Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Preliminary Site Investigation with Limited Intrusive Sampling

Proposed Residential Subdivision
Menangle Park North, Menangle Park

Prepared for
Dahua Group Sydney Project 2 Pty Ltd

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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

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Executive Summary

Douglas Partners Pty Ltd (DP) was commissioned by Dahua Group Sydney Project 2 Pty Ltd, care of APP Corporation Pty Ltd to undertake a Preliminary Site Investigation with limited intrusive sampling ('PSI') for the proposed residential development of a parcel of land referred to as Menangle Park North, Menangle Park, NSW ('the site'). The works was carried out in accordance with DP's proposal MAC160099 dated 5 August 2016. The PSI is required to accompany Development Applications (DA) to Campbelltown City Council ('Council') for the proposed residential development of the site.

This PSI report has been completed with reference to NSW EPA guidelines under the Contaminated Land Management (CLM) Act 1997, NSW State Environmental Planning Policy No. 55 – *Remediation of Land* (SEPP 55) for a Preliminary Site Investigation and National Environment Protection Council *National Environment Protection (Assessment of Site Contamination) Measure*, 1999, as amended 2013 (NEPM, 2013). This report includes recommendations regarding the suitability of the site for the proposed development and the need for further work.

The objectives of the PSI are to 1) identify potential data gaps relating to the contamination status of the site through review of previous environmental assessments and desktop investigations; 2) undertake intrusive works sampling and analysis to address the identified data gaps; and 3) provide advice and recommendations so that an informed decision can be made on the remediation works required to render the site suitable, from a contamination standpoint, for the proposed residential development of the balance of the site.

All identified PAEC were further considered and key data gaps identified. A number of key PAEC were subject to intrusive soil and / or groundwater sampling and assessment as part of this PSI. A total of 115 test pits were completed at the site; soil samples were collected from 65 of the test pits and analysed for COPC and assessed against SAC. Based on the findings of the PSI, of the 25 PAECs identified at the site, a total of 21 AECs were identified as requiring additional investigation and / or remediation. DP recommends that targeted Supplementary Site Investigations (SSI) are carried out specific for the AECs. The SSI design should consider recommendations made in this report in order to further characterise identified AECs. Given the size of the site and to assist subdivision, ISSI reports should be prepared and delivered specific to AECs or development staging areas.

DP recommends AEC specific SSIs are carried out as follows:

- Coal wash material fill and stockpiles in Precincts 500 and 300 (AECs 1, 2, 4, 5 and 12);
- ACM impact and burial pits in the former fireworks factory (AECs 14, 17 and 18);
- Stockpiles and suspected filling (AECs 3, 4, 6, 8, 9, 11, 13 and 16);
- Farm shed (AEC 16); and
- Minor AECs (AECs 19, 20, and 21).

The potential for contamination constraints to the proposed development for the site excluding the AECs is considered by DP to be low, however there exists the potential for isolated pockets of contamination to be present in areas of the site that have not been directly subject to intrusive investigation as part of this PSI. To appropriately manage unexpected potential contamination issues encountered during development works, DP recommends the development and implementation of an Unexpected Finds Protocol prior to carrying out bulk earthworks at the site.

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1. Introduction

Douglas Partners Pty Ltd (DP) was commissioned by Dahua Group Sydney Project 2 Pty Ltd (Dahua), care of APP Corporation Pty Ltd (APP) to undertake a Preliminary Site Investigation with limited intrusive sampling ('PSI') for the proposed residential development of a parcel of land referred to as Menangle Park North, Menangle Park, NSW ('the site'). The works was carried out in accordance with DP's proposal MAC160099 dated 5 August 2016. The PSI is required to accompany Development Applications (DA) to Campbelltown City Council ('Council') for the proposed residential development of the site.

Land to the south of the site (Menangle Park South) is subject to a separate DA for residential development purposes and is therefore the subject of a separate PSI (DP Project 76744.04).

This PSI was conducted concurrently with geotechnical and salinity investigations which have been reported separately under DP Project 76744.02 and 76744.03 respectively. This PSI report has been completed with reference to NSW EPA guidelines under the Contaminated Land Management (CLM) Act 1997, NSW State Environmental Planning Policy No. 55 – *Remediation of Land* (SEPP 55) for a Preliminary Site Investigation and National Environment Protection Council *National Environment Protection (Assessment of Site Contamination) Measure*, 1999, as amended 2013 (NEPM, 2013). This report includes recommendations regarding the suitability of the site for the proposed development and the need for further work.

1.1 Objectives

The objectives of the PSI are as follows:

- Identify potential data gaps relating to the contamination status of the site through review of previous environmental assessments and desktop investigations;
- Undertake intrusive works sampling and analysis to address the identified data gaps; and
- Provide advice and recommendations so that an informed decision can be made on the remediation works required to render the site suitable, from a contamination standpoint, for the proposed residential development of the balance of the site.

2. Scope of Works

The following scope of work was carried out:

- Detailed review of the following:

  - Site geology, hydrogeology and topography;
  - Current and historical aerial photographs available from NSW Land and Property Information (LPI);
  - EPA register search; and
  - Available historical reports and site plans.
- Detailed review of the following to identify any potential areas of environmental concern (PAEC) and possible data gaps:
  - Previous contamination reports and assessment data against NEPM (2013) criteria; and
  - Current and historical aerial photographs;
- A screening review of previous assessment data against current NEPM (2013) criteria;
- A detailed site walkover and mapping of PAEC;
- Complete a data gap assessment;
- Excavation of a total of 115 test pits across the balance of the site to a maximum depth of 2.5 m or 0.5 m into natural (or prior refusal). Of the 115 test pits, soil samples were collected from 65 test pits and analysed for contaminants of potential concern (COPC);
- Collection of representative soil samples from the test pits at regular depth intervals (i.e. 0 – 0.1 m and 0.4 – 0.5 m);
- Analysis of selected soil samples for the following COPC:
  - Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc);
  - Total recoverable hydrocarbons (TRH);
  - Benzene, toluene, ethyl benzene and xylene (BTEX);
  - Polycyclic aromatic hydrocarbons (PAH);
  - Phenols;
  - Organochlorine pesticides (OCP) and organophosphorus pesticides (OPP);
  - Polychlorinated biphenyls (PCB);
  - Asbestos;
  - Additional metals (aluminium, strontium, barium, iron and magnesium); and
  - Explosives.
- Laboratory analysis of fragments of potential asbestos containing materials (PACM) for asbestos identification;
- Field sampling and laboratory analysis in compliance with standard environmental protocols, including a Quality Assurance / Quality Control (QA/QC) plan consisting of approximately 10 % replicate sampling (intra-laboratory replicate samples); and
- Preparation of this report detailing the methodology and results of the investigation and assessment of the site's suitability for the proposed development.

3. Site Background

3.1 Site Identification

The site is irregular in shape with an approximate area of 393 hectares (ha) and lies within the Local Government Area (LGA) of Campbelltown City Council. For reporting purposes, the site has been divided into five areas (Precincts 100 to 500) which correspond to the proposed development precincts, as provided by APP. The precinct boundaries are presented on Drawing 1.

The site is currently registered as 22 separate lots, listed below and shown on Drawing 2:

Precinct 100

- Lot 32 on Deposited Plan (D.P.) 1105615;
- Lots 5 on D.P. 249530;
- Lots 12, 15 and 17 on D.P. 251335;
- Part Lots 8 and 9 on D.P. 249530 (the remaining extent of Lot 8 is located on Precinct 300); and
- Part Lot 2 on D.P. 737485 (the remaining extent of this lot is located on Precincts 200 and 300).

Precinct 200

- Part Lot 2 on D.P. 737485; and
- Lot 2, on D.P. 554242.

Precinct 300

- Lot 59 on D.P. 10718;
- Part Lot 8 on D.P. 249530;
- Part Lot 2 on D.P. 737485;
- Lot 11 on D.P. 584016;
- Lot 1 on D.P. 598067;
- Lot 1 on D.P. 1091474; and
- Lot 32 on D.P. 1101983.

Precinct 400

- Lot 1000 on D.P. 1219023;
- Lot 641 on D.P. 6000334; and
- Lot 1001 on D.P. 121 9028.

Precinct 500

- Lot D on D.P. 19853; and
- Lot X on D.P 378264.

The site layout and lot boundaries are shown on Drawing 1, Appendix A.

3.2 Site Description

The site is bound to the east by the Hume Highway, to the south by Menangle Road, to the south west by Racecourse Avenue, to the north west by the Nepean River and Glenlee Coal Processing Plant and to the north by the rail loop servicing the coal processing plant (Drawing 1, Appendix A). Camden Valley R.C. Model Flying Club is located in the north western portion of the site (Precinct 500).

The southern and north-eastern parts of the site comprise broad rolling hills with gentle to moderate slopes (3 - 15%) with some localised steeper slopes (up to 20%). These areas generally drain towards the central and western parts of the site which comprises a gently sloping to flat alluvial terrace (0 - 5%) adjacent to the Nepean River. Howes Creek, flows east (from approximate RL 90, relative to Australian height datum (AHD) through the alluvial terrace in the central part of the site towards the Nepean River (at approximate RL 68). There is an overall relief of approximately 60 m from the highest part of the site (at the top of the hill near BH2, approximate RL 126) to the Nepean River, the lowest part of the site.

At the time of the investigation, the site was mainly rural land covered with grass with localised areas of scattered to moderately dense trees. Much of the site is used for grazing land, primarily agistment of cattle and horses with numerous associated farm dams constructed across the site.

The site also has 2 coal seam gas wells (active at the time of the investigation) and associated gas gathering lines installed within the located along the middle of the eastern boundary. A further five wells are located within 50 m of the site boundary; two wells located directly next to the southern boundary of Precinct 500, and the remaining three located north of Precinct 500. The approximate location of the coal seam gas wells and associated gathering lines are presented on Drawing 1 (Appendix A). DP understands that the gas wells and gathering lines will be decommissioned prior to the development of the site.

Glenlee Estate is located between Precincts 100 and 500 but is not part of the site; DP understands that the estate is a registered heritage site and will therefore not be subject to development.

Key features of the site are presented in Drawing 1 (Appendix A).

Historical land-use has been dominated by rural activities since European settlement, including cattle and sheep grazing, dairy farming and crop cultivation. Industrial land-use occurs off site locally and includes coal processing, sand mining, and natural gas extraction. It is understood that a fireworks factory operated over one part of the site from 1956.

3.2.1 Current Zoning

The site is currently zoned under Campbelltown Local Environmental Plan (2015) as NU40 Non-Urban i.e. land that is in a rural or environmental zone and has an area of less than 40 hectares.

3.3 Regional Geology and Soil Landscapes

3.3.1 Geology

The site can be broadly divided into two geological units (Refer Figure 1, following page).

The rolling hills in the north-eastern and southern parts of the site are underlain by the Bringelly Shale of the Wianamatta Group of Triassic age (refer to the Geological Survey of New South Wales (1985), *Wollongong-Port Hacking Geological Map No. 137 Series Sheet, 1:100,000 Geological Sheet 9029-9129)*.
The flat-lying areas in the western portion of the site are dominated by Quaternary "low level" alluvial deposits of the Nepean River Valley. Tertiary "high level" alluvial deposits are preserved in the central part of the site.

The Bringelly Shale, which in the vicinity of the site includes an unnamed, fine to medium grained quartz-lithic sandstone member, typically comprises shale, carbonaceous claystone, laminite and some minor coaly bands which weather to form clays of high plasticity.

The Bringelly Shale is overlain by the Minchinbury Sandstone which is in turn overlain by the Ashfield Shales which can be found further south of the site. Typically 1.5 – 3.5 m in thickness, the Minchinbury Sandstone is a fine to medium-grained quartz lithic sandstone which is light grey when fresh, typically weathering to brown. The results of the borehole drilling suggest that the Minchinbury Sandstone was encountered within the upper ridgelines at the north-eastern end of the site.

Quaternary alluvial deposits of the Nepean River are mainly derived from weathering of Permian and Triassic bedrock and comprise typically grey-brown, medium grained quartz sand with layers of silt and humic clay. Charcoal particles are abundant in some horizons. The Tertiary high level alluvial deposits are preserved as a valley-fill at an elevation of between RL 80 and RL 100, overlying weathered shales of the Wianamatta Group. In the Menangle Park area, the deposits were (at least in part) the result of aeolian and alluvial deposition and comprise white to orange/brown sand and clayey sand.

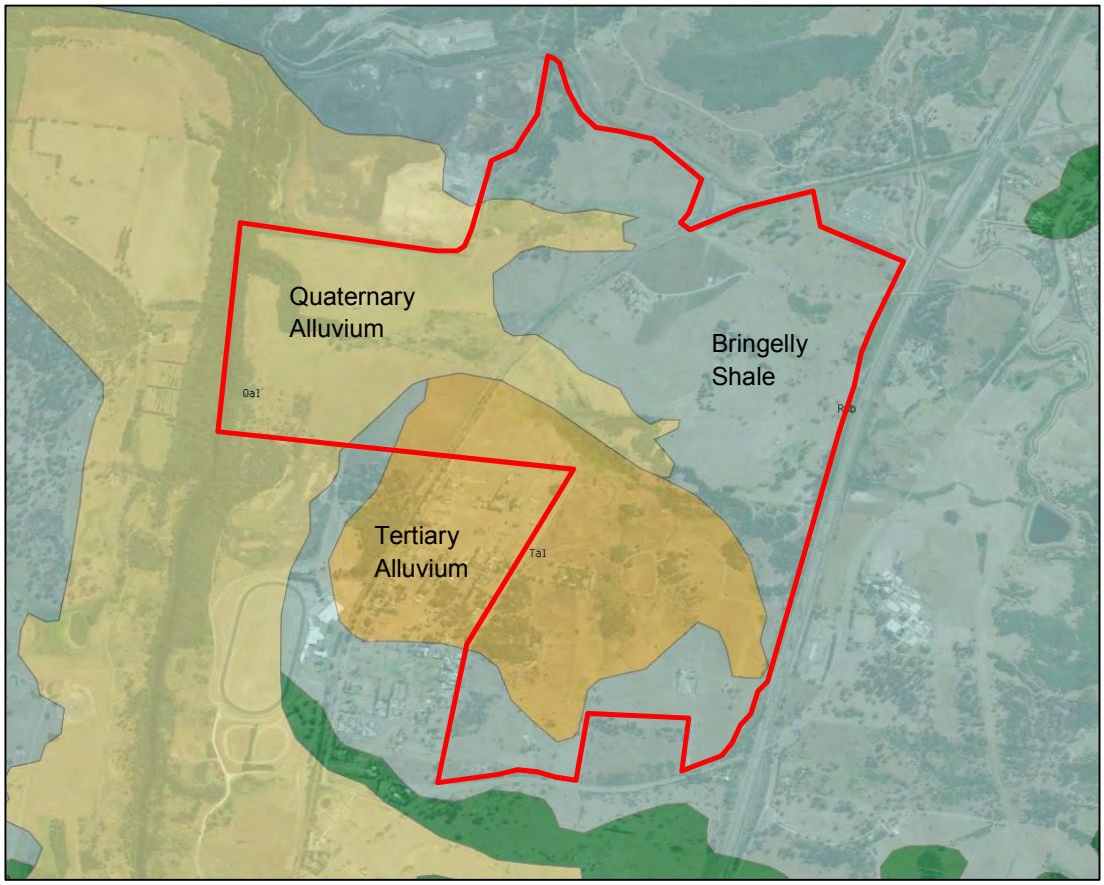


Figure 1 – Geology Mapping

3.3.2 Soil Landscapes

Soil landscapes over the site generally reflect the underlying geology and topography. With reference to the Soil Conservation Service of NSW (1990) *Soil Landscapes of the Wollongong-Port Hacking 1:100,000 Sheet,* the site is broadly divided into two distinct soil landscapes: the Blacktown residual soil present in the north, south and east portions of the site and the Theresa Park alluvial soil present in the central and western portions of the site. The two soil landscapes are further described below:

The Blacktown Soil Landscape is a residual soil group associated with the gently undulating slopes and broad rounded crests and ridges on the Wianamatta Group in the eastern part of the site. The unit comprises up to four soil horizons that range from shallow red-brown hard-setting sandy clay soils on crests and upper slopes to deep brown to yellow sand and clay soils overlying grey plastic mottled clay on mid- to lower slopes. These soils are typically of low fertility, are moderately reactive and have a generally low wet bearing strength.

The Theresa Park Soil Landscape is an alluvial unit associated with Tertiary and Quaternary flood plains and terraces of the Nepean River. Soil types include brown sandy loam, reddish-brown sandy clay, and light clay. Fluvial bedding is sometimes evident, and their sand-rich nature is reflected in typically higher permeability and low available water holding capacity. Development limitations of

these soils include: seasonal and localised permanent waterlogging, erosion hazards, localised flood hazards, hardsetting surfaces and are generally of low fertility.

The approximate extents of the soil landscapes are shown in Figure 2 (following page) however there were discrepancies between the results of the subsurface investigation and the map shown. The actual extents of the Theresa Park Soil Landscape more closely resemble the extents of the alluvium shown on the geological map in Figure 1 (below).

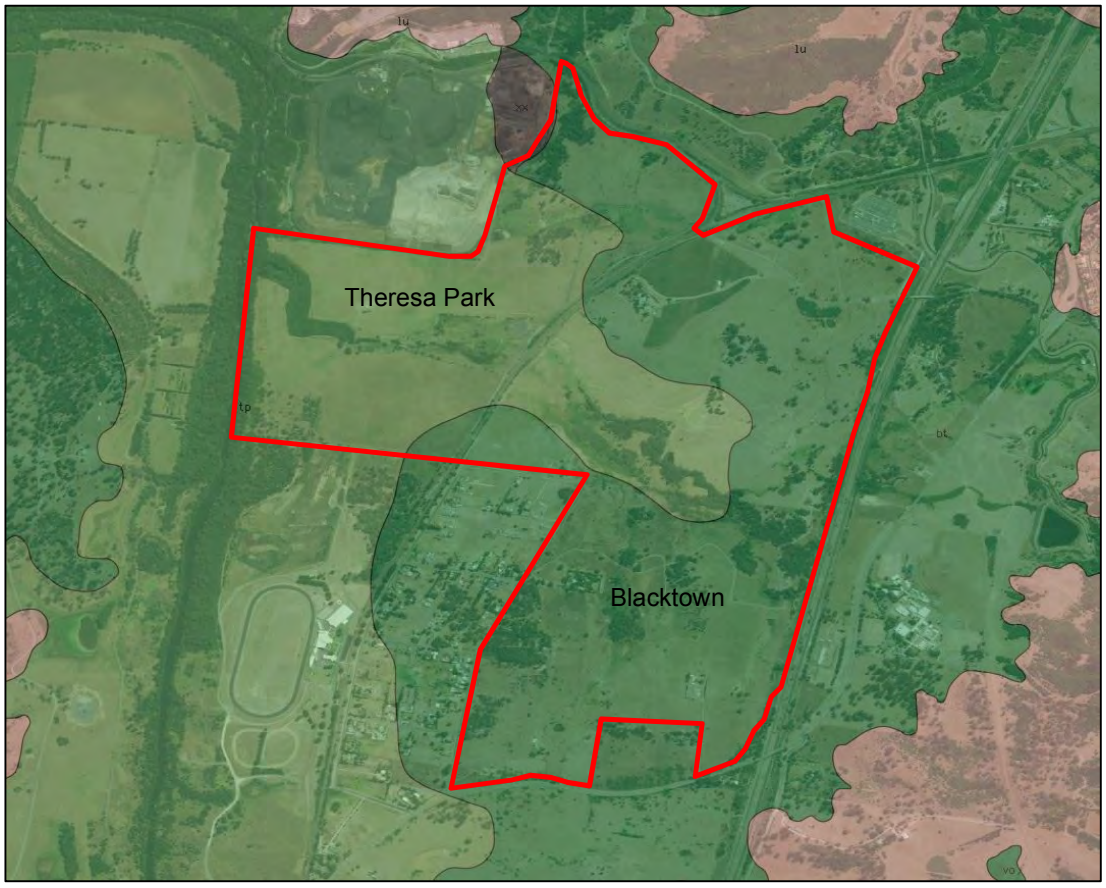


Figure 2 – Soil landscapes

3.4 Groundwater

A groundwater investigation was undertaken in the Camden South area adjacent to the Menangle Park site, which has a similar hydrogeological setting (AWT, 2001; as referenced in DP, 2004 and discussed in Section 3.6). The study indicated that there were two distinct groundwater settings in that area:

1) Groundwater within Wianamatta Group shale; and

2) Groundwater within unconsolidated Quaternary deposits of the Nepean River flood plain.

Groundwater flow in unconsolidated Quaternary deposits is likely to be by porous flow in sandy horizons. Shales of the Wianamatta Group on the other hand have a very low intrinsic permeability, and groundwater flow is likely to be dominated by fracture flow.

A 2013 investigation and subsequent report completed by DLA Environmental Pty Ltd (DLA 2013; refer to Section 3.6) comprised the installation of six groundwater monitoring bores (MW1 – MW6). Five of these bores were located on site by DP and dipped to determine Standing Water Levels (SWL). In summary, the SWL for MW1 – MW5 were in the range 1.1 – 3.2 m bgl.

A search of groundwater bore data through the Department of Infrastructure Planning and natural Resources (DIPNR) shows 35 registered bores within a 5 km radius of Menangle Park, two of which lie in close proximity to the Menangle Park North Site. Bore = GW101106 is located within the Glenlee Olive Grove property (not included in this investigation), and bore GW109315 is located immediately west of Cummins Road (the south western boundary of the site). The drill logs for these bores are summarised below:

- GW101106 encountered a residual soil profile to a depth of 5 m overlying shale and sandstone bedrock to a termination depth of 280 m with a SWL of 14 – 17 m below ground level (bgl).
- GW109315 encountered alluvial silty sand and sand to the termination depth of 3 m with a standing water level of 0.6 m recorded.

Historical accounts of the farmland area south of Menangle Road formally occupied by Thomas Vardy (in the mid-1800s) refer to several springs in that area. The springs are likely due to shallow groundwater discharge from above a low permeability shale or sandstone unit towards the top of the Ashfield Shale.

3.5 Hydrology

Howes Creek flows east through the alluvial terrace in the central part of the site towards the Nepean River. The Nepean River runs parallel with the north western site boundary, towards the north. Farm dams are located throughout the site.

3.6 Previous Investigations

The site has been subject to the following previous investigations of relevance to this investigation:

- BC Furr Environmental Services (BCFES) *Draft Remedial Action Plan – 59 Cummins Road, Menangle Park.* Ref. 01094, Rev 4, dated 25 August 2003 (BCFES, 2003)
- DP *Report on Land Capability Study, The Menangle Park Urban Release Area, Menangle Park*, Project 36500, August 2004 (DP, 2004)
- DP *Report on Review of Land Capability Study, Menangle Park Urban Release Area, Menangle Park*, Project 36500.2, 8 December 2009 (DP, 2011)
- DLA Environmental (DLA) *Menangle Park Release Area, Precinct 200 – Stage One Preliminary Environmental Site Assessment*. Reference R01 dated June 2012 (DLA, 2012a)

- DLA, *Menangle Park Release Area, Howes Creek Detailed Environmental Site Assessment, Soil Salinity and Aggressivity Report*, Report R01 – June 2012 (DLA, 2012b)
- DLA, *Menangle Park Release Area, Howes Creek Remediation Action Plan*¸ Reference R00, dated June 2012 (DLA, 2012c)
- DLA, *Menangle Park Release Area, Precinct 200 and Precinct 300, Stage 2 Detailed Environmental Site Assessment, Soil Salinity and Aggressivity Report*, DL2847_S000505, Reference R02, dated October 2013 (DLA, 2013)
- DP, Letter report *Historical Reports Review and Data Gap Assessment, Menangle Park Urban Development Area, Menangle Park, NSW*, Project 76680.00-1 Draft, dated 19 June 2015; and
- JBS&G Urban Growth Menangle Park – *Review of Available Site Contamination Data*, Reference 50960-101,019, Rev 1, dated 7 July 2015 (JBS & G, 2015).

A summary of the above investigations are presented below.

- The former fireworks factory located on Precinct 300 has previously been subject to a DSI completed by HLA Envirosciences (not provided for review; referenced in BCFES, 2003) that identified three main areas of the site where waste, including ACM generated during operation of the factory site was buried. EM surveying completed prior to the BCFES (2003) report identified a further two burial pits located in the centre of the factory site. Surface waste, including bonded asbestos containing materials (ACM) was also recorded on the ground surface in several locations and the majority of ACM fragments were recorded in the vicinity of former building footprints to a depth of up to 0.2 m below the surface.
- A Land Capability Study was completed by DP to assess the suitability of the site and surrounding Menangle Park area for re-zoning and urban development from a contamination, salinity and geotechnical perspective. Several areas of the site were identified in the Land Capability Study as having a moderate potential for contamination:
  - Burial pits and surficial ACM located at the former fireworks factory (Precinct 300);
  - Former farm shed with ACM roofing (Precinct 500);
  - Agricultural land including the use of pesticides, fuels, ACM and potential for uncontrolled landfilling; and
  - Use of pindone bait on at least one lot along Cummins Road (Precinct 400);

  Test pits, soil sampling and analysis was completed as part of the Land Capability Study. Soil sampling locations are presented in Drawing 3 attached. Soil analytical results as presented in the Land Capability Study were visually screened against NEPC (2013) guideline values (refer to Section 11) as part of this PSI; all analytical results were below relevant human health and environmental guideline values for residential land use. The Land Capability Study concluded that, with the exception of the former farm shed located on Precinct 500 and the former fireworks factory, there was no evidence for significant widespread or diffuse contamination across the site. The LCS recommended further investigation was carried out including a PSI and additional soil / groundwater assessment where required;
- DLA prepared a Preliminary Environmental Site Assessment (PESA) for Precinct 200 (DLA, 2012a) including a review of analytical results from soil samples collected from Howes Creek and surrounding area. The PESA concluded that no significant sources of land contamination were identified.

- A Detailed Environmental Site Assessment (DESA) was subsequently completed by DLA (DLA, 2013) for Precinct 200 and Precinct 300 and was further discussed by JBS&G (2015). Key findings of the DESA are summarised below:
  - Three stockpiles were observed during the DESA and no ACM or other suspected contamination was observed on the surface of the stockpiles. Buried waste including household waste was observed in four locations; ACM was observed in three test pit locations completed in the burial pits. A loose 2 m length of ACM pipe with a single break was observed near Howes Creek. A rendered brick tank containing brick and general rubbish was also observed. According to JBS&G (2015), at least 500 m^3 of waste material is present in the burial pits;
  - Soil samples were collected from soil and stockpiles at the site, six groundwater monitoring wells and four surface water sampling locations in Howes Creek. Soil, groundwater and surface water samples were analysed for contaminants including metals, BTEX, TRH, pesticides, PAHs and PCBs. Based on a screen of concentrations against NEPC (2013) criteria, DP note the following exceedances:
    - Total chromium in sample S1 (150 mg/kg) exceeds the corresponding HIL for hexavalent chromium (100 mg/kg);
    - Copper in samples TP38-1 (710 mg/kg) and BP5-1 (170,000 mg/kg) exceeds the HIL (6,000 mg/kg) and EIL (210 mg/kg);
    - Lead in samples TP40-0.4 (450 mg/kg) and BP5-1 (330 mg/kg) exceeds the corresponding HIL (300 mg/kg);
    - Strontium (up to 9,700 mg/kg) in locations BP5, S2, TP38, TP39 and TP40 exceeds the corresponding criteria (refer to Section 11 for assessment criteria); and
    - Barium in TP38 (120,000 mg/kg) and TP40 (83,000 mg/kg) exceeds corresponding criteria for this element;
- Owing to the discovery of unknown chemicals, sparklers and discarded fireworks found buried in the eastern part of the former fireworks site, an “explosivity analysis” was carried out by DLA (2013) on seven samples collected from here. Samples were analysed for a range of explosives including HMX, RDX, tetryl, nitrobenzenes, nitrotoluenes and nitroglycerine. No explosives were reported above the LOR; and
- Groundwater sample analytical results recorded elevated concentrations of the following against NEPC (2013) criteria:
  - Aluminium in sample GW2 (68 mg/kg) exceeded the corresponding GIL (55 mg/kg);
  - Zinc in sample GW1, GW2 and GW5 (16, 24 and 19 mg/kg respectively) exceeded the corresponding GIL (8 mg/kg);
  - Manganese in GW4 (3,200 mg/L) exceeded the corresponding GIL (1,900 mg/L)
- Surface water sample analytical results complied with all relevant criteria;
- Elevated concentrations of metals such as barium, strontium and iron reported in soil samples collected from near Howes Creek and Lot 59 have been indicated by DP (2015) to be potentially associated with burial of fireworks manufacturing material; and
- A separate DESA completed by DLA for the Howes Creek area (DLA, 2012b) identified small stockpiles of soil and building waste as well as a 2 m length of ACM pipe. Based on laboratory

analytical results, no chemical contamination was identified in samples collected from the stockpiles, however remediation may be required for aesthetic purposes. The stockpiles do not appear to have been assessed for asbestos impact;

4. Site History

A site history review was undertaken to identify PAEC and COPC which may arise from previous land uses, the presence of demolished or partly demolished buildings, soil stockpiles, land filling, waste disposal and / or other potentially contaminating activities. The findings of the site history investigation are summarised in Sections 4.1 and 4.2 below.

4.1 Historical Aerial Photograph Review

Historical aerial photographs from 1956 – 1994 are provided in Drawings 4 – 7, Appendix A (in order). A summary of the key findings are presented below:

1956 - The aerial photograph for 1956 provided by NSW LPI only covers the western half of the site. The viewable portion of the site consists largely of cleared rural land with patches of vegetation. Numerous farm dams are located throughout the site. The land use appears to be agricultural, with several paddocks present. Racecourse Avenue can be seen adjacent to the south western part of the site. Towards the southern portion of the site (Precinct 300), there are two structures present, likely to be homesteads. Within the central portion of the site in the former fireworks site (Precinct 300) several small structures are visible which likely form part of the fireworks factory. A homestead is visible in the southern portion of Precinct 300. Part of Glenlee Estate can be seen immediately adjacent to the site. Two structures are visible in the western portion of Precinct 500.

1975 - Notable change has occurred within the south west portion of the site (Precincts 300 and 400) compared to 1956. The two structures observed in 1956 are still present. In addition a new structure / homestead has been constructed, as well as the development of several more structures further west (Precinct 400). Three horse training tracks can be seen in the south western part of Precinct 300. A house can be seen adjacent the Hume Motorway, just outside the eastern site boundary. South of the fireworks site, four new structures can be seen that are likely associated with the fireworks site. A homestead and associated gardens is visible in the south east portion of Precinct 300. A structure is observed in the northern portion of Precinct 100. Within the eastern portion of the site (Precinct 100), there now appears to be two houses and dirt roads. The remainder of the site appears much the same as in 1956.

