Dear Alex,

Investigation of Subterranean Ground Conditions
112 Salmon Street, Port Melbourne

1. Introduction

Given the understanding of known landfilling in the Port Melbourne area, Douglas Partners Pty Ltd (DP) was engaged to undertake an investigation of subterranean ground conditions within a portion of a parcel of land located at 112 Salmon Street, Port Melbourne (hereinafter referred to as the ‘site’). The works were commissioned on 5 April 2018 by Lissa Gunnersen of Aquaino Pty Ltd and undertaken in general accordance with Douglas Partners’ email proposal dated 21 February 2018.

2. Background

DP previously prepared a Report on Preliminary Site Investigation for Contamination (PSI) for the site (project reference: 79525.00.R.001.Rev.0), in October 2016. The objective of the PSI was to assess the potential for contamination from on and off-site sources based on the past and present land uses and to provide advice regarding the level of investigation required with reference to the Department of Sustainability and Environment (DSE) General Practice Note – Potentially Contaminated Land (2005). The scope of the PSI included a review of various desktop sources of information augmented with a detailed site inspection. The site history review and detailed site inspection suggested that the site and surrounding area was historically a flood plain, as well as being used as a sand quarry, and may have been filled using imported soils, including overburden from construction of the Coode Canal. Other potential contamination sources were identified at the site and these are presented in the PSI (DP 2016).

It is well known that sand extraction (mining) was historically undertaken in Port Melbourne and historical photographs examined as part of the PSI indicated that a portion of a pond was located along the eastern boundary of the site. The pond was considered by DP to be possibly associated with historic sand mining activities and has subsequently been back-filled and built on.
3. **Objective**

The objective of this assessment was to establish whether the property located at 112 Salmon Street had historically been encroached-on by a landfill or tip.

4. **Scope of Works**

To achieve the stated objective, the following scope of work was undertaken:
- Drilling of ten boreholes in the south eastern portion of the site;
- Collection of soil samples at nominated depths (note: no sample analysis was undertaken);
- Visual inspection and logging of ground conditions encountered; and
- Preparation of this report outlining the findings of the investigation.

5. **Site Identification and Topography**

The site is located at property address 112 Salmon Street, Port Melbourne. A site and location plan is presented in Drawing 1, attached. The site is bound by commercial/industrial buildings to the north, Salmon Street to the west, Woolboard Road to the south and Thackeray Road to the east. Beyond Woolboard Road is the Port Melbourne Industrial Estate which consists of commercial offices and warehouses while commercial offices exist beyond Thackeray Road.

The site topography and surrounding natural landform is generally flat with a very gentle slope downwards in an easterly direction.

6. **Geology**

According to the Geological Survey of Victoria’s 1:31 680 scale Melbourne and Suburbs sheet, the site is expected to be underlain by Quaternary Age alluvial flats, mud flats, beach and estuarine deposits and typically comprises Port Melbourne Sands overlying Coode Island Silt.

7. **Field Work Observations**

Ten boreholes (BH1 to BH10) were drilled in the south eastern portion of the site on 12, 13 and 19 April 2018 using rigs provided by Apex Drilling Pty Ltd. Seven of the boreholes were located along the southern and eastern site boundaries and three were located further inwards of the site boundaries for comparison purposes. Bore locations are presented on Drawing No. 2, copy attached. The boreholes were drilled to a maximum depth of 7.0 m below ground level (bgl) and logged by an experienced environmental scientist from DP.
Ground conditions generally comprised filling overlying natural soil. An asphalt and crushed rock surface was present at four locations and a concrete slab was present at three locations.

The filling was variable in depth and composition being recorded as 3.7 m deep in BH7 and up to 5.5 m deep in boreholes BH3 and BH4. The filling comprised varying quantities of black to dark brown silty sand, brown and dark grey clayey sand, dark grey/brown sandy silt, pale brown, orange brown and grey silty clay, grey brown gravelly silt, dark brown to grey clayey silt and brown and red gravelly sand.

Natural soil comprised grey silty sand, described as fine grained sand with some shell fragments.

Inclusions were observed in the filling. These were generally of trace (very low) proportions and included fragments of glass, concrete, plastic (Perspex) metal, slate, brick and timber, pieces of metal wire, nails, fabric and clinker and clinker gravel.

A strong hydrocarbon odour was noted at 2.3 – 2.4 m depth in BH7.

A copy of the borehole logs showing the logged ground conditions are attached to this letter.

