = 4.1 ppm TP165/5 DS 2.30-2.50m R = 0A		CI	CLAY, medium plasticity, brown/yellow/grey				
		2.70			СН	CLAY, high plasticity, grey mottled yellow, trace of fine to medium sitistone gravvel.		ŭ										
	-																	
	3.5	3.70				TEST PIT DISCONTINUED @ 3.70 m												
	- 4.0— -																	
	- 4.5— -																	
): Exca	Image: system Image: system Excavation 0.0 0.0 - 0.0 - 0.0 - 0.0 - 0.0 - 0.0 - 0.0 - 0.0 - 0.0 - 0.0 - 0.0 - 0.0 - 0.0 - 1.0 - 1.0 - 0.10 - 1.0 - 1.0 - 0.5 - 1.0 - 1.0 - 0.5 - 0.5 - 0.5 - 0.5 - 0.5 - 0.5 - 0.5 - 0.5 - 0.5 - 0.5 - 0.5 - 0.6 - 0.7 - 0.7 - 0.7 - 0.7 - 0.7 - 0.7 - 0.7 - 0.7 -	N 056230 Excavation 0 Image: state stat	Description Sampling Section Sampling Image: section DEPTH Image: sectin DEPTH	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	2 0652002 BUCKET TYPE: 450mm Securition Sampling Field Material Descr VIII of Line SMPLE OR PEED TEST VIII of Line SOL / ROCK MATERIAL DESCRIPTION 00	2 0562002 BUCKET TYPE: 450mm Securition Sampling Field Material Description y<	2 05623002 BUCKET TYPE: 450mm CH Image: Second Control of Control	2 052202 BUCKET TYPE 450m CHECKED 63 DATE 266 Semantic regime Semantic regime Field Material Description If is a set of the second and the seco								

Golder

Drilling		Sampling		
JOB NO:	056230	02		Н
LOCATION:	Pitt Tov	vn		IN
PROJECT:	Propos	ed Residential Developn	nent	SL
CLIENT:	Johnso	n Property Group		C

COORDS: 301461 m E 6282051 m N 56 MGA94 SURFACE RL: m DATUM: AHD NCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Au DRILLER: Golder LOGGED: GJF CHECKED: GKS

and Auge	er	
der		
•	DATE:	21/3/05
(S	DATE:	26/6/05

2 L 00 00 00 00 00 00 00 00 00 00 00 00 00			Dri	ling		Sampling				Field Material Descrip				
2 L Image: Construction of the second secon	METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	ADDITIONAL	
1 0				0.0				×	SP	Silty SAND, fine grained, brown.			TOPSOIL	Т
Holds Holds <th< td=""><td></td><td></td><td>ntered</td><td>-</td><td>0.20</td><td>R=0A</td><td></td><td>×</td><td>SP</td><td>SAND, fine to medium grained, brown/grey with clay.</td><td></td><td></td><td>NATURAL.</td><td>-</td></th<>			ntered	-	0.20	R=0A		×	SP	SAND, fine to medium grained, brown/grey with clay.			NATURAL.	-
Holds Holds <th< td=""><td>НА</td><td>L</td><td>ndwater not Encour</td><td>- 0.5</td><td>0.70</td><td>DS 0.40-0.60m R = 0A</td><td></td><td></td><td></td><td></td><td>Σ</td><td></td><td></td><td></td></th<>	НА	L	ndwater not Encour	- 0.5	0.70	DS 0.40-0.60m R = 0A					Σ			
19 100 ND CF BOEHCLE @ 100m 15- 1 1 1 15- 1 1 1 20- 1 1 1 30- 1 1 1 30- 1 1 1 40- 1 1 1 40- 1 1 1 40- 1 1 1 40- 1 1 1 40- 1 1 1 40- 1 1 1 40- 1 1 1 40- 1 1 1 40- 1 1 1 40- 1 1 1 40- 1 1 1 1 40- 1 1 1 1 40- 1 1 1 1 40- 1 1 1 1 40- <td></td> <td></td> <td>Grou</td> <td>-</td> <td></td> <td>HA166/3 DS 0.80-1.00m</td> <td></td> <td></td> <td>SC</td> <td></td> <td></td> <td></td> <td></td> <td></td>			Grou	-		HA166/3 DS 0.80-1.00m			SC					
				- <u>1.0</u>	1.00	R = 0A		·			\vdash			+
				-										
				- 1.5—										
				-										
1 25				2.0										
25- 25- 30- 30- 35- 1 40- 1 40- 1 40- 1 40- 1 45- 1 1 1 45- 1 1 1 45- 1 1 1 </td <td>±1.00.2 00</td> <td></td> <td></td> <td>-</td> <td></td>	±1.00.2 00			-										
This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without				- 2.5—										
This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without				-										
This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without				3.0— -										
August of the report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without				- - 3.5—										
This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without				-										
This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without				- 40										
Image: Constraint of the second consecond consecond constraint of the second constraint of				-										
This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without				- - 4.5										
Image: Contract of the second contrac				-										
This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without				- 	_]					L	
attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.					This r atten	eport of borehole must b npt to assess possible co	e read ntami	d in conj ination.	unctic Any r	references to potential contamination are for information only and do not r	geoti neces	echnica sarily ii	al purposes only, without ndicate the presence or GAP gINT FN.	F01 RI

C			Gol sso	der Cial	tes				REPORT	0			TP167
PF LC	JEN ROJE DCAT DB N	CT: TON:	l			lopn	nent	:	Coords: 301361 m e 6282067 m n 56 MGA94 Surface RL: m datum: Ahd Pit depth: 4.00 m Bucket Type: 450mm		MA CO LO	EET: 1 OF 1 CHINE: CAT NTRACTOR: One GGED: GJF ECKED: GKS	all DATE: 14/3/05 DATE: 26/6/05
		Exca	ation		Sampling	_			Field Material Descrip				
METHOD	EXCAVATION RESISTANCE	WATER	۵Ŀ	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	ADDI	TURE AND TIONAL WATIONS
			0.0	0.20	$\begin{array}{l} TP167/1 \\ DS 0.00-0.20m \\ R = 0A \\ PID = 5.3 ppm \\ \end{array} \\ TP167/2 \\ DS 0.40-0.80m \\ R = 0A \\ PID = 3.6 ppm \\ BS 0.4 - 0.8 \\ \end{array} \\ \begin{array}{l} TP167/3 \\ DS 1.00-1.20m \\ R = 0A \end{array} \end{array}$		XXX	SP SP	Silty SAND SAND, fine to medium grained yellow/brown with fine to medium iron stained sandstone gravels.			TOPSOIL NATURAL	
H	L	Groundwater not Encountered		2.20	PID = 4.8 ppm TP167/4 DS 2.00-2.20m R = 0A PID = 3.4 ppm TP167/5 DS 3.00-3.20m R = 0A			80	Clayey SAND, fine to medium grained brown/yellow /grey with fine to medium iron stained sandstone.	. ≥			
			4.0 4.5 4.5 - - - - - - - - - - - - - - - - - - -	<u>3.30</u> <u>3.50</u> <u>4.00</u>	PID = 4.1 ppm TP167/5 DS 3.80-4.00m R = 0A PID = 4.2 ppm			SC СН	Increasing coarse sandstone CLAY, high plasticity, grey/yellow trace of fine to medium gravel. TEST PIT DISCONTINUED @ 4.00 m Reached target depth	-	õ		
				 This atten	report of test pit must be r ppt to assess possible cor	read i	in conju nation.	Inction Any r	with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not absence of soil or groundwater contamination.	geotec neces	chnica sarily ii	purposes only, without ndicate the presence or	GAP gINT FN. F01 RL

Golder

JOB NO:	056230	02	
LOCATION:	Pitt Tov	vn	
PROJECT:	Propos	ed Residential Developn	nent
CLIENT:	Johnsc	n Property Group	

COORDS: 301266 m E 6282078 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m

Early Martanial D

SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

			ling		Sampling				Field Material Descrip				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
F			0.0		HA168/1 DS 0.00-0.20m		×	SP	Sity SAND, fine grained, brown.	۵		TOPSOIL	Γ
		tered	-	0.20	R = 0A PID = 3.8 ppm		×	SP	Silty SAND, fine grained, grey/white.		1	NATURAL.	
	L	Encoun	-		HA168/2		r · ·			M-D			
HA		ater not	0.5		DS 0.40-0.60m R = 0A PID = 3.5 ppm								•
		Groundwater not Encountered	-	0.70	PID = 3.5 ppm		9	SP	Gravely SAND, fine to medium grained, white motiled yellow/red with				
	м	Ũ	-	1.00	HA168/3 DS 0.80-1.00m R = 0A		0 di		fine to medium iron stained gravel.	Σ			
				1.00	PID = 4.1 ppm	/			END OF BOREHOLE @ 1.00 m Reached target depth				-
			-										
			-										
			1.5										
			-										
			- 2.0—										
Md 61			-										
06 2:06:			-										
6/06/200			- 2.5—										.
1.GDT (-										
GAP5_			-										
JGS.GP.			- 3.0—										.
SWITPLO			-										
TOWN N			-										
- PITT			3.5—										.
OHNSON			-										
23002_J			-										
/IRO\056			4.0										-
050/EN/			-										
201/001-			-										
: J:\05Pf			4.5										-
-L PAGE			-										
GLB FU.			-										
GAP5_1.GLB_FULL_PAGE_J:05PR0J:001-050/ENVIROI05623002_JOHNSON - PITT TOWN NSW/TPLOGS.GPJ_GAP5_1.GDT_06/06/2006_2:06:19 PM	J	L	-5.0-	This r atten	eport of borehole must be npt to assess possible cor	e read	d in conj ination.	unctic Any i	L	geote leces	.ı echnica sarily i	L	01a
													۲Ľ

Golder

CLIENT:	Johnson F
PROJECT:	Proposed
LOCATION:	Pitt Town
JOB NO:	05623002

hnson Property Group oposed Residential Development t Town COORDS: 301160 m E 6282093 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

		_	ling		Sampling	_			Field Material Descrip				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
	L		0.0	0.25	HA169/1 DS 0.00-0.20m R = 0A PID = 3.6 ppm HA169/2		× × × ×	SP SP	Silty CLAY, fine to medium grained, brown. SAND, fine to medium grained, brown/yellow/red.	M-D	L	TOPSOIL NATURAL	T
НA		Groundwater not Encountered	0.5 	0.80	R = 0.4000.60m R = 0.4000.60m PID = 3.0 ppm HA169/3			SP	As above but with iron stained fine to medium gravels sandstone.	Σ			-
	м		- <u>1.0</u> -	1.00	DS 0.80-1.00m R = 0A PID = 3.7 ppm				END OF BOREHOLE @ 1.00 m Reached target depth				
			- - 1.5										.
Σ			- - 2.0										.
10WN NSW11FLUGS.GPJ GAP5_1.GD1 06/06/2006 2:06:24 PM			- - 2.5										.
NSWIPLOGS.GPJ GAP2_			- - 3.0 -										.
			- - 3.5— -										.
GAPS_1.GLB FULL PAGE J.USPROJIUT-USULENVIROUSS23002_JUHNSON - PTIT			- - 4.0 -										.
AGE J:\05PKOJ\001-1			- 4.5— -										.
29_1.GLB FULL F	 		- - 						n with googongaming policy and oblem integer. It has been possed at the				
GAF				atten	apoir of bore foller must be npt to assess possible cor	ntami	ination.	Any r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	Jeoes	sarily in	an purposes only, without ndicate the presence or GAP gINT FN. I	F01a RL

PR(ENT: CJEC CATIC 3 NO:	:T: DN: :			on Property Group and Residential Develop vn	pment		Coords: 301224 m e 6281988 m n 56 MGA94 Surface RL: m datum: Ahd Pit depth: 4.00 m Bucket Type: 450mm		MA CO LO		E: 14/3/05 E: 26/6/05						
-		xca\	vation		Sampling	_	1	Field Material Descri		≻								
	RESISTANCE	WATER	DEPTH (metres)	<i>DEPTH</i> RL	Sample or Field test	RECOVERED GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AN ADDITIONAL OBSERVATION:							
			0.0	0.30	TP170/1 DS 0.00-0.20m R = 0A TP170/2	× Ø × × ×	MC SP	Gravelly SILT, low plasticity, brown with sand. Silty SAND, fine grained, white/grey with fine to medium gravels.		D-DM	Asbestos fragments on surface. Ash Metal fragments							
		ge @ 1.9m	ge @ 1.9m	ge @ 1.9m	0.5— - - -	0.80	DS 0.40-0.80m R = 0A BS 0.4 - 0.8	× × ×	, SC	Clayey SAND, fine to medium grained white mottled orange/red with iron stained sandstone.								
					tge @ 1.9m	ge @ 1.9m	ge @ 1.9m	je @ 1.9m	age @ 1.9m	page @ 1.9m	age @ 1.9m	le @ 1.9m	1.0— - - -		TP170/3 DS 1.00-1.20m R = 0A			
		V Minor water seepage @ 1.9m	1.5— - - -															
ā	L		2.0	2.10	TP170/4 DS 2:00-2:20m R = 0A		SC cl	Sandy CLAY/Clayey SAND, fine to medium grained, brownlyellow/grey.										
			2.5— - - -							D-DM								
			3.0	3.30	TP170/5 DS 3.00-3.20m R = 0A		s SC	Clayey SAND, fine to medium grained, grey/dark grey mottled yellow/orange.	×									
			3.5 - - -															
			- 4.0 - - -	4.00				TEST PIT DISCONTINUED @ 4.00 m Reached target depth										
			4.5— - -															