1984 - The four structures previously observed south of the former fireworks site, and the structure adjacent the Hume Highway are no longer present. Some of the structures within the former fireworks site appear to be undergoing demolition. Structures associated with Camden Valley R.C. Model Flying Club (Precinct 500) are visible for the first time. Roads/tracks can be seen traversing the centre of Precinct 500, towards the flying club.

1994 – One of the structures within the southern portion of the site has been demolished. North west of the residential area, there appears to be scattered materials or ground disturbance. Within the

present day aero club area, one of the large structures has been demolished. A 'figure 8' like feature is visible in the eastern part of Precinct 500.

All dams observed in historical aerial photographs are currently present on site, i.e. based on the review of historical aerial photographs no historical dams appear to have been infilled.

2009 – 2016 – A review of recent aerial photographs available on Nearmap[1] was carried out and summarised below:

Structures previously visible in the south west portion of Precinct 400 are no longer visible. Several 'figure 8' like suspected ground disturbance features are visible in the eastern part of Precinct 500 in several aerial photographs, including September 2010 (Figure 3 below). These are located in the same area as observed in the 1994 aerial photograph. No structures were visible in this portion of the site in historical aerial photographs that were reviewed as part of this PSI.

Figure 3 – Several 'figure 8' like features visible in Precinct 500 (September 2010)

The construction of the coal seam gas well located in the south eastern corner of Precinct 100 appears to have commenced in approximately October 2011, as visible in Figure 4 below.

[1] http://www.nearmap.com.au/. Last accessed 2 December 2016.

Figure 4 – Construction of coal seam gas well (circled red) and associated gathering lines (red arrow) in south east corner of Precinct 100 (February 2011)

The construction of the coal seam gas well located in the north eastern part of Precinct 300 appears to have commenced in approximately September 2010, where the general area appears to have been cleared and is in use as a vehicle parking area and container and possibly a stockpile storage area.

Figure 5 – Construction of coal seam gas well in south east corner of Precinct 100 (October 2011)

Suspected washout of material between the coal processing plant and the north west part of Precinct 500 is visible in several Nearmap aerial photographs, including May 2015 (see Figure 6 below):

Figure 6 – Suspected washout of material (May 2015)

4.2 Statutory Notices and Licenses

A search of the NSW EPA website on 20 February 2017 indicated that:

- The site has not been included in the list of NSW contaminated sites notified to EPA;
- No notices or orders made under the *Contaminated Land Management* (CLM) Act 1997 have been issued for the site or adjacent properties; and
- No licences under Schedule 1 of the *Protection of the Environment Operations* (POEO) Act, 1997 have been issued for the site or adjacent properties.

5. Site Walkover

A site walkover was completed by DP on 24, 29 and 30 November 2016. Key observations made during the walkover are presented on Drawing 8 (Appendix A) and allocated a Mapping Reference Point (MRP) which are cross-referenced below. Photographs are provided in Appendix B.

- Several areas in the north west part of the site (Precinct 400) were covered with surface fill comprising dark grey / black fill (MRP 1) suspected to be coal wash material possibly sourced from the adjacent coal processing plant (photograph 1). Suspected coal wash material was also observed in a small creek located near the north west corner of the site (MRP 2) and stockpiled next to the north western site boundary (MRP 4).

- A total of two on site and five off site gas wells were observed across and near to the site (MRPs 3, 12, 27, 33, 38, 39 and 40; see photograph 2).
- Timber and corrugated steel were observed in part of Precinct 400, likely relics of a former structure (MRP 5; photograph 3).
- A roadbase stockpile was observed in the northern part of Precinct 100 (MRP 6).
- Several dams were observed across the site. The wall of one dam located in Precinct 400 (MRP 7) could not be closely inspected at the time of the walkover, therefore the material type could not be confirmed.
- Several "figure 8" like features visible on historical aerials (and discussed in Section 4.1) were closely inspected during the walkover (MRP 8); no suspected filling was observed, however a clear difference in vegetation type here indicates filling could possibly be present.
- Four coal wash stockpiles were observed on suspected coal wash filling next to Howes Creek in Precinct 500 (MRP 9).
- The railway embankment running between Precinct 400 and Precincts 100 and 200 (outside of the site boundary) contains fill, possibly including suspected coal wash material (MRP 10; photograph 4). The embankment is located outside of the site boundary and is therefore not likely to affect the proposed development of the site.
- Scattered brick fragments were observed in a tree covered area of Precinct 400, possibly from a former structure (MRP 11). No structure was evident here in the review of historical aerial photographs.
- Several stockpiles and loose unconsolidated material was observed in the north western part of Precinct 100, including loose railway ballast (MRP 13), topsoil, light brown gravelly clay, blue gravel, a loose concrete pipe, construction and demolition type material (MRP 14) and loose timber fence posts (MRP 17). The material was however removed prior to intrusive investigation works and may have been associated with construction works for the adjacent railway line.
- Three stock watering wells were observed on the northern part of Precinct 100 (MRPs 15 and 18).
- A dilapidated horse shelter constructed with brick and corrugated steel was observed in the northern part of Precinct 100 and was in use at the time of the walkover (MRP 16; photograph 6).
- A timber fenced power line was observed along the north eastern part of the site within the site boundary, running parallel with the railway embankment (MRP 19).
- A tree-covered storage area including scrap metal, old railway sleepers, corrugated steel and disused metal aviary containers was observed in the centre of Precinct 100 (MRP 20).
- A stockpile containing reworked natural material was observed in Precinct 100 (MRP 21). No suspected anthropogenic material was observed.
- A dam located in the south eastern part of Precinct 100 included a dam wall which was covered with vegetation at the time of the walkover and may potentially contain fill (MRP 22). A nearby scrap yard and residence contained old cars, horseboxes, small animal kennels, small plant and machinery and several intermediate bulk containers (IBCs) (MRP 23; photograph 7). The residence area includes two separate houses constructed with brick, timber and concrete tiles.
- Grass covered hummocky ground was visible next to Howes Creek including a small elongated mound (MRP 24) and several small isolated mounds (MRP 25).

- Several loose scattered tyres were visible on the ground surface in the south eastern part of Precinct 100 (MRP 26).
- Several stockpiles were visible next to and on the southern side of Howes Creek (MRP 28). As the stockpiles were covered with grass at the time of the walkover it was not possible to inspect the content of the stockpiles. A nearby concrete drainage pipe was observed covered with coal wash (MRP 29)
- A dam located near to Howes Creek (MRP 30) included a dam wall which was covered with vegetation at the time of the walkover and may potentially contain fill.
- Several isolated stockpiles were observed on the former fireworks site site (MRP 31) and ACM fragments were visible on the general ground surface (MRP 32), also within the former fireworks site. As much of the former fireworks site site was covered with grass at the time of the inspection, it was not possible to closely inspect the site surface for further ACM fragments.
- Several ACM pipes and fragments of asbestos were observed on Precinct 500 near to the Nepean River (MRP 34; photograph 8). Two large water tanks and metal sheeting were also noted in the vicinity of the area. An old shanty with disused electrical appliances was also observed (MRP 35; photograph 9).
- A grass covered stockpile containing suspected ACM pipes and concrete was observed in the southern portion of Precinct 300 (MRP 36; photograph 10).
- A stockpile containing reworked natural material was observed in the south east portion of Precinct 300 (MRP 37). No suspected anthropogenic material was observed.

Key observations from the site walkover are presented in Drawing 8.

6. Summary of Site Structures

Table 1 below details structures observed in recent and historical aerial photographs and during the site walkover.

Table 1: Summary of Current and Historical Site Structures

Precinct	Description	Identified From	Approx. Period Constructed	Approx. Period Demolished
100	Two houses	Historical aerial photograph	Prior to 1975	Current.
	Structure in northern portion	Historical aerial photographs	Prior to 1975	Current.
200	Structures likely associated with the former fireworks factory	Historical aerial photographs	Prior to 1975	Prior to 1984
300	Structures associated with the former fireworks factory	Historical aerial photographs, historical reporting	Prior to 1956	Demolition in progress during 1984
	Rendered brick tank	Historical reporting	Not known	Current.
	Two structures – likely homesteads	Historical aerial photographs	Prior to 1956	Current.

Precinct	Description	Identified From	Approx. Period Constructed	Approx. Period Demolished
	Homestead near to the centre	Historical aerial photographs	Prior to 1975	Current.
	Homestead in south western portion	Historical aerial photographs	Prior to 1956	Current.
400	Small structures	Historical aerial photographs	Prior to 1975	Between 1994 and 2009
500	Former farm shed	Historical reporting	Prior to 1956	Current.
	Structures associated with Camden Valley R.C. Model Flying Club	Historical aerial photographs	Prior to 1984	Current.

7. Potential Areas of Environmental Concern

Based on a review of site background information, site history, previous investigations and the site walkover a total of 25 PAECs have been identified as requiring further consideration. These identified PAEC are presented in Table 2 below and are presented on Drawing 10 (Appendix A).

Table 2: PAECs

Precinct	MRP	PAEC #	Description	Identified From
500	MRP 1, 2	1	Suspected coal wash filling on surface, in unnamed creek and in Howes Creek	Site walkover
500	MRP 4	2	Stockpiles containing suspected coal wash material	Historical reports, site walkover
500	MRP 7	3	Suspected filling in dam wall	Site walkover
500	MRP 8	4	Possible filling – 'figure 8' like feature	Historical aerial photographs
500	MRP 9	5	Four suspected coal wash stockpiles located on suspected coal wash filling, next to Howes Creek	Site walkover
100	MRP 14	6	Location of stockpiles of construction and demolition type materials	Site walkover
All	MRP 19	7	Timber power poles observed in Precinct 100 and likely present elsewhere on the site	Site walkover
100	MRP 20	8	Scrap yard / storage area	Site walkover
100	MRP 22	9	Possible filling in dam wall	Site walkover
100	MRP 23	10	Scrap yard	Site walkover
300	MRP 24	11	Possible filling	Site walkover

Precinct	MRP	PAEC #	Description	Identified From
300	MRP 25	12	Possible filling	Site walkover
300	MRP 28	13	Several stockpiles covered with grass that may contain anthropogenic materials	Historical reports, site walkover
300	MRP 29	14	Localised filling of suspected coal wash around concrete drainage pipe	Site walkover
300	MRP 31	15	Grass covered stockpiles	Site walkover
300	MRP 32	16	ACM impact on the site surface and shallow soil conditions on the former fireworks site.	Historical reports, site walkover
500	MRP 34	17	Former farm shed	Historical reports
300	MRP 36	18	Stockpile covered with grass and containing suspected ACM pipe	Site walkover
300	N/A	19	Burial pits on the former fireworks site.	Historical reports
300	N/A	20	Metal impact in groundwater	Historical reports
400	N/A	21	Use of pindone bait	Historical reports
500	MRP 32	22	ACM pipes and fragments on surface	Site walkover
All	N/A	23	Historical agricultural land use - potential use of pesticides, fuels, ACM containing materials and uncontrolled landfilling	Historical reports, site walkover
100, 300 and 500	MRP 3, 12, 27, 33, 38, 39 and 40	24	Gas wells and gathering line	Site drawings, site walkover
All	N/A	25	Asbestos pipe network – it is common for former agricultural and rural residential sites to have utilised asbestos pipes as part of their private infrastructure. No *in situ* pipes were observed during the walkover however it is not possible to inspect such a network unless uncovered during intrusive works	Historical knowledge

8. Data Gap Assessment

Based on the findings of the site history review and the detailed site walkover, data gaps in the current understanding of the contamination status of the site have been identified and are provided in Table 3 below.

Table 3: Data Gap Assessment Findings

PAEC	Description	Discussion and Recommended Works

1	Suspected coal wash was observed during the site walkover on the ground surface and in stockpiles in several locations in the north west of the site (Precinct 500). Recent aerial photographs on Nearmap indicate washout of suspected coal wash from the adjacent coal processing plant may have recently occurred.	Coal wash may have associated petroleum hydrocarbon and metal impact. As per the Client's request, the testing of suspected coal wash material was not included in the current scope of works. Recommendations for future investigation works are considered further in Section 14.
2		
3	Suspected filling was observed in the dam wall during the site walkover.	The site walkover identified possible foreign fill material (i.e. not reworked natural) in one dam wall at the site. As per the Client's request, the testing of the dam wall was not included in the current scope of works. Recommendations for future investigation works are considered further in Section 14.
4	Several "figure 8" like features visible on aerial photographs and during the walkover may contain filling – Precinct 400.	Test pits completed as part of this investigation were inspected for any possible fill materials.
5	Suspected coal wash was observed during the site walkover stockpiles located next to Howes Creek (Precinct 500).	Coal wash may have associated petroleum hydrocarbon and metal impact. As per the Client's request, detailed testing of suspected coal wash material was not included in the current scope of works. Recommendations for future investigation works are considered further in Section 14.
6	Stockpiles containing construction and demolition type materials.	Stockpiles containing construction and demolition type materials may potentially contain other COPC, including asbestos. As per the Client's request, limited stockpile testing was conducted as part of the PSI. Recommendations for additional testing are included in Section 14.
7	The contamination status associated with timber poles on site is currently not understood.	Historically, timber power lines have been treated using preservatives that can impact the underlying soils. Metal and hydrocarbon impacts are commonly associated with such treatments. The testing of soils associated with timber power poles has been considered further in Section 14 (future works).
8	The contamination status of soils associated with the scrap yard / lay down areas in Precinct 100 is currently not understood.	Limited targeted testing of soils in this portion of the site was completed as part of the PSI.
9	Suspected filling was observed in the dam wall during the site walkover.	The site walkover identified possible foreign fill material (i.e. not reworked natural) in one dam wall at the site. As per the Client's request, the testing of the dam wall was not included in the current scope of works. Recommendations for future investigation works are considered further in Section 14.
10	A scrap yard and storage area was observed during the site walkover. Machinery maintenance and storage occurred nearby.	The storage and maintenance of machinery may be a possible source of metal and hydrocarbon impact.
11	Possible filling was observed on the site surface however grass cover prevented closer inspection.	As per the Client's request, limited targeted testing was conducted as part of the PSI. Recommendations for additional testing are included in Section 14.
12	Possible filling was observed on the site surface however grass cover prevented closer inspection.	As per the Client's request, limited targeted testing was conducted as part of the PSI. Recommendations for additional testing are included in Section 14.

13	Several stockpiles were observed here where dense grass cover prevented closer inspection.	Test pits were completed in these stockpiles as part of this investigation.
14	Localised suspected coal wash material was observed surrounding a concrete pipe.	Coal wash may have associated petroleum hydrocarbon and metal impact. As per the Client's request, detailed testing of suspected coal wash material was not included in the current scope of works. Recommendations for future investigation works are considered further in Section 14.
15	Several stockpiles were observed here where dense grass cover prevented closer inspection.	As per the Client's request, limited targeted testing was conducted as part of the PSI. Recommendations for additional testing are included in Section 14.
16	The extent of ACM impact on the former fireworks site (Precinct 300) has not to date been appropriately delineated.	A review of previous investigation reports identified surface ACM impact in several locations at the former fireworks factory site. Surface ACM fragments were observed on the surface during the site walkover. Delineation of surface ACM will be required to inform future waste disposal and / or remediation requirements. Identified ACM impact will require remediation and validation as part of future stages of works (discussed in Section 14).
17	A farm shed containing ACM roofing was historically located on Precinct 500.	The farm shed was identified in previous investigation reports and historical aerial photographs. The area was identified based on historical aerial photographs and inspected and samples as part of this PSI.
18	Stockpile covered with grass preventing closer inspection however a suspected ACM pipe was visible on the stockpile surface at the time of the walkover.	Asbestos impact will require appropriate remediation and validation. As per the Client's request, limited stockpile testing was conducted as part of the PSI. Recommendations for additional testing are included in Section 14.
19	The extent of burial pits on the former fireworks site (Precinct 300) has not to date been appropriately delineated.	A review of previous investigation reports identified burial pits in several locations at the former fireworks factory site. Delineation of burial pits will be required to inform future waste disposal and / or remediation requirements. Burial pits will require remediation and validation as part of future stages of works (discussed in Section 14).
20	Metal impact in groundwater below the former fireworks site has not to date been delineated.	Additional groundwater data were collected from existing wells as part of this PSI.
21	Pindone bait may have historically been used in lots located in Precinct 400 to control rabbit populations.	Pindone bait is a liquid form which is typically mixed with bait (such as carrots and oats) to prepare for application on the site. Pindone is an anticoagulant poison, i.e. it acts to reduce the blood clotting abilities of the rabbit's body. As per the Client's request, the testing for contaminants associated with historical pindone bait is not included in the current scope of works. Recommendations for future investigation works are considered further in Section 14
22	ACM pipes and fragments on surface (Precinct 500)	Test pits completed as part of this investigation were inspected for any possible fill materials. Surface soil analytical results for soil samples collected were assessed as part of this investigation. Identified ACM impact will require remediation and validation as part of future stages of works (discussed in Section 14).
23	The potential use of pesticides, fuels, ACM containing materials and	The site has historically been used for agricultural uses. Pesticides and fuels are known to be used on such sites. The

	uncontrolled landfilling (if present) across the general balance of the site may have impacted shallow soil conditions at the site.	use of ACM containing building materials has historically been prevalent in NSW generally. Uncontrolled landfilling is known to have historically occurred on such rural lots. The site was subject to a grid-based low-density sampling regime, targeting COPC associated with general agricultural land use as part of the PSI. An Unexpected Finds Protocol should be developed for future works at the site – refer to Section 14.
24	Two gas wells and several gas gathering lines are located on the site.	Localised metal, hydrocarbon and methane impact may be associated with any leaks / spills near the wells and gathering lines.
25	Given the historical use for the site, an asbestos pipe network may be present at the site.	No suspected pipe network was observed during the works, however detecting such a network on private land can be tricky. An Unexpected Finds Protocol should be developed for future works at the site – refer to Section 14.

9. Preliminary Conceptual Site Model

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors (linkages). A preliminary CSM provides a framework to identify potential contamination sources and how potential receptors may be exposed to contamination either in the present or the future (i.e. it enables an assessment of the potential source – pathway – receptor linkages).

9.1 Potential Sources

Potential sources of contamination identified in the data gaps assessment are summarised in Table 4 below.

Table 4: Potential Contamination Sources and COC

Precinct	Potential Source	Description of Potential Source	COC
General Site	Stockpiles and possible filling – general site (S1)	Several stockpiles were observed at the site during the site walkover. Previous investigation reports and historical aerial photographs identified the potential for localised possible filling in the proximity of former structures at the site.	Metals, TRH, BTEX, PAH, OCP, OPP, PCB, phenols, and asbestos
General Site	Agricultural land use (S2)	Current and historical agricultural land use and associated pesticide use may potentially impact the surface soils.	Metals, OCP and OPP

400		Historical use of pindone bait.	Pindone (GCMS screen[2])
General Site	Historical structures (S3)	Possible use of ACM in building materials which may have fragmented and impacted surface / near surface.	Asbestos
General Site	Timber power poles (S4)	Historical treatment of timber power poles can result in metal and hydrocarbon impact to the underlying soils.	Metals, TRH, BTEX, PAH, phenols
100	Scrap yard / lay down area (S5)	The storage and maintenance of mechanical equipment and vehicles may result in leaked / spillage of hydrocarbons on the ground surface.	Metals, TRH, BTEX, PAH, phenols
300	Historical use of ACM – former fireworks site (S6)	ACM impact is known to be present on the site surface and may extend into the underlying soil.	Asbestos
300	Burial pits – former fireworks site (S7)	Burial pits containing waste materials including potential explosives and ACM are known to be located on site. Delineation of the extent of known burial pits can benefit future remediation works.	Metals, additional metals, explosives, TRH, BTEX, PAH, OCP, OPP, PCB, phenols, explosives, and asbestos
500	Suspected coal wash on site surface and in stockpiles (S8)	Coal wash can contain elevated metals and hydrocarbons.	Metals, TRH, BTEX, PAH, phenols
200, 300 and 500	Coal Seam Gas Wells and gas gathering lines (decommissioned)	Drilling of gas well includes the creation of mud pits for drilling mud recirculation. These pits can be contaminated with hydrocarbons. Soil surrounding associated infrastructure may be impacted with hydrocarbons.	Metals, TRH, BTEX, PAH

Notes: *Metals: comprising arsenic (As), cadmium (Cd, chromium (Cr), copper (Cu), lead (Pb), mercury (Hg), nickel (Ni) and zinc (Zn);*
Additional metals comprising aluminium (Al), strontium (Sr), barium (Ba), iron (Fe) and magnesium (Mg);
TRH - Total recoverable hydrocarbons;
BTEX - Benzene, toluene, ethylbenzene and xylene;
PAH - Polycyclic aromatic hydrocarbons;
OCP and OPP - Organochlorine and organophosphorous pesticides;
PCB - Polychlorinated biphenyls;
ACM – Asbestos Containing Material

9.2 Potential Receptors

[2] GCMS: Gas chromatography mass spectrometry. Recommended by the laboratory for the screening of soils where pindone bait is suspected.

The following potential human receptors (R) have been identified for the site:

- R1 – Construction and maintenance workers (during site redevelopment);
- R2 – Residential site users following development of the site; and
- R3 – Land users to the west, along Menangle Road (rural residential).

Owing to the likely high salinities of groundwater associated with the Wianamatta Group in the region (typically brackish to saline), groundwater beneath the site is unlikely to be suitable for irrigation purposes. Furthermore, no bores were registered within 1 km of the site for irrigation purposes. Therefore the assessment of risks associated with use of groundwater for irrigation purposes is not required.

The following potential ecological receptors (R) have been identified for the site:

- R4 – Local groundwater and receiving water bodies;
- R5 – Surface water bodies (creeks, farm dams and the Nepean River); and
- R6 – Ecology. DP notes that exposure to contaminants via plant uptake is usually associated with the upper 2 m (root zone and habitation zone for many species) of the soil profile.

9.3 Potential Pathways

Potential pathways for contamination include the following:

- P1 – Ingestion and dermal contact;
- P2 – Inhalation of fibres, dust and/or vapours;
- P3 – Leaching of contaminants and vertical migration into groundwater;
- P4 – Surface water run-off;
- P5 – Lateral migration of groundwater providing base flow to watercourses; and
- P6 – Plant uptake.

9.4 Summary of CSM

A 'source – pathway – receptor' approach has been used to assess the potential risks of harm being caused to human or ecological receptors from contamination sources on or in the vicinity of the site, via exposure pathways. The possible exposure pathways between the above sources (S1 – S3) and receptors (R1 to R6) are provided in Table 5 below. Assessment of the preliminary CSM was used to identify appropriate sampling and analysis to investigate current data gaps and assess the suitability of the site for the proposed residential use.

Table 5: Preliminary Conceptual Site Model

Source	Exposure Pathway	Receptor	Requirement for Additional Data and / or Management

Source	Exposure Pathway	Receptor	Requirement for Additional Data and / or Management
General site: S1: Stockpiles and possible filling S2: Agricultural land use S4: Timber power poles **Precinct 100:** S5: Scrap yard / lay down area **Precinct 300:** S7: Burial pits – former fireworks site **Precinct 400:** S2: Pindone bait **Precinct 500:** S8: Suspected coal wash stockpiles / fill **Precincts 200, 300 and 500:** Coal seam gas wells and gas gathering lines	P1 – Ingestion and dermal contact; P2 – Inhalation of fibres and/or dust and/or vapours	R1 – Construction and maintenance workers. R2 – Future site users following development of the site. R3 – Land users along Menangle Road.	An intrusive investigation is required to quantify and assess possible contamination including chemical testing of soil (and groundwater if deemed necessary). As the current investigation comprises limited intrusive investigation only, additional investigations may be required.
	P3 – Leaching of contaminants and vertical migration into groundwater. P4 – Surface water run-off. P5 – Lateral migration of groundwater providing baseflow to watercourses.	R4 – Local groundwater and receiving water bodies. R5 – Surface water bodies.	
	P6 – Plant uptake.	R6 – Local ecology.	
General site: S3: Historical structures **Precinct 300:** Historical use of ACM – former fireworks site	P1 – Ingestion and dermal contact; P2 – Inhalation of fibres and/or dust and/or vapours	R1 – Construction and maintenance workers. R2 – Future site users following development of the site. R3 – Land users along Menangle Road.	

10. Sampling and Analysis Plan

10.1 Sampling Rationale

Field investigations were undertaken between 19 January and 15 February 2017 by two experienced DP field staff (environmental scientist and engineer respectively). All environmental-specific sampling and logging was conducted by a DP environmental scientist.

The field investigation was designed in accordance with the seven step data quality objective (DQO) process provided in Appendix B, Schedule B2 of the *National Environment Protection (Assessment of Site Contamination) Measure 1999* as amended 2013 (NEPC, 2013). The DQO adopted for this PSI is provided in Appendix C.

The findings of the site history review and data gaps assessment were used to inform the sampling rationale which comprises a combination of targeted and grid sampling locations. Targeted sample locations for burial pits observed during previous investigations on the former fireworks site (refer to Section 3.6) were positioned using coordinates provided in the relevant previous investigation report (DLA, 2013 A total of 115 test pits were completed across the site and soil samples were collected and assessed for contamination assessment purposes from 65 test pits.

Owing to the large number of test pit locations, test pit numbers were split based on the precinct and test pit number within each precinct (e.g. 100-1 to 100-25 located within Precinct 100 and 500-1 to 500-33 located in Precinct 500). Stockpile numbers were also numbered based on their precinct number and stockpile number (e.g. 100-SP1 to 100-SP4 located within Precinct 100).

All test pits were excavated using a JCB 4X backhoe fitted with a 450 mm toothed bucket to a minimum depth of 0.5 m into natural material, with the majority extending to approximately 3 m below ground level (bgl) or prior refusal in order to meet sampling requirements for the salinity investigation (reported separately – refer to Section 1). For stockpile locations, test pits were excavated only to the base of the stockpile. Soil samples for contamination assessment purposes were generally collected at depths 0.0 – 0.1 m and 0.4 – 0.5 m within the test pits, targeted fill layers and changes in the soil profile. Only a surface sample (i.e. 0 – 0.1 m) was collected from test pits 500-1 and 500-2 using a hand trowel due to access constraints preventing access to the backhoe. No test pit was excavated at TP 100-7 due to safety issues (an untethered dog was in close proximity to this test pit location). Stockpile sample locations 100-SP1 and 100-SP2 could not be completed as programmed as stockpiles observed during the site walkover were no longer present therefore a surface sample was collected by hand from these locations. Test pit locations are shown on Drawing 9, Appendix A and test pit logs are provided in Appendix D.

Three Potential ACM fragments were collected during the investigation and submitted to the laboratory for confirmatory analysis for asbestos. Field sieving and assessment and laboratory analysis for asbestos was completed in accordance with NEPC (2013) at three test pit locations within the former fireworks site (300-19 to 300-21).

Groundwater monitoring bores MW1 – MW5 were purged (3 times water column volume) and sampled using dedicated disposal bailers. Water quality parameters were monitoring during purging to observe for stabilised groundwater conditions. Bore MW6 could not be located during the investigation; a broken PVC casing was observed near to this well indicating that bore MW6 may have previously been damaged. DP notes that no bore log could be located in previous investigation reports, therefore the slotting interval and aquifer strata could not be confirmed. Based on observations during the soil sampling investigation works DP considers it likely that groundwater was sampled from the unconfined shallow sand aquifer.

The selected rationale for the sampling locations investigated and analytes tested is provided in Table 6 below.

Table 6: Summary of Sampling and Analysis Rationale

Monitoring Bore / Test Pit Location	Sample Depth	TP depth (m bgl)	Depth of filling (m bgl)	Analytes	Location Target / PAEC Reference	Sample Target
Precinct 100						
100-1	0-0.1	0.8	0.5	Metals, TRH, BTEX, PAH, phenols, OCP, OPP, PCB, asbestos	Possible filling in vicinity of structure	Fill
100-2	0-0.1	3.0	Not present	Metals, OCP, OPP	PAEC 23	Topsoil
100-3	0-0.1	3.0	Not present	Metals, OCP, OPP	Scrapyard / storage area / PAEC 8	Topsoil
100-4	0-0.1	2.7	Not present	Metals, TRH, BTEX	Background	Topsoil
100-5	0-0.1	1.2	0.9	Metals, TRH, BTEX, PAH, phenols, OCP, OPP, PCB, asbestos	Scrapyard / storage area – possible filling / PAEC 10	Fill
100-6	0-0.1	0.9	-			Topsoil (no fill present)
100-7	Not completed due to safety issues					
100-12 to 100-21	0-0.1	1.1 - 3	-	Metals, TRH, BTEX	Background	Topsoil
100-SP1	0.4 – 0.5	Base of stockpile	-	Metals, TRH, BTEX, PAH, phenols, OCP, OPP, PCB, asbestos	Stockpile / PAEC 6	Fill within stockpile
100-SP2						
Precinct 200						
200-1	0-0.1	2.6	-	Metals, TRH, BTEX	PAEC 23	Topsoil
200-2	0-0.1	3.0	-	Metals, TRH, BTEX, PAH, phenols, OCP, OPP, PCB, asbestos	PAEC 23	Topsoil
200-3 to 200-5	0-0.1	3.0	-	Metals, TRH, BTEX		
200-6	0-0.1	3.0	-	Metals, TRH, BTEX, PAH, phenols, OCP, OPP, PCB, asbestos		
Precinct 300						
300-1	0-0.1	3.0	-	Not tested – no fill	PAEC 23	Topsoil
300-2	Test pit was positioned using coordinates from DLA (2013) to sample and assess previously observed burial pit, however no filling / burial pit was observed. No samples were therefore scheduled for analysis.					