8. Conclusions

Based on the information collected during this investigation, it would appear that the site has been filled, probably to create a platform prior to site development. This was a common practice in many areas of inner suburban Melbourne and the sources of filling can be numerous, widespread and of variable composition and quality.

Furthermore, the findings made during the investigation and the observed ratio of soil volume to the inclusions suggest that the site is not situated on a landfill or tip.

Regarding the future development of the site, the recommendations presented in the DP PSI (DP 2016) are still considered relevant and should be implemented as and when deemed necessary.

9. References

- Department of Sustainability and Environment (2005), Potentially Contaminated Land General Practice Note, June 2005.
10. Limitations

Douglas Partners (DP) has prepared this letter report for this project at 112 Salmon Street in accordance with DP’s proposal dated 21 February 2018 and acceptance received from Lissa Gunnersen of Aquaino Pty Ltd dated 5 April 2018. The work was carried out under DP’s Conditions of Engagement. This report is provided for the exclusive use of Aquaino P/L for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP’s field testing has been completed.

DP’s advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the environmental components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.
Please contact the undersigned if you have any questions on this matter.

Yours faithfully,
Douglas Partners Pty Ltd

Glyn Eade
Senior Environmental Scientist

Attachments: About this Report
Soil Descriptions
Symbols and Abbreviations
Drawing 1 – Site Location Plan
Drawing 2 – Borehole Location Plan
Borehole Logs

Cc Lissa Gunnersen
lagunnersen@gunnersen.com.au

Reviewed by
Dean Woods
Senior Associate
Introduction
These notes have been provided to amplify DP’s report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP’s reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

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This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs
The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater
Where groundwater levels are measured in boreholes there are several potential problems, namely:

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports
The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.
About this Report

Site Anomalies
In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes
Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection
The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.
### Soil Descriptions

**Description and Classification Methods**

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726-1993, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

**Soil Types**

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

<table>
<thead>
<tr>
<th>Type</th>
<th>Particle size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boulder</td>
<td>&gt;200</td>
</tr>
<tr>
<td>Cobble</td>
<td>63 - 200</td>
</tr>
<tr>
<td>Gravel</td>
<td>2.36 - 63</td>
</tr>
<tr>
<td>Sand</td>
<td>0.075 - 2.36</td>
</tr>
<tr>
<td>Silt</td>
<td>0.002 - 0.075</td>
</tr>
<tr>
<td>Clay</td>
<td>&lt;0.002</td>
</tr>
</tbody>
</table>

The sand and gravel sizes can be further subdivided as follows:

<table>
<thead>
<tr>
<th>Type</th>
<th>Particle size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse gravel</td>
<td>20 - 63</td>
</tr>
<tr>
<td>Medium gravel</td>
<td>6 - 20</td>
</tr>
<tr>
<td>Fine gravel</td>
<td>2.36 - 6</td>
</tr>
<tr>
<td>Coarse sand</td>
<td>0.6 - 2.36</td>
</tr>
<tr>
<td>Medium sand</td>
<td>0.2 - 0.6</td>
</tr>
<tr>
<td>Fine sand</td>
<td>0.075 - 0.2</td>
</tr>
</tbody>
</table>

The proportions of secondary constituents of soils are described as:

<table>
<thead>
<tr>
<th>Term</th>
<th>Proportion</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>And</td>
<td>Specify</td>
<td>Clay (60%) and Sand (40%)</td>
</tr>
<tr>
<td>Adjective</td>
<td>20 - 35%</td>
<td>Sandy Clay</td>
</tr>
<tr>
<td>Slighty</td>
<td>12 - 20%</td>
<td>Slighty Sandy Clay</td>
</tr>
<tr>
<td>With some</td>
<td>5 - 12%</td>
<td>Clay with some sand</td>
</tr>
<tr>
<td>With a trace of</td>
<td>0 - 5%</td>
<td>Clay with a trace of sand</td>
</tr>
</tbody>
</table>

**Definitions of grading terms used are:**

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

**Cohesive Soils**

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Abbreviation</th>
<th>Undrained shear strength (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very soft</td>
<td>vs</td>
<td>&lt;12</td>
</tr>
<tr>
<td>Soft</td>
<td>s</td>
<td>12 - 25</td>
</tr>
<tr>
<td>Firm</td>
<td>f</td>
<td>25 - 50</td>
</tr>
<tr>
<td>Stiff</td>
<td>st</td>
<td>50 - 100</td>
</tr>
<tr>
<td>Very stiff</td>
<td>vst</td>
<td>100 - 200</td>
</tr>
<tr>
<td>Hard</td>
<td>h</td>
<td>&gt;200</td>
</tr>
</tbody>
</table>