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05623002

REPORT OF TEST PIT: TP171

CLIENT: PROJECT: LOCATION: JOB NO:

GAP5_1.GLB FULL PAGE J:\05PROJ\001-050\ENVIRO\05623002_JOHNSON - PITT TOWN NSWITPLOGS.GPJ GAP5_1.GDT 06\06/2006 2:10:32 PM

Johnson Property Group Proposed Residential Development Pitt Town

COORDS: 301262 m E 6281938 m N 56 MGA94 SURFACE RL: m DATUM: AHD PIT DEPTH: 3.50 m BUCKET TYPE: 450mm SHEET: 1 OF 1 MACHINE: CAT CONTRACTOR: Onecall LOGGED: GJF DATE: 14/3/05 CHECKED: GKS DATE: 26/6/05

Excavation		Sampling			Field Material Descri						
METHOD EXCAVATION BESISTANCE	WATER	DEPTH (metres)	<i>DEPTH</i> RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC	USC Svmbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
		0.0	0.20	TP171/1 DS 0.00-0.20m R = 0A PID = 3.8 ppm	××××	• SF	Silty SAND, fine grained, brown. Silty SAND, fine grained, white/brown with fine to medium gravels.			TOPSOIL	
		- 0.5 -		TP171/2 DS 0.40-0.60m R = 0A PID = 5.1 ppm	× × ×			M-D			-
		- 1.0 - -	0.90	TP171/3 DS 1.00-1.20m R = 0A PID = 4.2 ppm		SC	Clayey SAND, fine to medium grained white mottled orange/red with ironstone gravels.				-
Ha L	Groundwater not Encountered	- 1.5 - -									-
	Ground	2.0	2.00	TP171/4 DS 2:00-2:20m R = 0A PID = 3.6 ppm		SC C	Sandy CLAY/CLAYEY SAND, fine to medium grained low plasticity, brown/yellow/grey.	×			-
		2.5				┝╶╺╎╶┥╎╸┆╺╎╶┥╷ ┝					
		3.0 - - - - -	<u>320</u> 3.50	TP171/5 DS 3.00-3.20m R = 0A PID = 3.0 ppm			Clayey SAND, fine to medium grained grey/dark grey mottled yellow/orange.				-
							TEST PIT DISCONTINUED @ 3.50 m Reached target depth				
		4.0									-
		- - 4.5 -									-
		- - -5.0	 This atten	report of test pit must be re Ipt to assess possible contr	ad in cor	junctio 1. Any	n with accompanying notes and abbreviations. It has been prepared for references to potential contamination are for information only and do not absence of soil or groundwater contamination.	geote neces	chnica sarily ii	I purposes only, without indicate the presence or GAP gINT FN. F0) D1e

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05623002

REPORT OF BOREHOLE: BH172

CLIENT: PROJECT: LOCATION: JOB NO:

- NOSNHC

Johnson Property Group Proposed Residential Development Pitt Town

COORDS: 301179 m E 6281918 m N MGA94 SURFACE RL: 23.3 m DATUM: AHD INCLINATION: -90° HOLE DIA: 125 mm HOLE DEPTH: 10.50 m

SHEET: 1 OF 1 DRILL RIG: Gemco 210B DRILLER: Drilltest LOGGED: GJF CHECKED: LBM

DATE: 4/3/05 DATE: 26/6/05



Golder

Drilling		Sampling						
JOB NO:	056230	02	F					
LOCATION:	Pitt Tov	vn	I					
PROJECT:	Propos	Proposed Residential Development						
CLIENT:	Johnso	n Property Group	C					

Coords: 301187 m e 6281964 m n 56 MGA94 Surface RL: m datum: Ahd Nclination: -90° Hole dia: 75 mm Hole depth: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

	-	Dri	lling		Sampling				Field Material Descrip		_		
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0	0.30	HA173/1 DS 0.00-0.20m R = 0A PID = 3.8 ppm			SP	SAND, fine to medium grained, brown.	M-D		TOPSOIL	Γ
НA	L	Groundwater not Encountered	- 0.5—	0.60	HA173/2 DS 0.40-0.60m R = 0A			SP	SAND, fine to medium grained, brown/grey.			NATURAL.]-
		Groundwate	-	0.90	PID = 4.8 ppm HA173/3			SP	SAND, fine to medium grained, grey mottled yellow trace of fine iron stained gravel.	Σ			
			- 	1.00	DS 0.80-1.00m R = 0A PID = 4.6 ppm			SP	As above but with CLAY & medium gravel. END OF BOREHOLE @ 1.00 m Reached target depth				
			-										
			1.5— -										-
			- 2.0—										-
06 2:06:28 PM			-										
GAP5_1.GLB_FULL_PAGE_J:05PROJ:001-050/ENVIRO/05623002_JOHNSON - PITT TOWN NSWITPLOGS.GPJ_GAP5_1.GDT_06/06/2006_2:06:28 PM			- 2.5—										-
.GPJ GAP5_1.			-										
NSW/TPLOGS			3.0										-
4 - PITT TOWN			- 3.5—										-
002_JOHNSON			-										
ENVIRO\05623			- 4.0—										-
PROJ\001-050\			-										
L PAGE J:\05			4.5— -										
25_1.GLB_FUL]		- - - 5.0										
GAI				atten	npt to assess possible cor	ntam	ination.	Any r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not n absence of soil or groundwater contamination.	your 1606S	sarily i	an purposes only, without ndicate the presence or GAP gINT FN. F	[:] 01a RL2

Golder
V Associates

CLIENT:	Johnson F
PROJECT:	Proposed
LOCATION:	Pitt Town
JOB NO:	05623002

hnson Property Group oposed Residential Development t Town

COORDS: 301190 m E 6282001 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

Drilling			Sampling									
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0	0.30	HA DS 0.00-0.20m R = 0A PID = 5.2 ppm			SP	SAND, fine to medium grained, brown.	M-D		TOPSOIL
ЧA		Groundwater not Encountered	- 0.5—	0.60	HA DS 0.40-0.60m R = 0A			SP	SAND, fine to medium grained, brown/grey.			NATURAL.
		Groundwa	-		PID = 3.6 ppm HA DS 0.80-1.00m		0 0	SP	Gravelly SAND, fine to medium grained, grey mottled yellow.	Σ		
			<u>1.0</u>	1.00	R = 0A \PID = 4.1 ppm		· · · · ·		END OF BOREHOLE @ 1.00 m Reached target depth			
			- - 1.5—									
			-									
2:06:36 PM			2.0									
TOWN NSWIPLOGS.GPJ GAPS_1.GD1 06/06/2006 2:06:36 PM			- 2.5—									
.GPJ GAP5_1.G			-									
N NSW/TPLOGS			3.0									
			- 3.5—									
15623002_JOHN			- - -									
01-050/ENVIRO/(4.0— - -									
GAPS_1.GLB FULL PAGE J:05PR0J/001-050/ENVIRO/05623002_JOHNSON - PITT			- 4.5—									
GLB FULL PAG			-									
GAP5_			— 5.0 —	This r atten	eport of borehole must be npt to assess possible cor	read	in conji nation.	unctic Any r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	geote	echnica sarily i	al purposes only, without ndicate the presence or GAP gINT FN. F01 RL

CLIENT: PROJECT:

LOCATION:

JOB NO:

REPORT OF BOREHOLE: BH175

: CT: ION:):				lopn	nent	: 	Coords: 301258 m e 6281981 m n 56 Mga94 Surface RL: m datum: Ahd Nclination: -90° Hole dia: 75 mm Hole depth: 1.00 m	
Dril	ling		Sampling				Field Material Descrip	otion
WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE

SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF I CHECKED: GKS I

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METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0	0.40	HA175/1 DS 0.00-0.20m R = 0A PID = 4.7 ppm		× × * × × ×	SP	Silty SAND, fine grained, brown.			TOPSOIL
ΗA	L	Groundwater not Encountered	- 0.5— -	0.10	HA175/2 DS 0.40-0.60m R = 0A PID = 3.4 ppm		×	SP	SAND, fine to medium grained, white/grey.	Σ		NATURAL.
		0	- 1.0	1.00	HA175/3 DS 0.80-1.00m R = 0A PID = 2.1 ppm				END OF BOREHOLE @ 1.00 m Reached target depth			
			- - 1.5									
			- - 2.0									
16/2006 2:06:45 PM			- - -									
GAP5_1.GDT 06/0			2.5 - -									
NSW/TPLOGS.GPJ			- 3.0 -									
INSON - PITT TOWN			- 3.5									
VIR 0\05623002_JOF			- - 4.0									
GAP5_1.GLB FULL PAGE _J:05PROJ001-050ENVIRON05623002_JOHNSON - PITT TOWN NSWITPLOGS.GPJ GAP5_1.GDT 06/06/2006 2:06:45 PM			- - 4.5									
LB FULL PAGE J:\0			-									
GAP5_1.GL]	L[—5.0—	This n atten	eport of borehole must be npt to assess possible cor	e read	d in conj ination.	junctic Any r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	geote leces	 echnica sarily ir	al purposes only, without ndicate the presence or GAP gINT FN. F01 RL

PROJECT:

LOCATION:

JOB NO:

REPORT OF BOREHOLE: BH176

		n Property Group ed Residential Deve /n	lopn	nent	ę	Coords: 301225 m e 6281967 m n 56 MGA94 Surface RL: m datum: Ahd Inclination: -90°						
	056230	02			-	HOLE DIA: 75 mm HOLE DEPTH: 1.00 m						
J		Sampling				Field Material Descrip	oti					
		SAMPLE OR	ERED	U	nbol							

SHEET: 1 OF 1 DRILL RIG: Har DRILLER: Golde LOGGED: GJF CHECKED: GKS

nd Aug	ər	
er		
	DATE:	21/3/05
S		26/6/05

Drilling Sampling				Sampling		Field Material Description							
METHOD	PENETRATION RESISTANCE	_	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION		CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0-		HA176/1			SP	SAND, fine to medium grained, brown.			TOPSOIL/LANDSCAPE GARDEN	Γ
		q	_		DS 0.00-0.20m R = 0A								
		untere	-		PID = 2.6 ppm								
-		Groundwater not Encountered	-	0.40	HA176/2			SP	SAND, fine to medium grained, brown/grey.			NATURAL.	
НA	L	ater no	0.5		DS 0.40-0.60m R = 0A					Σ			
		undwa	-	0.70	PID = 2.9 ppm			SP	SAND, fine to medium grained, grey/white trace of gravels.				
		Gro	-		HA176/3								
			- 	1.00	DS 0.80-1.00m R = 0A								
			-		PID = 1.8 ppm	1			END OF BOREHOLE @ 1.00 m Reached target depth				
			-										
			-										
			1.5										
			-										
			_										
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0410									n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.)1; RL:

Golder

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JOB NO:	056230	02	
LOCATION:	Pitt Tov	vn	
PROJECT:	Propos	ed Residential Developmen	ıt
CLIENT:	Johnsc	n Property Group	

COORDS: 301216 m E 6281954 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Aug DRILLER: Golder LOGGED: GJF CHECKED: GKS

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nd Auge	er	
ler		
	DATE:	21/3/05
S	DATE:	26/6/05

Drilling		Sampling			Field Material Descrip								
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0-		HA177/1			SP	SAND, fine grained, brown/black with clay.			TOPSOIL.	$\overline{\top}$
			-	0.20	DS 0.00-0.20m R = 0A								
		Groundwater not Encountered	-	0.20	PID = 5.1 ppm		× ×	SP	Silty SAND, fine grained, brown.	1		NATURAL.	1
		count	-				×						
∢	١.	ot En	-	0.50	HA177/2 DS 0.40-0.60m		×						
ЧA		ter no	0.5-		R = 0A			SP	SAND, fine to medium grained, white/grey.	Σ			-
		ndwa	_		PID = 4.3 ppm								
		Grou	-										
			-		HA177/3 DS 0.80-1.00m			•					
_			-1.0	1.00	R = 0A		•		END OF BOREHOLE @ 1.00 m				
			-		PID = 2.8 ppm	1			Reached target depth				
			-										
			-										
			-										
			1.5—										-
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5				This r	report of borehole must be not to assess possible con	e read	d in conji ination	unctic Anv r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r	geote	echnica sarily i	al purposes only, without ndicate the presence or	
				Cauch					absence of soil or groundwater contamination.		iy i	GAP gINT FN.	F01;
													ΠL

Golder

Drilling		Sampling
JOB NO:	056230	02
LOCATION:	Pitt Tov	vn
PROJECT:	Propos	ed Residential Development
CLIENT:	Johnso	n Property Group

COORDS: 301230 m E 6281935 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: GJF CHECKED: GKS

Drilling		Sampling				Field Material Descrip							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
НА	L	। अर्जीor water seepage observed @ 0.8m	0.0	0.30	HA178/1 DS 0.00-0.20m R = 0A PID = 1.6 ppm HA178/2 DS 0.40-0.60m R = 0A			SP SP	SAND, fine to medium grained, brown/dark brown.	Σ		TOPSOIL NATURAL	_
		Mor water	- - - - <u>1.0</u>	1.00	PID = 2.9 ppm HA178/3 DS 0.80-1.00m R = 0A PID = 2.4 ppm			SP	SAND, fine to medium grained, grey/white/yellow trace of fine to medium sandstone gravel.	M-W			
			- - - 1.5						Reached target depth				-
~			- - - 2.0-										-
GAP5_1.GLB FULL PAGE_J:05PROJ001-050ENVIRON06623002_JOHNSON - PITT TOWN NSWITPLOGS.GPJ_GAP5_1.GDT_06062006_2:07:05 PM			- - 2.5—										-
SWITPLOGS.GPJ GAP5_1.			- - 3.0										-
OHNSON - PITT TOWN N			- 3.5— -										-
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LL PAGE J:\05PR0J\001			- 4.5— -										-
GAP5_1.GLB FU.]		- 	 This r atten	eport of borehole must be	reac	d in conji ination.	unctio Any r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r absence of soil or groundwater contamination.	geote neces	echnica sarily i	al purposes only, without ndicate the presence or GAP gINT FN. Ff F	01e
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Golder
Associates