Monitoring Bore / Test Pit Location	Sample Depth	TP depth (m bgl)	Depth of filling (m bgl)	Analytes	Location Target / PAEC Reference	Sample Target
300-3 and 300-4	0.4-0.5 / 0-0.1	1.2	1.1	PAHs, additional metals and explosives	Burial Pits / PAEC 19	Filling
300-5 and 300-6	Test pits were positioned using coordinates from DLA (2013) to sample and assess previously observed burial pits, however no filling / burial pits were observed. No samples were therefore scheduled for analysis.					
300-7	0-0.1	3.0	0.2	Metals, TRH, BTEX, PAH, phenols, OCP, OPP, PCB, asbestos	PAEC 23	Fill
300-8 and 300-9	0-0.1	3.0	-			Topsoil
300-10	0-0.1	1.4	0.8	Metals, additional metals, TRH, BTEX, PAH, phenols, OCP, OPP, PCB, explosives, asbestos	Burial Pit / PAEC 19	Fill
300-11 to 300-13	NT	2.6 – 3.0	-	Not tested – no fill	PAEC 23	Topsoil
300-14	Test pits were positioned using coordinates from DLA (2013) to sample and assess previously observed burial pits, however no filling / burial pits were observed. No samples were therefore scheduled for analysis.					
300-14A	0.4–0.5	0.8	0.5	PAHs, explosives	Test pit completed near 300-14 where filling visible on surface – likely burial pit	Fill
300-15 and 300-16	0.4 - 0.5 / 0 – 0.1	1.6 / 1.8	1.4	Additional metals (300-16 only), metals, TRH, BTEX, PAH, phenols, OCP, OPP, PCB, explosives, asbestos	Burial Pit / PAEC 19	Fill
300-17	Material in this burial pit was not tested owing to an abundance of oversize / ACM observed.					
300-18	Test pit was positioned using coordinates from DLA (2013) to sample and assess previously observed burial pit, however no filling / burial pit was observed. No samples were therefore scheduled for analysis.					
300-19 to 300 - 21	0-0.1	0.9 – 1.2	0.2 – 0.8	Additional metals, explosives, PAH (300-20 only), asbestos	ACM impact / PAEC 16	Fill / reworked natural

Monitoring Bore / Test Pit Location	Sample Depth	TP depth (m bgl)	Depth of filling (m bgl)	Analytes	Location Target / PAEC Reference	Sample Target
300-22 and 300-23	0-0.1	3.0	-	Metals, OCP, OPP	PAEC 23	Topsoil
300-24	0-0.1	3.0	-	Asbestos	In vicinity of ACM structure	Topsoil
300-25	Test pit was positioned using coordinates from DLA (2013) to sample and assess previously observed burial pit, however no filling / burial pit was observed. No samples were therefore scheduled for analysis.					
300-26	0-0.1	2.5	2.0	Explosives	Burial Pit / PAEC 19	Filling
to 300-28	Test pit was positioned using coordinates from DLA (2013) to sample and assess previously observed burial pit, however no filling / burial pit was observed. No samples were therefore scheduled for analysis.					
300-SP1 to 300-SP4	0.4 – 0.5	Base of stockpile	-	Asbestos only	Stockpile / PAEC 13	Fill within stockpile
MW1 – MW5	-	-	-	Additional metals, metals, TRH, BTEX, PAH, phenols, OCP, OPP, PCB, explosives	Groundwater / PAEC 20	
Precinct 400						
400-1	0-0.1	2.4	-	Metals, TRH, BTEX, PAH, phenols, OCP, OPP, PCB, asbestos	PAEC 23	Topsoil
400-2		3.0				
400-3		1.6		Metals, OCP, OPP		
400-4		3.0	-			
Precinct 500						
500-1 to 500-2b	0-0.1	0.1	0.2	Metals, OCP, OPP	Investigate former structure / PAECs 17 and 22	Fill
500-3	0-0.1	-	-			Topsoil
500-4	0-0.1	-	-		PAEC 23	Topsoil
500-5 and 500-6	0-0.1	3.1 / 1.6	-	Metals, TRH, BTEX, PAH, phenols, OCP, OPP, PCB, asbestos		
500-7	0-0.1	3.0	0.3		Suspected former filling / possible structure / PAEC 4	Filling

Monitoring Bore / Test Pit Location	Sample Depth	TP depth (m bgl)	Depth of filling (m bgl)	Analytes	Location Target / PAEC Reference	Sample Target
500-8	0-0.1	3.0	0.9	Metals, TRH, BTEX	Suspected coal wash / PAEC 1	Filling
500-9	0-0.1	2.1	-	Metals, TRH, BTEX, PAH, phenols, OCP, OPP, PCB, asbestos	PAEC 23	Topsoil
500-10		3.0				
500-11	0-0.1	3.0	0.5	Metals, TRH, BTEX, PAH, phenols	Suspected coal wash / PAEC 1	Filling
500-12	0-0.1	3.0	-	Metals, OCP, OPP	PAEC 23	Topsoil
500-13						
500-SP1	0.4 – 0.5	Base of stockpile	-	Metals, OCP, OPP, asbestos	Stockpile / PAEC 5	Fill within stockpile
500-SP2					PAEC2	

10.2 Field Sampling Procedure

Sampling data was recorded to comply with routine chain-of-custody requirements and DP's standard operating procedures. The general sampling, handling, transport and tracking procedures are detailed below:

- Sample locations were pre-determined using GIS prior to field work and were located in the field using a handheld Garmin GPS;
- Disposable nitrile gloves were used to collect all samples. Gloves were replaced prior to the collection of each sample in order to prevent cross-contamination;
- A JCB 4X backhoe fitted with a 450 mm tooth bucket was used to excavate all test pits. Samples were collected from the freshly exposed walls of the test pits and placed into laboratory prepared glass jars. In addition, 50 g bag samples were collected for asbestos testing;
- Surface samples were collected from the ground surface using disposable nitrile gloves and hand tools. Samples were collected from soils that did not come into contact with the hand tools.
- Each sample was transferred into a new laboratory prepared glass jar, with minimal headspace, and sealed with a Teflon lined lid. Each jar was individually sealed to reduce the potential for cross contamination during transportation to the laboratory;
- Sample containers were labelled with individual and unique identification including project number, sample ID, depth and date of sampling;
- Logs were completed for all test pits. Test pit logs included, where relevant, sample identification, coordinates, date of collection, a description of the substrate conditions encountered, visual or olfactory evidence of contamination, the depth of samples collected, QA / QC samples collected, the sampler and equipment used; and

- For samples that required sieving, 10 L bulk composite samples were collected using a shovel and transferred into a 10 L bucket. Samples were weighed in the field using pre-calibrated scales, and subsequently sieved using a 7 mm sieve. Any ACM fragments remaining on the sieve were recorded - namely the number of ACM fragments >7 mm, the condition of the fragment, size range and the weight of screened ACM. In addition, 500 ml bag samples were collected for laboratory analysis for each 10 L sample collected.

10.3 Sample Analysis

Laboratory analysis of primary and intra-laboratory samples was conducted by Envirolab Services Pty Ltd (Envirolab). Envirolab is accredited by the National Association of Testing Authorities (NATA) and are required to conduct in – house QA / QC procedures. These are normally incorporated into every analytical run and include assessment of reagent blanks, spike recovery, surrogate recovery and laboratory duplicates.

The analytical methods used are summarised in the laboratory certificates of analysis, included in Appendix E. Not all samples submitted to Envirolab were analysed. Samples that were not analysed were placed on hold should further testing be of benefit.

10.4 Assessment of Asbestos Samples

Soil samples collected for asbestos assessment purposes (i.e. test pits 300-19 to 300-21 located on the former fireworks site) were assessed as per the procedures below:

- Manual on-site screening by passing each ~10 L bulk sample through a <7 mm aperture sieve (or spreading out each sample on contrasting coloured sheeting if soils were too cohesive) for visual identification of ACM. The concentration of asbestos as ACM in soil was estimated using the following equation:

  % w/w asbestos in soil =
  % asbestos content x weight of ACM (kg) / weight of soil sample
  For ~10 L bulk samples, asbestos content within ACM was assumed to be 15 %.

- Laboratory analysis for asbestos of the 500 mL samples was completed at NATA accredited Envirolab Services Pty Ltd utilising Polarized Light Microscope Dispersion Staining techniques in accordance with Standards Australia (2004), Australian Standards (AS) 4964 Method for the Qualitative Identification of Asbestos in Bulk Samples (SA, 2004) to determine presence and weight of FA and AF. The quantities of asbestos as FA and AF soil was estimated using the following equation:

  % w/w asbestos in soil =
  Weight of asbestos as FA and AF (estimated by Envirolab) / weight of soil sample

  As referenced in Section 3, NATA does not accredit laboratory facilities for the estimation of the concentration of ACM, FA or AF in soil.

- The analytical results were compared against the relevant SAC (Table 2).

11. Site Assessment Criteria

The Site Assessment Criteria (SAC) applied in this PSI have been informed by the proposed land use (i.e. residential with accessible soils) and the preliminary CSM which identified human and ecological receptors to potential contamination on the site (refer to Section 9). Analytical results were assessed (as a Tier 1 assessment) against the investigation and screening levels as per Schedule B1, National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013 (NEPC, 2013). Where relevant, soil ecological screening levels have been calculated based on analytical results for soil cation exchange capacity (CEC) and pH collected during the salinity investigation, as follows:

- **CEC**: 10 meq/100g based on the average of 18 soil analytical results (range from <1 to 38 meq/100g)
- **pH**: 6.5 based on the average of 441 soil analytical results (ranging from 4.2 to 9.9 pH units)

Where soil and groundwater compounds were recorded above the LOR but no suitable SAC was provided in NEPC (2013) guidelines, alternative guideline sources approved by NEPC (2013) and in use in other states were consulted. Such sources include US Environment Protection Agency (EPA) Regional Screening Levels (RSLs) for residential land use, as amended May 2016[3], Canadian Environmental Quality Guidelines soil contact soil quality guidelines (SQGs) for PAHs for residential / parkland land use[4] (CCME, 2010) and Western Australia. With regard to explosives, in the absence of a comprehensive guideline reference such analytical data will be considered further if any explosives are recorded above the LOR by the laboratory.

As the site is proposed to be redeveloped for residential land use, the investigation and screening levels adopted are consistent with a generic residential land use scenario. The adopted SAC are listed on the analytical results tables in Appendix F.

12. Results

12.1 Field Work Observations

The test pits indicate that subsurface conditions underlying the site typically comprise topsoil and filling overlying alluvial, colluvial and residual soils. Test pits 100-2, 100-4, 100-8 to 100-12, 100-14, 100-15, 100-17, 100-20 to 100-25, 200-1, 200-2, 300-11, 300-24, 300-33, 300-35 , 300-38, 300-40, 300-42, 400-1 to 400-3, 500-3 to 500-5, 500-07, 500-09, 500-12, 500-14, 500-24, 500-16 and 500-32 first encountered weathered rock of variably extremely low to medium strength at depths of 0.2 – 2.6 m.

12.1.1 Topsoil and Filling Depths

Based on the results of the test pitting, topsoil was encountered from the surface to depths in the range 0.1 – 0.4 m at most locations with the exception of areas of Precincts 100 and 300 where filling was encountered from the surface to depths in the range 0.1 – 2 m in test pits 100-1, 100-5, 300-10, 300-14A, 300-15, 300-16, 300-17, 300-19, 300-19A, 300-2, 300-20, 300-21, 300-26, 300-26, 300-28, 300-3, 300-4, 300-5, 300-7.

[3] https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016. Last accessed 10 April 2017.
[4] http://ceqg-rcqe.ccme.ca/en/index.html#void. Last accessed 10 April 2017.

Suspected coal wash material was observed in the surface soils from test pits 500-7 (PAEC 4), 500-8 (PAEC 1) and 500-11 (PAEC 1).

12.1.2 Rock Depth

Shale, siltstone and sandstone bedrock were encountered across the site at a varying depths. Based on the results of the test pitting and boreholes, rock of at least low strength was encountered between depths of 0.2 – 2.7 m within Pits 100-2, 100-4, 100-8 to 100-12, 100-14, 100-15, 100-17, 100-20 to 100-25, 200-1, 200-2, 300-11, 300-24, 300-33, 300-35, 300-38, 300-40, 400-1 to 400-3, 500-3 to 500-5, 500-07, 500-09, 500-12, 500-14, 500-16, 5-32 and Bores 1 – 6. Bores 1 – 3 were drilled on the ridgeline along the north-east portion of the site and likely intersected the Minchinbury Sandstone which overlies the generally weaker interbedded shale, siltstone, and sandstone encountered in the test pits.

Free groundwater was observed in test pits 300-3, 300-5, 300-12, 300-22, 300-24, 300-29 to 300-31, 300-34, 300-35, 500-8, 500-11, 500-12, 500-13, 500-15, 500-24, 500-25, 500-33 at depths in the range 0.8 – 3.0 m. It is noted, however, that the pits were immediately backfilled following excavation which precluded longer term monitoring of any groundwater levels that might be present. Groundwater levels are affected by factors such as weather conditions, which will vary with time, and soil permeability.

Test pit logs are included in Appendix D, together with notes defining classification methods and descriptive terms.

12.1.3 Burial Pits

The burial pits were located based on coordinates provided in previous investigation reports, however not all burial pits could be located during this investigation. No burial pits were observed at 300-6, 300-18, 300-25 and 300-27, however a gully approximately 10 m x 3 m was observed at location 300-27 filled with rubbish / anthropogenic material including scrap metal, brick, tin, boulders, Styrofoam packaging, hose pipe, wood, ceramic and suspected ACM.

Burial pits were observed at locations 300-2 to 300-5, 300-7, 300-10, 300-15 to 300-17, 300-19 to 300-21, 300-26 and 300-28. Material in burial pits generally comprised silty sand or sand with anthropogenic material including ACM, glass, plastic, bricks and wiring. A black powder, potentially gun powder was observed in the fill at location 300-10. Where present, the depth of burial pits ranged from 0.2 to 2 m bgl. Historically reported burial pits could not be located at four test pits. It is likely that more burial pits exist that have not been previously identified.

12.2 Soil Analytical Results

The analytical results for the soil samples collected during this PSI are summarised in Tables F1-F3 (Appendix F), together with the adopted SAC. Laboratory analytical certificate of analysis is provided in Appendix E.

12.2.1 Heavy Metals

Heavy metals were reported below the LOR and / or SAC in all samples analysed, with the exception of zinc in fill soils from 500-1 (1,800 mg/kg) and 500-2 (550 mg/kg) which exceeded the corresponding SAC (480 mg/kg).

12.2.1 Additional Metals

Additional metals were reported below the LOR and / or SAC in all samples analysed.

12.2.2 TRH and BTEX

TRH and BTEX were not reported above the LOR and / or the SAC in any of the samples analysed.

12.2.3 PAH

PAHs were reported below the LOR and / or SAC in all samples analysed, with the exception of the following:

- Phenanthrene (1.2 mg/kg) exceeded the SAC (0.046 mg/kg) in fill soil (suspected coal wash material) from 500-7 targeting PAEC 4;
- Benzo(a)anthracene (0.78 mg/kg) exceeded the SAC (0.16 mg/kg) in fill soil (suspected coal wash material) from 500-8 targeting PAEC 1;
- Dibenzo(a,h)anthracene (0.06 mg/kg) marginally exceeded the SAC (0.016 mg/kg) in fill soil (suspected coal wash material) from 500-8; and
- Phenanthrene (1.1 mg/kg) exceeded the SAC (0.046 mg/kg) in stockpile sample 500-SP1 targeting stockpiled suspected coal wash (PAEC 5).

12.2.4 Phenols

Phenols were not reported above the LOR in any of the samples analysed.

12.2.5 OCP, OPP and PCBs

OCP, OPP and PCBs were not reported above the LOR in any of the samples analysed.

12.2.6 Asbestos

Asbestos was not reported by the laboratory in any of the soil samples analysed, with the exception of fill soil from 300-20 where chrysotile containing ACM was reported (0.1604 % w/w). Fragments of asbestos were observed in stockpile 100-SP2. ACM in bulk soil samples collected from the surface from 300-20 (0.033 % w/w) and 300-21 (0.014 % w/w) exceeded the relevant SAC (0.01 % w/w).

12.2.7 Explosives

Explosives were not reported above the LOR in any of the samples analysed.

12.3 Groundwater

The analytical results for the groundwater samples collected during the PSI are summarised in Tables F5 and F6 (Appendix F), together with the adopted SAC. Laboratory analytical certificate of analysis is provided in Appendix E.

12.3.1 Heavy Metals

Heavy metals were reported below the LOR and / or SAC in all samples analysed, with the exception of the following:

- Nickel in groundwater from MW1 (13 mg/L) which marginally exceeded the corresponding GIL (11 mg/L); and
- Zinc in groundwater from MW1 (69 mg/L) and MW3 (29 mg/L) which exceeded the corresponding GIL (8 mg/L).

12.3.2 Additional Metals

Heavy metals were reported above the SAC in the following samples:

- Aluminium in groundwater from MW1 (200 mg/L) and MW2 (140 mg/L) which exceeded the corresponding US EPA RSL (20 mg/L);
- Barium in all groundwater samples (ranging from 62 to 610 mg/L) exceeded the corresponding SAC (3.8 mg/L). It is noted however that the use of background criteria is considered to be conservative. Concentrations of barium in bores MW1 and MW3 (610 and 220 mg/L respectively) are noticeably higher than concentrations in the remaining bores (ranging between 17 and 63 mg/L);
- Iron in groundwater from MW1, MW2 and MW3 (1,200 mg/L, 270 mg/L and 790 mg/L in order) exceeded the corresponding US EPA RSL (14 mg/L); and
- Strontium in all groundwater samples (ranging from 22 to 270 mg/L) exceeded the corresponding SAC (12 mg/L). It is noted however that the use of background criteria is considered to be conservative, however no other criteria is available for total strontium.

12.3.3 TRH and BTEX

TRH and BTEX were not reported above the LOR in any of the samples analysed.

12.3.4 PAH

PAHs were not reported above the LOR in any of the samples analysed.

12.3.5 Phenols

Phenols were not reported above the LOR in any of the samples analysed.

12.3.6 OCP, OPP and PCBs

OCP, OPP and PCBs were not reported above the LOR in any of the samples analysed.

12.3.7 Explosives

Explosives were not reported above the LOR in any of the samples analysed.

12.4 Quality Assurance and Quality Control

A review of the adopted QA / QC procedures and results (Appendix G) indicates that the DQIs have generally been met.

13. Discussion

The scope of the PSI included a site walkover, review of site history information, review of previous investigations, soil sampling and laboratory analysis. Previous investigations carried out at the site prior to this PSI have focused on Precincts 200 and 300 (south of Howes Creek); however Precincts 300 (north of Howes Creek), 100, 400 and 500 have not previously been subject of a contamination assessment, prior to this PSI.

The review of the previous investigations, site history review and site walkover findings identified a total of 25 PAECs and associated data gaps that require further investigation. Key PAECs can be generally summarised as follows:

- Coal wash-type filling on the site surface, in an unnamed creek, in Howes Creek and in stockpiles;
- Stockpiles containing construction and demolition materials and possibly asbestos;
- Historical filling;
- Timber power poles;
- Scrap yard / storage area;
- ACM impact in shallow soils across the former fireworks site;
- Anthropogenic materials, soil metal and ACM impact in burial pits in the former fireworks site;
- ACM and zinc impact associated with a farm shed Precinct 500;
- Metal impact in groundwater;
- Historical use of pindone bait;
- ACM in infrastructure; and
- Gas wells and gathering lines.

All identified PAEC were further considered and key data gaps identified. A number of key PAEC were subject to intrusive soil and / or groundwater sampling and assessment as part of this PSI. A total of 115 test pits were completed at the site; soil samples were collected from 65 of the test pits and analysed for COPC and assessed against SAC. Based on the findings of the PSI, of the 25

PAECs identified at the site, a total of 21 AECs were identified as requiring additional investigation and / or remediation (refer to Table 6 for full detail, including recommendations).

13.1 Areas of Environmental Concern

The findings of the PSI, including the finding of the preliminary soil and groundwater investigation works have been used to assess identified PAEC further and identified AECs requiring additional investigation, remediation and / or management works. Identified AECs are provided in 7 below and are presented on Drawing 11 (Appendix A).

Table 7: Summary of PAEC Outcome

PAEC Ref	AEC ?	AEC Ref	Description	Recommendations
1	Yes	1	Suspected coal wash filling on surface, in unnamed creek and in Howes Creek. Soil analytical results for samples collected from coal wash filling have identified PAH impact.	The delineation of the extent of coal wash filling at the site should be carried out in future investigation works. PAH impact may potentially leach into the underlying soil and groundwater, therefore further soil, soil leachate (coal wash and underlying natural soils and potentially groundwater testing for PAH should be included in future investigation works.
2	Yes	2	Stockpiles containing suspected coal wash material are impacted with PAHs. It is noted that limited stockpile testing has been undertaken as part of the PSI. PAH impact in these stockpiles can potentially leach into the underlying soil and groundwater.	Soil and soil leachate testing for the stockpiles and underlying natural ground should be included as part of future investigation works. Given the limited scope of testing undertaken as part of this PSI (as agreed with the Client) future testing should include all identified COPC associated with coal wash material.
3	Yes	3	Suspected filling was observed in dam wall however testing of this material is outside of the Client-agreed scope for this PSI.	Soil sampling and analysis for COPC should be included in the scope of future investigation works.
4	Yes	4	Possible filling – 'figure 8' like feature	Limited testing undertaken here identified coal wash material on the surface here. Additional testing should be undertaken as part of the future scope of works as filling and / or residual structures may be present elsewhere across this area.
5	Yes	5	Four suspected coal wash stockpiles located on suspected coal wash filling, next to Howes Creek	Soil and soil leachate testing for the stockpiles and underlying natural ground should be included as part of future investigation works. Given the limited scope of testing undertaken as part of this PSI (as agreed with the Client) future testing should include all identified COPC associated with coal wash material.
6	Yes	6	Location of stockpiles of construction and demolition type materials	The stockpiles were removed (by persons unknown) from the site prior to the intrusive investigation works. Surface soil sampling identified localised

				ACM impact at the stockpile footprints. A thorough inspection and remediation works should be completed in accordance with NEPC (2013) guidelines.
7	Yes	7	Timber power poles observed in Precinct 100 and likely present elsewhere on the site	A detailed programme of all timber power poles at the site should be completed as part of future investigation works. Targeted soil sampling and analysis of soils located at the base of timber power poles should be carried out as part of future investigation works.
8	No	-	Scrap yard / storage area	Targeted soil sampling and analysis at the scrap yard / storage area did not identify any SAC exceedances.
9	Yes	8	Possible filling in dam wall	Soil sampling and analysis for COPC should be undertaken in future investigation works.
10	No	-	Scrap yard	Targeted soil analysis completed as part of this investigation did not identify any significant impact. Given the nature for such contamination to be highly localised, further investigations should be completed as part of future investigation works.
11	Yes	9	Possible filling	Soil sampling and analysis for COPC should be included in the scope of future investigation works.
12	Yes	10	Possible filling	Soil sampling and analysis for COPC should be included in the scope of future investigation works.
13	Yes	11	Several stockpiles covered with grass that may contain anthropogenic materials	Suspected coal wash material was observed in one stockpile here. Additional sampling and analysis for COPC should be included in the scope of future investigation works.
14	Yes	12	Localised filling of suspected coal wash around concrete drainage pipe	Soil sampling and analysis for COPC should be included in the scope of future investigation works.
15	Yes	13	Grass covered stockpiles	Soil sampling and analysis for COPC should be included in the scope of future investigation works.
16	Yes	14	ACM impact on the site surface and shallow soil conditions on the former fireworks site.	Excluding burial pits, ACM impact was observed in the top 0.2 to 0.6 m of the soil profile. ACM impact will require remediation and validation likely across the extent of the former fireworks site. Historical aerial photographs indicate that structures associated with the former fireworks site were located on Precinct 200 toward the south. Therefore this possible historical extension of the former fireworks site should be included in the scope of future investigation works.
17	Yes	15	Farm shed	ACM and zinc impact in shallow soils will require remediation and validation.
18	Yes	16	Stockpile covered with grass and containing suspected ACM pipe	Stockpile sampling and analysis for COPC should be included in the scope of future investigation works. Identified ACM impact should be remediated and validated.
19	Yes	17	Burial pits on the former	Test pits targeting burial pits located within the

			fireworks site.	former fireworks site (Precinct 300) identified buried material at 13 test pits and a rubbish filled gully at one test pit. The depth of buried material within the burial pits ranged between 0.2 and 2 m bgl. Historically reported burial pits could not be located at four test pits. It is likely that more burial pits exist that have not been previously identified.
20	Yes	18	Metal impact in groundwater	Groundwater analytical results demonstrate metal impact below the site may be attributed to historical site use at the former fireworks site, and particularly burial pits located here. Owing to the absence of bore survey data, it was not possible to construct accurate groundwater flow contours. In order to confirm regional metal groundwater conditions, additional bores located in the area surrounding the former fireworks factory site will be required.
21	Yes	19	Use of pindone bait	Soil analysis specific for pindone bait should be completed in future investigation works.
22	Yes	20	ACM pipes and fragments on surface	ACM impact requires remediation and validation.
23	No	-	Historical agricultural land use - potential use of pesticides, fuels, ACM containing materials and uncontrolled landfilling	No COPC associated with historical agricultural land use were recorded in soil samples completed for this PAEC above SAC in any of the soil samples analysed as part of this PSI.
24	Yes	21	Gas wells and gathering line	Targeted soil sampling and analysis for COPC should be carried out and assessed as part of future investigation works. Identify mud pits and assess remediation and validation information provided by asset owner. Given the safety issues associated with drilling / test pitting near to infrastructure, soil sampling should be carried as close as practicable to infrastructure and representative of pollutant linkages associated with the development.
25	No	-	Asbestos pipe network – it is common for former agricultural and rural residential sites to have utilised asbestos pipes as part of their private infrastructure. No *in situ* pipes were observed during the walkover however it is not possible to inspect such a network unless uncovered during intrusive works	No suspected pipe network was observed during the works, however detecting such a network on private land can be tricky. An Unexpected Finds Protocol should be developed for future works at the site – refer to Section 14.

14. Conclusions and Recommendations

Based on the findings of the PSI including soil sampling and groundwater monitoring, a total of 21 AECs at the site have been identified as requiring further investigation and / or remediation. DP recommends that targeted Supplementary Site Investigations (SSI) are carried out specific for the AECs. The SSI design should consider recommendations made in this report in order to further characterise identified AECs. Precincts 300 (south of Howes Creek), 100, 400 and 500 have not previously been subject of a contamination assessment, prior to this PSI.

Given the size of the site and to assist subdivision, SSI reports should be prepared and delivered specific to AECs or development staging areas.

DP recommends AEC specific SSIs are carried out as follows:

- Coal wash material fill and stockpiles in Precincts 500 and 300 (AECs 1, 2, 4, 5 and 12);
- ACM impact and burial pits in the former fireworks factory (AECs 14, 17 and 18);
- Stockpiles and suspected filling (AECs 3, 4, 6, 8, 9, 11, 13 and 16);
- Farm shed (AEC 16);
- Minor AECs (AECs 19, 20, and 21); and
- Low density sampling for Precincts 300 (north of Howes Creek), 100, 400 and 500.

Given the likely complexity of the SSI design for portions of the site (such as the former fireworks site and coal wash material in Precinct 500) and the large size of the site, DP recommends a Sampling and Analysis Quality Plan (SAQP) is prepared prior to each SSI. The purpose of the SAQP is to outline how data will be collected and assessed during the SSI with respect to identified AECs. Low density sampling for Precincts 300 (north of Howes Creek), 100, 400 and 500 shall comprise one sample location per hectare and shall include sampling completed as part of this PSI. Such low density sampling is typically required by Council prior to development application for individual development stages.

Depending on the findings of the SSI, it may be necessary to conduct further investigation works, such as additional groundwater monitoring. A Remediation Action Plan (RAP) will be required to be prepared prior to any remediation works.

The potential for contamination constraints to the proposed development for the site excluding the AECs is considered by DP to be low, however there exists the potential for isolated pockets of contamination to be present in areas of the site that have not been directly subject to intrusive investigation as part of this PSI. To appropriately manage unexpected potential contamination issues encountered during development works, DP recommends the development and implementation of an Unexpected Finds Protocol prior to carrying out bulk earthworks at the site.

15. Limitations

Douglas Partners (DP) has prepared this report (or services) for this project at Menangle Park North, Menangle Park in accordance with DP's proposal dated 5 August 2016. The work was carried out under Contract reference 13647/80172527 dated 14 February 2017. This report is provided for the exclusive use of Dahua Group Sydney Project 2 Pty Ltd 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.

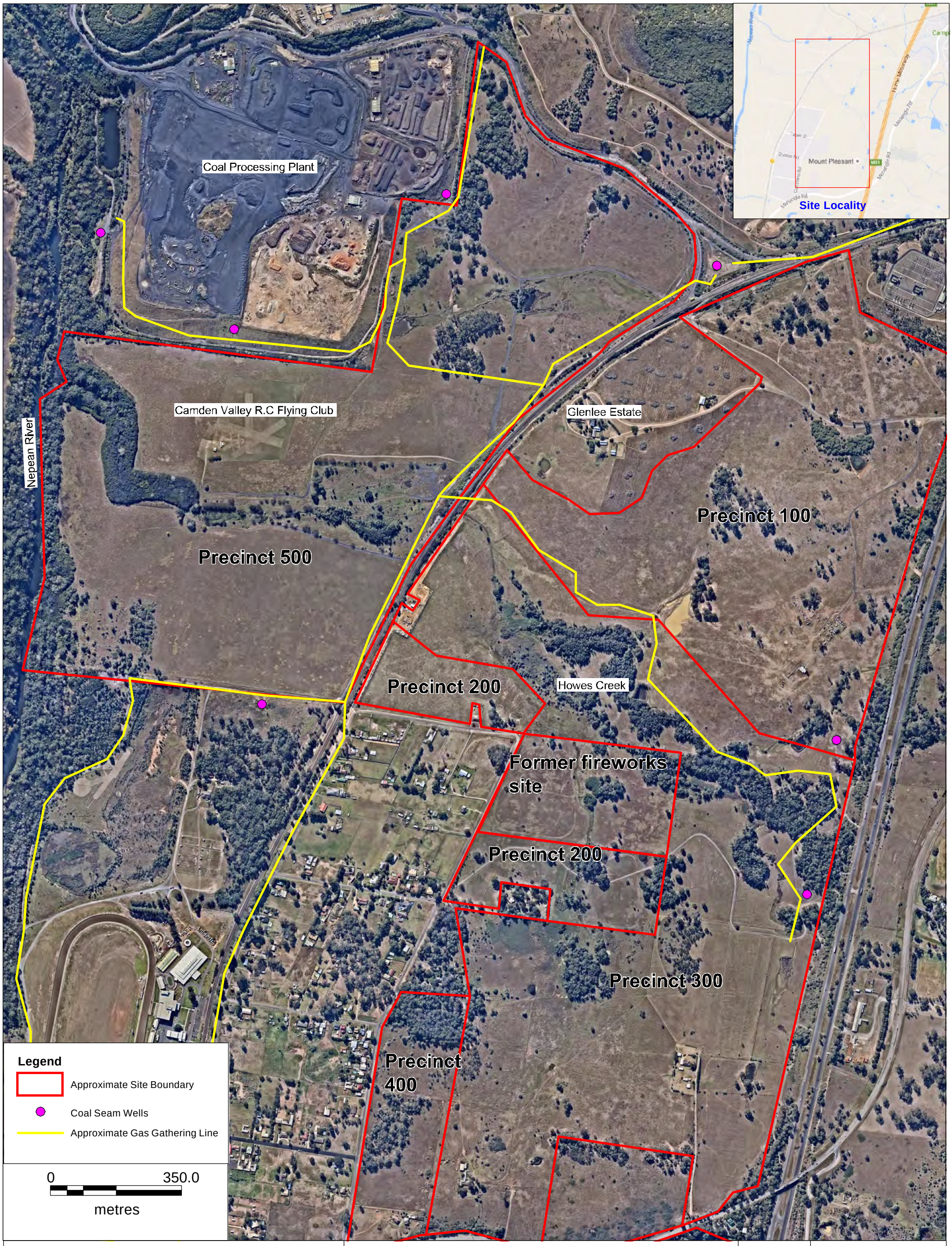
This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

This report has been produced with reference to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 (ASC NEPM 1999) as originally issued and does not take into account the amendments made to ASC NEPM 1999 in 16 May 2013 and as approved by the NSW EPA on 11 June 2013 [or other state approvals as appropriate]. This is because this report was commenced and substantially completed prior to 16 May 2013; and significant additional works and/or cost would be necessary to meet the amended ASC NEPM; and the information available to DP to date indicates that any possible risks associated with applying the original ASC NEPM are likely to be relatively low.