**Cohesionless Soils**

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

<table>
<thead>
<tr>
<th>Relative Density</th>
<th>Abbreviation</th>
<th>SPT N value</th>
<th>CPT qc value (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very loose</td>
<td>vl</td>
<td>&lt;4</td>
<td>&lt;2</td>
</tr>
<tr>
<td>Loose</td>
<td>l</td>
<td>4 - 10</td>
<td>2 - 5</td>
</tr>
<tr>
<td>Medium dense</td>
<td>md</td>
<td>10 - 30</td>
<td>5 - 15</td>
</tr>
<tr>
<td>Dense</td>
<td>d</td>
<td>30 - 50</td>
<td>15 - 25</td>
</tr>
<tr>
<td>Very dense</td>
<td>vd</td>
<td>&gt;50</td>
<td>&gt;25</td>
</tr>
</tbody>
</table>
Soil Origin
It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slope wash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.
## Introduction
These notes summarise abbreviations commonly used on borehole logs and test pit reports.

## Drilling or Excavation Methods
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Core drilling</td>
</tr>
<tr>
<td>R</td>
<td>Rotary drilling</td>
</tr>
<tr>
<td>SFA</td>
<td>Spiral flight augers</td>
</tr>
<tr>
<td>NMLC</td>
<td>Diamond core - 52 mm dia</td>
</tr>
<tr>
<td>NQ</td>
<td>Diamond core - 47 mm dia</td>
</tr>
<tr>
<td>HQ</td>
<td>Diamond core - 63 mm dia</td>
</tr>
<tr>
<td>PQ</td>
<td>Diamond core - 81 mm dia</td>
</tr>
</tbody>
</table>

## Water
- Water seep: ▲
- Water level: ▼

## Sampling and Testing
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Auger sample</td>
</tr>
<tr>
<td>B</td>
<td>Bulk sample</td>
</tr>
<tr>
<td>D</td>
<td>Disturbed sample</td>
</tr>
<tr>
<td>E</td>
<td>Environmental sample</td>
</tr>
<tr>
<td>U₅₀</td>
<td>Undisturbed tube sample (50mm)</td>
</tr>
<tr>
<td>W</td>
<td>Water sample</td>
</tr>
<tr>
<td>pp</td>
<td>Pocket penetrometer (kPa)</td>
</tr>
<tr>
<td>PID</td>
<td>Photo ionisation detector</td>
</tr>
<tr>
<td>PL</td>
<td>Point load strength Is(50) MPa</td>
</tr>
<tr>
<td>S</td>
<td>Standard Penetration Test</td>
</tr>
<tr>
<td>V</td>
<td>Shear vane (kPa)</td>
</tr>
</tbody>
</table>

## Description of Defects in Rock
The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

### Defect Type
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Bedding plane</td>
</tr>
<tr>
<td>Cs</td>
<td>Clay seam</td>
</tr>
<tr>
<td>Cv</td>
<td>Cleavage</td>
</tr>
<tr>
<td>Cz</td>
<td>Crushed zone</td>
</tr>
<tr>
<td>Ds</td>
<td>Decomposed seam</td>
</tr>
<tr>
<td>F</td>
<td>Fault</td>
</tr>
<tr>
<td>J</td>
<td>Joint</td>
</tr>
<tr>
<td>Lam</td>
<td>Lamination</td>
</tr>
<tr>
<td>Pt</td>
<td>Parting</td>
</tr>
<tr>
<td>Sz</td>
<td>Sheared Zone</td>
</tr>
<tr>
<td>V</td>
<td>Vein</td>
</tr>
</tbody>
</table>

### Orientation
The inclination of defects is always measured from the perpendicular to the core axis.
- h: horizontal
- v: vertical
- sh: sub-horizontal
- sv: sub-vertical

### Coating or Infilling Term
- cln: clean
- co: coating
- he: healed
- inf: infilled
- stn: stained
- ti: tight
- vn: veneer