PROJECT:

LOCATION:

JOB NO:

REPORT OF BOREHOLE: BH179

ling		Sampling	
	056230	02	HOLE DIA: 75
	Pitt Tov	ľ	INCLINATION:
	Propos	ed Residential Developm	nent SURFACE RL:
	Johnso	n Property Group	COORDS: 301

COORDS: 301257 m E 6281910 m N 56 MGA94 CURFACE RL: m DATUM: AHD NCLINATION: -90° IOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Au DRILLER: Golder LOGGED: GJF CHECKED: GKS

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nd Aug	er	
er		
	DATE:	21/3/05
S	DATE:	26/6/05

Drilling		Sampling			Field Material Description								
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
F			0.0-		HA179/1		××	SP	Silty SAND, fine grained, brown.			TOPSOIL.	T
		ed	-	-	DS 0.00-0.20m R = 0A		× ×			Δ			
		Groundwater not Encountered	-	0.30	PID = 4.8 ppm		×	SP	SAND, fine to medium grained, grey/white.	-	-	NATURAL.	+
⊲	L	ot Enci	-	1	HA179/2 DS 0.40-0.60m								
ΗA		ater no	0.5		R=0A								
		wpunc	-	-	PID = 3.9 ppm		•			Σ			
		G	-	0.90	HA179/3								
	М		-1.0	1.00	DS 0.80-1.00m R = 0A			SP	Ĵ,				4
			-	1	PID = 3.7 ppm	4			END OF BOREHOLE @ 1.00 m Reached target depth				
			-	-									
			-										
			1.5—	-									
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96 2:0			-	-									
06/200			-										
00/10			2.5]									
5_1.GI			-	1									
I GAP			-										
5S.GP.			3.0-										
IPLOC			-	1									
M SN			-	-									
IOWN			-										
			3.5	1									
NSON			-	1									
HOL-			-										
62300			-	-							1		
KU/U5			4.0—	1							1		
0/ENVI				1									
001-05			-	-									
KONC			-	-									
J:\05F			4.5	1							1		
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FULL			-	-							1		
1.GLB			-]				L .		L_			
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				auer	npr 10 assess pussible (U	n nati (i	micuUii.	,-⊾iy i	absence of soil or groundwater contamination.	10000	Scally I	GAP gINT FN. F	-01 RL

Golder
Associates

CLIENT:	Johnson F
PROJECT:	Proposed
LOCATION:	Pitt Town
JOB NO:	05623002

hnson Property Group oposed Residential Development t Town COORDS: 301220 m E 6281916 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Au DRILLER: Golder LOGGED: GJF CHECKED: GKS

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der		
-	DATE:	23/3/05
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	Drilling			Sampling				Field Material Descrip	tion			
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
			0.0-	0.10			P 6 4		CONCRETE, fine to medium sub angular gravels.			CONCRETE.
	L	countered	-	0.40	HA180/1 DS 0.10-0.30m R = 0A PID = 4.1 ppm				Gravelly Sity CLAY, low plasticity, brown trace of fine sand.			FILL
НА	L-M	Groundwater not Encountered	- 0.5 - - -		HA1802 DS 0.40-0.60m R = 0A PID = 5.3 ppm HA1803 DS 0.80-1.00m		* * * * *	SP	Sity SAND, fine grained, brown/light brown, trace of fine to medium gravels.	Σ		NATURAL.
			- 1.0 - -	1.00	R = 0A \PID = 4.9 ppm		, x		END OF BOREHOLE @ 1.00 m Reached target depth			
			- - 1.5—									
			-									
MH 81:20:			2.0									
TOWN NSWITPLOGS.GFJ GAPS_1.GDT U6/06/2006 2:07:13 PM			- 2.5—									
.068.6PJ GAP5_1			- - 3.0—									
			-									
GAP2_1.GLB FULL FAGE J.WEFKUJWUT-USUENVIKUWES23002_JUFNSON - FILL			3.5— - -									
ULENVIRO/U96230			- 4.0— -									
G0-100/C024G0/:C			- - 4.5—									
SLB FULL PAGE			- - -									
GAP5_1.C	J	L	— 5.0 —	This r atten	eport of borehole must be in the second seco	L read tamii	I <u> </u>	I unctio Any r	L	L geote neces	.l echnic sarily i	L

Golder
Associates

CLIENT: PROJECT:		Property Group Residential Developme	ent
LOCATION:	Pitt Town		
JOB NO:	05623002		
Drilling		Sampling	

COORDS: 301197 m E 6281939 m N 56 MGA94 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand AUg DRILLER: Golder LOGGED: GJF CHECKED: GKS

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nd AUg	ger	
der		
	DATE:	23/3/05
(S	DATE:	26/6/05

Drilling			Sampling				Field Material Descrip						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0-	0.10		Т	44		CONCRETE, fine to medium sub angular gravel.			CONCRETE.	Т
			-	0.10	HA181/1			F	Silty/Gravelly CLAY, low plasticity, brown.		1	FILL.	1
	L	red	-		DS 0.10-0.30m					Σ			
		ounte	-	0.40	R = 0A PID = 5.1 ppm					2			
		Enco	-	0.40	HA181/2		* *	SP	Silty SAND, fine grained, brown/light brown.		1	NATURAL.	+
ΗA		r not	0.5-		DS 0.40-0.60m		* *	1					-
	L-M	wate	-		R = 0A PID = 4.2 ppm		. ×						
		Groundwater not Encountered	-				××						
		ē	-		HA181/3		× ×						
			-	1.00	DS 0.80-1.00m R = 0A		××	ł					
			1.0	1.00	PID = 4.9 ppm	┢			END OF BOREHOLE @ 1.00 m				1.
			-						Reached target depth				
			-										
			-										
			-										
			1.5—										.
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TOWN NSWITPLOGS.GPJ GAP5_1.GDT 06/06/2006 2:07:22 PM			2.5—										.
LOS			-										
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GAP			-										
GPJ			-										
068			3.0-										·
VIPL			-										
NSN			-										
OWN			-										
			-										
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			_										
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10562			4.0										.
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GAP5_1.GLB_FULL PAGE_J:05PR0J1001-050LENVIROU0552002_J0HNSON - PTIT	L	L	— 5.0 —	J Thie r			1 1 in coni		L multiple accompanying notes and abbreviations. It has been prepared for		u	L	
GA				atter	npt to assess possible co	ntam	ination.	Any r	eferences to potential contamination are for information only and do not r	ieces	sarily i	ndicate the presence or	501
									absence of soil or groundwater contamination.			GAP gINT FN. F	RL
L													
PF LC		ECT: FION	:		n Property Group ed Residential Deve n	elopn	nent	:	REPORT OF POSITION: Refer to figure 4 SURFACE RL: m DATUM: AHD INCLINATION: -90°	E	SH DR DR LO	EET: 1 OF 1 ILL RIG: Hand Auger ILLER: Golder GGED: DM D	ATE: 5/5/05
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JC	BN			056230					HOLE DIA: 75 mm HOLE DEPTH: 1.00 m		UH	ECKED: GKS D	ATE: 26/6/05
	z	-	lling		Sampling				Field Material Descrip	tion	≿		
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE ADDITION OBSERVATI	AL
	L-M		0.0	-	HA182/1 DS 0.00-0.10m			SP	SAND, fine grained, white.	Σ		NATURAL. Camphor odour.	
НА	L	Groundwater not Encountered	- - 0.5	0.20	R = 0A PID = 6.2 ppm HA182/2 DS 0.20-0.50m R = 0A PID = 3.9 ppm			SP	As above, yellow/brown.				
	м	Grou	-	1.00	HA182/3 DS 0.70-0.90m R = 0A PID = 4.8 ppm								
									END OF BOREHOLE @ 1.00 m Reached target depth				
	This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination. GAP gINT FN.												

GAP5_1.GLB FULL PAGE _3:05PROJ:001-050IENVIRO/05623002_JOHNSON - PITT TOWN NSWTPLOGS.GPJ GAP5_1.GDT 06/06/2006 2:07:26 PM

AP gINT FN. F01a RL2

CLIENT: PROJECT: LOCATION: JOB NO:	Johns Propo Pitt To 05623	002	lopn	nent	:	POSITION: Refer to figure 4 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 0.80 m		DR DR LO	EET: 1 OF 1 IILL RIG: Hand Auger IILLER: Golder GGED: DM DATE: 5/5/05 ECKED: GKS DATE: 26/6/05
METHOD PENETRATION RESISTANCE WATER	DEPTH (metres) DEPTN RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	Field Material Descrip		CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
HA T S PE Groundwater not Encountered		HA183/1 DS 0.00-0.10m R = 0A PID = 4.9 ppm DUP183/1 HA183/2 P0 92 102	RE	GR	Sn SP SP	SAND, fine grained, yellow/brown, with medium cemented gravels.	D-M	E	NATURAL Mild camphor odour.
		DS 0.70-0.80m R = 0A PID = 4.3 ppm				END OF BOREHOLE @ 0.80 m Reached target depth			Refusal on comented sand.

REPORT OF BOREHOLE: BH184

CLIENT:	Johnson F
PROJECT:	Proposed
LOCATION:	Pitt Town
JOB NO:	05623002

GAP5_1.GLB FULL PAGE _:\05PROJ\001-050\ENVIRO\05623002_JOHNSON - PITT TOWN NSWITPLOGS.GPJ GAP5_1.GDT 06\06/2006 2:07:34 PM

ohnson Property Group roposed Residential Development tt Town POSITION: Refer to figure 4 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 0.40 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: DM CHECKED: GKS

d Auger r DATE: 5/5/05 DATE: 26/6/05

		Dril	ling		Sampling				Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0-		HA184/1		× 🖡	SP	Sandy SILT, low plasticity, brown/light brown			NATURAL.	
∢	L	ШN	-	0.20	DS 0.00-0.10m R = 0A		× x	2		_			
ЧA	мн	GWNE			PID = 5.8 ppm			SP	SAND, fine grained, white/brown, cemented.	Δ			
	IVH			0.40	HA184/2 DS 0.20-0.40m								
			0.5—		R = 0A PID = 4.3 ppm				END OF BOREHOLE @ 0.40 m Reached target depth			Refusal on cemented sand.	_
			-		1 ID = 4.5 ppm				· · · · · · · · · · · · · · · · · · ·				
			-										
			-										
			-										
			1.0-										-
			-										
			-										
			-										
			15										
			1.5										
			_										
			-										
			-										
			2.0-										-
			-										
			-										
			-										
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			-										
			3.0—										-
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			3.5—										_
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			4.0-										-
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			-										
			-										
			4.5—										-
			-										
			-										
			-										
		$\lfloor _ floor$		_				L	 				_
			0.0	This r	eport of borehole must be i	read	l in conji nation	unctio Anv n	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not r	geote	echnica sarily ir	al purposes only, without	
				audi		n nl			absence of soil or groundwater contamination.		y II	GAP gINT FN. FC)1a RL2
												Γ	~

REPORT OF BOREHOLE: BH185

JOB NO:	05623002
LOCATION:	Pitt Town
PROJECT:	Proposed Residential Development
CLIENT:	Johnson Property Group

POSITION: Refer to figure 4 SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 1.00 m SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: DM I CHECKED: GKS I

. d Auger r DATE: 5/5/05 DATE: 26/6/05

	Drilling Sampling								Field Material Descrip	· · · · ·				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS		
		\square	0.0-		HA185/1		×	CL	Sandy CLayey SILT, low plasticity, black/brown.		6	NATURAL.	Т	
		Ponded Water	-	0.20	DS 0.00-0.10m R = 0A		* *				S	High concetration rotting organic matter.		
		nded	-		PID = 4.3 ppm HA185/2			SC	Clayey SAND, fine to medium grained, grey/brown mottled orange.	≥				
		Ро	-		DS 0.20-0.50m R = 0A		L	1						
ΗA	L		0.5—	0.50 0.60	PID = 3.8 ppm			<u> </u>	As above, medium grained with meidum sandstone gravels.				·	
			-	0.00	HA185/3		Ē,	CL	Sandy CLAY, low to medium plasticity, grey, trace fine gravels.					
			-		DS 0.60-0.80m R = 0A			CI		Σ	s			
			-		PID = 4.1 ppm			1						
	-		-1.0	1.00		+		<u> </u>	END OF BOREHOLE @ 1.00 m				-	
			-						Reached target depth					
			-											
			-											
			1.5-										.	
			-											
			-											
			-											
			2.0-										.	
N N N N			-											
2:01			-											
UWN NSWITELUGS.GFJ GAFS_1.GD1 UQU02UUD 2:U7:39 FM			-											
			2.5—										.	
201			-											
- 64			-											
5 2			-											
5.00			3.0-										.	
VI PL			-											
			-											
M O I			-											
			3.5-										.	
NOON	1		-											
			-											
23002	1		-											
acrino;			4.0-										.	
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Nnen-I			-											
00/00			_											
AHCU			4.5—										.	
с Ч	1		-											
LL LA			-											
9 2			-											
6442_1.6LB FULL FAGE J.(DBFRUJUUT-050)ENVIROU0523002_JUFINSON - FITT]	L_l	— 5.0 —	ا		1_]	<u> </u>	l	L_	<u> _</u> _	L		
GAP									In with accompanying notes and abbreviations. It has been prepared for references to potential contamination are for information only and do not r absence of soil or groundwater contamination.			ndicate the presence or GAP gINT FN. F	=01; RL	