Douglas Partners Pty Ltd

Appendix A

Drawings and About This Report



Douglas Partners
Geotechnics | Environment | Groundwater

TITLE: Site Locality and Site Boundary
Proposed Residential Subdivision
Menangle Park North, NSW

OFFICE: Macarthur
DRAWN BY: CLN
DATE: 10.04.17

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT No: 76744.01
DRAWING No: 1
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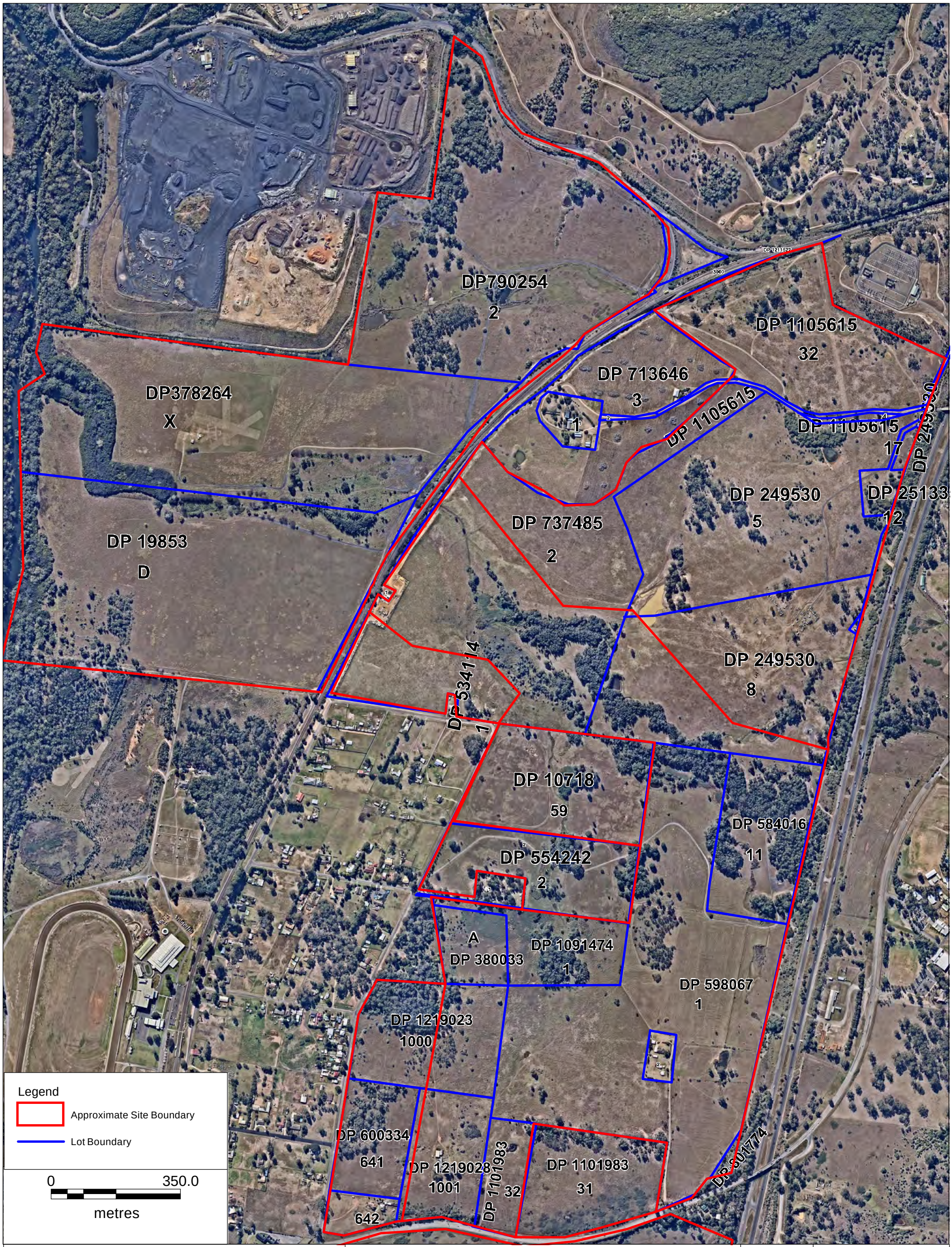

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TITLE: Lot Boundaries
Proposed Residential Subdivision
Menangle Park North, NSW

OFFICE: Macarthur
DRAWN BY: CLN
DATE: 11.04.17

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT No: 76744.01
DRAWING No: 2
REVISION: A
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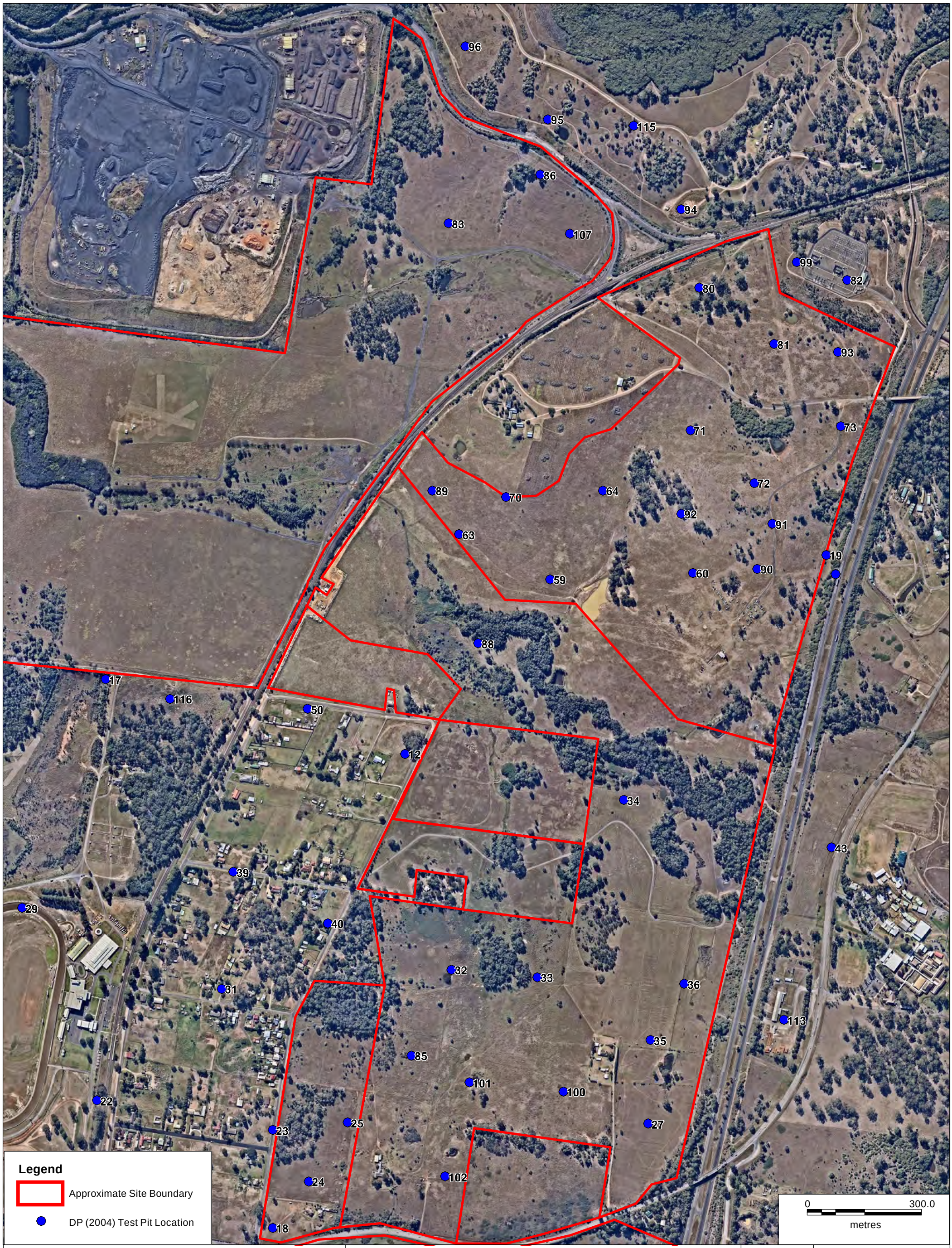

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TITLE: Previous Investigation Test Pit Locations
Proposed Residential Subdivision
Menangle Park North, NSW

OFFICE: Macarthur
DRAWN BY: CLN
DATE: 11.04.2017

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT No: 76744.01
DRAWING No: 3
REVISION: A
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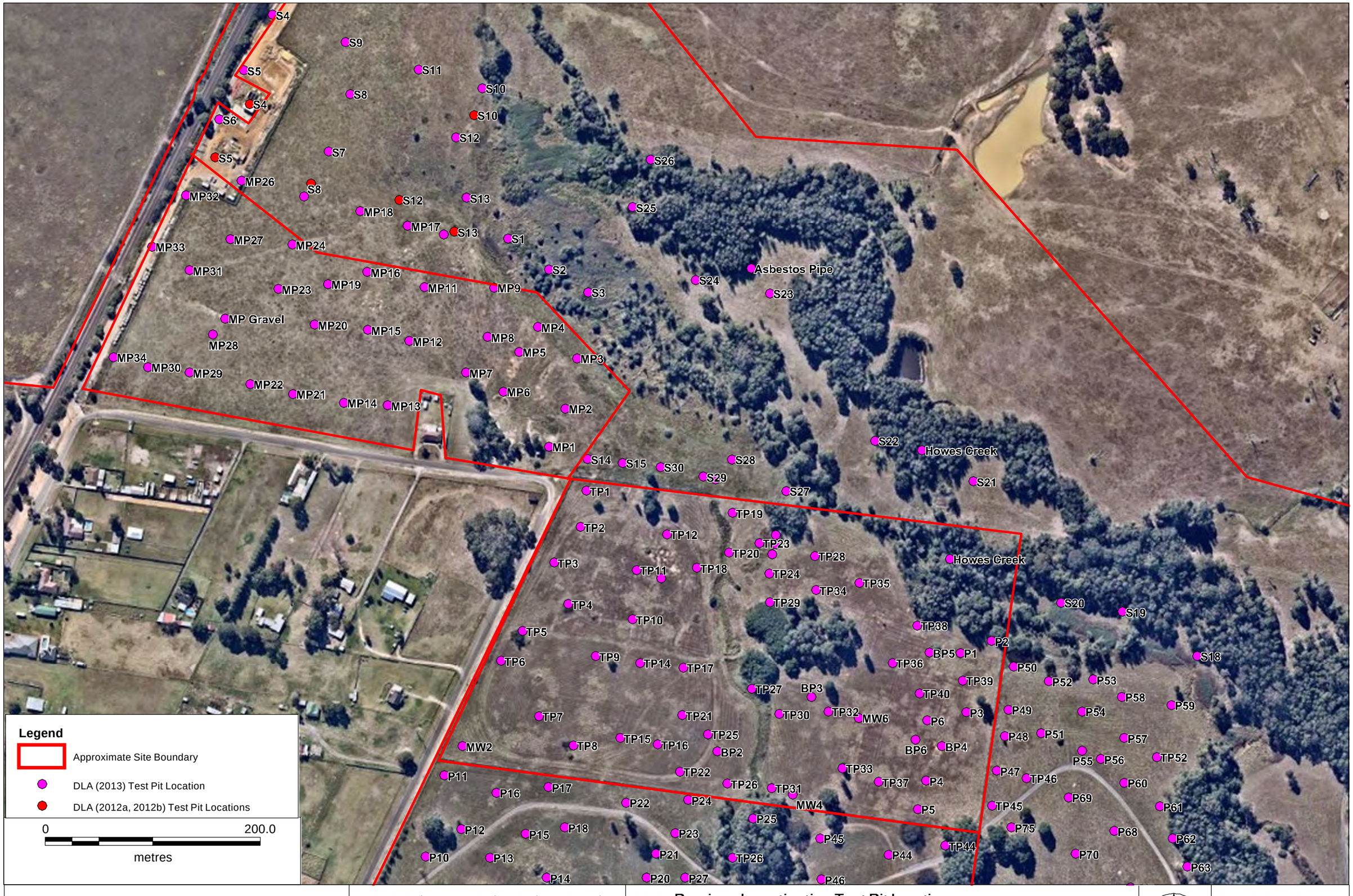

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CLIENT: Dahua Group Sydney Project 2 Pty Ltd		TITLE: Previous Investigation Test Pit Locations Proposed Residential Subdivision Menangle Park North, NSW	PROJECT No: 76744.01
OFFICE: Macarthur	DRAWN BY: CLN		DRAWING No: 3a
SCALE: As shown	DATE: 10.04.2017		REVISION: A

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CLIENT: Dahua Group Sydney Project 2 Pty Ltd		TITLE: Previous Investigation Test Pit Locations Proposed Residential Subdivision Menangle Park North, NSW	PROJECT No: 76744.01
OFFICE: Macarthur	DRAWN BY: CLN		DRAWING No: 3b
SCALE: As shown	DATE: 10.04.2017		REVISION: A

N
MGA

P36 P41 P43 P35 P90 P89 P82 TP48 SA1 TP50 P88 P83 P80 SA2 P93 P76 P81 P87 P84 P92 P79 P77 TP51 Abandoned P91 P86 TP49 P78 P85 BH2 BH42 BH1 BH51 BH48 BH52 BH50 BH43 BH20 Rubbish Pi BH4 BH19 BH5 BH3 BH21 BH45 BH47 BH49 BH41 BH6 BH7 BH22 BH44 BH26 BH27 BH8 BH9 BH10 BH23 BH25 BH34 BH33 BH28 BH18 Rubbish Pi BH40 BH11 Rubbish Pit BH24 BH46 BH29 BH32 BH35 BH17 SP BH12 BH31 BH16 BH36 BH15 BH13 BH37 BH30 BH38 BH14 BH39

Legend

Approximate Site Boundary

DLA (2013) Test Pit Locations

0 150.0

metres

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CLIENT: Dahua Group Sydney Project 2 Pty Ltd		TITLE: Previous Investigation Test Pit Locations Proposed Residential Subdivision Menangle Park North, NSW
OFFICE: Macarthur	DRAWN BY: CLN	
SCALE: As shown	DATE: 10.04.2017	

N
MGA

PROJECT No:	76744.01
DRAWING No:	3c
REVISION:	A

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TITLE: Historical Aerial Photograph - 1956
Proposed Residential Subdivision
Menangle Park North, NSW

MGA

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DATE: 11.04.2017

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT No: 76744.01
DRAWING No: 4
REVISION: A
SCALE: As shown

Legend

Approximate Site Boundary

Historical Feature

0 500.0

metres

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TITLE: Historical Aerial Photograph - 1975
Proposed Residential Subdivision
Menangle Park North, NSW

N
MGA

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DRAWN BY: CLN
DATE: 11.04.2017

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT No: 76744.01
DRAWING No: 5
REVISION: A
SCALE: As shown

Legend

Approximate Site Boundary

Historical Feature

0 500.0

metres

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TITLE: Historical Aerial Photograph - 1984
Proposed Residential Subdivision
Menangle Park North, NSW

MGA

N

OFFICE: Macarthur

DRAWN BY: CLN

DATE: 11.04.2017

CLIENT: Dahua Group Sydney Project 2 Pty Ltd

PROJECT No: 76744.01

DRAWING No: 6

REVISION: A

SCALE: As shown

Legend

Approximate Site Boundary

Historical Feature

0 500.0

metres

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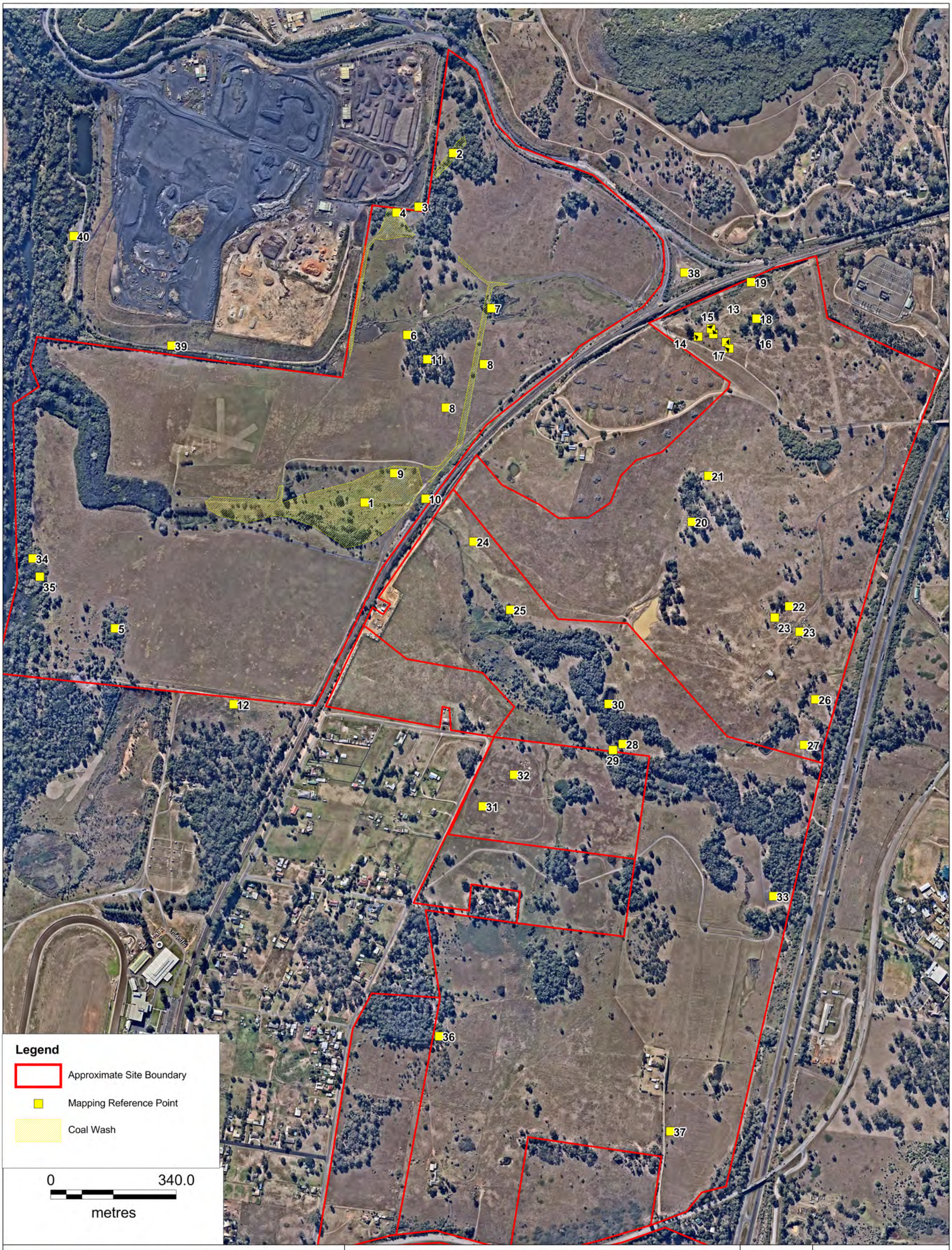
TITLE: Historical Aerial Photograph - 1994
Proposed Residential Subdivision
Menangle Park North, NSW

MGA

OFFICE: Macarthur
DRAWN BY: CLN
DATE: 11.04.2017

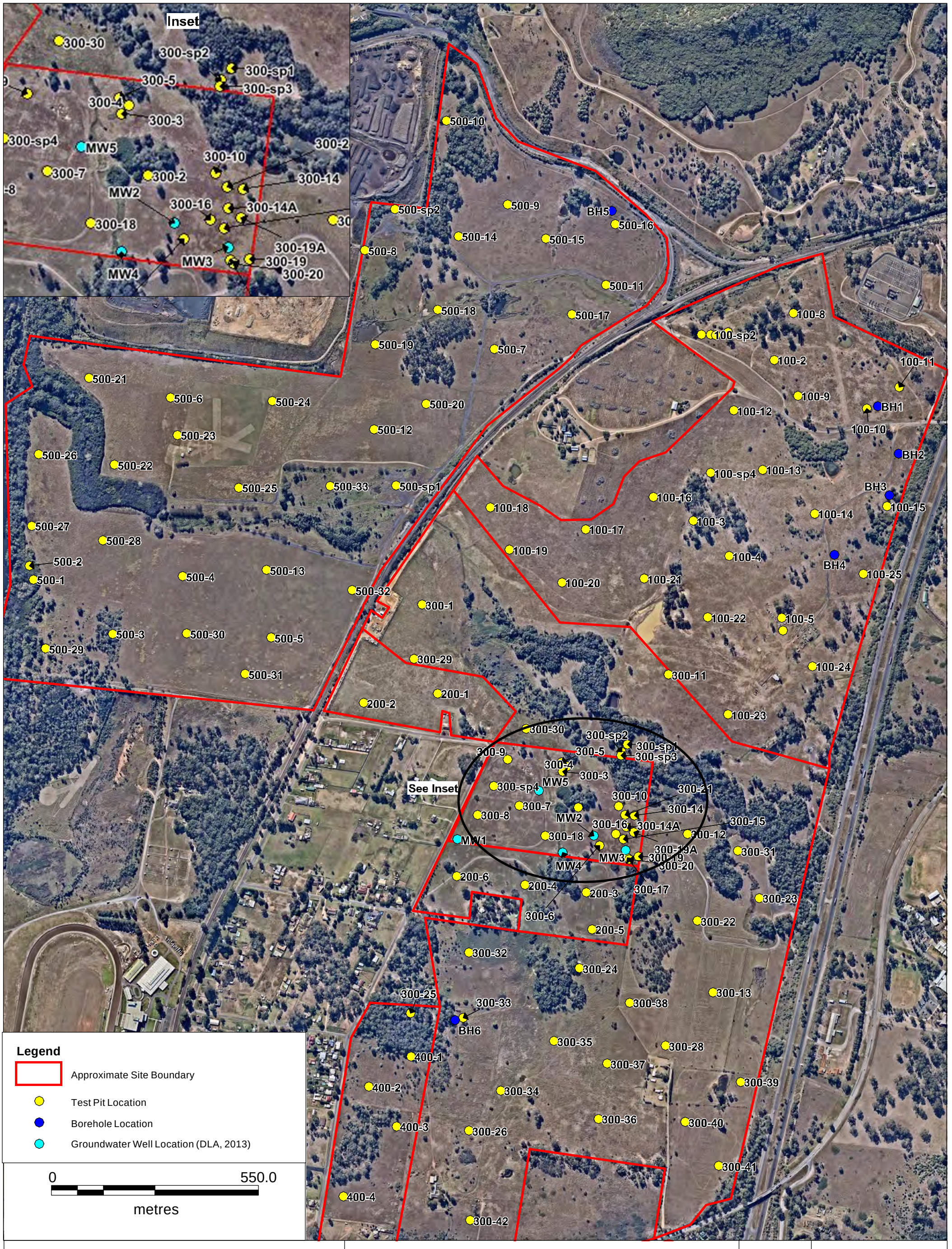
CLIENT: Dahua Group Sydney Project 2 Pty Ltd | PROJECT No: 76744.01 | DRAWING No: 7 | REVISION: A | SCALE: As shown



Douglas Partners
Geotechnics / Environment / Groundwater

TITLE: Site Walkover Observations Proposed Residential Subdivision Menangle Park North, NSW				OFFICE: Macarthur DRAWN BY: CLN DATE: 11.04.2017
CLIENT: Dahua Group Sydney Project 2 Pty Ltd	PROJECT No: 76744.01	DRAWING No: 8	REVISION: A	SCALE: As shown

MRP	Observation
1	Various areas covered with suspected coal wash (approximate and not definitive)
2	Coal wash in creek
3	Gas well
4	Stockpiles of coal wash
5	Former structure - timber fencing and corrugated steel
6	Possible filling in dam wall
7	"Figure 8" feature - possible former structure
8	Railway embankment may contain suspected coal wash material
9	Scattered brick fragments - possible former structure
10	Gas well
11	Relic farming equipment
12	Loose railway ballast on ground surface
13	Stockpiles of topsoil, light brown gravelly clay, blue gravel, concrete pipe and construction and demolition type material
14	Two wells in concrete casing
15	Dilapidated horse shelter constructed with brick and corrugated steel
16	Stockpile containing timber fence posts
17	Well in concrete casing
18	Timber power line running parallel to the railway embankment
19	Laydown area / storage yard containing metal, old railway sleepers, corrugated steel, chainlink metal aviary containers
20	Possible fill wall
21	Scrap yard containing old cars, horseboxes, small animal kennels, small plant and machinery and several IBC's
22	Possible fill material in ridge line
23	Uneven ground - possible fill material
24	Loose scattered tyres
25	Gas well
26	Several stockpiles covered with grass
27	Concrete drainage pipe covered with suspected coal wash
28	Stockpile - suspected to be 'cut' from making of adjacent dam. Stockpile is covered with grass
29	Stockpiles covered with grass
30	Several suspected ACM fragments visible on surface
31	Gas well
32	Several ACM pipes and fragments of asbestos on site surface
33	Shanty with disused electrical appliances



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TITLE: Test Pit and Borehole Locations
Proposed Residential Subdivision
Menangle Park North, NSW

OFFICE: Macarthur
DRAWN BY: CLN
DATE: 11.04.2017

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT No: 76744.01
DRAWING No: 9
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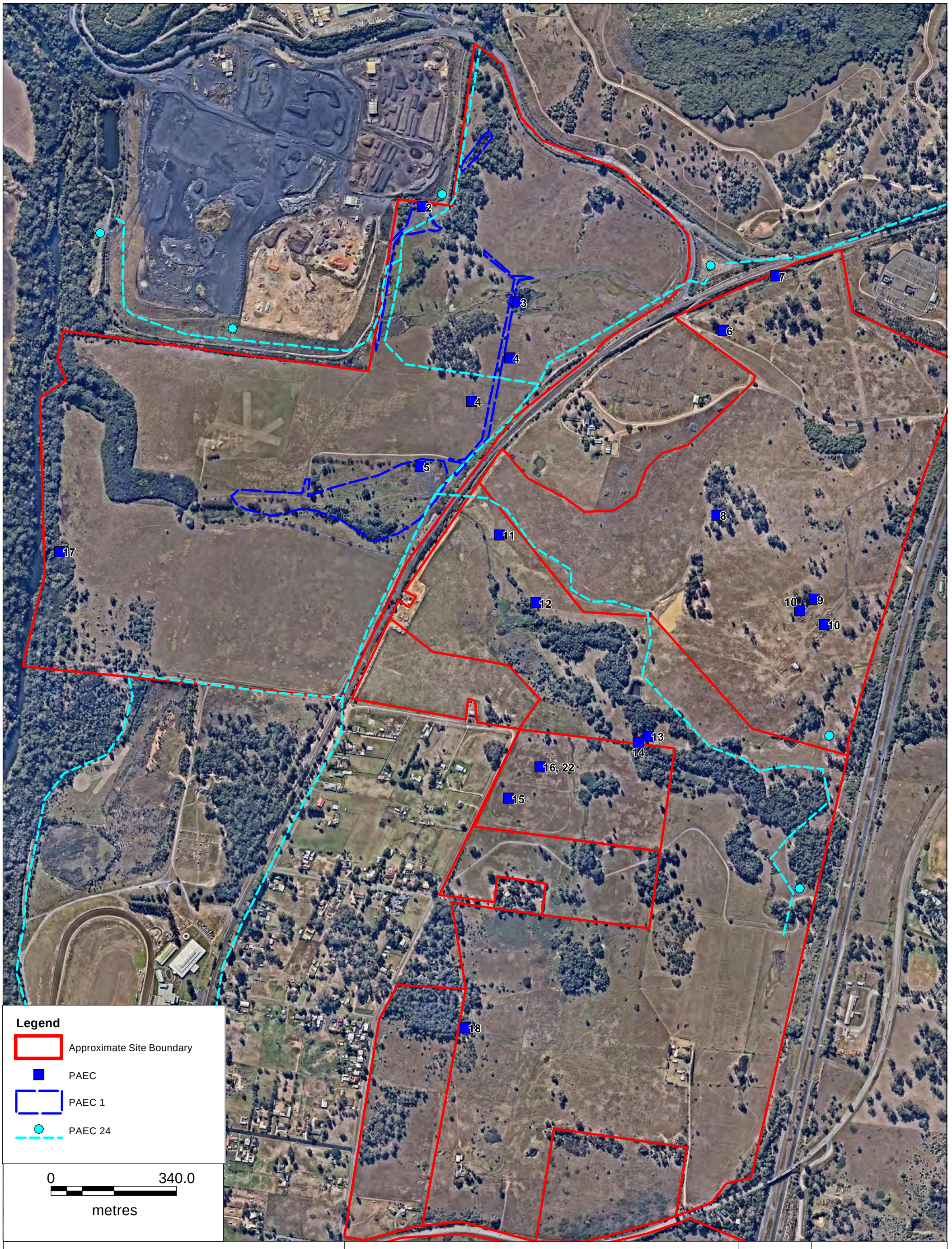

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TITLE: Potential Areas of Environmental Concern
Proposed Residential Subdivision
Menangle Park North, NSW

MGA

OFFICE: Macarthur
DRAWN BY: CLN
DATE: 11.04.2017

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT No: 76744.01
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REVISION: A
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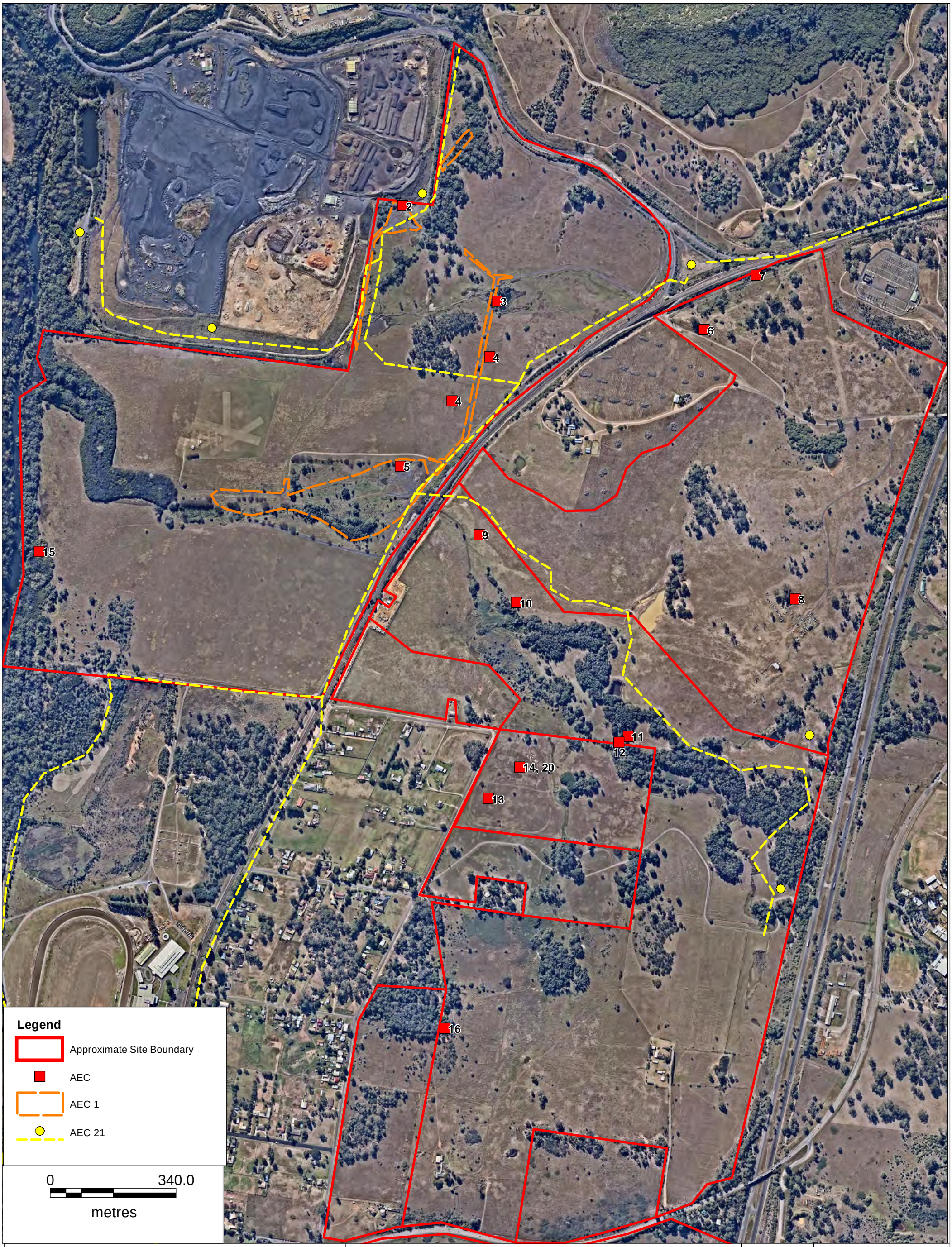

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TITLE: Areas of Environmental Concern
Proposed Residential Subdivision
Menangle Park North, NSW

MGA

OFFICE: Macarthur
DRAWN BY: CLN
DATE: 11.04.2017

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT No: 76744.01
DRAWING No: 11
REVISION: A
SCALE: As shown

About this Report

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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.