### Coating Descriptor
- ca: calcite
- cbs: carbonaceous
- cly: clay
- fe: iron oxide
- mn: manganese
- slt: silty

### Shape
- cu: curved
- ir: irregular
- pl: planar
- st: stepped
- un: undulating

### Roughness
- po: polished
- ro: rough
- sl: slickensided
- sm: smooth
- vr: very rough

### Other
- fg: fragmented
- bnd: band
- qtz: quartz
## Symbols & Abbreviations

### Graphic Symbols for Soil and Rock

#### General
- Asphalt
- Road base
- Concrete
- Filling

#### Soils
- Topsoil
- Peat
- Clay
- Silty clay
- Sandy clay
- Gravelly clay
- Shaly clay
- Silt
- Clayey silt
- Sandy silt
- Sand
- Clayey sand
- Silty sand
- Gravel
- Sandy gravel
- Cobbles, boulders
- Talus

#### Sedimentary Rocks
- Boulder conglomerate
- Conglomerate
- Conglomeratic sandstone
- Sandstone
- Siltstone
- Laminate
- Mudstone, claystone, shale
- Coal
- Limestone

#### Metamorphic Rocks
- Slate, phyllite, schist
- Gneiss
- Quartzite

#### Igneous Rocks
- Granite
- Dolerite, basalt, andesite
- Dacite, epidote
- Tuff, breccia
- Porphyry
Site Location Plan
Investigation of Subterranean Ground Conditions
112 Salmon Street, Port Melbourne

CLIENT: Aquaino Pty Ltd

PROJECT: 79525.01

DWG No: 1

REV: 0

DATE: 2-May-18
Asphalt.

Crushed Rock.

FILLING / SANDY SILT: Dark grey, fine grained sand, trace fine to medium grained angular basalt gravel, M<Wp, humid.

FILLING / SILTY CLAY: Firm, orange brown, black, fine to medium grained sand, trace fine to medium grained angular basalt gravel, trace metal and timber fragments, M>Wp.

FILLING / SILTY SAND: Black, fine to coarse grained sand, some fine to medium grained sandstone gravel, trace timber and red brick fragments, damp.

Dark grey, some clay below 2 m.

SILTY SAND (SM): Medium dense, grey, fine grained sand, some shell fragments, saturated.

Bore discontinued at 6.0m

---

**Borehole Log**

**CLIENT:** Aquaino Pty Ltd

**PROJECT:** Investigation of Subterranean Ground Conditions

**LOCATION:** 112 Salmon Street, Port Melbourne

**SURFACE LEVEL:** --

**EASTING:** 317425

**NORTHING:** 5611126

**DATE:** 12/4/2018

**BORE No:** BH 1

**PROJECT No:** 79525.01

**DIP/AZIMUTH:** 90°/--

**SHEET 1 OF 1**

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description of Strata</th>
<th>Sampling &amp; In Situ Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>Asphalt.</td>
<td></td>
</tr>
<tr>
<td>0.3</td>
<td>Crushed Rock.</td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td>FILLING / SANDY SILT: Dark grey, fine grained sand, trace fine to medium grained angular basalt gravel, M&lt;Wp, humid.</td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td>FILLING / SILTY CLAY: Firm, orange brown, black, fine to medium grained sand, trace fine to medium grained angular basalt gravel, trace metal and timber fragments, M&gt;Wp.</td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>FILLING / CLAYEY SAND: Dark grey, fine grain sand, trace fine to coarse grain sand, fine grain red brick gravel, trace ceramic fragments, damp.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dark grey, some clay below 2 m.</td>
<td></td>
</tr>
<tr>
<td>4.5</td>
<td>SILTY SAND (SM): Medium dense, grey, fine grained sand, some shell fragments, saturated.</td>
<td></td>
</tr>
<tr>
<td>6.0</td>
<td>Bore discontinued at 6.0m</td>
<td></td>
</tr>
</tbody>
</table>

**SURVEY:**

**TYPE OF BORING:** Solid flight auger.

**WATER OBSERVATIONS:** Wet at 3.5 m.

**REMARKS:** Location coordinates are in WGS 84 Zone 55 H.
**BOREHOLE LOG**

**CLIENT:** Aquaino Pty Ltd  
**PROJECT:** Investigation of Subterranean Ground Conditions  
**LOCATION:** 112 Salmon Street, Port Melbourne  
**SURFACE LEVEL:** --  
**BORE No:** BH 2  
**EASTING:** 317431  
**NORTHING:** 5811104  
**DATE:** 12/4/2018  
**PROJECT No:** 79525.01  
**DIP/AZIMUTH:** 90°/--

**SURFACE LEVEL:** --  
**EASTING:** 317431  
**NORTHING:** 5811104  
**DATE:** 12/4/2018  
**PROJECT No:** 79525.01  
**DIP/AZIMUTH:** 90°/--