REPORT OF BOREHOLE: BH186

Drilling		Sampling		
JOB NO:	056230	02		HOLE DIA: 75 mm HC
LOCATION:	Pitt Tov	vn		INCLINATION: -90°
PROJECT:	Propos	ed Residential Developr	nent	SURFACE RL: m DA
CLIENT:	Johnso	n Property Group		POSITION: Refer to fig

gure 4 TUM: AHD OLE DEPTH: 0.40 m

SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: DM CHECKED: GKS

DATE: 5/5/05 DATE: 26/6/05

	Drilling Sampling								Field Material Description								
	METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS				
F				0.0-	0.40	HA186/1		×	ML	Sandy SILT, low plasticity, brown with organic matter.			NATURAL.	T			
			ш	-	0.10	DS 0.00-0.10m		*	SP	SAND, medium grained, yellow/brown with medim cemented gravevl,		⊢					
	ЧA	L	GWNE	-		R = 0A PID = 6.0 ppm			1	trace day.	Σ̈́						
			G	-		HA186/2											
ŀ					0.40	DS 0.20-0.40m			+	END OF BOREHOLE @ 0.40 m			Refusal.	-			
				0.5-		R = 0A PID = 5.2 ppm	Λ			Reached target depth			Neiusai.	-			
				-			'										
				-													
				-													
				_													
				1.0										-			
				-													
				_													
				_													
				_													
				15													
				1.5													
				2.0-													
5				2.0-													
43 PN				-													
2:07:				-													
900				-													
06/20				-													
. 06/				2.5—										-			
.GDT				-													
5_1				-													
GAF				-													
.GPJ				-													
OGS				3.0-										-			
\TPL				-													
NSN				-													
NNO				-													
T TC				-													
LI -				3.5—										-			
SON				-													
NHO				-													
02_J				-													
6230				-													
0/05				4.0-										-			
NVIR				-													
150\E				-													
001-C				-													
ROJ				-													
\05PI				4.5—										-			
Э				-													
PAG				-													
ULL				-													
В				-													
1.6			L _	-5.0-	l _	L	1_]	<u> </u>	l	L_	I	L				
GAP5_1.GLB FULL PAGE J:/05PROJ/001-050/ENVIRO/05623002_JOHNSON - PITT TOWN NSWITPLOGS.GPJ GAP5_1.GDT 06/06/2006 2:07:43 PM					This r	eport of borehole must be	read	d in conj		on with accompanying notes and abbreviations. It has been prepared for references to potential contamination are for information only and do not r	geote		al purposes only, without				
Ĭ					allen	יישי ויט משפשש אינשאוויש (100	ncu i i	m icluUi I.	л у Г	absence of soil or groundwater contamination.	CUES	Janiy I	GAP gINT FN. F	F01a			
														RĽ			

CLIENT:

PROJECT:

LOCATION:

Drilling

JOB NO:

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REPORT OF BOREHOLE: BH187

DATE: 5/5/05

DATE: 26/6/05

- Lin						SHE	ET: 1 OF 1	
Johnso	n Property Group			I	POSITION: Refer to figure 4A	DRI	LL RIG: Hand Au	uger
Propos	ed Residential Deve	elopn	nent	;	SURFACE RL: m DATUM: AHD	DRI	LLER: Golder	
Pitt Tow	vn			I	INCLINATION: -90°	LOC	GGED: DM	l
056230	02				HOLE DIA: 75 mm HOLE DEPTH: 0.80 m	CHE	ECKED: GKS	
	Sampling				Field Material Descr	ription		

METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
НА	м	Groundwater not Encountered	0.0 - -	0.40	HA187/1 DS 0.00-0.10m R = 0A PID = 3.9 ppm HA187/2 DS 0.20-0.40m		× × × × × × × ×	ML	Sandy SILT, low plasticity, brown/light brown.	D		NATURAL	
н	L-M	Groundwater n	0.5	0.80	R = 0A PID = 4.1 ppm HA187/3 DS 0.60-0.80m R = 0A		* * * * *	SP	Silty SAND, medium grained, yellow/brown, with fine to medium gravels.	Σ			-
			- 1.0 -		\PID = 4.7 ppm				END OF BOREHOLE @ 0.80 m Reached target depth				-
			- - 1.5										-
			- - 2.0										-
			-										
			2.5 - -										-
			3.0										-
			- 3.5 — -										-
			- - 4.0										-
			- - 4.5										_
			-										
		L I	— <u>5.</u> 0—	This re attern	eport of borehole must be port to assess possible cor	reac	l d in conj nation.	junctic Any r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not n absence of soil or groundwater contamination.	geote eces	 echnica sarily ii	ndicate the presence or GAP dINT FN. F	01a RL2

B ASS	older ociates	REPORT	FOF BOREHOLE: BH188 SHEET: 1 OF 1
JENT: COJECT: DCATION: IB NO:	Johnson Property Group Proposed Residential Dev Pitt Town 05623002	POSITION: Refer to figure 4A relopment SURFACE RL: m DATUM: AHD INCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 0.80 m	DRILL RIG: Hand Auger DRILLER: Golder LOGGED: DM DATE: 5/5/05 CHECKED: GKS DATE: 26/6/05
Drilling	Sampling		al Description
PENETRATION RESISTANCE WATER DEPTH	SAMPLE OR	SOIL/ROCK MATERIAL DESCRIPTION	A B B C V V V V V V V V V V V V V
0.0	0 10 HA188/1	× → ML Sandy SILT, low plasticity, brown/light brown.	
Groundwater not Encountered	DS 0.00-0.10m R = 0A PID = 3.9 ppm HA188/2 DS 0.20-0.40m R = 0A	SP Sitty SAND, fine grained, brown/yellow.	
20 de la condwate	5 PID = 4.7 ppm HA188/3 DS 0.60-0.80m 0.80 R = 0A PID = 4.1 ppm	SP As above but fine to medium grained.	Ψ

Golder

CLIENT:

PROJECT:

LOCATION:

JOB NO:

GAP5_1.GLB FULL PAGE _1:05PROJ/001-050IENVIRO/05623002_JOHNSON - PITT TOWN NSWTPLOGS.GPJ GAP5_1.GDT 06/06/2006 2:08:01 PM

REPORT OF BOREHOLE: BH189

		opn	nent	: 	POSITION: Refer to figure 4A SURFACE RL: m DATUM: AHD NCLINATION: -90° HOLE DIA: 75mm HOLE DEPTH: 0.80m	
	Sampling				Field Material Descri	ptio
DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	
	HA189/1		×	ML	Sandy SILT, low plasticity, brown/light brown.	Г

SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: DM CHECKED: GKS

DATE: 5/5/05 DATE: 26/6/05

		Drill	ling		Sampling			-	Field Material Descrip	tion			
METHOD PENETRATION	RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
		Groundwater not Encountered	0.0	0.40	HA189/1 DS 0.00-0.10m R = 0A PID = 5.3 ppm HA189/2 DS 0.200.40m		× × × × ×	ML	Sandy SILT, low plasticity, brown/light brown.	D	L	NATURAL	
	м	Groundwater r	0.5	0.80	R = 0A PID = 4.9 ppm HA189/3 DS 0.60-0.80m R = 0A PID = 4.3 ppm			SP	SAND, fine to medium grained, white/grey, trace fine gravels.	Δ			 . .
			- 1.0 -		<u>, , , , , , , , , , , , , , , , , , , </u>				Reached target depth				 .
			- 1.5— -										 .
			- 2.0										. . .
			- - 25										.
			- - 3.0-										.
			- - 3.5 –										· ·
			-										
			4.0										- . .
			- 4.5 -										
_]_		[- 5.0	 This n atten	eport of borehole must be in the assess possible cont	read	in conj nation.	unctio Any r	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not n absence of soil or groundwater contamination.	geote jeces	echnica sarily ir	ndicate the presence or GAP gINT FN. F	01a RL2

	ENT		550		n Property Group			I	POSITION: Refer to figure 4		-	EET: 1 OF 1 ILL RIG: Hand Au	ger
_00	DJE CAT 3 NC	ION:		Propos Pitt Tov 056230		opn	nent	I	Surface RL: m Datum: AHD Inclination: -90° Hole DIA: 75 mm Hole Depth: 0.80 m		LO	ILLER: Golder GGED: DM ECKED: GKS	DATE: 5/5/05 DATE: 26/6/05
). Drill		000200	Sampling				FIELE DIA: 75 THIN HOLE DEPTH. 0.00 TH	otion	On	LUNED. UND	DATE: 20/0/03
	RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUC ADD OBSEF	TURE AND TIONAL RVATIONS
		itered	0.0	0.20	HA190/1 DS 0.00-0.10m R = 0A				SAND, fine grained, brown/yellow.			NATURAL - Organic matter.	
	L	Groundwater not Encountered	-		PID = 2.8 ppm HA190/2 DS 0.20-0.40m R = 0A			CL	Sandy CLAY/CLayey SAND, low plasticity, orange/brown with medium to coarse sandstone gravels.	Σ			
		Groundwate	0.5	0.60	PID = 4.3 ppm HA190/3 DS 0.60-0.80m			SC	Clayey SAND, fine grained, brown/yellow.		ш		
			1.0-	0.80	R = 0A PID = 3.9 ppm		·		END OF BOREHOLE @ 0.80 m Reached target depth				
			- - - 1.5 - - -										
			- 2.0										
			- 2.5 - -										
			- 3.0— - -										
			- 3.5 - -										
			- 4.0 — - -										
			- 4.5 - -										

CLIENT ROJE OCAT	ECT: FION: O:		Johnso	02	elopr	nent	:	POSITION: Refer to figure 4 SURFACE RL: m DATUM: AHD NCLINATION: -90° HOLE DIA: 75 mm HOLE DEPTH: 0.80 m		DR DR LO	EET: 1 OF 1 ILL RIG: Hand Auger ILLER: Golder GGED: DM DATE: 5/5/05 ECKED: GKS DATE: 26/6/0
PENETRATION RESISTANCE	-	DEPTH (metres)	DEPTH RL	Sampling SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	Field Material Descr		CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
L	Groundwater not Encountered	0.0	0.20	HA191/1 DS 0.00-0.10m R = 0A PID = 5.3 ppm HA191/2 DS 0.20-0.40m R = 0A PID = 4.6 ppm HA191/3 DS 0.60-0.80m R = 0A		× × · · ·	SP SC	Silty SAND, fine grained, brown. Clayey SAND, fine to medium grained, orange/grey.	□ □ ∑		NATURAL
				\PID = 5.1 ppm				END OF BOREHOLE @ 0.80 m Reached target depth			
		2.5									
		- - 4.0 - - 4.5 - - -									

CLIENT: PROJECT:

LOCATION:

JOB NO:

REPORT OF BOREHOLE: BH192

-	Sampling		F	ield Mat
056230	02		HOLE DIA: 75 mm HOLE DEPTH: 0).80 m
Pitt Tov	MU		INCLINATION: -90°	
Propos	ed Residential Devel	opment	SURFACE RL: m DATUM: AHD	
Johnso	on Property Group		POSITION: Refer to figure 4	

SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: DM

DATE: 5/5/05 CHECKED: GKS DATE: 26/6/05

		Dril	ling		Sampling				Field Material Descrip				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0-	0.40	HA192/1		×	ML	Clayey SILT, low plasticity, brown.		S	Organic layer.	Т
		red	-	0.10	DS 0.00-0.10m	_	Ť.	SC	Clayey SAND, fine to medium grained, yellow/orange mottled grey.	1	–	Base of channel	7
		Groundwater not Encountered	-		R = 0A PID = 2.8 ppm		Ē					NATURAL.	
		inco	-		HA192/2		-	ļ					
ЧЧ	L	ot E	-		DS 0.20-0.40m					Σ			
1	_	ater r	0.5-	0.50	R=0A								Ι.
		awbr	0.0		PID = 4.1 ppm		<u>}</u>	CI	CLAY, medium plasticity, grey mottled yellow trace of gravel.				
		rour	_		HA192/3			ļ			L-MD		
		G	-	0.80	DS 0.60-0.80m R = 0A		[-]	ł			-		
					PID = 5.3 ppm				END OF BOREHOLE @ 0.80 m				1
			-						Reached target depth				
			1.0-										·
			-										
			-										
			-										
			_										
			1.5										.
			_										
			_										
			-										
			2.0—										1.
2 A A			-										
:08:2			-										
96 2			-										
8/200			-										
06/00			2.5—										-
5			-										
5			-										
SAP5			-										
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SZ													
MO			_										
-			-										
-			3.5—										1
2SO1			-										
E O			-										
002			-										
623(-										
000			4.0-										·
NVIK			-										
50/E			-										
01-0			-										
00/CO			-										
15PK			4.5-										.
):r			-										
AGE			-										
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54		'	-5.0	This r	eport of borehole must be	read	d in coni	unctic	→	geote	chnic	al purposes only, without	
Ğ				atten	npt to assess possible cor	ntami	ination.	Any r	references to potential contamination are for information only and do not i	neces	sarily i	ndicate the presence or	
									absence of soil or groundwater contamination.			GAP gINT FN. I	F01a RL

Golder

CLIENT:

PROJECT:

LOCATION:

JOB NO:

GAP5_1.GLB FULL PAGE _3:05PROJ/001-050/ENVIRO/05623002_JOHNSON - PITT TOWN NSWTPLOGS.GPJ GAP5_1.GDT 06/06/2006 _2:08:28 PM