Copyright

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:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- 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.

Sampling Methods

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Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Soil Descriptions

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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, 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:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

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

Type	Particle size (mm)
Coarse gravel	20 - 63
Medium gravel	6 - 20
Fine gravel	2.36 - 6
Coarse sand	0.6 - 2.36
Medium sand	0.2 - 0.6
Fine sand	0.075 - 0.2

The proportions of secondary constituents of soils are described as:

Term	Proportion	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	20 - 35%	Sandy Clay
Slightly	12 - 20%	Slightly Sandy Clay
With some	5 - 12%	Clay with some sand
With a trace of	0 - 5%	Clay with a trace of sand

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:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	vs	<12
Soft	s	12 - 25
Firm	f	25 - 50
Stiff	st	50 - 100
Very stiff	vst	100 - 200
Hard	h	>200

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:

Relative Density	Abbreviation	SPT N value	CPT qc value (MPa)
Very loose	vl	<4	<2
Loose	l	4 - 10	2 -5
Medium dense	md	10 - 30	5 - 15
Dense	d	30 - 50	15 - 25
Very dense	vd	>50	>25

Soil Descriptions

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
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.

Rock Strength

Rock strength is defined by the Point Load Strength Index ($Is_{(50)}$) and refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects. The test procedure is described by Australian Standard 4133.4.1 - 1993. The terms used to describe rock strength are as follows:

Term	Abbreviation	Point Load Index $Is_{(50)}$ MPa	Approx Unconfined Compressive Strength MPa*
Extremely low	EL	<0.03	<0.6
Very low	VL	0.03 - 0.1	0.6 - 2
Low	L	0.1 - 0.3	2 - 6
Medium	M	0.3 - 1.0	6 - 20
High	H	1 - 3	20 - 60
Very high	VH	3 - 10	60 - 200
Extremely high	EH	>10	>200

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Extremely weathered	EW	Rock substance has soil properties, i.e. it can be remoulded and classified as a soil but the texture of the original rock is still evident.
Highly weathered	HW	Limonite staining or bleaching affects whole of rock substance and other signs of decomposition are evident. Porosity and strength may be altered as a result of iron leaching or deposition. Colour and strength of original fresh rock is not recognisable
Moderately weathered	MW	Staining and discolouration of rock substance has taken place
Slightly weathered	SW	Rock substance is slightly discoloured but shows little or no change of strength from fresh rock
Fresh stained	Fs	Rock substance unaffected by weathering but staining visible along defects
Fresh	Fr	No signs of decomposition or staining

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with some fragments
Fractured	Core lengths of 40-200 mm with some shorter and longer sections
Slightly Fractured	Core lengths of 200-1000 mm with some shorter and loner sections
Unbroken	Core lengths mostly > 1000 mm

Rock Descriptions

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq \text{100 mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or better. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Symbols & Abbreviations

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Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core Drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

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

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

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

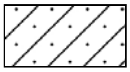
Soils


Topsoil

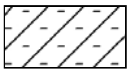

Peat


Clay

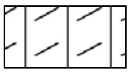

Silty clay

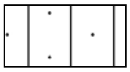

Sandy clay

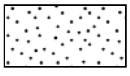

Gravelly clay

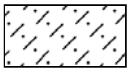

Shaly clay

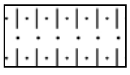

Silt


Clayey silt


Sandy silt

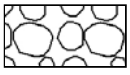

Sand

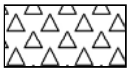

Clayey sand


Silty sand


Gravel


Sandy gravel


Cobbles, boulders

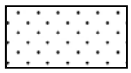

Talus

Sedimentary Rocks

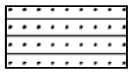

Boulder conglomerate

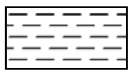

Conglomerate


Conglomeratic sandstone

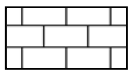

Sandstone


Siltstone


Laminite

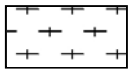

Mudstone, claystone, shale

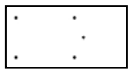

Coal


Limestone

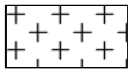
Metamorphic Rocks

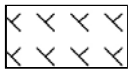

Slate, phyllite, schist

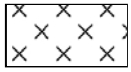

Gneiss

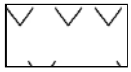

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

Cone Penetration Tests

Douglas Partners

Introduction

The Cone Penetration Test (CPT) is a sophisticated soil profiling test carried out in-situ. A special cone shaped probe is used which is connected to a digital data acquisition system. The cone and adjoining sleeve section contain a series of strain gauges and other transducers which continuously monitor and record various soil parameters as the cone penetrates the soils.

The soil parameters measured depend on the type of cone being used, however they always include the following basic measurements

- Cone tip resistance q_c
- Sleeve friction f_s
- Inclination (from vertical) i
- Depth below ground z

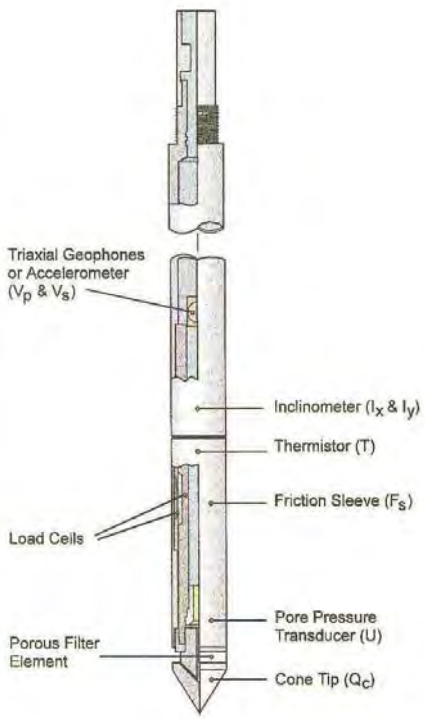


Figure 1: Cone Diagram

The inclinometer in the cone enables the verticality of the test to be confirmed and, if required, the vertical depth can be corrected.

The cone is thrust into the ground at a steady rate of about 20 mm/sec, usually using the hydraulic rams of a purpose built CPT rig, or a drilling rig. The testing is carried out in accordance with the Australian Standard AS1289 Test 6.5.1.

Figure 2: Purpose built CPT rig

The CPT can penetrate most soil types and is particularly suited to alluvial soils, being able to detect fine layering and strength variations. With sufficient thrust the cone can often penetrate a short distance into weathered rock. The cone will usually reach refusal in coarse filling, medium to coarse gravel and on very low strength or better rock. Tests have been successfully completed to more than 60 m.

Types of CPTs

Douglas Partners (and its subsidiary GroundTest) owns and operates the following types of CPT cones:

Type	Measures
Standard	Basic parameters (q_c, f_s, i & z)
Piezocone	Dynamic pore pressure (u) plus basic parameters. Dissipation tests estimate consolidation parameters
Conductivity	Bulk soil electrical conductivity (σ) plus basic parameters
Seismic	Shear wave velocity (V_s), compression wave velocity (V_p), plus basic parameters

Strata Interpretation

The CPT parameters can be used to infer the Soil Behaviour Type (SBT), based on normalised values of cone resistance (Qt) and friction ratio (Fr). These are used in conjunction with soil classification charts, such as the one below (after Robertson 1990)

Cone Penetration Tests

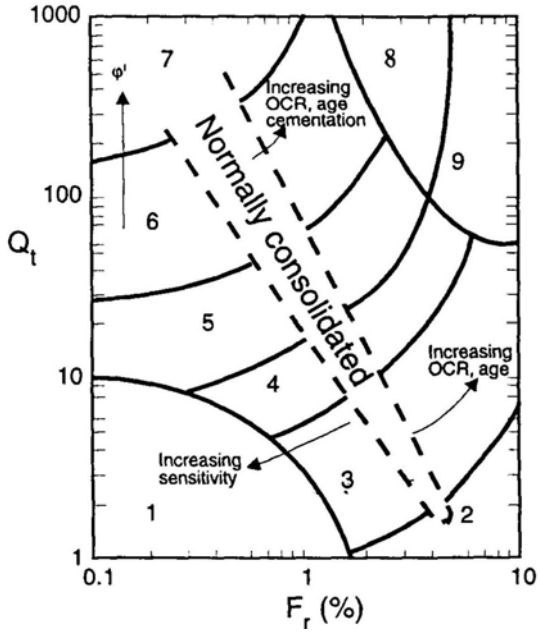


Figure 3: Soil Classification Chart

DP's in-house CPT software provides computer aided interpretation of soil strata, generating soil descriptions and strengths for each layer. The software can also produce plots of estimated soil parameters, including modulus, friction angle, relative density, shear strength and over consolidation ratio.

DP's CPT software helps our engineers quickly evaluate the critical soil layers and then focus on developing practical solutions for the client's project.

Engineering Applications

There are many uses for CPT data. The main applications are briefly introduced below:

Settlement

CPT provides a continuous profile of soil type and strength, providing an excellent basis for settlement analysis. Soil compressibility can be estimated from cone derived moduli, or known consolidation parameters for the critical layers (eg. from laboratory testing). Further, if pore pressure dissipation tests are undertaken using a piezocone, in-situ consolidation coefficients can be estimated to aid analysis.

Pile Capacity

The cone is, in effect, a small scale pile and, therefore, ideal for direct estimation of pile capacity. DP's in-house program ConePile can analyse most pile types and produces pile capacity versus depth plots. The analysis methods are based on proven static theory and empirical studies, taking account of scale effects, pile materials and method of installation. The results are expressed in limit state format, consistent with the Piling Code AS2159.

Dynamic or Earthquake Analysis

CPT and, in particular, Seismic CPT are suitable for dynamic foundation studies and earthquake response analyses, by profiling the low strain shear modulus G_0. Techniques have also been developed relating CPT results to the risk of soil liquefaction.

Other Applications

Other applications of CPT include ground improvement monitoring (testing before and after works), salinity and contaminant plume mapping (conductivity cone), preloading studies and verification of strength gain.

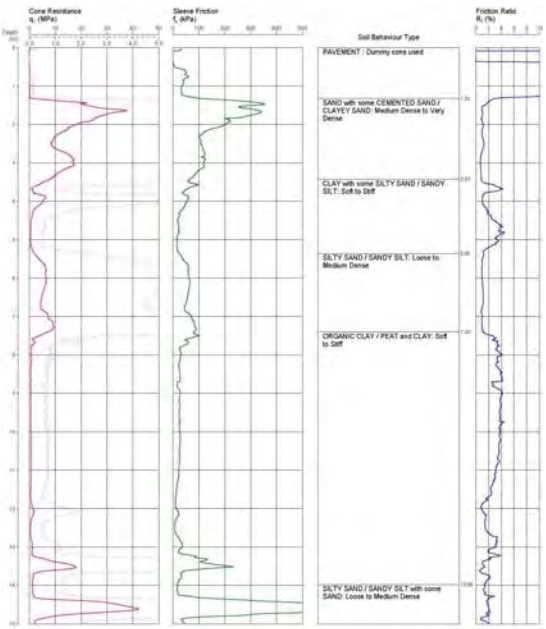


Figure 4: Sample Cone Plot

Appendix B

Site Photographs

Photograph 1 - Suspected Coal Wash

Photograph 2 - One of four gas wells

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJ:	76744.01
	PSI with Limited Sampling	PLATE:	1
	Menangle Park North, NSW	REV:	A
	CLIENT: Dahua Group Sydney Project 2 Pty Ltd	DATE:	24.11.2016

Photograph 3 - Stockpiles of timber and corrugated steel

Photograph 4 - Fill associated with the railway embankment

Douglas Partners Geotechnics | Environment | Groundwater	Site Photographs	PROJ:	76744.01
	PSI with Limited Sampling	PLATE:	2
	Menangle Park North, NSW	REV:	A
	CLIENT: Dahua Group Sydney Project 2 Pty Ltd	DATE:	24.11.2016

Photograph 5 - Stockpile of loose timber fence posts

Photograph 6 - Dilapidated horse shelter

Douglas Partners Geotechnics / Environment / Groundwater	Site Photographs	PROJ:	76744.01
	PSI with Limited Sampling	PLATE:	3
	Menangle Park North, NSW	REV:	A
	CLIENT: Dahua Group Sydney Project 2 Pty Ltd	DATE:	24.11.2016

Photoraph 7 - Scattered rubbish in lay down / scrap yard

Photograph 8 - ACM pipes

Douglas Partners Geotechnics | Environment | Groundwater	Site Photographs	PROJ:	76744.01
	PSI with Limited Sampling	PLATE:	4
	Menangle Park North, NSW	REV:	A
	CLIENT: Dahua Group Sydney Project 2 Pty Ltd	DATE:	24.11.2016

Photograph 9 - An old shanty with disused electrical appliances inside

Photograph 10 - Grass covered stockpile with suspected ACM pipe and concrete slab

Douglas Partners Geotechnics | Environment | Groundwater	Site Photographs	PROJ:	76744.01
	PSI with Limited Sampling	PLATE:	5
	Menangle Park North, NSW	REV:	A
	CLIENT: Dahua Group Sydney Project 2 Pty Ltd	DATE:	24.11.2016

Appendix C

DQO

Appendix C1: Data Quality Objectives

This Data Gaps DSI has been devised broadly in accordance with the seven step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of the *National Environment Protection (Assessment of Site Contamination) Measure* 1999 as amended 2013 (NEPC, 2013). The DQO process is outlined below:

C1.1 State the Problem

The site is proposed to be redeveloped for residential land use with accessible soils. Review of previous assessments, site history and a site inspection identified key potential areas of environmental concern (PAEC) associated with historical site use. In order to assess the contamination status of the site, targeted and grid sampling locations were carried out across the site.

The "problem" to be addressed is therefore to confirm the extent and nature of potential contamination at the site (which is currently not known), and as such, it is unclear whether the site is suitable for the proposed development.

C1.2 Identify the Decision/Goal of the Study

The suitability of the site for the proposed residential land use was assessed based on a comparison of the analytical results for all contaminants of potential concern (COPC) with the adopted site assessment criteria (SAC) as detailed in Appendix E2 and discussed below.

The main COPC are expected to be total recoverable hydrocarbons (TRH), benzene, toluene, ethyl benzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH), heavy metals and asbestos. Other commonly found contaminants which may be present include phenols, organochlorine pesticides (OCP), organophosphate pesticides (OPP) and polychlorinated biphenyls (PCB). In addition, the metals aluminium, strontium, barium, iron and magnesium as well as an explosives suite was analysed for selected burial pit samples within the former fireworks factory (Precinct 300).

The following specific decisions were considered as part of the Data Gaps DSI:

- Did field observation and analytical results identify potential contamination sources which were not included in the preliminary CSM?
- Were COPC present in soil at concentrations that pose a potential risk to identified receptors?
- Were COPC present in background areas of the site at concentrations that are above expected background ranges?
- Does concentration of COPC in soil present a risk to groundwater beneath the site?
- Is the data sufficient to make a decision regarding the abovementioned risks, the suitability of the site for the proposed development, or are additional investigations required?
- Does contamination at the site, if encountered, trigger the Duty to Report requirements under the CLM Act 1997?
- Are there any off-site migration issues that need to be considered?

- Is the data sufficient to enable the preparation of a Remediation Action Plan (RAP) and / or Environmental Management Plan (EMP) should the data suggest these are required?

C1.3 Identify Information Inputs

Inputs into the decisions are as follows:

- Review of relevant previous investigations;
- Review of regional geology, topography and hydrogeology information;
- Review of site history information;
- Completion of a site inspection
- The lithology of the site as described in the test pit logs;
- Soil samples were collected in a general grid pattern across the Site. A total of 115 test pits were excavated;
- Field and laboratory QA / QC data to assess the suitability of the environmental data for the PSI (Appendix H);
- Analytical results for the COPC; and
- Laboratory reported concentrations of COPC were compared with the NEPC (2013) criteria as discussed in Section E2.

C1.4 Define the Study Boundaries

The site is irregular in shape with an approximate area of 393 hectares (ha) and lies within the Local Government Area (LGA) of Campbelltown City Council. For reporting purposes, the site has been sub-split into five areas (Precincts 100 to 500) which correspond to the proposed development precincts, as provided by APP. The precinct boundaries are presented on Drawing 1. The site is currently registered as 22 separate lots as shown on Drawing 2.

The investigation was undertaken to a maximum depth of 3.0 m below ground level (bgl) across the site. All test pits terminated in natural soils.

Field investigations were undertaken between 19 January and 15 February 2017 by a DP environmental scientist / engineer.

C1.5 Develop the Analytical Approach (or decision rule)

The information obtained during the assessment was used to characterise the site in terms of contamination issues and risk to human health and the environment. The decision rules used in characterising the site were as follows:

- The adopted SAC was the NSW Environment Protection Authority (EPA) endorsed criteria; and
- The contaminant concentrations in soil were compared to the adopted SAC to determine whether further investigation or remedial action was required.

Field and laboratory test results were considered useable for the assessment after evaluation against the following data quality indicators (DQIs):

- Precision – a measure of variability or reproducibility of data;
- Accuracy – a measure of closeness of the data to the 'true' value;
- Representativeness – the confidence (qualitative) of data representativeness of media present on site;
- Completeness – a measure of the amount of usable data from a data collection activity; and
- Comparability – the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event.

The specific limits are outlined in the data QA / QC procedures and results (Appendix H).

C1.6 Specify the Performance or Acceptable Criteria

Decision errors for the respective COPC for fill and natural soils are:

1. Deciding that fill and natural soil at the site exceeds the adopted SAC when they truly do not; and
2. Deciding that fill and natural soil at the site is within the adopted SAC when they truly do not.

Decision errors for the PSI were minimised and measured by the following:

- The sampling regime targeted each stratum identified to account for site variability;
- Sample collection and handling techniques were in accordance with DP's *Field Procedures Manual*;
- Samples were prepared and analysed by a NATA-accredited laboratory with the acceptance limits for laboratory QA / QC parameters based on the laboratory reported acceptance limits and those stated in NEPC (2013);
- The analyte selection is based on the available site history, past site activities, site features and the findings of previous investigations. The potential for contaminants other than those proposed to be analysed is considered to be low;
- The SAC were adopted from established and NSW EPA endorsed guidelines. The SAC have risk probabilities already incorporated; and
- A NATA accredited laboratory using NATA endorsed methods are used to perform laboratory analysis. Where NATA endorsed methods are not used, the reasons are stated. The effect of using non-NATA methods on the decision making process are explained.

C1.7 Optimise the design for obtaining data

Sampling design and procedures that were implemented to optimise data collection for achieving the DQOs included the following;

- NATA endorsed methods were used to perform laboratory analysis;

- To optimise the selection of soil samples for chemical analysis, all samples collected were screened using a calibrated photo-ionisation detector (PID) allowing for site assessment and sample selection. In addition, additional soil samples were collected but kept 'on hold' pending details of initial analysis so that they could be analysed if further delineation was required; and
- Adequately experienced environmental scientists/engineers were chosen to conduct field work and sample analysis interpretation.

Appendix C2: Site Assessment Criteria (Residential)

The Site Assessment Criteria (SAC) applied in the current investigation are informed by the proposed land use and the CSM which identified human and environmental receptors to potential contamination on the site (refer to Section 10). Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising investigation and screening levels as per Schedule B1, *National Environment Protection (Assessment of Site Contamination) Measure* 1999, as amended 2013 (NEPC, 2013).

The investigation and screening levels applied in the current investigation comprise levels adopted for a generic residential land use scenario with accessible soils.

C2.1 Health Investigation and Screening Levels

The generic Health Investigation Levels (HILs) and Health Screening Levels (HSLs) are considered to be appropriate for the assessment of human health risk associated with contamination at the site. The adopted soil HILs and HSLs for the potential contaminants of concern are presented in Table C2, with inputs into their derivation shown in Table C1.

HILs are applicable to assessing health risk arising via all relevant pathways of exposure for a range of metals and organic substances. The HIL are generic to all soil types and apply generally to a depth of 3 m below the surface for residential use.

HSLs are applicable to selected petroleum compounds and fractions to assess the risk to human health via inhalation and direct contact pathways. It should be noted that although the CSM identifies a direct contact pathway as well as construction worker receptors, the corresponding HSLs are significantly higher than those for the vapour intrusion pathway and are therefore not drivers for further assessment and/or remediation. As such the direct contact and intrusive maintenance worker HSLs have not been listed.

Table C1: Inputs to the Derivation of HSLs

Variable	Input	Rationale
Potential exposure pathway	Inhalation of vapours	Potential exposure pathways
Soil Type	Silt	Dominant soil type in surface soils (see Test Pit and Borehole Logs – Appendix F
Depth to contamination	0 m to <1 m	Potential contamination sources likely to impact surface soils

Table C2: HIL and HSL in mg/kg Unless Otherwise Indicated

Contaminants		HIL- A	HSL- AB
Metals	Arsenic	100	-
	Cadmium	20	-
	Chromium (VI)	100	-
	Copper	6000	-
	Lead	300	-
	Mercury (inorganic)	40	-
	Nickel	400	-
	Zinc	7400	-
PAH	Benzo(a)pyrene TEQ[1]	3	-
	Total PAH	300	
	Naphthalene	-	4
TRH	C6 – C10 (less BTEX) [F1]	-	40
	>C10-C16 (less Naphthalene) [F2]	-	230
	>C16-C34 [F3]	-	-
	>C34-C40 [F4]	-	-
BTEX	Benzene	-	0.6
	Toluene	-	390
	Ethylbenzene	-	NL[3]
	Xylenes	-	95
Phenol	Pentachlorophenol (used as an initial screen)	100	-
OCP	Aldrin + Dieldrin	6	-
	Chlordane	50	-
	DDT+DDE+DDD	240	-
	Endosulfan	270	-
	Endrin	10	-
	Heptachlor	6	-
	HCB	10	-
	Methoxychlor	300	-
OPP	Chlorpyrifos	160	-
PCB[2]		1	

Notes:

1 Sum of carcinogenic PAH

2 Non dioxin-like PCBs only.

3 The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would results in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.

C2.2 Ecological Investigation Levels

Ecological Investigation Levels (EILs) and Added Contaminant Limits (ACLs), where appropriate, have been derived in NEPC (2013) for only a short list of contaminants comprising As, Cu, Cr (III), DDT, naphthalene, Ni, Pb and Zn. The adopted EILs, derived using the *Interactive (Excel) Calculation Spreadsheet* (Standing Council on Environment and Water (SCEW) website (http://www.scew.gov.au/node/941)) are shown in the following Table C4, with inputs into their derivation shown on Table C3.

Table C3: Inputs to the Derivation of EILs

Variable	Input	Rationale
Age of contaminants	"Aged" (>2 years)	Given the potential sources of soil contamination are from historic use, the contamination is considered as "aged" (>2 years)
pH	6.5	Based on the average of 441 soil analytical results (ranging from 4.2 to 9.9 pH units)
CEC	10 cmolc/kg	Based on the average of 18 soil analytical results (range from <1 to 38 meq/100g)
Clay content	10 %	Conservative value for initial screen
Traffic volumes	low	The Site is considered to be located within a low traffic area
State / Territory	New South Wales	-

Table C4: EIL in mg/kg

Analyte		EIL
Metals	Arsenic	100
	Copper	210
	Nickel	170
	Chromium III	410
	Lead	1100
	Zinc	480
PAH	Naphthalene	170
OCP	DDT	180

C2.3 Ecological Screening Levels

Ecological Screening Levels (ESLs) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESLs, based on a fine soil type are shown in the following Table C5.

Table C5: ESL in mg/kg

Analyte		ESL[1]	Comments
TRH	C6 – C10 (less BTEX) [F1]	180*	All ESLs are low reliability apart from those marked with * which are moderate reliability
	>C10-C16 (less Naphthalene) [F2]	120*	
	>C16-C34 [F3]	1300	
	>C34-C40 [F4]	5600	
BTEX	Benzene	65	
	Toluene	105	
	Ethylbenzene	125	
	Xylenes	45	
PAH	Benzo(a)pyrene	0.7	

C2.4 Other Guidelines Used

Where soil and groundwater compounds were recorded above the LOR but no suitable SAC was provided in NEPC (2013) guidelines, alternative guideline sources approved by NEPC (2013) were consulted. Such sources include US Environment Protection Agency (EPA) *Regional Screening Levels* (RSLs) for residential land use, as amended May 2016, and Canadian Environmental Quality Guidelines soil contact *Soil Quality Guidelines* (SQGs) for PAHs for residential / parkland land use (CCME, 2010). Where NEPC (2013) criteria were not available (or in the case of copper in groundwater were further assessed), metals were assessed against known background concentrations for soil and river water, as reported in Berkman, D.A. *Monograph 9 Field Geologists' Manual*, Fourth Edition, 2001 (Berkman, 2001). With regard to explosives, in the absence of a comprehensive guideline reference such analytical data will be considered further if any explosives are recorded above the LOR by the laboratory.

Asbestos in Soil

NEPC (2013) defines the various asbestos types as follows:

Bonded ACM: Asbestos containing material which is in sound condition, bound in a matrix of cement or resin, and cannot pass a 7 mm x 7 mm sieve.

FA: Fibrous asbestos material including severely weathered cement sheet, insulation products and woven asbestos material. This material is typically unbonded or was previously bonded and is now significantly degraded and crumbling.

AF: Asbestos fines including free fibres, small fibre bundles and also small fragments of bonded ACM that pass through a 7 mm x 7 mm sieve.

A detailed asbestos assessment was undertaken at 3 locations within Precinct 300 (Test Pits 300-19, 300-20 and 300-21). Soil samples collected for asbestos assessment purposes were assessed as per the procedures below:

- Manual on-site screening by passing each ~10 L bulk sample through a <7 mm aperture sieve (or spreading out each sample on contrasting coloured sheeting if soils were too cohesive) for visual identification of ACM.
- Laboratory analysis for asbestos of the 500 mL samples was completed at NATA accredited Envirolab Services Pty Ltd utilising Polarized Light Microscope Dispersion Staining techniques in accordance with Standards Australia (2004), Australian Standards (AS) 4964 Method for the Qualitative Identification of Asbestos in Bulk Samples (SA, 2004) to determine presence and weight of FA and AF.

At all other locations, a conservative approach was assumed as an initial screening measure. 50 g samples were collected and analysed at a LOR of 0.1 g / kg as a preliminary screen for the presence of asbestos at sampling locations across the Site. At these locations the preliminary screen was conducted to assess the potential extent of asbestos and to determine the requirement for (and / or to guide) further characterisation of asbestos with reference to NEPC (2013).