**Sampling & In Situ Testing**

**Results & Comments**

**Water**

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description of Strata</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>FILLING / CLAYEY SAND: Brown, fine to coarse grained sand, some fine to medium grained angular basalt gravel, M&lt;Wp.</td>
</tr>
<tr>
<td>1</td>
<td>FILLING / SANDY SILT: Dark grey, brown, fine grain sand, some clay, some fine to medium grain gravel, damp.</td>
</tr>
<tr>
<td>1.5</td>
<td>Trace medium grained pyroclastic gravel below 1.5 m.</td>
</tr>
<tr>
<td>2.0</td>
<td>FILLING / SILTY CLAY: Pale brown and grey, trace fine to coarse grained sand, M=Wp.</td>
</tr>
<tr>
<td>3</td>
<td>Dark brown and grey, some fine to coarse grained sand, M&gt;Wp below 3 m.</td>
</tr>
<tr>
<td>4</td>
<td>Slightly Sandy, M&gt;Wp, wet below 4 m. Pale grey brown and orange, trace fine grained sand, M&gt;Wp, moist below 4.2 m.</td>
</tr>
<tr>
<td>5</td>
<td>SILTY SAND (SM): Medium dense, grey, fine grained sand, some shell fragments, saturated.</td>
</tr>
<tr>
<td>6</td>
<td>Bore discontinued at 6.0m</td>
</tr>
</tbody>
</table>

**Sampling & In Situ Testing Legend**

- **A** Auger sample  
- **B** Bulk sample  
- **BLK** Block sample  
- **C** Core drilling  
- **D** Disturbed sample  
- **E** Environmental sample  
- **G** Gas sample  
- **P** Piston sample  
- **PLD** Photo ionisation detector (ppm)  
- **PLT** Point load test (kPa)  
- **PLD(D)** Point load diametral test (kPa)  
- **PP** Pocket penetrometer (kPa)  
- **S** Shear vane (kPa)  
- **W** Water sample  
- **W** Water level  
- **V** Standard penetration test

**REMUS:** Location coordinates are in WGS 84 Zone 55 H.

**RIG:** Custom 4WD  
**DRILLER:** Apex Drilling  
**LOGGED:** AP  
**CASING:** NA  

**REMARKS:**

- **TYPE OF BORING:** Solid flight auger.  
- **WATER OBSERVATIONS:** Wet below 4 m.
FILLING / GRAVELLY SILT: Pale grey brown, fine to medium grained angular basalt gravel, some fine to coarse grained sand, humid.

FILLING / CLAYEY SILT: Dark brown, some fine to medium grained angular basalt gravel, trace fine to coarse grained sand, trace glass fragments, M<Wp, damp.

FILLING / SANDY SILT: Brown, fine grained sand, trace medium grained angular basalt gravel, damp.

FILLING / SILTY SAND: Dark brown, fine to coarse grained sand, trace fine to medium grained basalt and sandstone gravel, trace clay, trace fabric and metal wire fragments, damp.

Some gravel and red brick fragments.

Trace sheet metal fragments below 3 m.

FILLING / CLAYEY SAND: Pale brown, fine to coarse grained sand, some fine to coarse grained red brick gravel, trace timber fragments, moist; M>Wp.

Trace glass and metal (nails) fragments below 5 m.

SILTY SAND (SM): Medium dense, grey, fine grained sand, some shell fragments saturated.

Bore discontinued at 7.0m.

---

SURFACE LEVEL: --

Bore No: BH 3

EASTING: 317435
NORTHING: 5811083
DATE: 13/4/2018

SHEET 1 OF 1

---

LOCATION: 112 Salmon Street, Port Melbourne

---

CLIENT: Aquaino Pty Ltd
PROJECT: Investigation of Subterranean Ground Conditions

---

LOGGED: AP
CASING: NA

---

RIG: Custom 4WD
DRILLER: Apex Drilling

---

TYPE OF BORING: Solid flight auger.
WATER OBSERVATIONS: Wet at 4.3 m.
REMARKS: Location coordinates are in WGS 84 Zone 55 H.
### Sampling & In Situ Testing

<table>
<thead>
<tr>
<th>Well Construction Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TYPE OF BORING:</strong> Solid flight auger.</td>
</tr>
<tr>
<td><strong>WATER OBSERVATIONS:</strong> Wet below 4.5 m.</td>
</tr>
<tr>
<td><strong>REMARKS:</strong> Location coordinates are in WGS 84 Zone 55 H.</td>
</tr>
</tbody>
</table>