REPORT OF BOREHOLE: BH193

	on Property Group sed Residential Deve wn	elopn	nent	;	POSITION: Refer to figure 4 SURFACE RL: m DATUM: AHD INCLINATION: -90°
05623	002				HOLE DIA: 75 mm HOLE DEPTH: 0.80 m
	Sampling				Field Mate
	SAMPLE OR FIELD TEST	VERED	HIC	Symbol	SOIL/ROCK MATERIAL DESCRIPTION

SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: DM

DATE: 5/5/05 CHECKED: GKS DATE: 26/6/05

		Dril	ling		Sampling				Field Material Descrip	tion			
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
	1		0.0-		HA194/1		×— -	ML	Clayey SILT, low plasticity, brown.		S	TOPSOIL	
		be	-	0.10	HA194/1 DS 0.00-0.10m		ľ				0		.
		nter	-		R=0A			CI	CLAY, medium plasticity, brown/yellow.			NATURAL.	.
		con			PID = 4.9 ppm								
		Groundwater not Encountered	-	1	HA194/2			ŀ					.
ЧA	L	r no	-		DS 0.20-0.40m R = 0A			-		Σ	st		•
		vate	0.5-		PID = 3.7 ppm						"		-
		vbri	-	0.60									.
		g rot	-		HA194/3 DS 0.60-0.80m			CI	As above mottled grey.				.
		-		0.80	R = 0A								
					PID = 4.6 ppm				END OF BOREHOLE @ 0.80 m				
			-						Reached target depth				.
			1.0-										-
			-	-									•
			-										.
			-										.
													Ι.
			45										
			1.5—										-
			-	1									•
			-	1									•
			-	-									•
			-	-									.
			2.0-										_
			_										.
													Ι.
			-	1									.
			-	1									•
			2.5—	1									-
			-										•
			-										.
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			-										.
			3.0-										
			5.0										
			-										.
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			-	1									.
			-	1									•
			3.5—	1									-
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			40										
			4.0-										-
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			-										-
			4.5-										-
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				atten	port of borenoie must be fi opt to assess possible conta	amir	nation.	Any n	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not n	eces	sarily ir	ndicate the presence or	
								•	absence of soil or groundwater contamination.		•	GAP gINT FN. F)1a
													RL2

Golder

CLIENT:

PROJECT:

LOCATION:

JOB NO:

GAP5_1.GLB FULL PAGE _3:05PROJ/001-050/ENVIRO/05623002_JOHNSON - PITT TOWN NSWTPLOGS.GPJ GAP5_1.GDT 06/06/2006 _2:08:32 PM

REPORT OF BOREHOLE: BH194

	Sampling			Field Materia
056230	02		HOLE DIA: 75 mm HOLE DEPTH:	0.90 m
056000	000			0.00
Pitt To	wn		INCLINATION: -90°	
Propos	sed Residential Devel	opment	SURFACE RL: m DATUM: AHD	
Johnso	on Property Group		POSITION: Refer to figure 4	
-				

SHEET: 1 OF 1 DRILL RIG: Hand Auger DRILLER: Golder LOGGED: DM

DATE: 5/5/05 CHECKED: GKS DATE: 26/6/05

		Dril	ling		Sampling				Field Material Descrip				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	Sample or Field test	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
			0.0-	0.10	HA193/1	×		ML	Sandy/Clayey SILT, low plasticity, brown.	Σ	S	Organic layer.	
		be	-	0.10	DS 0.00-0.10m R = 0A	×		ML	Sandy/Clayey SILT, low plasticity,orange/ brown.			Base of drainage channel.	1
		nter	-		PID = 5.0 ppm	×				2		NATURAL.	•
		ncor	-		HA193/2	X	Ĵ	2		M-M	٨S		•
ЧA	L	not E	-	0.50	DS 0.20-0.40m R = 0A	×		,					•
_		rater	0.5—	0.00	PID = 4.1 ppm	×		ML	As above but Clayey SILT				-
		Groundwater not Encountered	-		HA193/3	×	۲. ۲.						•
		GD	-		DS 0.60-0.80m R = 0A	×	<u> </u>				S		.
			_	0.90	PID = 3.9 ppm	×							
			1.0-						END OF BOREHOLE @ 0.90 m Reached target depth				
			-						Reached larger depin				.
			_										.
			_										.
			_										.
			1.5										_
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			-										•
			2.0-										-
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			2.5-										
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			3.0-										_
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			4.0										
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<u> </u>	لـ ۱	∟ I	- 5.0 -	This n	eport of borehole must be re	ר וב יי הפני	l 1 conii	 unctio	n with accompanying notes and abbreviations. It has been prepared for	L _	ı ⊥ chnic≈	L	·
				atten	npt to assess possible conta	mina	ation.	Any re	n with accompanying notes and abbreviations. It has been prepared for eferences to potential contamination are for information only and do not n	eces	sarily in	ndicate the presence or GAP gINT FN. Fi	71~
									absence of soil or groundwater contamination.				RL2