Appendix D

Test Pit Logs

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: 89 mAHD
EASTING: 293466
NORTHING: 6226013

PIT No: 100-1
PROJECT No: 76744.01
DATE: 15/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
89		FILLING - brown sandy gravelly clay with sandstone cobbles and boulders		E	0.0 0.1				
	0.5	SANDY CLAY - orange brown sandy clay with a trace of gravel and rootlets, MC<PL		E	0.5 0.6				
	0.8	Pit discontinued at 0.8m - limit of investigation							
88	1								1
87	2								2
86	3								3

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: ACM sheeting and brick fragments observed adjacent to stockpile

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: 98 mAHD
EASTING: 293591
NORTHING: 6225934

PIT No: 100-2
PROJECT No: 76744.01
DATE: 15/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
98	0.0	TOPSOIL - brown silty clay with some gravel and a trace of rootlets		E	0.0				
					0.1				
	0.2	SANDY GRAVELLY CLAY - hard, orange brown sandy gravelly (ironstone) clay with a trace of rootlets, MC<PL							
				E	0.4				
				D/B	0.5				
	0.9	SANDSTONE - very low strength, highly weathered, orange and grey sandstone with low to very low strength grey shale bands							
97	1			D	1.0				1
				D	1.5				
96	2	- with low strength sandstone band below 2.0m		D	2.0				2
	2.4	SILTSTONE - low strength, moderately weathered, orange and grey siltstone with extremely low strength, extremely weathered bands		D	2.5				
		- becoming clay-like below 3.0m							
95	3	3.0 Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: --
EASTING:
NORTHING:

PIT No: 100-3
PROJECT No: 76744.01
DATE: 13/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
		TOPSOIL - grey to light brown slightly clayey silt with a trace of sand		D	0.0 0.1				
	0.4	SILTY CLAY - hard, yellow brown silty clay with a trace of fine ironstone gravel		D	0.4 0.5				
	1			D	1.0		pp >600		1
		- becoming grey mottled brown and orange brown below 1.2m		D	1.5		pp >600		
	2			D	2.0		pp >600		2
		- with a trace of calcite nodules below 2.6m		D	2.5		pp >600		
	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0		pp >600		3

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: ECR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: 91 mAHD
EASTING: 293473
NORTHING: 6225416

PIT No: 100-4
PROJECT No: 76744.01
DATE: 14/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
91	0.2	TOPSOIL - brown silty clay with a trace of rootlets		E*	0.0 0.1				
		SILTY CLAY - hard, orange brown silty clay with a trace of rootlets, MC<PL		E D	0.4 0.5				
90	1	- becoming grey mottled orange below 1.0m		D	1.0				1
		- with extremely low to low strength orange shale bands below 1.5m		D	1.5				
	1.8	SHALE - extremely low strength, extremely weathered, grey and orange shale							
89	2			D	2.0				2
		- with low strength bands below 2.5m		D	2.5				
	2.7	Pit discontinued at 2.7m - refusal on medium strength shale							
88	3								3

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: * Replicate sample BD1/140217 collected

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: 95 mAHD
EASTING: 293610
NORTHING: 6225250

PIT No: 100-5
PROJECT No: 76744.01
DATE: 14/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
95		FILLING - sandy gravelly clay with some cobbles and boulders and anthropogenics comprising copper pipe and concrete		E	0.0				
					0.1				
				E	0.4				
					0.5				
	0.9	CLAYEY SILT - brown clayey silt with a trace of rootlets							
94	1								1
	1.1	SILTY CLAY - hard, orange mottled grey silty clay with a trace of rootlets, MC<PL							
	1.2	Pit discontinued at 1.2m - limit of investigation							
93	2								2
92	3								3

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: 95 mAHD
EASTING: 293613
NORTHING: 6225217

PIT No: 100-6
PROJECT No: 76744.01
DATE: 14/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
95	0.0	TOPSOIL - brown clayey silt with a trace of gravel and rootlets		E	0.0				
	0.1				0.1				
	0.2	GRAVELLY SILTY CLAY - hard, orange mottled grey gravelly silty clay with some cobbles							
	0.4			E	0.4				
	0.5				0.5				
	0.9	Pit discontinued at 0.9m - limit of investigation							
94	1								1
93	2								2
92	3								3

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Near old rusted vehicles and stockpile of tyres

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: 94 mAHD
EASTING: 293644
NORTHING: 6226056

PIT No: 100-8
PROJECT No: 76744.01
DATE: 15/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
94	0.0	TOPSOIL - brown clayey silt with a trace of gravel and rootlets							
	0.2	SANDY CLAY - hard, orange brown sandy clay with a trace of (ironstone) gravel and rootlets, MC<PL		D, U_{50}	0.5				
93	1	- becoming orange mottled grey, slightly gravelly below 1.0m		D	1.0				1
	1.4	SHALE - very low strength, highly weathered, orange and grey shale with a trace of ironstone		D	1.5				
		- becoming extremely low strength, grey below 1.6m							
92	2	- becoming brown and grey with low strength sandstone band below 2.0m		D	2.0				2
				D	2.5				
	2.6	SILTSTONE - low strength, moderately weathered, grey brown siltstone with low strength sandstone band							
91	3			D	3.0				3
	3.0	Pit discontinued at 3.0m - limit of investigation							

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: 107 mAHD
EASTING: 293650
NORTHING: 6225838

PIT No: 100-9
PROJECT No: 76744.01
DATE: 15/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
107	0.2	TOPSOIL - brown silty clay with some sand and a trace of rootlets							
	0.4	SANDY CLAY - hard, orange brown sandy clay with a trace of rootlets							
	0.6	SANDSTONE - low strength, moderately weathered, grey sandstone with medium strength bands		D	0.5				
106	1	Pit discontinued at 0.6m - refusal on medium strength sandstone							
105	2								
104	3								

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: ECR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: 126 mAHD
EASTING: 293843
NORTHING: 6225808

PIT No: 100-10
PROJECT No: 76744.01
DATE: 15/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
126	0.2	TOPSOIL - brown clayey silt with a trace of rootlets							
		SANDY CLAY - hard, orange brown sandy clay, slightly gravelly with ironstone gravel, MC<PL		D	0.5				
125	0.9	SANDSTONE - medium strength, moderately weathered, grey brown sandstone with very low strength ironstone band		D	1.0				
	1.1	Pit discontinued at 1.1m - refusal on medium strength sandstone							
124									
123									

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: 115 mAHD
EASTING: 293926
NORTHING: 6225863

PIT No: 100-11
PROJECT No: 76744.01
DATE: 15/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
115	0.2	TOPSOIL - brown silty clay with a trace of sand, gravel and rootlets							
		SANDY CLAY - hard, orange brown mottled grey sandy clay with a trace of rootlets, MC<PL		D	0.5				
114	1	- with some gravel below 1.0m		D	1.0				1
		- with ironstone inclusions below 1.5m		D	1.5				
113	2	- with very low strength orange sandstone band, MC~PL below 2.0m		D	2.0				2
	2.4	SANDSTONE - low strength, moderately weathered, orange and grey sandstone with medium strength band							
112	2.5	Pit discontinued at 2.5m - refusal on medium strength sandstone		D	2.5				3

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: --
EASTING:
NORTHING:

PIT No: 100-12
PROJECT No: 76744.01
DATE: 13/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
		TOPSOIL - dark brown clayey silt with a trace of rootlets, moist		D	0.0 0.1				
	0.3	SILTY CLAY - hard, red brown silty clay, fissured, MC<PL		D	0.4 0.5				
	0.8	SANDSTONE - very low strength, highly weathered, light brown sandstone with extremely low and low strength bands		D	1.0				
		- becoming low strength below 1.5m		D	1.5				
	1.8	Pit discontinued at 1.8m - refusal on low to medium strength sandstone							

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: ECR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: --
EASTING:
NORTHING:

PIT No: 100-13
PROJECT No: 76744.01
DATE: 13/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
		TOPSOIL - brown clayey silt with a trace of rootlets, moist		D	0.0				
	0.2	SILTY CLAY - hard, orange brown silty clay, MC<PL			0.1				
				D	0.4		pp >600		
					0.5				
	1			D/B	1.0		pp >600		1
				D	1.5		pp >600		
	2	- with a trace of calcite nodules below 2.0m		D	2.0		pp >600		2
				D	2.5		pp = 500-550		
	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0		pp = 450-500		3

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: ECR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: --
EASTING:
NORTHING:

PIT No: 100-14
PROJECT No: 76744.01
DATE: 13/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
		TOPSOIL - brown silty clay with a trace of rootlets		D	0.0				
					0.1				
	0.2	SILTY CLAY - hard, red brown silty clay with a trace of sandstone gravel and 2 rounded sandstone boulders (250mm x 200mm x 90mm) (COLLUVIUM)							
				D	0.4				
					0.5				
1	1.0	SANDSTONE - medium strength, highly weathered, light brown medium grained sandstone		D	1.0				1
	1.2	Pit discontinued at 1.2m - refusal on medium to high strength sandstone							
2									2
3									3

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: ECR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: --
EASTING:
NORTHING:

PIT No: 100-15
PROJECT No: 76744.01
DATE: 13/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
		TOPSOIL - brown silty clay with a trace of rootlets		D	0.0				
	0.2	SILTSTONE - very low strength, highly weathered, grey to brown siltstone			0.1				
		- becoming low strength below 0.5m		D	0.4				
	1	- becoming low to medium strength, moderately weathered below 0.9m		D	0.5				
	1.1	Pit discontinued at 1.1m - refusal on medium strength siltstone			1.0				

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: ECR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: --
EASTING:
NORTHING:

PIT No: 100-16
PROJECT No: 76744.01
DATE: 13/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
		TOPSOIL - brown clayey silt with a trace of rootlets, moist		D	0.0				
	0.2	SILTY CLAY - hard, brown slightly sandy silty clay, MC<PL			0.1				
				D	0.4				
					0.5				
	1	- becoming red brown, sandy below 1.0m		D	1.0				1
				D	1.5				
	1.8	CLAYEY SAND - medium dense, red brown slightly silty clayey sand							
	2			D	2.0				2
	2.3	SILTY CLAY - very stiff, grey, orange and red brown silty clay, iron indurated, MC~PL		D	2.5		pp = 250-300		
	3								3
	3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0		pp = 250-300		

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: ECR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: --
EASTING:
NORTHING:

PIT No: 100-17
PROJECT No: 76744.01
DATE: 13/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
		TOPSOIL - brown silty clay with a trace of rootlets		D	0.0				
	0.3				0.1				
		SILTY CLAY - hard, red brown silty clay with a trace of ironstone gravel		D	0.4		pp >600		
					0.5				
	1	- becoming light brown mottled brown below 1.0m		D	1.0		pp >600		1
	1.2	SILTSTONE - low strength, highly weathered, grey to brown siltstone							
				D	1.5				
	2	- becoming low to medium strength, moderately weathered below 1.9m		D	2.0				2
	2.1	Pit discontinued at 2.1m - refusal on medium strength siltstone							
	3								3

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: ECR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: --
EASTING:
NORTHING:

PIT No: 100-18
PROJECT No: 76744.01
DATE: 13/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
		TOPSOIL - light grey to brown clayey silt with a trace of rootlets		D	0.0				
	0.2	SILTY SAND - dense, light grey slightly gravelly silty sand with a trace of clay (ALLUVIUM)			0.1				
	0.4	SILTY CLAY - hard, light brown silty clay, MC<PL (ALLUVIUM)		D	0.4		pp >600		
					0.5				
1				D	1.0		pp >600		1
		- with some sand below 1.5m		D	1.5		pp >600		
2		- becoming slightly sandy below 2.0m		D	2.0		pp >600		2
				D	2.5		pp >600		
3	3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0		pp >600		3

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: ECR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: --
EASTING:
NORTHING:

PIT No: 100-19
PROJECT No: 76744.01
DATE: 13/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water
		TOPSOIL - light brown clayey silt with some sand, gravel and a trace of rootlets, moist (ALLUVIUM)		D	0.0			
					0.1			
	0.3	SILTY CLAY - hard, orange brown silty clay, MC<PL (ALLUVIUM)						
				D	0.4		pp >600	
				B	0.5			
		- becoming red brown, slightly sandy below 0.8m						
	1			D	1.0		pp >600	
		- becoming red brown mottled grey, sandy, friable below 1.5m		D	1.5		pp = 500-550	
	2			D	2.0		pp = 450-500	
		- becoming very stiff, orange brown mottled grey below 2.5m		D	2.5		pp = 400-450	
	3			D	3.0		pp = 300-350	
	3.0	Pit discontinued at 3.0m - limit of investigation						

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: ECR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: --
EASTING:
NORTHING:

PIT No: 100-20
PROJECT No: 76744.01
DATE: 13/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
		TOPSOIL - brown clayey silt with some sand and a trace of rootlets, moist		D	0.0 0.1				
	0.3	SILTY CLAY - hard, light brown silty clay, MC<PL		D	0.4 0.5		pp >600		
	0.8	SHALE - very low strength, highly weathered, grey and brown shale with extremely low strength bands		D	1.0				
	1	- becoming medium strength, slightly weathered, light grey below 1.2m		D	1.5				
	1.6	Pit discontinued at 1.6m - refusal on medium strength shale							
	2								
	3								

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: ECR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: --
EASTING:
NORTHING:

PIT No: 100-21
PROJECT No: 76744.01
DATE: 13/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
		TOPSOIL - brown clayey silt with a trace of sand and rootlets, moist		D	0.0				
	0.2	SILT - hard, light grey slightly sandy slightly clayey silt			0.1				
	0.4	SILTY CLAY - hard, light brown silty clay		D	0.4		pp >600		
1					0.5				
				D	1.0		pp = 450-500		
		- becoming very stiff, light grey mottled orange brown below 1.4m			1.5		pp = 350-400		
2	2.0	SILTSTONE - low strength, highly weathered, light grey and orange brown siltstone		D	2.0				
		- becoming low to medium strength below 2.3m		D	2.5				
	2.6	Pit discontinued at 2.6m - refusal on medium strength siltstone							
3									

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: ECR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: --
EASTING: 293416
NORTHING: 6225252

PIT No: 100-22
PROJECT No: 76744.01
DATE: 14/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
	0.1	TOPSOIL - brown clayey silt with a trace of rootlets							
		SILTY CLAY - hard, orange mottled grey silty clay, slightly gravelly with some fine grained sand and a trace of rootlets, MC<PL		D/B	0.5				
	1	- becoming red mottled grey below 1.0m		D	1.0				
				D	1.5				
	1.8	SANDSTONE - low strength, moderately weathered, grey and orange sandstone with very low strength bands							
	2			D	2.0				
		- with very low to low strength, grey and orange shale below 2.5m		D	2.5				
	2.8	SILTSTONE - medium strength, moderately weathered, grey siltstone							
	3			D	3.0				
	3.1	Pit discontinued at 3.1m - refusal on medium strength shale/siltstone							

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: --
EASTING: 293467
NORTHING: 6225006

PIT No: 100-23
PROJECT No: 76744.01
DATE: 14/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
	0.2	TOPSOIL - silty clay with a trace of rootlets							
		SILTY CLAY - hard, orange mottled grey silty clay with some gravel and a trace of cobbles (possible COLLUVIUM)		D	0.5				
	0.9	SHALE - very low strength, highly weathered, grey and orange shale with low strength bands		D	1.0				
	1								1
		- with medium strength grey shale bands below 1.5m		D	1.5				
	2			D	2.0				2
	2.1	Pit discontinued at 2.1m - refusal on medium strength shale							
				D	2.5				
	3			D	3.0				3

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: --
EASTING: 293677
NORTHING: 6225131

PIT No: 100-24
PROJECT No: 76744.01
DATE: 14/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
	0.2	TOPSOIL - brown clayey silt with a trace of rootlets and gravel							
		SILTY CLAY - hard, orange brown mottled grey silty clay with some gravel and a trace of rootlets (possible COLLUVIUM)		D	0.5				
	1	- becoming grey below 0.9m		D	1.0				1
	1.2	SHALE - very low to low strength, highly to moderately weathered, dark grey and orange shale		D	1.5				
	2	- becoming medium strength, light grey below 2.0m		D	2.0				2
	2.2	Pit discontinued at 2.2m - refusal on medium strength shale							
	3								3

Dynamic Penetrometer Test (blows per 150mm): 5 10 15 20

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: --
EASTING: 293824
NORTHING: 6225373

PIT No: 100-25
PROJECT No: 76744.01
DATE: 14/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
	0.2	TOPSOIL - brown silty clay with a trace of rootlets							
		SILTY CLAY - hard, yellow brown silty clay with some gravel, MC<PL		D	0.5				
	1	- becoming more yellow, slightly gravelly below 1.0m		D	1.0				1
		- becoming orange brown below 1.5m		D	1.5				
	1.9	SANDSTONE - very low to low strength, moderately to highly weathered, red, orange and grey sandstone		D	2.0				2
	2.4	SILTSTONE - medium strength, moderately weathered, grey brown siltstone		D	2.5				
	2.6	Pit discontinued at 2.6m - refusal on medium strength siltstone							3

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: --
EASTING: 293435
NORTHING: 6225999

PIT No: 100-SP2
PROJECT No: 76744.01
DATE: 15/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		FILLING - gravelly clay with anthropogenics comprising bricks, plastic, concrete and ACM fragments		E	0.0				
					0.1				
		- with grey gravel band between 0.3 - 0.35m							
	0.5	SANDY CLAY - hard, brown sandy clay with a trace of rootlets, MC<PL							
	1								1
		- becoming orange below 1.1m		E	1.1				
					1.2				
	1.3	Pit discontinued at 1.3m - limit of investigation							
	2								2
	3								3

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Fill mound

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Development
LOCATION: Precinct 100, Menangle Park North

SURFACE LEVEL: --
EASTING: 293430
NORTHING: 6225644

PIT No: 100-SP4
PROJECT No: 76744.01
DATE: 14/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		FILLING - brown and orange sandy gravelly clay with some cobbles, shale, minor anthropogenics comprising plastic and shale gravel		E	0.0 0.1				
				E	0.4 0.5				
	1								1
	1.5	Pit discontinued at 1.5m - limit of investigation							
	2								2
	3								3

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Stockpile (4m x 4m x 1.5m)

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 72 mAHD
EASTING: 291839
NORTHING: 6225211

PIT No: 500-3
PROJECT No: 76744.01
DATE: 24/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
72		TOPSOIL - sandy silt with rootlets and fragments of animal bone		E	0.0				
	0.1	SAND - medium dense, orange fine grained sand with a trace of silt (alluvium)			0.1				
				E	0.4				
				D	0.5				
71	1	- becoming brown with very low strength sandstone below 1.0m		D	1.0				1
	1.2	SANDSTONE - low strength, moderately weathered, orange brown sandstone with extremely low strength, extremely weathered bands		D	1.5				
70	2	- with medium strength sandstone below 2.0m		D	2.0				2
	2.2	Pit discontinued at 2.2m - refusal on medium strength sandstone							
69	3								3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 72 mAHD
EASTING: 292022
NORTHING: 6225364

PIT No: 500-4
PROJECT No: 76744.01
DATE: 24/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
72	0.0	TOPSOIL - brown sandy silt with a trace of rootlets		E	0.0				
					0.1				
	0.2	SILTY SAND - medium dense, light grey and brown silty sand with low strength sandstone and a trace of rootlets (alluvium)							
					0.4				
				E					
				D	0.5				
		- becoming dense to very dense below 0.8m							
71	1			D	1.0				1
	1.4	SANDSTONE - low strength, moderately weathered, orange and grey sandstone with ironstone gravel		D	1.5				
70	2			D	2.0				2
		- becoming extremely low strength, extremely weathered below 2.5m		D	2.5				
69	3			D	3.0				3
	3.0	Pit discontinued at 3.0m - limit of investigation							

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 78 mAHD
EASTING: 292259
NORTHING: 6225201

PIT No: 500-5
PROJECT No: 76744.01
DATE: 24/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
78	0.0	TOPSOIL - silty sand with a trace of rootlets		E	0.0				
	0.1				0.1				
	0.2	SILTY SAND - medium dense, yellow brown fine grained silty sand, damp (alluvium)							
	0.4			E	0.4				
	0.5			D	0.5				
		- becoming dense below 0.6m							
	0.8	SILTY SANDY CLAY - very stiff to hard, red to orange mottled grey silty sandy clay with a trace of ironstone gravel (alluvium)							
77	1			D	1.0				1
				D	1.5				
76	2			D	2.0				2
		- becoming grey brown with low strength orange grey shale							
				D	2.5				
	2.7	SANDSTONE - extremely low strength, extremely weathered, grey and orange sandstone with medium strength bands							
75	3			D	3.0				3
	3.1	Pit discontinued at 3.1m - limit of investigation							

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 70 mAHD
EASTING: 291989
NORTHING: 6225834

PIT No: 500-6
PROJECT No: 76744.01
DATE: 23/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
70	0.0	TOPSOIL - brown clayey silt with a trace of rootlets, moist		E	0.0				
					0.1				
	0.3	CLAYEY SANDY SILT - hard, brown clayey sandy silt, moist (alluvium)							
				E	0.4				
					0.5				
69	1			D	1.0				1
				D	1.5				
	1.6	CLAYEY SAND - dense, red brown clayey sand with some silt, moist (alluvium)							
68	2			D	2.0				2
				D	2.5				
67	3			D	3.0				3
	3.0	Pit discontinued at 3.0m - limit of investigation							

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 81 mAHD
EASTING: 292848
NORTHING: 6225964

PIT No: 500-7
PROJECT No: 76744.01
DATE: 20/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
81		ROADBASE - gravel and cobbles (coalwash)		E	0.0				
					0.1				
	0.3	SANDY CLAY - hard, orange sandy clay with very low to low strength sandstone, MC<PL (alluvium)							
				E	0.4				
	0.5	SILTY CLAY - hard, orange and grey silty clay, MC<PL		D	0.5				
80	1			D	1.0				1
				E					
					1.1				
	1.3	SANDSTONE - extremely low strength, extremely weathered, grey and orange sandstone with some low strength bands		D	1.5				
	1.9	SHALE - low strength, moderately weathered, grey shale with some medium strength bands							
79	2			D	2.0				2
				D	2.5				
78	3	3.0		D	3.0				3
		Pit discontinued at 3.0m - limit of investigation							

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 74 mAHD
EASTING: 292505
NORTHING: 6226224

PIT No: 500-8
PROJECT No: 76744.01
DATE: 23/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
74	0.0	ROADBASE - coal and silty gravel (coalwash)		E	0.0				
	0.15	ROADBASE - coalwash			0.1				
	0.4	FILLING - dark brown silty clay with coal and some gravel, MC<PL		E	0.4				
				D	0.5				
	0.9	SILTY CLAY - stiff, orange brown silty clay, MC<PL							
73	1			D	1.0				1
				D	1.5				
72	2			D	2.0				2
		- with extremely low strength, extremely weathered sandstone, MC~PL below 2.5m		D	2.5			▼ 23-01-17	
		- becoming wet below 3.0m							
71	3	3.0 Pit discontinued at 3.0m - limit of investigation		D	3.0				3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed at 2.7m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 81 mAHD
EASTING: 292883
NORTHING: 6226346

PIT No: 500-9
PROJECT No: 76744.01
DATE: 20/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
81	0.0	TOPSOIL - brown silty clay with a trace of rootlets		E*	0.0 - 0.1				
	0.2	SILTY CLAY - hard, red brown silty clay with a trace of rootlets, MC<PL		E	0.4				
				D/B	0.5				
	0.8	SHALE - low strength, moderately weathered, grey and orange shale with some medium strength bands							
80	1			D	1.0				1
				D	1.5				
79	2	- becoming medium strength, grey brown below 2.0m		D	2.0				2
	2.1	Pit discontinued at 2.1m - refusal on medium strength shale							
78	3								3

Dynamic Penetrometer Test (blows per 150mm): 5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: * Replicate sample BD1/200117 collected

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 81 mAHD
EASTING: 292720
NORTHING: 6226569

PIT No: 500-10
PROJECT No: 76744.01
DATE: 23/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
81	0.2	TOPSOIL - dark brown silty clay with a trace of rootlets		E	0.0–0.1				
		SILTY CLAY - hard, dark brown silty clay with a trace of gravel and rootlets, MC<PL		E	0.4				
				D	0.5				
80	1			D	1.0				1
		- becoming orange mottled grey, sandy with a trace of ironstone gravel below 1.3m		D	1.5				
79	2			D	2.0				2
		- becoming MC~PL below 2.5m		D	2.5				
78	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0				3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 79 mAHD
EASTING: 293144
NORTHING: 6226133

PIT No: 500-11
PROJECT No: 76744.01
DATE: 23/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
79		ROADBASE - coalwash and gravel		E	0.0				
					0.1				
				E	0.4				
	0.5	SILTY CLAY - hard, yellow brown silty clay, MC<PL		D	0.5				
78	1	- with some gravel below 1.0m		D	1.0				1
		- becoming mottled grey below 1.5m		D	1.5				
77	2	- becoming stiff to very stiff, MC~PL below 2.0m		D	2.0			▼ 23-01-17	2
				D	2.5				
		- becoming orange, sandy, MC>PL (wet) below 3.0m							
76	3	3.0 Pit discontinued at 3.0m - limit of investigation		D	3.0				3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed at 2.1m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 72 mAHD
EASTING: 292528
NORTHING: 6225750

PIT No: 500-12
PROJECT No: 76744.01
DATE: 23/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
72		TOPSOIL - brown silty clay with a trace of rootlets		E	0.0				
					0.1				
	0.2	SANDY CLAY - hard, dark brown sandy clay with a trace of rootlets, MC<PL (alluvium)							
				E	0.4				
				D	0.5				
71	1 1.0	SANDSTONE - low strength, moderately weathered, grey and orange sandstone with very low strength shale band		D	1.0				1
				D	1.5				
70	2			D	2.0				2
		- becoming yellow and grey with medium strength sandstone band and extremely low strength, extremely weathered band below 2.5m		D	2.5			23-01-17	
69	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0				3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed at 2.7m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 74 mAHD
EASTING: 292243
NORTHING: 6225377

PIT No: 500-13
PROJECT No: 76744.01
DATE: 24/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
74	0.0	TOPSOIL - brown silty sand with a trace of rootlets		E*	0.0				
					0.1				
	0.3	SILTY SAND - medium dense, brown grey fine grained silty sand with a trace of rootlets, humid (alluvium)							
				E	0.4				
				D	0.5				
		- becoming light grey below 0.6m							
73	1	- becoming dense below 0.9m		D	1.0				1
	1.3	CLAYEY SAND - dense, orange brown mottled grey fine grained clayey sand with very low strength sandstone, damp (alluvium)							
		- becoming more grey with band of low strength sandstone, moist below 1.5m		D	1.5				
	1.8	SANDY CLAY - very stiff, orange mottled grey sandy clay, MC~PL (alluvium)							
72	2			D	2.0				2
				D	2.5				
71	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0			▼ 24-01-17	3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed at 3.0m

REMARKS: * Replicate sample BD1/240117 collected

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 77 mAHD
EASTING: 292752
NORTHING: 6226262

PIT No: 500-14
PROJECT No: 76744.01
DATE: 23/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
77	0.2	TOPSOIL - brown clayey silt with a trace of rootlets							
		SILTY CLAY - hard, brown and orange silty clay with some gravel and a trace of rootlets		D	0.5				
76	1			D	1.0				1
		- with extremely low strength, extremely weathered, dark grey shale with low strength bands below 1.5n		D	1.5				
75	2			D	2.0				2
	2.1	SANDSTONE - low strength, moderately weathered, brown grey sandstone with some extremely low strength, extremely weathered bands and low strength grey shale		D	2.5				
74	3			D	3.0				3
	3.0	Pit discontinued at 3.0m - limit of investigation							

Dynamic Penetrometer Test (blows per 150mm): 5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 80 mAHD
EASTING: 292984
NORTHING: 6226255

PIT No: 500-15
PROJECT No: 76744.01
DATE: 23/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
80	0.0	TOPSOIL - brown silty clay with a trace of rootlets							
	0.2	SILTY SANDY CLAY - hard, orange silty sandy clay with a trace of very low strength shale and rootlets, MC<PL (alluvium)		D	0.5				
79	1	- becoming grey below 1.0m		D	1.0				1
				D	1.5				
78	2	- with some gravel below 2.0m		D	2.0				2
		- becoming orange, MC~PL below 2.5m		D	2.5				
77	3	- becoming firm, wet (MC>PL) below 3.0m		D	3.0				3
	3.2	Pit discontinued at 3.2m - limit of investigation							

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed at 2.6m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 89 mAHD
EASTING: 293167
NORTHING: 6226294

PIT No: 500-16
PROJECT No: 76744.01
DATE: 20/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
89		TOPSOIL - brown clayey silt with some rootlets							
	0.3	SILTY CLAY - hard, red silty clay with ironstone bands, MC<PL		D	0.5		pp >600		
	0.9	SILTY CLAY - hard, grey silty clay, MC<PL		D	1.0		pp >600		
88	1								1
	1.4	SILTSTONE - very low strength, moderately weathered, grey siltstone with medium strength bands		D	1.5				
	1.8	SANDSTONE - very low to low strength, moderately weathered, brown sandstone							
87	2 2.0	Pit discontinued at 2.0m - refusal on low to medium strength sandstone		D	2.0				2
86	3								3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: IKA

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 78 mAHD
EASTING: 293054
NORTHING: 6226055

PIT No: 500-17
PROJECT No: 76744.01
DATE: 20/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
78		TOPSOIL - brown silty clay with a trace of rootlets							
	0.2	SILTY CLAY - hard, yellow brown silty clay with a trace of rootlets, MC<PL		D	0.5				
77	1			D	1.0				1
		- becoming very stiff, with some gravel below 1.5m		D	1.5				
76	2	- becoming orange mottled grey below 2.0m		D	2.0				2
		- with low strength, highly weathered sandstone bands below 2.5m		D	2.5				
75	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0			▼ 20-01-17	3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 73 mAHD
EASTING: 292698
NORTHING: 6226067

PIT No: 500-18
PROJECT No: 76744.01
DATE: 23/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
73		TOPSOIL - brown silty clay with a trace of rootlets							
	0.3	SILTY SANDY CLAY - stiff, dark brown silty sandy clay, MC<PL (alluvium)		D	0.5				
72	1	- becoming brown grey, gravelly below 1.0m		D	1.0				1
		-becoming MC~PL below 1.5m		D	1.5				
71	2	- becoming orange grey below 2.0m		D	2.0				2
70	3			D	3.0			23-01-17 ▼	3
	3.1	Pit discontinued at 3.1m - limit of investigation							

Dynamic Penetrometer Test (blows per 150mm): 5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 74 mAHD
EASTING: 292532
NORTHING: 6225976

PIT No: 500-19
PROJECT No: 76744.01
DATE: 23/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
74		TOPSOIL - clayey silt with a trace of rootlets							
	0.2	GRAVELLY SILTY SAND - dense, brown gravelly silty fine grained sand, humid (alluvium)		D	0.5				
73	1			D	1.0				1
				D	1.5				
	1.8	SILTY SANDY CLAY - very stiff, orange grey silty sandy clay, MC<PL (alluvium)							
72	2			D	2.0				2
		- becoming red below 2.5m		D	2.5				
71	3	3.0 Pit discontinued at 3.0m - limit of investigation		D	3.0				3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 76 mAHD
EASTING: 292667
NORTHING: 6225818

PIT No: 500-20
PROJECT No: 76744.01
DATE: 23/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
76		TOPSOIL - dark brown silty clay with a trace of rootlets							
	0.2	SILTY CLAY - hard, orange brown silty clay, MC<PL		D	0.5				
	0.8	SHALE - very low strength, highly weathered, orange grey shale with extremely low strength bands		D	1.0				
75	1	- with medium strength bands below 1.1m							1
				D	1.5				
74	2	- becoming grey below 2.0m		D	2.0				2
		- beocming dark grey below 2.5m		D	2.5				
73	3 3.0	- becoming medium strength below 3.0m Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 70 mAHD
EASTING: 291774
NORTHING: 6225886

PIT No: 500-21
PROJECT No: 76744.01
DATE: 25/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
70		TOPSOIL - brown silty clay with a trace of rootlets							
	0.2	CLAYEY SILT - hard, brown clayey silt, MC<PL (alluvium)		D	0.5				
69	1			D	1.0				1
				D	1.5				
68	2	- becoming dark brown, slightly sandy with a trace of gravel below 2.0m		D	2.0				2
		- becoming red brown, MC~PL below 2.3m		D	2.5				
67	3	- becoming stiff to very stiff below 2.9m		D	3.0				3
	3.0	Pit discontinued at 3.0m - limit of investigation							