#### CLIENT:
Aquaino Pty Ltd

#### PROJECT:
Investigation of Subterranean Ground Conditions

#### LOCATION:
112 Salmon Street, Port Melbourne

#### SURFACE LEVEL:

#### EASTING:
317446

#### NORTHING:
5811055

#### DATE:
13/4/2018

#### BORNE No:
BH 4

#### PROJECT No:
79525.01

#### SHEET 1 OF 1

---

**Borehole Log**

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description of Strata</th>
<th>Sampling &amp; In Situ Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>FILLING / GRAVELLY SAND: Brown and red, fine to coarse grained sand, fine to coarse grained basalt and red brick gravel, trace plastic (perspex) fragments, damp.</td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td>FILLING / SILTY SAND: Brown, dark grey, fine grain sand, some medium grain red brick, clinkers and basalt gravel, damp. Band of quartz gravel at 1 m. Some clay below 1.5 m.</td>
<td></td>
</tr>
<tr>
<td>5.5</td>
<td>SILTY SAND (SM): Medium dense, grey, fine grained sand, some shell fragments, saturated.</td>
<td></td>
</tr>
<tr>
<td>6.0</td>
<td>Bore discontinued at 6.0m</td>
<td></td>
</tr>
</tbody>
</table>

---

**Sampling & In Situ Testing Legend**

- **A** Auger sample
- **B** Bulk sample
- **BLK** Block sample
- **C** Core drilling
- **D** Disturbed sample
- **E** Environmental sample
- **G** Gas sample
- **P** Piston sample
- **U** Tube sample (x mm dia.)
- **W** Water sample
- **S** Water seep
- **V** Water level
- **PLD** Point load diametral test (kPa)
- **PLA** Point load axial test (kPa)
- **PID** Photo ionisation detector (ppm)
- **SPT** Standard penetration test (kPa)
- **PP** Pocket penetrometer (kPa)
<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description of Strata</th>
<th>Graphic</th>
<th>Sampling &amp; In Situ Testing</th>
<th>Well Construction Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05</td>
<td>Asphalt</td>
<td>E</td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td>0.15</td>
<td>Crushed Rock</td>
<td>E</td>
<td>1.0</td>
<td>H5</td>
</tr>
<tr>
<td>0.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>FILLING: Intermittent bands of gravelly clay and fragments of slate &lt;70 mm.</td>
<td>E</td>
<td>1.7</td>
<td>H5</td>
</tr>
<tr>
<td>1.8</td>
<td>FILLING / GRAVELLY SAND: Brown, fine to coarse grain sand, fine to medium grain gravel, trace red brick, concrete, glass and metal fragments, damp.</td>
<td>E</td>
<td>1.8</td>
<td>H5</td>
</tr>
<tr>
<td></td>
<td>Band of bricks at 0.7 m</td>
<td>E</td>
<td>1.9</td>
<td>H5</td>
</tr>
<tr>
<td>2.5</td>
<td>Concrete boulders at 1.3 m</td>
<td>E</td>
<td>2.0</td>
<td>H5</td>
</tr>
<tr>
<td>3</td>
<td>Band of grey, pale brown fine grained sand from 1.6 to 1.8 m</td>
<td>E</td>
<td>3.7</td>
<td>H5</td>
</tr>
<tr>
<td></td>
<td>Trace charcoal and clay at 1.5 m</td>
<td>E</td>
<td>3.8</td>
<td>H5</td>
</tr>
<tr>
<td>3.8</td>
<td>FILLING / SILTY CLAY: Orange brown, trace fine grain sand, M&gt;Wp.</td>
<td>E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>FILLING / SILTY CLAY: Brown, some fine to medium grain sand, M=Wp.</td>
<td>E</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M&gt;Wp below 3.5 m.</td>
<td>E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.8</td>
<td>SILTY SAND (SM): Medium dense, grey, fine grained sand, some shell fragments, saturated.</td>
<td>E</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bore discontinued at 4.5m
**BOREHOLE LOG**

**CLIENT:** Aquaino Pty Ltd  
**PROJECT:** Investigation of Subterranean Ground Conditions  
**LOCATION:** 112 Salmon Street, Port Melbourne  
**SURFACE LEVEL:** --  
**BORE No:** BH 6  
**EASTING:** 317435  
**NORTHING:** 5811035  
**DATE:** 19/4/2018  
**PROJECT No:** 79525.01  
**DIP/AZIMUTH:** 90°/--  
**SHEET** 1 OF 1