EXPLANATION OF NOTES, ABBREVIATIONS & TERMS USED ON BOREHOLE AND TEST PIT REPORTS

DRILLING/EXCAVATION METHOD

ADy* Auger Drilling RT Rotary Tricone bit NMLC Diamond Core - 52 mm V V-Bit RAB Rotary Air Blast NQ Diamond Core - 47 mm TC-Esit, e.g., ADT RC Reverse Circulation BH Tractor Mounted Backhoe HA Hand Auger PT Push Tube EX Tracket Myarulic Excavator Dicube Coring CT Cable Tool Rig EE Existing Excavation WB Washbore or Bailer JET Jatting HAND Excavated by Hand Methods PENETRATION/EXCAVATION RESISTANCE L Low resistance. Rapid penetration possible with little effort from the equipment used. H High resistance to penetration/vosable at an acceptable rate with moderate effort from the equipment used. H High resistance to penetration/vosable at an acceptable without the risk of damage or unacceptable wear to the digging implement or machine. R Refusal or Practical Refusal. No further progress possible without the risk of damage or unacceptable wear to the digging implement or machine. ROUNDWATER NOT The observation of groundwater, whether present or not, was not possible due to drilling OBSERVED RONDUNWATER NOT The observation reg or alonger period.	DRILLI	NG/EXCAVATION METH	DD				
V V-Bit RAB Rotary Air Blast NQ Diamond Core - 47 mm T TC-Bit, e.g. ADT RC Reverse Circulation BH Tractor Mounded Backhoe HA Hand Auger PT Push Tube EX Tractor Mounded Backhoe DTC Diatube Coring CT Cable Tool Rig EE Existing Excavation DTC Diatube Coring CT Cable Tool Rig EE Existing Excavation PENETRATION/EXCAVATION RESISTANCE L Low resistance. Rapid penetration possible at an acceptable rate with moderate effort from the equipment used. H High resistance to penetration/excavation. Further penetration is possible at a slow rate and requires significant effort from the equipment. R Refusal or Practical Refusal. No further progress possible without the risk of damage or unacceptable wear to the digging implement or machine. These assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator. WATER Water level at date show Partial water loss GROUNDWATER NOT The observation of groundwater, whether present or not, was not possible due to drilling tools, and the experience of the operator. SME Standard Ponetration Test to AS1289.6.3.1-1993 4,7,11 N=18 4,7,11 = Blows per 150xm. N = B	AS*	Auger Screwing	RD	Rotary blade o	r drag bit	HQ	Diamond Core - 63 mm
TC-Bit, e.g. ADT RC Reverse Circulation BH Tractor Mounted Backhoe HA Hand Auger PT Push Tube EX Tracket Mydraulic Excavator WB Washbore or Bailer JET Jetting HAND Excavated by Hand Methods PENETRATION/EXCAVATION RESISTANCE L Low resistance. Rapid penetration possible with little effort from the equipment used. M M Medium resistance. Excavation/possible at an acceptable rate with moderate effort from the equipment used. H High resistance to penetration/excavation. Further penetration is possible at a slow rate and requires significant effort from the equipment. R Refusal or Practical Refusal. No further progress possible without the risk of damage or unacceptable wear to the digging implement or machine. These assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator. Partial water loss GROUNDWATER NOT The observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave in of the borehole/test pit wes dry soon after excavation for that interval are reported present in less permeable strata. GROUNDWATER NOT The borehole/test pit wes dry soon after excavation for that interval are reported present in less permeable strata. <tr< td=""><td>AD*</td><td>Auger Drilling</td><td>RT</td><td>Rotary Tricone</td><td>bit</td><td>NMLC</td><td>Diamond Core - 52 mm</td></tr<>	AD*	Auger Drilling	RT	Rotary Tricone	bit	NMLC	Diamond Core - 52 mm
HA Hand Auger PT Push Tube EX Tracked Hydraulic Excavator DTC Diatube Coring CT Cable Tool Rig EE Existing Excavation WW Washore or Bailer JET Jetting HAND Excavated by Hand Methods PERTRATION/EXCAVATION RESISTANCE L Low resistance. Rapid penetration possible at an acceptable rate with moderate effort from the equipment used. H High resistance to penetration/excavation. Further penetration is possible at a slow rate and requires significant effort from the equipment. R Refusal or Practical Refusal. No further progress possible without the risk of damage or unacceptable wear to the digging implement or machine. These assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator. WATER Vater level at date shown ✓ Partial water loss GROUNDWATER NOT The observation of groundwater, whether present or not, was not possible due to drilling tools and the speriende. SMPLING AND TESTING Standard Penetration Test to AS1289.6.3.1.1993 47.11 N=18 47.11 = Blows per 150mm. N = Blows per 300mm penetration for that interval are reported. SMPLING AND TESTING Penetration occurred under the hammer and rod weight only WHE Penetration occurred under the hammer and rod weight only	*V	V-Bit	RAB	Rotary Air Blas	st	NQ	Diamond Core - 47 mm
DTC Diatube Coring CT Cable Tool Rig EE Existing Excavation PENETATION/EXCAVATION RESISTANCE L Low resistance. Rapid penetration possible with little effort from the equipment used. M Medium resistance. Excavation/possible at an acceptable rate with moderate effort from the equipment used. H High resistance. Excavation/possible at an acceptable rate with moderate effort from the equipment used. R Refusal or Practical Refusal. No further progress possible without the risk of damage or unacceptable wear to the digging implement or machine. These assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator. WATER Water level at date shown ✓ Partial water loss GROUNDWATER NOT The observation of groundwater, whether present or not, was possible due to drilling water, surface seepage or cave in of the borehole/test pit been left open for a longer period. SAMPLING AND TESTING Standard Penetration Test to AS1289.6.3.1-1993 4/,11 N=18 Bows per 150mm. N = Blows per 300mm penetration following 150mm seating Where practical refusal occurs, the blows and penetration for that interval are reported Penetration occurred under the hammer and rod weight only BS Disturbed sample BNW Penetration occurred under the hammer and rod weight only Hammer double bouncing on anvil Water sample PP <t< td=""><td>*Т</td><td>TC-Bit, e.g. ADT</td><td>RC</td><td>Reverse Circu</td><td>lation</td><td>BH</td><td>Tractor Mounted Backhoe</td></t<>	*Т	TC-Bit, e.g. ADT	RC	Reverse Circu	lation	BH	Tractor Mounted Backhoe
WB Washbore or Bailer JET Jetting HAND Excavated by Hand Methods PENETRATION/EXCAVATION RESISTANCE L Low resistance. Rapid penetration possible with little effort from the equipment used. M Medium resistance to penetration/excavation. Further penetration is possible at a slow rate and requires significant effort from the equipment. R Refusal or Practical Refusal. No further progress possible without the risk of damage or unacceptable wear to the digging implement or machine. These assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator. WATER ✓ Partial water loss GROUNDWATER NOT The observation of groundwater, whether present or not, was not possible due to drilling water, surface seegae or cave in of the borehole/sets pti. GROUNDWATER NOT The observation of groundwater, whether present or not, was not possible due to drilling water, surface seegae or cave in of the borehole/sets pti. GROUNDWATER NOT The borehole/test pti was dry soon after excavation following 150mm seating Where practical refusal occurre, the blows and penetration for that interval are reported the rod weight only. SMDELING AND ESSING Penetration occurred under the rod weight only. PUW Penetration occurred under the rod weight only. Puentration occurred under	HA	Hand Auger	PT	Push Tube		EX	Tracked Hydraulic Excavator
PENETRATION/EXCAVATION RESISTANCE L Low resistance. Rapid penetration possible with little effort from the equipment used. M Medium resistance. Excavation/possible at an acceptable rate with moderate effort from the equipment used. H High resistance to penetration/excavation. Further penetration is possible at a slow rate and requires significant effort from the equipment. R Refueal or Practical Refusal. No further progress possible without the risk of damage or unacceptable wear to the digging implement or machine. These assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator. WATER ✓ Partial water loss GROUNDWATER NOT The observation of groundwater, whether present or not, was not possible due to drilling tools, and the experience of the borehole/test pit. GROUNDWATER NOT The observation Test to AS1289.6.3.1-1993 47,11 N=18 4,7,11 = Blows per 150mm. N = Blows per 300mm penetration following 150mm seating Where practical refusal occurs, the blows and penetration for that interval are reported RW Penetration occurred under the hammer and rod weight only Hammer double sample BNW Pientration occurred under the hammer and rod weight only HW Pientration occurred under the spressed as uncorrected shear strength s, PID PM Kingto Sample	DTC	Diatube Coring	СТ	Cable Tool Rig)	EE	Existing Excavation
L Low resistance. Rapid penetration possible with little effort from the equipment used. M Medium resistance. Excavation/possible at an acceptable rate with moderate effort from the equipment used. H High resistance to penetration/excavation. Further penetration is possible at a slow rate and requires significant effort from the equipment. R Refusal or Practical Refusal. No further progress possible without the risk of damage or unacceptable wear to the digging implement or machine. These assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator. WATER Water level at date shown Partial water loss GROUNDWATER NOT The observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave in of the borehole/test pit. GROUNDWATER NOT The borehole/test pit was dry soon after excavation. However, groundwater could be present in less permeable strata. Inflow may have been observed had the borehole/test pit been left open for a longer period. SAMPLING AND TESTING 4,7,11 melta shows per 150mm. N = Blows per 300mm penetration following 150mm seating 30/80mm NW here practical refusal occurs, the blows and penetration for that interval are reported Penetration occurred under the hammer and rod weight only HB Hammer double bouncing on anvil DS Disturbed sample FP	WB	Washbore or Bailer	JET	Jetting		HAND	Excavated by Hand Methods
M Medium resistance. Excavation/possible at an acceptable rate with moderate effort from the equipment used. H High resistance to penetration/excavation. Further penetration is possible at a slow rate and requires significant effort from the equipment. R Refusal or Practical Refusal. No further progress possible without the risk of damage or unacceptable wear to the digging implement or machine. These assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator. WATER ✓ Partial water loss GROUNDWATER NOT The observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave in of the borehole/test pit. GROUNDWATER NOT The borehole/test pit was dry soon after excavation. However, groundwater could be present in less permeable strata. Inflow may have been observed had the borehole/test pit been left open for a longer period. SAMPLING AND TESTING Standard Penetration Test to AS1289.6.3.1-1993 4.7.11 N=18 4.7.11 Blows per 150mm. N = Blows per 300mm penetration for that interval are reported RW WW Penetration occurred under the hammer and rod weight only Hammer double bouncing on anvil DS Disturbed sample Field permeability test over section noted FV Field pane share test expressed as instrument reading in kPa	PENET	RATION/EXCAVATION R	ESISTAN	CE			
H High resistance to penetration/excavation. Further penetration is possible at a slow rate and requires significant effort from the equipment. R Refusal or Practical Refusal. No further progress possible without the risk of damage or unacceptable wear to the digging implement or machine. These assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator. WATER ✓ Partial water loss GROUNDWATER NOT The observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave in of the borehole/test pit. GROUNDWATER NOT The observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave in of the borehole/test pit. GROUNDWATER NOT The observation Test to AS1289.6.3.1-1993 4,7,11 N=18 SMPLING AND TESTINE SPT Standard Penetration Test to AS1289.6.3.1-1993 30/80mm 4,7,11 = Blows per 150mm. N = Blows per 300mm penetration following 150mm seating Where practical refusal occurse under the rod weight only. HW Penetration occurred under the hammer and rod weight only. HB Bulk disturbed sample PD Pield vane share test expressed as uncorrected shear strength s, PID PD Pield vane share test expressed as uncorrect	L	Low resistance. Rapid	penetration	n possible with lit	tle effort from the	equipment	used.
significant effort from the equipment. R Refusal or Practical Refusal. No further progress possible without the risk of damage or unacceptable wear to the digging implement or machine. These assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator. WATER Water R Water level at date shown Materian assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator. WATER Water INDER Water inflow Mater INDER GROUNDWATER NOT GROUNDWATER SAMPLE SIGN Contact as the sperased strate sperased as increation for that interval are reported G G G G G G G G G G G G G G G G G G G	М	Medium resistance. Ex	cavation/p	ossible at an acc	ceptable rate with	moderate e	effort from the equipment used.
the digging implement or machine. These assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator. WATER Water level at date shown Partial water loss GROUNDWATER NOT Complete water loss GROUNDWATER NOT GROUNDWATER NOT CROUNDWATER CROUNDWATER NOT CROUNDWATER CROUNDWATER NOT CROUNDWATER CROUNDWATER NOT CROUNDWATER CROUNDWATE	н				penetration is po	ossible at a	slow rate and requires
of excavation or drilling tools, and the experience of the operator. WATER ✓ Water inflow ✓ Complete water loss GROUNDWATER NOT OBSERVED The observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave in of the borehole/test pit. GROUNDWATER NOT ENCOUNTERED The borehole/test pit was dry soon after excavation. However, groundwater could be present in less permeable strata. Inflow may have been observed had the borehole/test pit been left open for a longer period. SAMPLING AND TESTING Standard Penetration Test to AS1289.6.3.1-1993 4,7,11 N=18 4,7,11 Blows per 150mm. N = Blows per 300mm penetration following 150mm seating Where practical refusal occurs, the blows and penetration for that interval are reported Penetration occurred under the rod weight only WW Penetration occurred under the hammer and rod weight only HB Hammer double bouncing on anvil DS Disturbed sample G Gas Sample FP Field permeability test over section noted FV Field penetration and Odour (for specific soil contamination assessment projects) Photoinisation Detector reading in ppm PM Pressuremeter test expressed as instrument reading in kPa U63 Thin walled tube sample - nu	R			further progress	possible without	the risk of d	amage or unacceptable wear to
✓ Water level at date shown ✓ Partial water loss ✓ Water inflow ✓ Complete water loss GROUNDWATER NOT OBSERVED The observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave in of the borehole/test pit. GROUNDWATER NOT ENCOUNTERED The borehole/test pit was dry soon after excavation. However, groundwater could be present in less permeable strata. Inflow may have been observed had the borehole/test pit been left open for a longer period. SAMPLING AND TESTINE Standard Penetration Test to AS1289.6.3.1-1993 4,7,11 N=18 30/80mm 4,7,11 = Blows per 150mm. N = Blows per 300mm penetration for that interval are reported RW Penetration occurred under the rod weight only HB Hammer double bouncing on anvil DS Disturbed sample BDS Bulk disturbed sample FV Field permeability test over section noted FV Field permeability test over section noted FV Photoionisation Detector reading in ppm PD Photoionisation Detector reading in strument reading in kPa Thin walled tube sample - number indicates norminal sample diameter in millimetres Range of Visually Observable contamination R = A No sisible evidence of contamination <t< td=""><td></td><td></td><td></td><td></td><td></td><td>ing the equi</td><td>ipment power, weight, condition</td></t<>						ing the equi	ipment power, weight, condition
Water inflow Complete water loss GROUNDWATER NOT OBSERVED The observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave in of the borehole/test pit. GROUNDWATER NOT ENCOUNTERED The borehole/test pit was dry soon after excavation. However, groundwater could be present in less permeable strata. Inflow may have been observed had the borehole/test pit been left open for a longer period. SAMPLING AND TESTING Standard Penetration Test to AS1289.6.3.1-1993 4.7,11 N=18 4.7,11 N=18 4.7,11 N=18 4.7,11 N=18 30/80mm Where practical refusal occurs, the blows and penetration following 150mm seating Where practical refusal occurred under the hammer and rod weight only WW Penetration occurred under the hammer and rod weight only HB Hammer double bouncing on anvil DS Disturbed sample G Gas Sample W Water Sample FP Field permeability test over section noted FV Field vane shear test expressed as instrument reading in kPa UB Photoionisation Detector reading in ppm PM Pocket penetrometer test expressed as instrument reading in kPa UB Thi walled tube sample - number	WATE	R					
GROUNDWATER NOT OBSERVED The observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave in of the borehole/test pit. GROUNDWATER NOT ENCOUNTERED The borehole/test pit was dry soon after excavation. However, groundwater could be present in less permeable strata. Inflow may have been observed had the borehole/test pit been left open for a longer period. SAMPLING AND TESTING Standard Penetration Test to AS1289.6.3.1-1993 4,7,11 N=18 4,7,11 Blows per 150mm. 8000 Where practical refusal occurs, the blows and penetration following 150mm seating Where practical refusal occurs, the blows and penetration for that interval are reported RW 901 Penetration occurred under the nod weight only HB Hammer double bouncing on anvil DS Disturbed sample GG Gas Sample V Water Sample FP Field vane shear test expressed as uncorrected shear strength s _v PID Photoinisation Detector reading in ppm PM Pressuremeter test over section noted FV Field vane shear test expressed as instrument reading in kPa Thin walled tube sample - number indicates nominal sample diameter in millimetres Ranking of Visually Observable Contamination R = A No non-natural odours identified <td>Ž</td> <td>✓ Water level at data</td> <td>ate shown</td> <td></td> <td></td> <td>tial water lo</td> <td>SS</td>	Ž	✓ Water level at data	ate shown			tial water lo	SS
OBSERVED water, surface seepage or cave in of the borehole/test pit. GROUNDWATER NOT ENCOUNTERED The borehole/test pit was dry soon after excavation. However, groundwater could be present in less permeable strata. Inflow may have been observed had the borehole/test pit been left open for a longer period. SAMPLING AND TESTING Standard Penetration Test to AS1289.6.3.1-1993 4,7,11 N=18 4,7,11 = Blows per 150mm. N = Blows per 300mm penetration following 150mm seating 30/80mm Where practical refusal occurs, the blows and penetration for that interval are reported Penetration occurred under the rod weight only HW Penetration occurred under the hammer and rod weight only HB Hammer double bouncing on anvil DS Disturbed sample BDS Bulk disturbed sample FP Field permeability test over section noted FV Field permeability test over section noted FV Field permeability test over section noted PP Procket penetrometer test expressed as uncorrected shear strength s, PID Photoionisation Detector reading in ppm PM Pressuremeter test over section noted PP Pocket penetrometer test expressed as instrument reading in kPa Thin walled tube sample - number indicates nominal sample diameter in millimetres	\square	> Water inflow			Con	nplete wate	r loss
ENCOUNTERED present in less permeable strata. Inflow may have been observed had the borehole/test pit been left open for a longer period. SAMPLING AND TESTING SPT Standard Penetration Test to AS1289.6.3.1-1993 4,7,11 N=18 4,7,11 = Blows per 150mm. N = Blows per 300mm penetration following 150mm seating 30/80mm Where practical refusal occurs, the blows and penetration for that interval are reported RW Penetration occurred under the rod weight only HW Penetration occurred under the hammer and rod weight only HB Hammer double bouncing on anvil DS Disturbed sample BDS Bulk disturbed sample FP Field permeability test over section noted FV Field permeability test over section noted FV Field vane shear test expressed as uncorrected shear strength sv PID Photoionisation Detector reading in ppm PM Pressuremeter test over section noted FV Field que sample - number indicates nominal sample diameter in millimetres Ranking of Visually Observable Contamination R = A No non-natural odours identified R = 0 No visible evidence of contamination R = A Slight evidence of ontamination R = 3 Slight evidence of contamination <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>was not possible due to drilling</td>							was not possible due to drilling
SPTStandard Penetration Test to AS1289.6.3.1-19934,7,11N=184,7,11 = Blows per 150mm.N = Blows per 300mm penetration following 150mm seating Where practical refusal occurs, the blows and penetration for that interval are reported RWRWPenetration occurred under the rod weight only HWPenetration occurred under the hammer and rod weight only Hammer double bouncing on anvilDSDisturbed sample BDSBDSBulk disturbed sample GGGas Sample VWVWater SampleFPField permeability test over section noted FVFVField vane shear test expressed as uncorrected shear strength svPIDPhotoionisation Detector reading in ppmPMPressuremeter test over section noted FVPPPocket penetrometer test expressed as uncorrected shear strength in walled tube sample - number indicates nominal sample diameter in millimetresRanking of Visually Observable Contamination and Odour (for specific soil contamination assessment projects)R = 0No visible evidence of visible contamination Significant visible contaminationR = 2Visible contamination Significant visible contaminationR = 2Significant visible contamination Significant visible contaminationR = 2Corre Recovery (%)SCR = Solid Core Recovery (%)RQD = Rock Quality Designation (%)	ENCOL	JNTERED pre bee	sent in less	s permeable stra	ta. Inflow may ha		
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			S	CR = Solid Core	Recoverv (%)	RQD	= Rock Quality Designation (%)
Length of core recovered		• • •					
$=\frac{\text{Length of core recovered}}{\text{Length of core run}} \times 100 \qquad =\frac{\sum \text{Length of cylindrical core recovered}}{\text{Length of core run}} \times 100 \qquad =\frac{\sum \text{Axial lengths of core } > 100 \text{ mm}}{\text{Length of core run}} \times 100$	$=\frac{Leng}{L}$	$\frac{100}{100} \times 100$	$= \frac{\sum Ler}{\sum}$	Length of core	run	$= \frac{\sum i}{2}$	$\frac{100 \text{ mm}}{\text{Length of core run}} \times 100$



		Strength				
VS	Very Soft	0 to 12 kPa	VL	Very Loose	Less than 15	0 to 4
S	Soft	12 to 25 kPa	L	Loose	15 to 35	4 to 10
F	Firm	25 to 50 kPa	MD	Medium Dense	35 to 65	10 to 30
St	Stiff	50 to 100 kPa	D	Dense	65 to 85	30 to 50
VSt	Very Stiff	100 to 200 kPa	VD	Very Dense	above 85	Above 50
Н	Hard	above 200 kPa				

[#] SPT correlations are not stated in AS1726 – 1993, and may be subject to corrections for overburden pressure and equipment type.

In the absence of test results, consistency and density may be assessed from correlations with the observed behaviour of the material.