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 70 mAHD
EASTING: 291841
NORTHING: 6225656

PIT No: 500-22
PROJECT No: 76744.01
DATE: 25/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
70		TOPSOIL - silty sandy clay with a trace of rootlets							
	0.2	CLAYEY SILT - hard, brown clayey silt, MC<PL (alluvium)		D	0.5				
69	1	- becoming stiff to very stiff, dark brown below 1.0,		D	1.0				1
		- becoming MC~PL below 1.5m		D	1.5				
68	2	- becoming slightly sandy below 2.0m		D	2.0				2
				D	2.5				
67	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 70 mAHD
EASTING: 292008
NORTHING: 6225735

PIT No: 500-23
PROJECT No: 76744.01
DATE: 25/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
70	0.2	TOPSOIL - brown silty clay with a trace of rootlets							
		SILTY CLAY - hard, brown silty clay with a trace of sand and rootlets, MC<PL (alluvium)		D	0.5				
	0.8	SILTY SANDY CLAY - hard, red brown silty sandy clay with a trace of rootlets, MC<PL (alluvium)		D	1.0				
69	1								1
	1.4	SANDY CLAY - hard, red brown sandy clay, MC<PL (alluvium)		D	1.5				
68	2			D	2.0				2
				D	2.5				
67	3								3
	3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0				

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 70 mAHD
EASTING: 292259
NORTHING: 6225825

PIT No: 500-24
PROJECT No: 76744.01
DATE: 20/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
70	0.2	TOPSOIL - brown clayey silt with some rootlets, MC<PL							
	0.4	CLAYEY SILT - stiff brown clayey silt, friable, MC<PL (alluvium)							
		CLAYEY SILT - very stiff brown clayey silt, MC<PL (alluvium)		D	0.5				
				U_{50}	0.8				
69	0.9 1	SANDY SILTY CLAY - firm, brown sandy silty clay, MC~PL (alluvium) - becoming grey brown mottled orange below 1.0m		D	1.0				
				D	1.5			20-01-17	
68	2			D	2.0		pp = 100-200		
	2.3	SANDY SILTY CLAY - firm to very stiff, sandy silty clay, MC~PL (alluvium)		D	2.5		pp = 200-300		
67	3 3.0	Pit discontinued at 3.0m - limit of investigation							

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: IKA

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed at 1.3m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 69 mAHD
EASTING: 292176
NORTHING: 6225593

PIT No: 500-25
PROJECT No: 76744.01
DATE: 25/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
69		TOPSOIL - brown silty clay with a trace of rootlets							
	0.2	CLAYEY SILT - hard, dark brown clayey silt, MC<PL (alluvium)		D	0.5				
68	1			D	1.0				1
		- becoming firm to very stiff, MC~PL below 1.5m		D	1.5				
67	2			D	2.0				2
		- becoming grey brown mottled orange below 2.5m		D	2.5				
		- becoming very stiff to hard below 3.0m						25-01-17	
66	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed at 2.8m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 72 mAHD
EASTING: 291648
NORTHING: 6225682

PIT No: 500-26
PROJECT No: 76744.01
DATE: 24/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
72	0.2	TOPSOIL - brown sandy silt with a trace of rootlets							
		CLAYEY SILTY SAND - dense, brown clayey silty sand with a trace of rootlets, humid (alluvium)							
		- with hard, orange silty clay band between 0.4 - 0.5m		D	0.5				
71	1			D	1.0				1
				D	1.5				
70	2			D	2.0				2
				D	2.5				
69	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 72 mAHD
EASTING: 291621
NORTHING: 6225490

PIT No: 500-27
PROJECT No: 76744.01
DATE: 24/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
72		TOPSOIL - brown sandy silt with a trace of rootlets							
	0.3	SILTY SAND - dense, brown silty sand with a trace of rootlets, damp (alluvium)		D	0.5				
71	1	- becoming dark brown, moist below 1.0m		D	1.0				1
				D	1.5				
70	2			D	2.0				2
				D	2.5				
69	3	3.0 Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 70 mAHD
EASTING: 291811
NORTHING: 6225451

PIT No: 500-28
PROJECT No: 76744.01
DATE: 24/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
70		TOPSOIL - brown silty clay with a trace of rootlets							
	0.2	SILTY CLAY - hard, brown silty clay with a trace of rootlets, MC<PL (alluvium)		D	0.5				
69	1	- becoming dark brown below 1.0m		D	1.0				1
				D	1.5				
68	2	- becoming MC~PL below 2.0m		D	2.0				2
		- becoming firm to stiff below 2.5m		D	2.5				
67	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 71 mAHD
EASTING: 291659
NORTHING: 6225169

PIT No: 500-29
PROJECT No: 76744.01
DATE: 25/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
71	0.2	TOPSOIL - brown clayey silt with a trace of rootlets							
		SILTY CLAY - hard, brown silty clay with a trace of rootlets, MC<PL (alluvium)		D	0.5				
		- becoming orange, slightly sandy with a trace of ironstone gravel below 0.8m							
70	1			D	1.0				1
				D	1.5				
69	2	- becoming very stiff below 2.0m		D	2.0				2
		- becoming red brown with find grained gravel below 2.3m		D	2.5				
68	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm) scale: 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 73 mAHD
EASTING: 292041
NORTHING: 6225217

PIT No: 500-30
PROJECT No: 76744.01
DATE: 24/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
73		TOPSOIL - brown silty sand with a trace of rootlets							
	0.3	SILTY SAND - dense, light brown silty sand with low strength sandstone bands (alluvium)		D	0.5				
		- becoming lighter in colour below 0.6m							
72	1			D	1.0				1
	1.1	SANDY CLAY - hard, orange grey sandy clay, MC<PL (alluvium)							
				D	1.5				
71	2			D	2.0				2
				D	2.5				
70	3	3.0 Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 78 mAHD
EASTING: 292183
NORTHING: 6225104

PIT No: 500-31
PROJECT No: 76744.01
DATE: 24/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
78		TOPSOIL - brown silty sand with a trace of rootlets							
	0.3	SILTY SAND - medium dense, light grey silty sand (alluvium)		D	0.5				
	0.6	SANDY CLAY - hard, orange mottled grey sandy clay, MC<PL (alluvium)							
77	1	- with low strength, moderately weathered, red grey sandstone bands below 1.0m		D	1.0				1
				D	1.5				
76	2			D	2.0				2
				D	2.5				
75	3	3.0 Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 77 mAHD
EASTING: 292471
NORTHING: 6225324

PIT No: 500-32
PROJECT No: 76744.01
DATE: 24/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
77	0.2	TOPSOIL - brown sandy silt with a trace of rootlets							
		SILTY SAND - dense, brown silty sand with a trace of rootlets (alluvium)		D	0.5				
	0.8	GRAVELLY CLAYEY SAND - dense, brown gravelly (sandstone) clayey sand (residual)							
76	1			D	1.0				1
	1.4	SANDSTONE - low strength, highly weathered, orange grey sandstone with medium strength bands		D	1.5				
	1.9	Pit discontinued at 1.9m - refusal on medium strength sandstone							
75	2			D	2.0				2
				D	2.5				
74	3								3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 500, Menangle Park North

SURFACE LEVEL: 70 mAHD
EASTING: 292421
NORTHING: 6225600

PIT No: 500-33
PROJECT No: 76744.01
DATE: 25/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
70		TOPSOIL - brown silty clay with a trace of rootlets							
	0.3	SILTY CLAY - stiff, dark brown silty clay with a trace of rootlets, MC<PL (alluvium)		D	0.5				
69	1	- becoming brown grey mottled orange below 1.0m		D	1.0				1
				D	1.5				
68	2	- becoming MC~PL below 2.0m		D	2.0				2
				D	2.5				
	2.7	SANDY CLAY - firm to stiff, orange grey sandy clay, MC~PL						25-01-17	
67	3	3.0 Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed at 2.8m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 400, Menangle Park North

SURFACE LEVEL: 106 mAHD
EASTING: 292631
NORTHING: 6224087

PIT No: 400-1
PROJECT No: 76744.01
DATE: 7/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
106	0.0	TOPSOIL - brown clayey silt with a trace of rootlets		E	0.0				
					0.1				
	0.2	SANDY CLAY - hard, red mottled grey sandy clay with a trace of rootlets, MC<PL (alluvium)							
					0.4				
				E					
				D	0.5				
105	1 1.0	GRAVELLY SANDY CLAY - hard, grey mottled orange gravelly sandy clay		D	1.0				1
		- with very low strength sandstone below 1.5m		D	1.5				
104	2 2.0	SANDSTONE - low strength, moderately weathered, grey and orange sandstone with medium strength bands		D	2.0				2
		- becoming medium strength below 2.2m							
	2.4	Pit discontinued at 2.4m - refusal on medium strength sandstone							
103	3								3

Dynamic Penetrometer Test (blows per 150mm) scale: 5, 10, 15, 20

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 400, Menangle Park North

SURFACE LEVEL: 98 mAHD
EASTING: 292518
NORTHING: 6224010

PIT No: 400-2
PROJECT No: 76744.01
DATE: 7/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
98	0.2	TOPSOIL - brown clayey silt with a trace of rootlets		E	0.0				
		SANDY CLAY - hard, red sandy clay with a trace of rootlets, MC<PL		E	0.2				
				D	0.4				
97	1	- becoming mottled grey below 1.0m		D	0.5				
				D	1.0				
				D	1.5				
96	2			D	2.0				
	2.3	SANDSTONE - low strength, moderately weathered, orange grey sandstone with very low to medium strength shale bands		D	2.5				
		- becoming orange grey with low strength sandstone bands below 2.5m							
95	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0				

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 400, Menangle Park North

SURFACE LEVEL: 101 mAHD
EASTING: 292456
NORTHING: 6223936

PIT No: 400-3
PROJECT No: 76744.01
DATE: 13/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
101	0.0	TOPSOIL - brown clayey silt with a trace of rootlets		D	0.0				
					0.1				
	0.2	SILTY CLAY - hard, brown silty clay, MC<PL							
				D	0.4				
					0.5				
	0.8	SILTSTONE - very low to low strength, highly weathered, grey and brown siltstone							
100	1			D	1.0				1
	1.3	SANDSTONE - low to medium strength, highly weathered, light grey medium grained sandstone							
				D	1.5				
	1.6	Pit discontinued at 1.6m - refusal on medium strength sandstone							
99	2								2
98	3								3

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: ECR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 400, Menangle Park North

SURFACE LEVEL: 92 mAHD
EASTING: 292447
NORTHING: 6223717

PIT No: 400-4
PROJECT No: 76744.01
DATE: 13/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
92	0.0	TOPSOIL - red brown slightly sandy silty clay with a trace of rootlets		D	0.0				
					0.1				
	0.2	SANDY CLAY - hard, red brown sandy clay with some silt, MC<PL							
				D	0.4				
					0.5				
91	1			D	1.0				1
	1.5	CLAYEY SAND - very dense, orange brown clayey sand, moist		D	1.5				
90	2			D	2.0				2
		- becoming orange brown mottled grey below 2.5m		D	2.5				
89	3			D	3.0				3
	3.0	Pit discontinued at 3.0m - limit of investigation							

RIG: JCB 4CX backhoe - 450mm bucket

LOGGED: ECR

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 76 mAHD
EASTING: 292661
NORTHING: 6225291

PIT No: 300-1
PROJECT No: 76744.01
DATE: 15/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
76	0.2	TOPSOIL - grey brown silty sand with a trace of rootlets		E	0.0				
					0.1				
		SAND - dense, light brown fine grained sand with very low strength sandstone band, damp (alluvium)							
				E	0.4				
				D	0.5				
75	1	- with low strength, highly weathered, orange and grey sandstone bands		D	1.0				1
				D	1.5				
74	2 2.0	SANDY CLAY - hard, orange and grey sandy clay with very low strength sandstone, MC<PL (alluvium)		D	2.0				2
				D	2.5				
73	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 86 mAHD
EASTING: 293066
NORTHING: 6224747

PIT No: 300-2
PROJECT No: 76744.01
DATE: 3/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
86		FILLING - brown silty sand with anthropogenics comprising ACM, glass, plastic, bricks, rusted metal and wiring		E	0.0 0.1				
	0.3	SAND - light brown fine grained sand with a trace of rootlets, humid (alluvium)		E	0.4 0.5				
	0.9	Pit discontinued at 0.9m - limit of investigation							
85	1								1
84	2								2
83	3								3

5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Test pit excavated at 293070/6224728 - no evidence of fill

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 83 mAHD
EASTING: 293030
NORTHING: 6224846

PIT No: 300-3
PROJECT No: 76744.01
DATE: 3/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
83		FILLING - brown fine grained sand with anthropogenics comprising metal sheeting, brick fragments, steel fragments (car parts), concrete and glass		E	0.0				
					0.1				
				E	0.4				
					0.5				
82	1			E	1.0			03-02-17	1
	1.1	SAND - dense, light brown and yellow medium grained sand, wet (alluvium)			1.1				
	1.2	Pit discontinued at 1.2m - limit of investigation							
81	2								2
80	3								3

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed at 1.0m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 82 mAHD
EASTING: 293041
NORTHING: 6224856

PIT No: 300-4
PROJECT No: 76744.01
DATE: 3/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
82		FILLING - brown silty sand with a trace of rootlets, concrete boulders, ACM fragments, brick and plastic		E	0.0 0.1				
81	1								1
	1.1	SAND - dense, light brown and yellow medium grained sand, moist (alluvium)		E	1.1				
	1.2	Pit discontinued at 1.2m - limit of investigation			1.2				
80	2								2
79	3								3

5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: ACM observed on surface at 293049/6224861

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 82 mAHD
EASTING: 293026
NORTHING: 6224866

PIT No: 300-5
PROJECT No: 76744.01
DATE: 3/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
82	0.0	FILLING - brown sand and dark grey gravel with anthropogenics comprising concrete fragments, ACM and bricks		E	0.0 - 0.1				
	0.4	SAND - light brown medium grained sand, moist (alluvium)		E	0.4 - 0.5			▼ 03-02-17	
81	1.0	Pit discontinued at 1.0m - limit of investigation							
80	2								
79	3								

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed at 0.9m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 87 mAHD
EASTING: 293127
NORTHING: 6224647

PIT No: 300-6
PROJECT No: 76744.01
DATE: 3/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
87	0.0	TOPSOIL - brown silty sand with a trace of rootlets		E	0.0				
	0.1				0.1				
	0.2	SAND - light brown medium grained sand with a trace of rootlets, humid (alluvium)							
	0.4			E	0.4				
	0.5				0.5				
86	1.0	Pit discontinued at 1.0m - limit of investigation							
85	2								
84	3								

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 85 mAHD
EASTING: 292910
NORTHING: 6224760

PIT No: 300-7
PROJECT No: 76744.01
DATE: 3/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
85		FILLING - brown clayey silty sand with a trace of rootlets and anthropogenics comprising bricks and copper wire		E	0.0				
					0.1				
	0.2	SAND - medium dense, brown medium grained sand with a trace of rootlets, damp (alluvium)							
				E	0.4				
				D	0.5				
		- becoming light brown below 0.7m							
84	1			D	1.0				1
	1.4	CLAYEY SAND - medium dense, brown clayey medium grained sand, damp (alluvium)		D	1.5				
83	2	- becoming orange and red below 2.0m		D	2.0				2
		- becoming yellow brown, moist below 2.5m		D	2.5				
		- becoming wet below 3.0m							
82	3	3.0 Pit discontinued at 3.0m - limit of investigation		D	3.0				3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 87 mAHD
EASTING: 292804
NORTHING: 6224735

PIT No: 300-8
PROJECT No: 76744.01
DATE: 6/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
87	0.0	TOPSOIL - dark grey silty sand with a trace of rootlets		E	0.0				
					0.1				
	0.2	SAND - medium dense to dense, grey brown fine grained sand with some clay and a trace of rootlets, humid (alluvium)							
				E	0.4				
				D	0.5				
		- becoming very dense, yellow brown, slightly clayey with extremely low strength sandstone band, damp below 0.8m							
86	1			D	1.0				1
	1.4	CLAYEY SAND - medium dense to dense, orange brown medium grained clayey sand with a trace of rootlets and low strength sandstone band, damp (alluvium)		D	1.5				
85	2	- with possible ironstone, moist below 2.0m		D	2.0				2
				D	2.5				
84	3	3.0 Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 83 mAHD
EASTING: 292886
NORTHING: 6224876

PIT No: 300-9
PROJECT No: 76744.01
DATE: 6/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
83	0.0	TOPSOIL - dark grey silty sand with a trace of rootlets		E	0.0				
					0.1				
	0.2	SAND - medium dense, light brown fine grained sand with a trace of clay and rootlets, damp (alluvium)							
				E	0.4				
				D	0.5				
82	1	- with some clay at 1.0m		D	1.0				1
	1.3	CLAYEY SAND - medium dense, light brown fine grained clayey sand with a trace of low strength orange sandstone bands, moist (alluvium)							
				D	1.5				
81	2			D	2.0				2
	2.5	SANDY CLAY - stiff to very stiff, orange brown and grey sandy clay, MC<PL (alluvium)		D	2.5				
80	3	3.0 Pit discontinued at 3.0m - limit of investigation		D	3.0				3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 85 mAHD
EASTING: 293184
NORTHING: 6224748

PIT No: 300-10
PROJECT No: 76744.01
DATE: 3/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
85		FILLING - brown silty sand with possible ash and anthropogenics comprising plastic and small plastic caps filled with black powder		E	0.0				
					0.1				
				E	0.4				
					0.5				
	0.8	SAND - orange brown fine grained sand, moist (alluvium)							
84	1								1
				E	1.3				
	1.4	Pit discontinued at 1.4m - limit of investigation			1.4				
83	2								2
82	3								3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: No fill observed at exact location for 300-10

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 86 mAHD
EASTING: 293307
NORTHING: 6225105

PIT No: 300-11
PROJECT No: 76744.01
DATE: 14/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
86	0.0	TOPSOIL - brown clayey silt with a trace of rootlets		E	0.0				
					0.1				
	0.2	SILTY GRAVELLY CLAY - hard, orange mottled red silty gravelly clay with some sand and a trace of rootlets, MC<PL (alluvium)							
				E	0.4				
				D U_{50}	0.5				
85	1			D	1.0				1
	1.5	- becoming grey mottled red, sandy with low strength sandstone bands below 1.4m		D	1.5				
		SILTY CLAY - hard, red mottled grey silty clay with some gravel, MC<PL							
	1.9	SANDSTONE - low strength, moderately weathered, orange and grey sandstone with extremely low strength, extremely weathered, grey shale							
84	2			D	2.0				2
		- becoming medium strength below 2.5m		D	2.5				
	2.6	Pit discontinued at 2.6m - refusal on medium strength sandstone							
83	3								3

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 86 mAHD
EASTING: 293358
NORTHING: 6224683

PIT No: 300-12
PROJECT No: 76744.01
DATE: 2/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
86		TOPSOIL - brown silty sand with a trace of rootlets		E	0.0				
	0.1	CLAYEY SAND - very dense, red brown fine grained clayey sand, moist (alluvium)			0.1				
				E	0.4				
				D	0.5				
		- becoming yellow to orange with low strength sandstone band, wet below 0.9m							
85	1			D	1.0				1
		- becoming orange brown below 1.5m		D	1.5				
84	2 2.0	SANDY CLAY - hard, orange and grey sandy clay, wet MC>PL (alluvium)		D	2.0			02-02-17	2
		- becoming stiff below 2.5m		D	2.5				
83	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed at 2.0m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 96 mAHD
EASTING: 293428
NORTHING: 6224257

PIT No: 300-13
PROJECT No: 76744.01
DATE: 1/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
96	0.2	TOPSOIL - brown silty sand with a trace of rootlets		E*	0.0 0.1				
		SILTY SAND - medium dense to dense, orange brown medium grained silty sand with a trace of rootlets and clay, humid (alluvium)		E D/B	0.4 0.5				
95	1			D	1.0				
				D	1.5				
94	2	- becoming red, damp below 2.0m		D	2.0				
		- becoming slightly clayey, moist below 2.5m		D	2.5				
		- with very low strength sandstone band below 3.0m							
93	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0				

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: * Replicate sample BD1/010217 collected

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 85 mAHD
EASTING: 293214
NORTHING: 6224724

PIT No: 300-14
PROJECT No: 76744.01
DATE: 3/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
85	0.0	TOPSOIL - brown medium grained sand with a trace of silt and rootlets		E	0.0				
	0.1				0.1				
	0.2	SAND - light brown fine to medium grained sand with a trace of silt, damp (alluvium)							
	0.4			E	0.4				
	0.5				0.5				
	0.7	Pit discontinued at 0.7m - limit of investigation							
84	1								1
83	2								2
82	3								3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: No evidence of fill

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 86 mAHD
EASTING: 293197
NORTHING: 6224696

PIT No: 300-14A
PROJECT No: 76744.01
DATE: 3/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
86	0.0	FILLING - brown medium grained sand with anthropogenics comprising metal wiring, metal and ACM fragments		E	0.0 0.1				
	0.5	SAND - orange brown fine to medium grained sand with a trace of silt, moist (alluvium)		E	0.6 0.7				
	0.8	Pit discontinued at 0.8m - limit of investigation							
85	1								1
84	2								2
83	3								3

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Near pit 300-14

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 87 mAHD
EASTING: 293189
NORTHING: 6224664

PIT No: 300-15
PROJECT No: 76744.01
DATE: 2/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
87		FILLING - brown silty sand with anthropogenics comprising broken glass, PACM, tin, plastic, metal and brick fragments		E	0.0 0.1				
				E	0.4 0.5				
86	1	- becoming light brown with anthropogenics comprising broken glass, PACM, tin, plastic, metal and brick fragments							1
	1.4	SAND - red brown medium grained sand with a trace of silt, moist (alluvium)		E	1.4 1.5				
	1.6	Pit discontinued at 1.6m - limit of investigation							
85	2								2
84	3								3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Burial pit (approximately 11m x 5m); ACM noted on surface

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 87 mAHD
EASTING: 293169
NORTHING: 6224678

PIT No: 300-16
PROJECT No: 76744.01
DATE: 3/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
87	0	FILLING - brown silty sand with anthropogenics comprising glass bottles, hose pipe, scrap metal, plastic, styrofoam, PACM, glass fragments and tin		E*	0.0 0.1				
86	1								1
	1.4	CLAYEY SAND - orange to red medium grained clayey sand, damp (alluvium)		E	1.4 1.5				
	1.8	Pit discontinued at 1.8m - limit of investigation							
85	2								2
84	3								3

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: * Replicate sample BD1/030217 collected; Fill observed at 293186/6224696 to 0.3m

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 88 mAHD
EASTING: 293200
NORTHING: 6224615

PIT No: 300-17
PROJECT No: 76744.01
DATE: 3/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
88		FILLING - brown medium grained silty sand with anthropogenics comprising scrap metal, numerous ACM fragments, glass, plastic and rubbish		E	0.0 0.1				
		- mor ACM content increasing below 0.4m		E	0.4 0.5				
87	1								1
86	2	CLAYEY SAND - red to orange medium grained clayey sand, damp (alluvium)		E	2.0 2.1				2
	2.3	Pit discontinued at 2.3m - limit of investigation							
85	3								3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Burial pit (13m x 10m)

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 86 mAHD
EASTING: 292981
NORTHING: 6224673

PIT No: 300-18
PROJECT No: 76744.01
DATE: 2/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
86		TOPSOIL - brown silty sand with a trace of rootlets		E	0.0				
					0.1				
	0.2	SAND - light brown fine grained sand with a trace of silt, moist (alluvium)							
				E	0.4				
					0.5				
	0.8	Pit discontinued at 0.8m - limit of investigation							
85	1								1
84	2								2
83	3								3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 88 mAHD
EASTING: 293229
NORTHING: 6224617

PIT No: 300-19
PROJECT No: 76744.01
DATE: 6/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
88		FILLING - brown silty sand with a trace of gravel and anthropogenics comprising ACM and glass fragments							
	0.3	SAND - orange brown fine grained sand, moist (alluvium)							
	0.9	Pit discontinued at 0.9m - limit of investigation							
87	1								1
86	2								2
85	3								3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: --
EASTING: 293217
NORTHING: 6224681

PIT No: 300-19A
PROJECT No: 76744.01
DATE: 6/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
	0.3	FILLING - brown silty sand with a trace of gravel and anthropogenics comprising ACM and glass fragments							
	0.9	SAND - orange brown fine grained sand, moist (alluvium)							
	1	Pit discontinued at 0.9m - limit of investigation							1
	2								2
	3								3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 88 mAHD
EASTING: 293205
NORTHING: 6224609

PIT No: 300-20
PROJECT No: 76744.01
DATE: 6/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
88		FILLING - brown fine grained sand with anthropogenics comprising ACM, metal sheeting fragments and plastic		E	0.0				
					0.1				
				E	0.4				
					0.5				
	0.8	SAND - light brown fine grained sand, moist (alluvium)							
87	1								1
	1.2	Pit discontinued at 1.2m - limit of investigation							
86	2								2
85	3								3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 85 mAHD
EASTING: 293194
NORTHING: 6224728

PIT No: 300-21
PROJECT No: 76744.01
DATE: 6/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
85	0.0	FILLING - brown fine grained sand with ACM, plastic, foam and rootlets		E	0.0				
	0.1				0.1				
	0.2	SAND - light brown fine grained sand, moist (alluvium)							
	0.4			E	0.4				
	0.5				0.5				
	0.9								
84	1	Pit discontinued at 0.9m - limit of investigation							1
83	2								2
82	3								3

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 91 mAHD
EASTING: 293384
NORTHING: 6224447

PIT No: 300-22
PROJECT No: 76744.01
DATE: 2/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
91	0.0	TOPSOIL - brown silty sand with a trace of rootlets		E	0.0				
					0.1				
	0.2	SAND - medium dense, orange brown medium grained sand with a trace of silt and rootlets, humid (alluvium)							
				E	0.4				
				D	0.5				
		- becoming dense to very dense below 0.9m							
90	1	- with a trace of gravel below 1.0m		D	1.0				1
				D	1.5				
	1.9	CLAYEY SAND - dense to very dense, orange to red fine grained clayey sand with a trace of rootlets, moist (alluvium)							
89	2			D	2.0				2
		- becoming red brown with ironstone grave below 2.5m		D	2.5				
		- with low strength red sandstone band, wet below 3.0m						▼ 02-02-17	
88	3	3.0 Pit discontinued at 3.0m - limit of investigation		D	3.0				3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed at 3.0m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 89 mAHD
EASTING: 293554
NORTHING: 6224515

PIT No: 300-23
PROJECT No: 76744.01
DATE: 2/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
89	0.0	TOPSOIL - brown silty gravelly clay with a trace of rootlets		E	0.0				
					0.1				
		- with band of cobbles between 0.2 - 0.3m							
	0.3	SILTY CLAY - hard, yellow brown silty clay with some medium grained sand and a trace of rootlets, MC<PL (alluvium)							
				E	0.4				
				D	0.5				
	0.9	SANDY CLAY - hard, grey mottled orange sandy clay with some calcareous nodules, MC<PL							
88	1			D	1.0				1
				D	1.5				
87	2	- becoming orange mottled grey with decreasing calcareous content below 2.0m		D	2.0				2
				D	2.5				
		- becoming very stiff, MC~PL below 3.0m							
86	3	3.0 Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 92 mAHD
EASTING: 293073
NORTHING: 6224317

PIT No: 300-24
PROJECT No: 76744.01
DATE: 30/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
92		TOPSOIL - grey silty sand with rootlets		E	0.0				
					0.1				
	0.2	CLAYEY SAND - medium dense, light brown medium grained sand with grey clay and rootlets, moist (alluvium)							
				E	0.4				
				D	0.5				
	0.9	SANDSTONE - extremely low strength, extremely weathered, grey sandstone with medium strength sandstone bands							
91	1			D	1.0				1
90	2			D	2.0				2
				D	2.5				
89	3			D	3.0			▼ 30-01-17	3
	3.0	Pit discontinued at 3.0m - limit of investigation							

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed at 3.0m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 111 mAHD
EASTING: 292624
NORTHING: 6224201

PIT No: 300-25
PROJECT No: 76744.01
DATE: 30/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
111	0.0	TOPSOIL - brown clayey silt with a trace of rootlets		E	0.0				
	0.1				0.1				
	0.2	SILTY CLAY - hard, red brown silty clay with a trace of gravel and rootlets							
	0.4			E	0.4				
	0.5				0.5				
110	1 1.0	Pit discontinued at 1.0m - limit of investigation							1
109	2								2
108	3								3

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 103 mAHD
EASTING: 292785
NORTHING: 6223888

PIT No: 300-26
PROJECT No: 76744.01
DATE: 1/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
103	0.0	FILLING - brown and red silty sand with a trace of sandstone fragments and anthropogenics comprising plastic and metal (topsoil)		E	0.0 0.1				
	0.4	FILLING - red fine grained sand with anthropogenics comprising bricks, plastic, metal wiring, glass, hose pipe, boulders, tin, vehicle parts, tile fragments, concrete and styrofoam		E	0.4 0.5				
102	1								1
101	2 2.0	SAND - red fine grained sand, humid (alluvium)		E	2.0 2.1				2
	2.5	Pit discontinued at 2.5m - limit of investigation							
100	3								3

5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Trench excavated to ~8m

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 106 mAHD
EASTING: 293301
NORTHING: 6224116

PIT No: 300-28
PROJECT No: 76744.01
DATE: 31/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
106	0.1	FILLING - brown silty sand with a trace of metal fragments, concrete and sandstone (topsoil)		E	0.0				5 10 15 20
		SILTY CLAY - hard, red brown silty clay with a trace of rootlets, MC<PL			0.1				
				E	0.4				
					0.5				
		- becoming grey mottled orange below 0.6m							
	0.8	Pit discontinued at 0.8m - limit of investigation							
105	1								1
104	2								2
103	3								3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Test pit excavated adjacent to concrete/brick tank (~3m diameter) with brick fragments, wiring, metal sheeting and rubbish

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 79 mAHD
EASTING: 292634
NORTHING: 6225142

PIT No: 300-29
PROJECT No: 76744.01
DATE: 15/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
79	0.3	TOPSOIL - grey brown silty sand with a trace of rootlets							
		SAND - medium dense, light brown fine grained sand with a trace of rootlets, damp (alluvium)		D	0.5				
78	1			D	1.0				1
	1.1	CLAYEY SAND - dense, grey and orange clayey fine grained sand, moist (alluvium)		D	1.5				
	1.9	SANDY CLAY - stiff to very stiff, grey and orange sandy clay, MC~PL (alluvium)		D	2.0				
77	2			D	2.5				2
		- with very low strength sandstone bands below 2.5m							
		- with low strength sandstone band below 3.0m							
76	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0			15-02-17	3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed at 3.0m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 80 mAHD
EASTING: 292929
NORTHING: 6224959