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description of Strata</th>
<th>Sampling &amp; In Situ Testing</th>
<th>Results &amp; Comments</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>Asphalt.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.3</td>
<td>Crushed Rock.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>FILLING / GRAVELLY SAND: Brown, fine to coarse grain sand, fine to medium grain gravel, trace red brick, concrete, glass and metal fragments, damp.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Band of concrete gravel at 1.2 m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loosely compacted below 1.6 m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>Metal fragments at 2.5 m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Band of concrete cobbles at 3.1 m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wet below 3.2 m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.7</td>
<td>SILTY SAND (SM): Medium dense, grey, fine grain sand, some shell fragments, saturated.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.5</td>
<td>Bore discontinued at 5.5m</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Borehole Log Details**

- **Well Construction Details:**
  - **Well:** BH6
  - **Construction Details:**
    - **E**
    - **E**
    - **E**
    - **E**
    - **E**
    - **E**
    - **E**
    - **E**
    - **E**

**Sampling & In Situ Testing Legend:**

- A: Auger sample
- B: Bulk sample
- BLK: Block sample
- C: Core drilling
- D: Disturbed sample
- E: Environmental sample
- G: Gas sample
- PID: Photo ionisation detector (ppm)
- PLD: Point load diametral test (kPa)
- PL(A): Point load axial test (kN)
- S: Standard penetration test
- V: Shear vane (kPa)
- W: Water level

**Remarks:** Location coordinates are in WGS 84 Zone 55 H.

**RIG:** Custom 4WD  
**DRILLER:** Apex Drilling  
**LOGGED:** AP  
**CASING:** NA

**TYPE OF BORING:** Solid flight auger.

**WATER OBSERVATIONS:** Wet below 3.2 m.
Asphalt.
Crushed Rock.

FILLING / GRAVELLY SAND: Brown, fine to coarse grain sand, fine to medium grain gravel, trace red brick, concrete, glass and metal fragments, damp. Some slag / ash gravel below 0.8 m.

FILLING / SANDY SILTY CLAY: Brown and dark grey, fine to coarse grained sand, some fine grained siltstone gravels. Band of wet black sand, with strong hydrocarbon odour at 2.2 m.

FILLING / RIPPED SILTSTONE: M>Wp, weak hydrocarbon odour.

FILLING / SILTY CLAY: Grey, some fine grain sand, M>>Wp, weak hydrocarbon odour.

SILTY SAND (SM): Medium dense, grey, fine grain sand, some shell fragments, saturated.

Bore discontinued at 4.5 m.
Concrete slab.

**FILLING / Slightly CLAYEY SAND**: Black and brown, fine to coarse grained sand, trace fine to medium grained angular basalt gravel, damp.

**FILLING / SILTY SAND**: Dark brown, fine grained sand, damp.

Trace fine to medium grained red brick and sandstone gravel below 1 m.

Trace fine grained clinker gravel below 1.5 m.

Some orange brown clay, trace timber and concrete fragments below 2 m.

**SILTY SAND (SM)**: Medium dense, grey, fine grained sand, some shell fragments.

Bore discontinued at 6.0m

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**BORE No**: BH 8  
**PROJECT No**: 79525.01  
**DATE**: 13/4/2018  
**SURFACE LEVEL**: --  
**EASTING**: 317424  
**NORTHING**: 5611110  
**DIP/AZIMUTH**: 90°/--  
**SITE**: 112 Salmon Street, Port Melbourne  
**CLIENT**: Aquaino Pty Ltd  
**PROJECT**: Investigation of Subterranean Ground Conditions  
**LOGGED**: AP  
**CASING**: NA  
**RIG**: Custom 4WD  
**DRILLER**: Apex Drilling  

---

**TYPE OF BORING**: Solid flight auger.  
**WATER OBSERVATIONS**: No free groundwater observed.  
**REMARKS**: Location coordinates are in WGS 84 Zone 55 H.
### BOREHOLE LOG

**CLIENT:** Aquaino Pty Ltd  
**PROJECT:** Investigation of Subterranean Ground Conditions  
**LOCATION:** 112 Salmon Street, Port Melbourne  
**SURFACE LEVEL:** --