TERMS FOR ROCK MATERIAL STRENGTH & WEATHERING AND ABBREVIATIONS FOR DEFECT DESCRIPTIONS

STRENGTH

STRENG	ТН							
Symbo	I Te	erm Point L (MPa	s ₍₅₀₎		Field Guide			
EL Extremely < 0.03 Low			3 Eas	ily remoulded by hand	d to a material with soil properties.			
VL		ery 0.03 to ow	with	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30 mm can be broken by finger pressure.				
L	L	ow 0.1 to	with 150	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of pick point; has dull sound under hammer. A piece of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.				
М	Mee	dium 0.3 to		dily scored with a knif be broken by hand wi	e; a piece of core 150 mm long by 50 mm diameter th difficulty.			
Н	H	igh 1 to	-		ong by 50 mm diameter cannot be broken by hand ck with a single firm blow; rock rings under hammer.			
VH		ery 3 to 1 igh	-	d specimen breaks w imer.	ith pick after more than one blow; rock rings under			
EH		emely >10 igh		Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.				
ROCK ST	RENGTH T	EST RESULTS						
	▼	Point Loa	d Strength	Index, Is(50), Axial tes	st (MPa)			
	•			Index, Is ₍₅₀₎ , Diametr				
ROCK M	ATERIAL W	EATHERING	Ŭ	(50)				
	nbol	Term			Field Guide			
R	S	Residual Soil	sub	stance fabric are no	emely weathered rock; the mass structure and longer evident; there is a large change in volume significantly transported.			
E	W	Extremely Weathered		Rock is weathered to such an extent that it has soil properties - i.e. it either disintegrates or can be remoulded, in water.				
DW	HW	Distinctly	disc	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by				
DVV	MW	Weathered	pore		eased due to deposition of weathering products in			
S	W	Slightly Weathered		k is slightly discoloure esh rock.	ed but shows little or no change of strength relative			
F	R	Fresh	Roc	k shows no sign of de	composition or staining.			
ABBREV	IATIONS FO	OR DEFECT TYPE	ES AND DE	SCRIPTIONS				
Defect Ty				or Infilling	Roughness			
B X	B Bedding parting		Cn Sn	Clean Stain	SI Slickensided Sm Smooth			
L	Foliation Cleavage)	Vr	Veneer	Ro Rough			
J	Joint		Ct	Coating	i i i i i i i i i i i i i i i i i i i			
SZ		zone (Fault)	Planarity	<u> </u>	Vertical Boreholes – The dip			
CS	Crushed	seam (Fault)	PI	Planar	(inclination from horizontal) of the			
DS		osed seam	Un	Undulating	defect is given.			
IS S	Infilled se		St	Stepped	Inclined Boreholes – The inclination is			
S V	Schistoci Vein	ıy			measured as the acute angle to the core axis.			
•			1					

Appendix B Infiltration Report prepared by SESL Report 19th April 2005



Sydney Environmenial and Soit Laboratory Pty Ltd ABN 70-106-810-708 16 Chilvers Road Thomleigh NSW 2120 Australia Address Mail to PO Box 357 Pennam Hills NSW 1715 Telephone: (02) 9980-6554 Facsimile: (02) 9980-6554 Facsimile: (02) 9484-2427 Web: www.sett.com.au Envir sett@sett.com.au

Attention: Glen Fuller Golder Associates Pty Ltd PO Box 1302 Crows Nest NSW 1585

Re: Infiltration - Bathurst, Pitt Town NSW

Sydney Environmental and Soil Laboratory (SESL) conducted on site infiltration testing on 15th April 2005 at Bathurst Street, Pitt Town NSW. The purpose of this work was to assess the permeability of the soil across the site, to gain information for use as part of the engineering sensitive urban design and possible filtration of stormwater.

Method

A total of 16 infiltration measurements were conducted (8 locations at Northern Site and 8 locations at Southern Site) across the site. Test locations were selected by Glen Fuller of Golder Associates and are identified on the following site plan. Infiltration measurements were conducted on level areas prepared by a backhoe and located adjacent to previously excavated test pits.

Infiltration measurements were conducted using the *Talsma Hallam* or shallow well permeameter method (Boesma, 1965b). This is our preferred method for dryland soils as it gives reliable results across a wide range of soil types.

Results

Table 1. Field Permeameter measurements at test locations across Northern Site

Test pit	Ksat (m/s)
TP 104	1.069×10^{-5}
TP 109	2.100×10^{-6}
TP 116	5.126 × 10 ⁻⁶
TP 132	4.501 × 10 ⁻⁶
TP 113	1.350×10^{-5}
TP 108	1.501×10^{-5}
TP 123	1.318×10^{-5}
TP 139	7.503×10^{-7}

Test pit	Ksat (m/s)
TP 140	4.024×10^{-6}
TP 154	3.376×10^{-6}
TP 157	5.908 × 10 ⁻⁶
TP 143	3.376×10^{-6}
TP 165	1.877×10^{-6}
TP 160	1.501×10^{-6}
TP 146	1.125×10^{-6}
TP 167	5.626×10^{-6}

Table 2. Field Permeameter measurements at test locations across Southern Site.

Soils across the site were predominately deep sandy loams of alluvial origin. These soils are commonly found throughout the Hawkesbury basin and typically have low fertility and high permeability. Soils in the South Western corner of the site showed slightly different physical properties, as they contained a high level of clay.

Table 1 and 2 above, show permeability across both sites is relatively high. These results are expected in sandy soils. We note infiltration at test pit 139 was significantly lower than all other sites. This result is due to the presence of clay through this South Western corner. The clay band also influenced infiltration at test pits 165, 160 and 146 on the Southern Site.

We trust this data set is of assistance in understanding infiltration across this site and will give guidance in developing appropriate hydraulic models.

If you require any further information please do not hesitate to contact either Daniel Saunders or myself of 9980 6554.

Regards,

lan

Charlotte Moore Soil Scientist

Attachment: Site Plan

Appendix C Laboratory Test Certificates
 Our Job:
 25131

 Batch No:
 2

 Your Ref:
 05623002

 Page:
 1 of 3

Laboratory Report



CLIENT: Golder Asociates Pty. Ltd

Address: PO Box 1302 Crows Nest NSW 1585

PROJECT: Material Analysis - Johnson Property Group- Pitt Town

Sample supplied by Client/ Analysed as Received

california bearing ratio

TEST DATE:	18/04/2005
TEST PROCEDURE	AS1289 6.1.1
Condition	4 Day Soak
Compaction	Standard
Drop of Rammer	300 mm
Mass of Rammer	2.7 kg
Surcharge	4.5 kg

SAMPLE No.		TP 108	TP 109	TP 119	TP 132
		0.4 - 0.8m	0.4 - 0.8m	0.4 - 0.8m	0.4 - 0.8m
OVERSIZE					
% greater than 1	9.0 mm	nk	nk	nk	nk
% oversize used	d in test	nil	nil	nil	nil
DENSITY					
maximum dry density	(t/m³)	1.95	1.89	2.00	1.99
before soak	(t/m ³)	1.94	1.89	2.00	1.97
density ratio	(%)	99.5	100.0	100.0	99.0
after soak	(t/m³)	1.94	1.89	2.00	1.97
MOISTURE					·····
field moisture	(%)	2.2	5.5 -	6.9	4.1
optimum moisture	(%)	9.2	9.8	8.7	8.4
at compaction	(%)	8.9	9.5	8.4	8.6
moisture ratio	(%)	96.5	97.0	96.5	102.5
after soak-top 30mm	(%)	10.7	9.8	9.2	10.1
after soak-overall	(%)	9.7	10.2	8.8	9.4
CBR VALUE					
(top) - 2.5mm	(%)	20	12	45	40
(top) - 5.0mm	(%)	25	16	45	35
swell after soak	(%)	nil	nil	nil	nil
	_				

Approved Signatory:

P.We

(Peter Weir) General Manager

Date: 22 April, 2005.

TERRATEST Pty. Ltd. (ABN 52 082 867 945)

117 Magowar Road, Girraween NSW 2145 Ph: (02) 9636 7377 Fax: (02) 9688 4757



NATA Accredited Laboratory No 541

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 Our Job:
 25131

 Batch No:
 2

 Your Ref:
 05623002

 Page:
 2 of 3

Laboratory Report



CLIENT: Golder Asociates Pty. Ltd

Address: PO Box 1302 Crows Nest NSW 1585

PROJECT: Material Analysis - Johnson Property Group- Pitt Town

Sample supplied by Client/ Analysed as Received

california bearing ratio

TEST DATE:	18/04/2005
TEST PROCEDURE	AS1289 6.1.1
Condition	4 Day Soak
Compaction	Standard
Drop of Rammer	300 mm
Mass of Rammer	2.7 kg
Surcharge	4.5 kg

SAMPLE No.		TP 139 0.4 - 0.8m	TP 140 0.4 - 0.8m	TP 146 0.4 - 0.8m	TP 157 0.4 - 0.8m
OVERSIZE					
% greater than 1	9.0 mm	nk	nk	nk	nk
% oversize used	l in test	nil	nil	nil	nil
DENSITY					
maximum dry density	(t/m³)	1.76	2.09	1.78	1.97
before soak	(t/m ³)	1.76	2.08	1.77	1.97
density ratio	(%)	100.0	100.0	99.5	100.0
after soak	(t/m³)	1.73	2.08	1.75	1.96
MOISTURE					
field moisture	(%)	14.6	5.4	19.1	5.5
optimum moisture	(%)	16.8	8.1	19.9	8.4
at compaction	(%)	16.7	7.8	19.7	8.2
moisture ratio	(%)	99.5	96.5	99.0	97.5
after soak-top 30mm	(%)	23.9	9.2	23.6	10.0
after soak-overall	(%)	18.7	8.4	20.6	8.7
CBR VALUE					
(top) - 2.5mm	(%)	2.0	35	2.5	25
(top) - 5.0mm	(%)	2.0	40	2.5	30
swell after soak	(%)	2.0	nil	1.5	nil

Approved Signatory:

2

(Peter Weir) General Manager

Date: 22 April, 2005.

TERRATEST Pty. Ltd. (ABN 52 082 867 945)

117 Magowar Road, Girraween NSW 2145 Ph: (02) 9636 7377 Fax: (02) 9688 4757

NATA Accredited Laboratory No 541

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 Our Job:
 25131

 Batch No:
 2

 Your Ref:
 05623002

 Page:
 3 of 3

Laboratory Report



CLIENT: Golder Asociates Pty. Ltd

Address: PO Box 1302 Crows Nest NSW 1585

PROJECT: Material Analysis - Johnson Property Group- Pitt Town

Sample supplied by Client/ Analysed as Received

california bearing ratio

TEST DATE:	18/04/2005
TEST PROCEDURE	AS1289 6.1.1
Condition	4 Day Soak
Compaction	Standard
Drop of Rammer	300 mm
Mass of Rammer	2.7 kg
Surcharge	4.5 kg

SAMPLE No.		TP 160 0.4 - 0.8m	TP 170 0.4 - 0.6m		
OVERSIZE					
% greater than 1	.9.0 mm	nk	nk		
% oversize use	d in test	nil	nil		
DENSITY					
maximum dry density	(t/m³)	1.80	1.89		
before soak	(t/m³)	1.78	1.87		
density ratio	(%)	99.0	99.0		
after soak	(t/m³)	1.77	1.87		
MOISTURE					
field moisture	(%)		5.3		
optimum moisture	(%)		9.7		
at compaction	(%)		9.6		
moisture ratio	(%)	101.0	99.0		
after soak-top 30mm	(%)	18.3	10.2	-	
after soak-overall	(%)	17.4	10.0		
CBR VALUE				· · · · · · · · · · · · · · · · · · ·	
(top) - 2.5mm	(%)	25	25		
(top) - 5.0mm	(%)	25	20		
swell after soak	(%)	nil	nil		

Approved Signatory:

P.De.

(Peter Weir) General Manager Date: 22 April, 2005.

TERRATEST Pty. Ltd. (ABN 52 082 867 945)

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Appendix D CSIRO "Guide to home owners on foundation maintenance and footing performance (1996)"



Improving the Built Environment

Sheet No. 10-91

Revised August 1996

Guide to home owners on foundation maintenance and footing performance (updated for AS 2870-1996)

Introduction

This guide was prepared by Dr P.F. Walsh, formerly of CSIRO and now with the University of Newcastle, with advice from the Standards Australia Committee on Residential Slabs and Footings, to provide guidance to home owners on their responsibilities for the care of clay foundations, and to discuss the performance that can be expected from a footing system. (The ground that supports a house is called a foundation, and the concrete structure that transfers the load to this foundation is the footing system.)

The best information about the design and construction of footing systems is contained in the Australian Standard AS 2870 'Residential Slabs and Footings'. The Standard gives a system of site classification, prescribed footing and slab designs, and construction methods that provide an excellent footing system for Australian houses. However, a warning is given that the chance of a footing failure is higher if extreme site conditions are permitted to occur, viz.:

- growth of trees too close to a footing;
- excessive or irregular watering of gardens adjacent to the house;
- lack of maintenance of site drainage; and
- failure to repair plumbing leaks.

The Standard further states that compliance with this guide is a way to avoid extreme site conditions.

Clay foundations are the cause of major problems for houses. Clays are very fine-grained soils that are plastic and sticky when wet, and hard and strong when dry. All clays swell or shrink to some degree as they become wet or dry out. 'Reactive' clays swell or shrink to such an extent that foundation movements can damage houses.

All house sites are classified. Reactive-clay sites are classified as S, M, H or E, in order of increasing reactivity. Proper maintenance of such clay sites requires that the moisture content of the clay should be kept reasonably constant.