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description of Strata</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.24</td>
<td>Concrete slab.</td>
</tr>
<tr>
<td>0.5</td>
<td><strong>FILLING</strong>: Red brick sand and gravel, trace glass fragments, humid.</td>
</tr>
<tr>
<td>1.0</td>
<td><strong>FILLING / SILTY SAND</strong>: Grey, fine grained sand, trace fine to medium grain basalt gravel, damp.</td>
</tr>
<tr>
<td></td>
<td><strong>FILLING / CLAYEY SILT</strong>: Black, orange, brown and red, trace fine to coarse grained sand, fine grained gravel, ceramic and timber fragments, MWP.</td>
</tr>
<tr>
<td></td>
<td>Pale orange brown, some to medium grained basalt gravel, trace red brick fragments.</td>
</tr>
<tr>
<td>2.2</td>
<td>Orange brown and dark brown below 2 m.</td>
</tr>
<tr>
<td>3.0</td>
<td><strong>FILLING / CLAYEY SAND</strong>: Brown, fine to coarse grained sand, some fine to medium grained sandstone and red brick gravel, damp.</td>
</tr>
<tr>
<td></td>
<td>Wet below 3.5 m</td>
</tr>
<tr>
<td>4.5</td>
<td><strong>SILTY SAND (SM)</strong>: Medium dense, grey, fine grained sand, some shell fragments, saturated.</td>
</tr>
<tr>
<td>6.0</td>
<td>Bore discontinued at 6.0m</td>
</tr>
</tbody>
</table>

**Depth**

<table>
<thead>
<tr>
<th>RL</th>
<th>Water Depth</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.24</td>
<td>0.3</td>
<td>BHB 1</td>
</tr>
<tr>
<td>0.5</td>
<td>0.4</td>
<td>BHB 1</td>
</tr>
<tr>
<td>1.9</td>
<td>1.9</td>
<td>BHB 2</td>
</tr>
<tr>
<td>4.8</td>
<td>4.9</td>
<td>BHB 3</td>
</tr>
</tbody>
</table>

**Sampling & In Situ Testing**

- **A** Auger sample
- **G** Gas sample
- **E** Environmental sample
- **P** Piston sample
- **W** Water sample
- **PLA** Point load axial test (kN) (MPa)
- **PID** Photo ionisation detector (ppm)
- **PDP** Point load diametral test (kN) (MPa)
- **PLD** Point load diametral test (kN) (MPa)
- **PP** Pocket penetrometer (kPa)
- **V** Shear vane (kPa)

**Well Construction Details**

- **RIG:** Custom 4WD
- **DRILLER:** Apex Drilling
- **LOGGED:** AP
- **CASING:** NA

**TYPE OF BORING:** Solid flight auger.

**WATER OBSERVATIONS:** Wet at 3.5 m.

**REMARKS:** Location coordinates are in WGS 84 Zone 55 H.
Concrete.

FILLING / SILTY SAND: Dark brown, fine to coarse grained sand, some medium grained red brick and clinker gravel, damp.

Grey and brown, some fine to medium grain red brick gravel below 1 m.

Band of pale grey and pale brown Clayey Silt, M<Wp at 2 m.

Dark grey, some clay, trace metal and fabric at 3 m.

SILTY SAND (SM): Medium dense, grey, fine grained sand, some shell fragments.

Bore discontinued at 6.0m

### Sampling & In Situ Testing

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Description of Strata</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.22</td>
<td>Concrete.</td>
</tr>
<tr>
<td>1</td>
<td>FILLING / SILTY SAND: Dark brown, fine to coarse grained sand, some medium grained red brick and clinker gravel, damp.</td>
</tr>
<tr>
<td>1</td>
<td>Grey and brown, some fine to medium grain red brick gravel below 1 m.</td>
</tr>
<tr>
<td>2</td>
<td>Band of pale grey and pale brown Clayey Silt, M&lt;Wp at 2 m.</td>
</tr>
<tr>
<td>3</td>
<td>Dark grey, some clay, trace metal and fabric at 3 m.</td>
</tr>
<tr>
<td>5.0</td>
<td>SILTY SAND (SM): Medium dense, grey, fine grained sand, some shell fragments.</td>
</tr>
<tr>
<td>6.0</td>
<td>Bore discontinued at 6.0m</td>
</tr>
</tbody>
</table>

### Remarks

- Location coordinates are in WGS 84 Zone 55 H.
- No free groundwater observed.

### Sampling & In Situ Testing Legend

- A Auger sample
- B Bulk sample
- BLK Block sample
- C Core drilling
- D Disturbed sample
- E Environmental sample
- G Gas sample
- P Piston sample
- PLD Photo ionisation detector (ppm)
- U Tube sample (x mm dia.)
- W Water sample
- pp Pocket penetrometer (kPa)
- s Standard penetration test
- V Shear vane (kPa)