Some minor cracking of masonry walls on reactive clay sites is almost inevitable despite proper design, construction and maintenance. Very slight cracks (up to 1 mm wide) could be expected in most houses. Larger cracks (up to 5 mm) may occur in some houses with properly designed and constructed footings if reactive clay sites have been subject to large changes of moisture. Cracks larger than 5 mm are regarded as significant damage.

Non-reactive sites – sands, silts and certain clays of class A or S – need only be protected from becoming extremely wet. This requires adequate attention to site drainage and prompt repair of plumbing leaks.

Further information on these topics is given in the following sections. The guide has been updated to be consistent with the revised edition of AS 2870 (1996).

Site classification

AS 2870 requires all sites to be classified. The emphasis has been placed on reactive clays that swell and shrink with changes of moisture content, because these are the most common cause of problems. The classification system is fairly complicated but, as a general guide, the following may be helpful in understanding the system for clay sites.

- S Clays that have not given trouble in the past.
- M Moderately reactive clays that may cause minor damage to brick houses on old-style light strip footings. Moderately reactive clays are common.
- H Highly reactive clays that often damage houses, paths and fences.
- E Extremely reactive clays that frequently damage houses even with strong footings. Generally rare in major cities except Adelaide. Other occurrences include outback NSW, Darling Downs, Geelong and Horsham.

Since the precautions necessary depend on the reactivity of the site, the owner should check the classification that is shown on the house plans.

The maintenance of the building and the site is the responsibility of the owner, and so the owner should be familiar with the requirements of this guide.

Care of clay foundations

All clays move with changes of moisture content, so the aim is to minimise such changes in the clay by:

- draining the site;
- keeping gardens and trees away from the house;
- adequate but moderate garden watering; and
- repairing plumbing leaks.

This sheet is available from **CSIRO** PUBLISHING • Freecall **1800** - **645051** CSIRO PUBLISHING, PO Box 1139, Collingwood, Vic 3066, Australia On a reactive-clay site there are some restrictions on the way the owner can safely develop the garden around the house. These restrictions apply mainly to brick houses. In most cases, only minimal precautions are justified for framed houses clad with timber or sheeting.

The site must be well drained. Under no circumstances should water be allowed to lie against the house or even near the house. The ground immediately next to the house should be graded away with a slope of about 50 mm over the first metre. Suitable surface drains should be provided to take the surface water away from the house. Where topsoil is brought in, it should not interfere with the site drainage, nor should it raise the ground level enough to block the weepholes in the brick walls or any subfloor vents. Even the subfloor of houses with timber floors should be drained so that water does not collect under the house.

Large garden beds are best not located near the house. This will avoid the possibility of introducing too much moisture to the foundation clay by overwatering. The zone near the house should be planned for paths or covered with gravel





and plastic sheeting. Small shrubs may be planted at reasonable spacings.

Gardens and lawns should be watered adequately but not excessively. Uniform, consistent watering can be important to prevent damage to the foundation during dry spells such as droughts or dry summers.

Trees and large shrubs require substantial amounts of water, and if the soil near the tree dries out, the roots will extend in search of soil moisture. Tree watering is important in late summer and in drought. The use of slow-drip watering systems may be appropriate. It has also been found useful to drill holes near trees and fill them with gravel to allow water better access to the tree roots. Otherwise, clays will shrink as they dry, and a house may settle as shown below.

Removal of large trees creates the opposite problem. As soil moisture is gradually restored, clays swell and may lift shallow footings.

Many factors determine the extent of clay drying by trees. The more important include soil type, and the size, number and species of trees. Trees obtain moisture from roots that spread sideways, and the drying zone is influenced by the extent of these roots. For single trees, the drying zone is usually half to twice the tree height, but the zone may be larger for groups or rows of trees. Although it is known that the species can influence the extent and severity of the drying zone, little definite information is available. Some Australian trees are particularly efficient in extracting water from very dry soils and can be more dangerous than non-Australian species that use large amounts of water in normal conditions. The effect of tree drying on the amount of movement is also related to the reactivity of the clay. To minimise the risk of damage, trees (especially groups of trees) should not be planted near the house on a reactive clay site, and the following limits are recommended:

- d = 1.5 h for Class E sites
- d = 1 h for Class H sites d = 0.75 h for Class M sites

where d is the distance of the tree from the house, and h is the eventual mature height of the tree. These values should be increased by 50% if the trees are in a dense group. These rules mean that on the average suburban block, trees that grow higher than 8–9 m are often impractical unless the owner accepts the risk of some damage to the house. If large trees are desired, it may be practical to adopt a specially designed footing system, e.g. a piled footing system.

A leak in the plumbing can cause the footings of a house on a reactive clay to move. The water seeps into the clay causing it to swell and push the footing system upwards. Any obvious leaks in stormwater, drainage or sewerage pipes should be investigated. Leaking water pipes can be detected by turning off all the taps and checking if the water meter records any flow.

The above restrictions may seem onerous for new home owners, but lack of site maintenance on a reactive clay can cause damage to the house. The whole issue should be kept in some perspective. The damage to houses caused by reactive clays is mostly unsightly cracks in the brickwork. In the typical Australian brick-veneer house, the brickwork does not support the structure. It is the timber frame that carries the walls and roof loads, so brick cracks do not affect the structural safety of the house.

If owners choose to disregard some of the above restrictions and, say, plant large trees all around the house, they should not blame the builder, the engineer or the Council if the house suffers some cracking.

Performance of footing systems

All building materials move. Concrete and timber shrink, bricks grow, and so on. Many building practices have been evolved to reduce the damage that such movements cause, and the minor difficulties that arise are usually repaired without significant problems.

Where footings are designed by an engineer, the basis of the design is the limitation of any vertical movement that might occur between the centre of the wall and a line joining the ends of the wall. This is termed the differential movement and limits are given in AS 2870 for various forms of house construction. For example, a masonry veneer house with articulation joints is designed for a movement limit of 30 mm. The amount of this movement at a house can be checked using a level or even a string line along a brick course in the wall. If the vertical differential movement is less than the prescribed limit then the footing system has performed up to standard.

Masonry wall cracking can have many causes other than footing movement, including bricks growing as they absorb moisture, the structural or shrinkage movements of the frame within the veneer skin or even accidental damage during construction. If the cracking is less than a few millimetres it is virtually impossible to determine the cause. Certainly if there is no evidence of excessive differential movement then footings should not be regarded as the cause of the cracking.

However, it must be accepted that on reactive clay sites, particularly Class H and E, some movement is likely and for some sensitive houses cracking may occur even for footings performing within expectations. In order to set realistic expectations, AS 2870 contains Appendix C which is included in this report.

The performance requirement of AS 2870 suggests that Category 0 to 1 damage may be expected for houses on a reactive-clay site, but that the damage is of little consequence. Category 2 damage (isolated cracks up to 5 mm wide) is clearly not satisfactory, but it still does not constitute significant failure and could be expected to occur under adverse environmental conditions.

For these categories of damage, it is the intention of AS 2870 that consequent repairs are part of the normal house maintenance, although during the warranty period this may be the responsibility of the builder.

Nonetheless, to ensure that the damage does not proceed to a more serious state, the owner should take some action.

- Check that the recommendations on site treatment, drainage, garden arrangement, trees etc., have been observed.
- Keep a record of the crack width against the time of the year. If the damage is as high as Category 2 and seems to be increasing, the owner should consult the builder who

may be able to offer more specific advice. If this does not prove satisfactory, the owner should engage a consulting engineer who specialises in house footings.

- Engage a plumber to check for leaks if this is suspected to be the cause.
- Replace soil moisture in dry spells by watering. Such watering can be more effective if holes or trenches are dug into the clay. The holes or trenches should be filled with compacted crushed rock or gravel and moderately watered. Some trees may need to be removed or kept pruned.

Complete stability is difficult to achieve, so repairs to damaged walls should include methods that will disguise further movements. Extra joints should be included in external masonry walls and further cracking in internal walls can be concealed by flexible paints, wall paper or panelling. Repairing of cracks with brittle fillers should be avoided unless the cracks have stabilised.

For the more serious categories of damage, the steps to be taken are similar, but there should be little delay in seeking advice. Remedial action for significant failure may still only include attention to stabilising moisture conditions as described above, but could also involve constructing a concrete path or a wall in the ground to stop drying of the foundation clay. Walls may even be designed to span over sagging footings or to cantilever beyond sagging footings. Underpinning is usually not satisfactory in reactive clays.

Experience indicates that lack of maintenance is responsible for many failures. Even with proper design and site maintenance the occasional failure may still occur because footing behaviour is so complex.

Shrinkage of concrete floors

Concrete needs water. Firstly to allow the fresh concrete to flow, and secondly to develop strength during its first few weeks. As a slab starts to dry, it shrinks and tries to contract. Some of this movement is restrained or resisted by friction on the bottom of the slab and by the beams in the ground. This restraint causes tension or stretching forces in the slab and these forces are often large enough to crack the slab.

Shrinkage cracking is almost inevitable and does not represent failure. Most owners never notice the cracks because they often do not occur until after the carpets are laid. Cracks under brittle or sensitive floor coverings are of concern, but the risk of damage can be reduced by using flexible mortars and glues for fixing slate and tiles etc. Also it helps to delay installing the floor covering until after the shrinkage has occurred. The length of delay should be at least three months after the slab has started to dry (i.e. from the time the slab is last wet from rain or during construction).

Adhesive-fixed floor coverings

A concrete slab takes a long time to dry. For example, under temperate condidons a slab will take about three months to dry. Moisture in the concrete can interfere with the bond or break down the adhesive used to attach floor coverings. However, a range of adhesives is available for various floor coverings and these should perform quite well on slabs that have been allowed to dry sufficiently. If there is any doubt, the moisture condition of the slab should be assessed before coverings are placed.

Conclusion

This guide has been prepared to advise owners on how to care for the foundation of their houses and what to expect from a well-designed footing system. The main concern with foundation maintenance is to prevent the foundation soil becoming too wet or too dry, and a variety of recommendations are given to achieve this.

Further information

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Martin, K. G., Lewis, R. K., Palmer, R. E. & Walsh, P. F. 1983, Floor Coverings on Concrete Slab-on-ground, CSIRO Australia, Division of Building Research Report, Melbourne.

Disclaimer

The information in this and other Information Sheets is advisory. It is provided in good faith and not claimed to be an exhaustive treatment of the relevant subject. Further professional advice needs to be obtained before taking any action based on the information provided.

Appendix C of As 2870

Description of typical damage and required repair	Approximate crack width limit (see Note 3)	Damage category
Hairline cracks	<0.1 mm	0
Tine cracks which do not need repair.	≤l mm	
Gracks noticeable but easily filled. Doors and windows stick slightly	≪5 mm	2
Cracks can be repaired and possibly a small amount of wall will need to be replaced. Doors and windows stick. Service pipes an fracture. Weathertightness often impaired	5–15 mm (or a number of cracks 3 mm or more in one group)	3
Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Window and door frames distort. Walls lean or bulge noticeably, some oss of bearing in beams. Service pipes disrupted	15–25 mm but also depends on number of cracks	4

Table Cz Classification of damage			
Description of typical damage	Approximate crack width limit in floor	Change in offset from a 3 m straight edge centred over defect (see Note 5)	Damage → category
Hairline cracks, insignificant movement of slab from level	<0.3 mm	<8 mm	0
Fine but noticeable cracks. Slab reasonably level	<1.0 mm	<10 mm	
Distinct cracks. Slab noticeably curved or changed in level	<2.0 mm	<15 mm	2
Wide cracks. Obvious curvature or change in level	2-4 mm	15–25 mm	3
Gaps in slab. Disturbing curvature or change in level	4–10 mm	>25 mm	4

Notes:

- 1 Crack width is the main factor by which damage to walls is categorised. The width may be supplemented by other factors, including serviceability, in assessing category of damage.
- 2 In assessing the degree of damage, account shall be taken of the location in the building or structure where it occurs, and also of the function of the building or structure.
- 3 Where the cracking occurs in easily repaired plasterboard or similar clad-framed partitions, the crack width limits may be increased by 50% for each damage category.
- 4 Local deviation of slope, from the horizontal or vertical, of more than 1/100 will normally be clearly visible. Overall deviations in excess of 1/150 are undesirable.
- 5 Account should be taken of the past history of damage in order to assess whether it is stable or likely to increase.
- 6 The straight edge is centred over the defect, usually, and supported at its ends by equal height spacers. The change in offset is then measured relative to this straight edge.

Appendix E Important Information about your Geotechnical Engineering Report



Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfil the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. And no one – not even you – should apply the report for any purpose or project except the one originally contemplated.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include : the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, *do not rely on a geotechnical engineering report* that was :

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical change that can erode the reliability of an existing geotechnical engineering report include those that affect :

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. Geotechnical Engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. Do not rely on a geotechnical engineering report whose adequacy may have been affected by : the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. Always contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions *only* at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgement to render an *opinion* about subsurface conditions throughout the site. Actual subsurface conditions may differ – sometimes significantly – from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgement and opinion. Geotechnical engineers can finalise their recommendations only by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for* the report's recommendations if that engineer does not perform construction observation.

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognise that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, but preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. Be sure contractors have sufficient time to perform additional study. Only

then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognise that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce such risks, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labelled "limitations", many of these provisions indicate where geotechnical engineers responsibilities begin and end, to help others recognise their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a geoenvironmental study differ significantly from those used to perform a geotechnical study. For that reason, a geotechnical engineering report does not usually relate anv geoenvironmental findings. conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Unanticipated environmental problems have led to numerous project failures. If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. Do not rely on an environmental report prepared for someone else.

Rely on Your Geotechnical Engineer for Additional Assistance

Membership in ASFE exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE member geotechnical engineer for more information.



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