PIT No: 300-30
PROJECT No: 76744.01
DATE: 6/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
80	0.1	TOPSOIL - brown clayey sand with some rootlets							
		SAND - loose, brown and grey medium grained sand with a trace of clay and rootlets, moist (alluvium)							
		- becoming wet below 0.5m		D	0.5			06-02-17	
79	1.0	Pit discontinued at 1.0m - due to wall collapse		D	1.0				
78	2								
77	3								

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed at 0.8m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 87 mAHD
EASTING: 293491
NORTHING: 6224630

PIT No: 300-31
PROJECT No: 76744.01
DATE: 2/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
87	0.2	TOPSOIL - brown silty clay with a trace of rootlets							
		SILTY CLAY - hard, orange mottled grey silty clay with a trace of gravel, MC<PL		D	0.5				
86	1	- becoming sandy and gravelly below 1.0m		D	1.0				1
		- becoming more orange below 1.5m		D	1.5				
85	2	- becoming MC~PL below 2.0m		D	2.0				2
				D	2.5				
84	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0			02-02-17	3

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed at 2.9m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 100 mAHD
EASTING: 292781
NORTHING: 6224363

PIT No: 300-32
PROJECT No: 76744.01
DATE: 7/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
100		TOPSOIL - brown silty sand with a trace of rootlets							
	0.2	SAND - medium dense, brown fine grained sand with some clay and a trace of rootlets, damp (alluvium)		D	0.5				
99	1	- becoming yellow brown below 1.0m		D	1.0				1
		- becoming orange below 1.3m		D	1.5				
98	2	- with extremely low strength sandstone band below 2.0m		D	2.0				2
	2.4	SANDY CLAY - very stiff to hard, orange brown sandy clay with a trace of rootlets and extremely low strength sandstone bands, MC~PL		D	2.5				
97	3	- becoming grey and orange with extremely low strength sandstone bands below 3.0m		D	3.0				3
	3.0	Pit discontinued at 3.0m - limit of investigation							

Dynamic Penetrometer Test (blows per 150mm) scale: 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 110 mAHD
EASTING: 292765
NORTHING: 6224189

PIT No: 300-33
PROJECT No: 76744.01
DATE: 30/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
110	0	TOPSOIL - brown sandy silt with a trace of rootlets							
	0.2	SILTY SANDY CLAY - hard, red silty sandy clay with a trace of gravel and rootlets, MC<PL (alluvium)		D U_{50}	0.5				
109	1	- becoming mottled grey below 1.0m		D	1.0				1
				D	1.5				
	1.9	SHALE - low strength, moderately weathered, orange and grey shale with some very low strength bands							
108	2			D	2.0				2
				D	2.5				
	2.6	- becoming medium strength with some low strength bands below 2.5m							
		Pit discontinued at 2.6m - refusal on medium strength shale							
107	3								3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 98 mAHD
EASTING: 292864
NORTHING: 6224004

PIT No: 300-34
PROJECT No: 76744.01
DATE: 31/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
98		TOPSOIL - brown silty sand with a trace of rootlets							
	0.2	SAND - loose, brown and orange fine grained sand with a trace of silt, moist (alluvium)		D	0.5				
97	1	- becoming dark brown and orange, wet below 1.0m		D	1.0				1
				D	1.5				
96	2			D	2.0			▼ 31-01-17	2
	2.0	- becoming saturated below 2.0m Pit discontinued at 2.0m - due to collapse of test pit wall							
95	3								3

Dynamic Penetrometer Test (blows per 150mm): 5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed at 2.0m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 93 mAHD
EASTING: 293005
NORTHING: 6224128

PIT No: 300-35
PROJECT No: 76744.01
DATE: 31/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
93		TOPSOIL - brown clayey sand with a trace of rootlets							
	0.2	SAND - dense to very dense, brown and yellow fine gained sand, slightly silty, moist (alluvium)		D	0.5				
92	1			D	1.0				1
		- becoming light brown, wet below 1.5m		D	1.5			31-01-17	
	1.9	SANDSTONE - extremely low strength, extremely weathered, grey sandstone with low strength and extremely low strength orange sandstone bands		D	2.0				2
91	2			D	2.5				
90	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: Free groundwater observed at 1.3m

REMARKS: Test pit collapsed

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 103 mAHD
EASTING: 293123
NORTHING: 6223920

PIT No: 300-36
PROJECT No: 76744.01
DATE: 31/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
103		TOPSOIL - brown sandy silt with a trace of rootlets							
	0.2	SILTY CLAY - hard, red brown mottled grey silty clay, slightly sandy, with a trace of gravel, MC<PL		D	0.5				
102	1			D	1.0				1
		- becoming heavily iron indurated below 1.5m		D	1.5				
	1.7	SANDY CLAY - hard, brown mottled red sandy clay with some ironstone gravel, MC<PL							
101	2			D	2.0				2
				D	2.5				
100	3	3.0 Pit discontinued at 3.0m - limit of investigation		D	3.0				3

5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 100 mAHD
EASTING: 293151
NORTHING: 6224068

PIT No: 300-37
PROJECT No: 76744.01
DATE: 31/1/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
100	0.1	TOPSOIL - brown silty sand with a trace of rootlets							
		CLAYEY SAND - dense to very dense, brown and red fine grained clayey sand, humid (alluvium)		D	0.5				
99	1			D	1.0				1
				D	1.5				
98	2 2.0	SANDY CLAY - hard, red brown mottled grey sandy clay with low strength sandstone band, MC<PL		D	2.0				2
		- becoming more grey and red below 2.2m		D	2.5				
97	3 3.0	- becoming more grey below 3.0m		D	3.0				3
		Pit discontinued at 3.0m - limit of investigation							

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 98 mAHD
EASTING: 293211
NORTHING: 6224230

PIT No: 300-38
PROJECT No: 76744.01
DATE: 1/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
98	0.1	TOPSOIL - brown silty sand with a trace of rootlets							
		CLAYEY SAND - very dense, light brown medium grained clayey sand with a trace of rootlets, humid (alluvium)		D	0.5				
	0.9	GRAVELLY SANDY CLAY - hard, red to orange mottled grey gravelly (ironstone) sandy clay with a trace of rootlets, MC<PL		D	1.0				1
97	1			D	1.5				
		- becoming more red below 1.5m							
96	2	- becoming grey and red sandy clay with very low strength sandstone band below 2.0m		D	2.0				2
				D	2.5				
	2.6	SHALE/SANDSTONE - low strength, moderately weathered, red shale and sandstone with some extremely low strength, extremely weathered, grey shale bands and very low strength fine grained sandstone							
95	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0				3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 97 mAHD
EASTING: 293505
NORTHING: 6224019

PIT No: 300-39
PROJECT No: 76744.01
DATE: 1/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
97		TOPSOIL - brown sandy silt with a trace of rootlets							
	0.2	SILTY CLAY - hard, yellow brown silty clay with a trace of rootlets, MC<PL		D	0.5				
96	1	- becoming mottled orange with a trace of gravel below 1.0m		D	1.0				1
		- becoming orange, sandy with a trace of ironstone gravel below 1.4m		D	1.5				
95	2			D	2.0				2
				D	2.5				
		- becoming grey brown, gravelly below 3.0m							
94	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 105 mAHD
EASTING: 293361
NORTHING: 6223918

PIT No: 300-40
PROJECT No: 76744.01
DATE: 1/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
105	0.2	TOPSOIL - brown sandy silt with a trace of rootlets							
		SILTY CLAY - hard, red mottled grey silty clay with a trace of rootlets and cobbles, MC<PL			0.4				
				D	0.5				
				U_{50}					
					0.8				
104	0.9	SHALE - low strength, moderately weathered, grey brown shale band with some medium strength shale							1
	1.1	SILTY CLAY - very stiff, grey and orange silty clay with a trace of low strength, grey brown shale							
				D	1.5				
103	1.8	SHALE - very low strength, highly weathered, grey and orange shale with some extremely low to low strength bands							2
				D	2.0				
	2.4	SANDSTONE - low strength, moderately weathered, light grey and red sandstone							
				D	2.5				
102	2.9	SHALE/SANDSTONE - low strength, moderately weathered, grey shale/sandstone with some medium strength bands							3
	3.0			D	3.0				
		Pit discontinued at 3.0m - limit of investigation							

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 103 mAHD
EASTING: 293441
NORTHING: 6223797

PIT No: 300-41
PROJECT No: 76744.01
DATE: 1/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
103	0.1	TOPSOIL - brown clayey silt with a trace of rootlets							
		SANDY GRAVELLY CLAY - hard, brown and orange sandy gravelly clay, MC<PL		D/B	0.5				
	0.8	SILTY SANDY CLAY - hard, orange brown mottled grey silty sandy clay with a trace of gravel, MC<PL							
102	1			D	1.0				1
		- becoming mottled red with some gravel below 1.5m		D	1.5				
101	2	- becoming more red with a trace of gravel below 2.0m		D	2.0				2
		- becoming very stiff, red and grey below 2.5m		D	2.5				
100	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 110 mAHD
EASTING: 292783
NORTHING: 6223653

PIT No: 300-42
PROJECT No: 76744.01
DATE: 1/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
110	0.1	TOPSOIL - brown clayey silt with a trace of rootlets							
		SILTY CLAY - hard, red brown silty clay with a trace of rootlets, MC<PL							
		- becoming brown, gravelly below 0.5m		D	0.5				
109	1	- with very low strength, yellow brown sandstone band below 1.0m		D	1.0				1
	1.4	SHALE - low strength, moderately weathered, grey brown shale with very low strength, orange and grey sandstone band		D	1.5				
108	2	- becoming dark grey with some medium strength shale bands below 2.0m		D	2.0				2
		- becoming grey brown below 2.5m		D	2.5				
107	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5 10 15 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Test pit moved 80m due to access restrictions

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 80 mAHD
EASTING: 293201
NORTHING: 6224914

PIT No: 300-SP1
PROJECT No: 76744.01
DATE: 14/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
80		FILLING - orange mottled grey sandy gravelly clay with some boulders, sandstone and a trace of concrete		E(x2)	0.0 0.1				
				E(x2)	0.4 0.5				
	0.7	SANDY GRAVELLY CLAY - hard, dark grey sandy gravelly clay with a trace of rootlets, MC<PL							
	0.9	Pit discontinued at 0.9m - limit of investigation							
79	1								1
78	2								2
77	3								3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Stockpile

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 80 mAHD
EASTING: 293185
NORTHING: 6224895

PIT No: 300-SP2
PROJECT No: 76744.01
DATE: 14/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
80		FILLING - brown grey sandy gravelly clay with a trace of rootlets		E	0.0 0.1				
	0.6	SILTY CLAY - very stiff, dark grey mottled orange silty clay, MC<PL		E	0.6 0.7				
79	1								1
	1.2	Pit discontinued at 1.2m - limit of investigation							
78	2								2
77	3								3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 81 mAHD
EASTING: 293184
NORTHING: 6224886

PIT No: 300-SP3
PROJECT No: 76744.01
DATE: 14/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
81	0.0	ROADBASE/COALWASH - silty gravel with cobbles		E(x2)	0.0				
	0.1				0.1				
	0.2	FILLING - orange and grey silty clay with some cobbles and gravel							
				E(x2)	0.4				
					0.5				
80	1.0	SILTY CLAY - soft, dark grey mottled orange silty clay, MC~PL							1
	1.3	Pit discontinued at 1.3m - limit of investigation							
79	2								2
78	3								3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Stockpile near sewage pipe

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 300, Menangle Park North

SURFACE LEVEL: 85 mAHD
EASTING: 292847
NORTHING: 6224807

PIT No: 300-SP4
PROJECT No: 76744.01
DATE: 6/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
85		FILLING - grey brown gravelly sand with cobbles and a trace of rootlets		E	0.0 0.1				
	0.8	SAND - yellow brown fine grained sand with a trace of silt and clay, damp		E	0.8 0.9				
84	1								1
	1.3	Pit discontinued at 1.3m - limit of investigation							
83	2								2
82	3								3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Stockpile (approximately 8m x 6m)

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 200, Menangle Park, NSW

SURFACE LEVEL: 81 mAHD
EASTING: 292703
NORTHING: 6225056

PIT No: 200-1
PROJECT No: 76744.01
DATE: 15/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
81	0.0	TOPSOIL - brown and grey silty sand with a trace of rootlets		E*	0.0 – 0.1				
	0.2	SAND - medium dense, light brown fine grained sand with a trace of rootlets, damp (alluvium)		E	0.4				
				D	0.5				
80	1	- becoming orange brown with very low strength orange sandstone bands below 1.1m		D	1.0				1
		- becoming orange, moist below 1.5m		D	1.5				
	1.9	SANDSTONE - extremely low strength, extremely weathered, orange and grey sandstone		D	2.0				2
79	2	- with low to medium strength bands below 2.5m		D	2.5				
	2.6	Pit discontinued at 2.6m - refusal on medium strength sandstone							
78	3								3

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: * Replicate sample BD1/150217 collected

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 200, Menangle Park, NSW

SURFACE LEVEL: 84 mAHD
EASTING: 292510
NORTHING: 6225025

PIT No: 200-2
PROJECT No: 76744.01
DATE: 15/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
84	0.0	TOPSOIL - brown and grey silty sand with a trace of rootlets		E	0.0				
					0.1				
	0.2	SAND - dense to very dense, light brown fine grained sand with very low strength red brown sandstone bands and a trace of rootlets, moist (alluvium)							
				E	0.4				
				D	0.5				
		- becoming orange with very low strenth sandstone bands and some clay below 0.7m							
83	1			D	1.0				1
	1.5	CLAYEY SAND - medium dense to dense, orange mottled grey clayey medium grained sand with very low to low strength sandstone bands (alluvium)		D	1.5				
82	2			D	2.0				2
	2.4	SANDSTONE - low strength, moderately weathered, orange and grey sandstone with extremely low and very low strength bands		D	2.5				
81	3	3.0 Pit discontinued at 3.0m - limit of investigation		D	3.0				3

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 200, Menangle Park, NSW

SURFACE LEVEL: 90 mAHD
EASTING: 293086
NORTHING: 6224522

PIT No: 200-3
PROJECT No: 76744.01
DATE: 2/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
90		TOPSOIL - brown and grey fine grained sand with a trace of rootlets		E*	0.0				
					0.1				
	0.2	SAND - dense to very dense, brown and red fine grained sand with a trace of silt and rootlets, damp (alluvium)							
				E	0.4				
				D	0.5				
89	1			D	1.0				1
		- becoming more red below 1.2m							
				D	1.5				
88	2	2.0 CLAYEY SAND - dense, red fine grained clayey sand with low strength sandstone bands, damp (alluvium)		D	2.0				2
				D	2.5				
		- becoming moist below 3.0m							
87	3	3.0 Pit discontinued at 3.0m - limit of investigation		D	3.0				3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS: * Replicate sample BD1/020217 collected

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 200, Menangle Park, NSW

SURFACE LEVEL: 89 mAHD
EASTING: 292930
NORTHING: 6224542

PIT No: 200-4
PROJECT No: 76744.01
DATE: 2/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
89		TOPSOIL - brown and grey fine grained sand with a trace of rootlets		E	0.0				
					0.1				
	0.2	SAND - medium dense, light brown fine grained sand with a trace of silt and rootlets, damp (alluvium)							
				E	0.4				
				D	0.5				
88	1	- becoming light brown below 1.0m		D	1.0				1
	1.5	CLAYEY SAND - medium dense, orange brown medium grained clayey sand with low strength sandstone bands, damp (alluvium)		D	1.5				
	1.9	SANDY CLAY - stiff to very stiff, orange and grey sandy clay with low strength sandstone bands, MC<PL (alluvium)							
87	2			D	2.0				2
				D	2.5				
		- with medium strength sandstone band below 3.0m							
86	3	3.0 Pit discontinued at 3.0m - limit of investigation		D	3.0				3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 200, Menangle Park, NSW

SURFACE LEVEL: 91 mAHD
EASTING: 293112
NORTHING: 6224425

PIT No: 200-5
PROJECT No: 76744.01
DATE: 2/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
91	0.1	TOPSOIL - brown silty sand with a trace of rootlets		E	0.0				
		SAND - medium dense, red brown fine grained sand with a trace of rootlets, humid (alluvium)			0.1				
				E	0.4				
				D	0.5				
90	1			D	1.0				1
		- with a trace of clay below 1.5m		D	1.5				
	1.9	CLAYEY SAND - dense, red brown medium grained clayey sand, damp (alluvium)							
89	2			D	2.0				2
		- with low strength sandstone band below 2.5m		D	2.5				
88	3 3.0	Pit discontinued at 3.0m - limit of investigation		D	3.0				3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dahua Group Sydney Project 2 Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: Precinct 200, Menangle Park, NSW

SURFACE LEVEL: 93 mAHD
EASTING: 292757
NORTHING: 6224571

PIT No: 200-6
PROJECT No: 76744.01
DATE: 2/2/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
93	0.0	TOPSOIL - grey fine grained sand with a trace of rootlets		E	0.0				
	0.2	SAND - very dense, light brown fine grained sand with a trace of silt, moist (alluvium)			0.1				
				E	0.4				
				D	0.5				
		- becoming medium dense below 0.6m							
92	1			D	1.0				1
	1.1	CLAYEY SAND - medium dense, brown and orange fine grained clayey sand, moist (alluvium)							
	1.5	SANDY CLAY - stiff, orange and grey sandy clay with very low strength sandstone bands, MC<PL (alluvium)		D	1.5				
91	2	- with low strength grey and orange sandstone bands below 2.0m		D	2.0				2
				D	2.5				
		- becoming hard, grey below 3.0m							
90	3	3.0 Pit discontinued at 3.0m - limit of investigation		D	3.0				3

RIG: JCB 4X backhoe - 450mm bucket

LOGGED: CLN

SURVEY DATUM: MGA94 Zone 56

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

Appendix E

Laboratory Analytical Reports

12 Ashley Street, Chatswood, NSW 2067
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envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 160926

Client:

Douglas Partners Pty Ltd Smeaton Grange
18 Waler Crescent
Smeaton Grange
NSW 2567

Attention: Emily McGinty

Sample log in details:

Your Reference:	**76744.01, Menangle Park North (Precinct 500)**
No. of samples:	34 Soils, 1 Material
Date samples received / completed instructions received	27/01/17 / 27/01/17

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	3/02/17 / 3/02/17
Date of Preliminary Report:	Not Issued

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Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	160926-8	160926-10	160926-12	160926-14	160926-16
Your Reference	---------- -	500-5	500-6	500-7	500-8	500-9
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		24/01/2017	23/01/2017	20/01/2017	23/01/2017	20/01/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Date analysed	-	31/01/2017	31/01/2017	31/01/2017	31/01/2017	31/01/2017
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	119	116	122	120	116

vTRH(C6-C10)/BTEXN in Soil				
Our Reference:	UNITS	160926-18	160926-20	160926-33
Your Reference	---------- -	500-10	500-11	BD1200117
Depth	----------	0.0-0.1	0.0-0.1	-
Date Sampled		23/01/2017	19/01/2017	20/01/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	30/01/2017	30/01/2017	30/01/2017
Date analysed	-	31/01/2017	31/01/2017	31/01/2017
TRHC$_6$ - C$_9$	mg/kg	<25	<25	[NA]
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	[NA]
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	[NA]
Benzene	mg/kg	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	[NA]
naphthalene	mg/kg	<1	<1	[NA]
Surrogate aaa-Trifluorotoluene	%	126	121	117

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	160926-8	160926-10	160926-12	160926-14	160926-16
Your Reference	---------- -	500-5	500-6	500-7	500-8	500-9
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		24/01/2017	23/01/2017	20/01/2017	23/01/2017	20/01/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Date analysed	-	31/01/2017	31/01/2017	31/01/2017	31/01/2017	31/01/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	104	104	106	106	104

svTRH (C10-C40) in Soil			
Our Reference:	UNITS	160926-18	160926-20
Your Reference	---------- -	500-10	500-11
Depth	----------	0.0-0.1	0.0-0.1
Date Sampled		23/01/2017	19/01/2017
Type of sample		Soil	Soil
Date extracted	-	30/01/2017	30/01/2017
Date analysed	-	31/01/2017	31/01/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	140	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	140	<50
Surrogate o-Terphenyl	%	123	105

PAHs in Soil						
Our Reference:	UNITS	160926-8	160926-10	160926-12	160926-16	160926-18
Your Reference	----------	500-5	500-6	500-7	500-9	500-10
Depth	- ----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		24/01/2017	23/01/2017	20/01/2017	20/01/2017	23/01/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Date analysed	-	31/01/2017	31/01/2017	31/01/2017	31/01/2017	31/01/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	1.2	<0.1	1.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	1.1
Fluoranthene	mg/kg	<0.1	<0.1	0.3	<0.1	0.2
Pyrene	mg/kg	<0.1	<0.1	0.1	<0.1	0.2
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Chrysene	mg/kg	<0.1	<0.1	0.3	<0.1	0.4
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	0.2
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	<0.05	<0.05	1.9	<0.05	3.8
Surrogate p-Terphenyl-d14	%	81	93	112	95	93

PAHs in Soil - Low Level			
Our Reference:	UNITS	160926-14	160926-20
Your Reference	----------	500-8	500-11
	-		
Depth	----------	0.0-0.1	0.0-0.1
Date Sampled		23/01/2017	19/01/2017
Type of sample		Soil	Soil
Date extracted	-	30/01/2017	30/01/2017
Date analysed	-	01/02/2017	01/02/2017
Naphthalene	mg/kg	1.9	0.02
Acenaphthylene	mg/kg	0.04	<0.01
Acenaphthene	mg/kg	0.13	<0.01
Fluorene	mg/kg	0.27	<0.01
Phenanthrene	mg/kg	13	0.21
Anthracene	mg/kg	0.14	0.02
Fluoranthene	mg/kg	2.2	0.06
Pyrene	mg/kg	1.5	0.05
Benzo(a)anthracene	mg/kg	0.78	0.04
Chrysene	mg/kg	3.0	0.05
Benzo(b,j+k)fluoranthene	mg/kg	1.5	0.04
Benzo(a)pyrene	mg/kg	0.19	0.02
Indeno(1,2,3-c,d)pyrene	mg/kg	0.05	0.01
Dibenzo(a,h)anthracene	mg/kg	0.06	<0.01
Benzo(g,h,i)perylene	mg/kg	0.16	0.02
Benzo(a)pyrene TEQ calc (zero)	mg/kg	0.51	<0.05
Benzo(a)pyrene TEQ calc(half)	mg/kg	0.51	<0.05
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	0.51	<0.05
Total +ve PAH's	mg/kg	25	0.54
Surrogate p-Terphenyl-d14	%	78	78

Organochlorine Pesticides in soil						
Our Reference:	UNITS	160926-1	160926-2	160926-3	160926-4	160926-6
Your Reference	---------- -	500-1	500-2	500-2b	500-3	500-4
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		25/01/2017	25/01/2017	25/01/2017	24/01/2017	24/01/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Date analysed	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	2.2	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	0.5	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	0.5	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	131	125	126	123	124

Organochlorine Pesticides in soil						
Our Reference:	UNITS	160926-8	160926-10	160926-12	160926-16	160926-18
Your Reference	---------- -	500-5	500-6	500-7	500-9	500-10
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		24/01/2017	23/01/2017	20/01/2017	20/01/2017	23/01/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Date analysed	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	123	123	125	125	118

Organochlorine Pesticides in soil				
Our Reference:	UNITS	160926-22	160926-24	160926-35
Your Reference	---------- -	500-12	500-13	BD1240117
Depth	----------	0.0-0.1	0.0-0.1	-
Date Sampled		20/01/2017	24/01/2017	24/01/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	30/01/2017	30/01/2017	30/01/2017
Date analysed	-	30/01/2017	30/01/2017	30/01/2017
HCB	mg/kg	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	119	123	123

Organophosphorus Pesticides						
Our Reference:	UNITS	160926-1	160926-2	160926-3	160926-4	160926-6
Your Reference	---------- -	500-1	500-2	500-2b	500-3	500-4
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		25/01/2017	25/01/2017	25/01/2017	24/01/2017	24/01/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Date analysed	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	131	125	126	123	124

Organophosphorus Pesticides						
Our Reference:	UNITS	160926-8	160926-10	160926-12	160926-16	160926-18
Your Reference	---------- -	500-5	500-6	500-7	500-9	500-10
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		24/01/2017	23/01/2017	20/01/2017	20/01/2017	23/01/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Date analysed	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	123	123	125	125	118

Organophosphorus Pesticides				
Our Reference:	UNITS	160926-22	160926-24	160926-35
Your Reference	----------	500-12	500-13	BD1240117
	-			
Depth	----------	0.0-0.1	0.0-0.1	-
Date Sampled		20/01/2017	24/01/2017	24/01/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	30/01/2017	30/01/2017	30/01/2017
Date analysed	-	30/01/2017	30/01/2017	30/01/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	119	123	123

PCBs in Soil						
Our Reference:	UNITS	160926-8	160926-10	160926-12	160926-16	160926-18
Your Reference	----------	500-5	500-6	500-7	500-9	500-10
	-					
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		24/01/2017	23/01/2017	20/01/2017	20/01/2017	23/01/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Date analysed	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	123	123	125	125	118

Acid Extractable metals in soil						
Our Reference:	UNITS	160926-1	160926-2	160926-3	160926-4	160926-6
Your Reference	---------- -	500-1	500-2	500-2b	500-3	500-4
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		25/01/2017	25/01/2017	25/01/2017	24/01/2017	24/01/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Date analysed	-	31/01/2017	31/01/2017	31/01/2017	31/01/2017	31/01/2017
Arsenic	mg/kg	10	5	7	<4	<4
Cadmium	mg/kg	4.2	0.9	<0.4	<0.4	<0.4
Chromium	mg/kg	15	16	10	12	9
Copper	mg/kg	89	18	11	4	6
Lead	mg/kg	110	76	52	9	9
Mercury	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	9	16	7	4	5
Zinc	mg/kg	1,800	550	280	9	14

Acid Extractable metals in soil						
Our Reference:	UNITS	160926-8	160926-10	160926-12	160926-14	160926-16
Your Reference	---------- -	500-5	500-6	500-7	500-8	500-9
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		24/01/2017	23/01/2017	20/01/2017	23/01/2017	20/01/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Date analysed	-	31/01/2017	31/01/2017	31/01/2017	31/01/2017	31/01/2017
Arsenic	mg/kg	<4	6	<4	<4	7
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	4	17	2	2	11
Copper	mg/kg	4	14	22	20	22
Lead	mg/kg	8	23	22	20	20
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	11	14	14	12
Zinc	mg/kg	13	45	41	30	38

Acid Extractable metals in soil						
Our Reference:	UNITS	160926-18	160926-20	160926-22	160926-24	160926-33
Your Reference	---------- -	500-10	500-11	500-12	500-13	BD1200117
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	-
Date Sampled		23/01/2017	19/01/2017	20/01/2017	24/01/2017	20/01/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Date analysed	-	31/01/2017	31/01/2017	31/01/2017	31/01/2017	31/01/2017
Arsenic	mg/kg	6	4	5	<4	7
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	11	13	19	2	11
Copper	mg/kg	26	25	18	2	21
Lead	mg/kg	21	15	21	3	20
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	16	12	13	1	13
Zinc	mg/kg	73	33	42	7	37

Acid Extractable metals in soil		
Our Reference:	UNITS	160926-35
Your Reference	---------- -	BD1240117
Depth	----------	-
Date Sampled		24/01/2017
Type of sample		Soil
Date prepared	-	30/01/2017
Date analysed	-	31/01/2017
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	2
Copper	mg/kg	2
Lead	mg/kg	3
Mercury	mg/kg	<0.1
Nickel	mg/kg	1
Zinc	mg/kg	6

Misc Soil - Inorg						
Our Reference:	UNITS	160926-8	160926-10	160926-12	160926-14	160926-16
Your Reference	---------- -	500-5	500-6	500-7	500-8	500-9
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		24/01/2017	23/01/2017	20/01/2017	23/01/2017	20/01/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Date analysed	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg			
Our Reference:	UNITS	160926-18	160926-20
Your Reference	---------- -	500-10	500-11
Depth	----------	0.0-0.1	0.0-0.1
Date Sampled		23/01/2017	19/01/2017
Type of sample		Soil	Soil
Date prepared	-	30/01/2017	30/01/2017
Date analysed	-	30/01/2017	30/01/2017
Total Phenolics (as Phenol)	mg/kg	<5	<5

Moisture						
Our Reference:	UNITS	160926-1	160926-2	160926-3	160926-4	160926-6
Your Reference	---------- -	500-1	500-2	500-2b	500-3	500-4
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		25/01/2017	25/01/2017	25/01/2017	24/01/2017	24/01/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Date analysed	-	31/01/2017	31/01/2017	31/01/2017	31/01/2017	31/01/2017
Moisture	%	8.3	11	7.4	6.1	4.8

Moisture						
Our Reference:	UNITS	160926-8	160926-10	160926-12	160926-14	160926-16
Your Reference	---------- -	500-5	500-6	500-7	500-8	500-9
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		24/01/2017	23/01/2017	20/01/2017	23/01/2017	20/01/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Date analysed	-	31/01/2017	31/01/2017	31/01/2017	31/01/2017	31/01/2017
Moisture	%	4.0	7.6	3.1	3.7	10

Moisture						
Our Reference:	UNITS	160926-18	160926-20	160926-22	160926-24	160926-33
Your Reference	---------- -	500-10	500-11	500-12	500-13	BD1200117
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	-
Date Sampled		23/01/2017	19/01/2017	20/01/2017	24/01/2017	20/01/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/01/2017	30/01/2017	30/01/2017	30/01/2017	30/01/2017
Date analysed	-	31/01/2017	31/01/2017	31/01/2017	31/01/2017	31/01/2017
Moisture	%	7.5	11	16	2.0	8.7

Moisture		
Our Reference:	UNITS	160926-35
Your Reference	---------- -	BD1240117
Depth	----------	-
Date Sampled		24/01/2017
Type of sample		Soil
Date prepared	-	30/01/2017
Date analysed	-	31/01/2017
Moisture	%	1.7

Asbestos ID - soils						
Our Reference:	UNITS	160926-8	160926-10	160926-12	160926-16	160926-18
Your Reference	---------- -	500-5	500-6	500-7	500-9	500-10
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		24/01/2017	23/01/2017	20/01/2017	20/01/2017	23/01/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	1/02/2017	1/02/2017	1/02/2017	1/02/2017	1/02/2017
Sample mass tested	g	Approx. 25g	Approx. 40g	Approx. 35g	Approx. 25g	Approx. 30g
Sample Description	-	Brown sandy soil	Brown clayey soil	Black bituminous soil	Brown clayey soil	Brown clayey soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - materials		
Our Reference:	UNITS	160926-32
Your Reference	---------- -	500-2
Depth	----------	-
Date Sampled		25/01/2017
Type of sample		Material
Date analysed	-	1/02/2017
Mass / Dimension of Sample	-	90x55x6mm
Sample Description	-	Grey compressed fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected Amosite asbestos detected

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.

Method ID	Methodology Summary
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/01/2017	160926-8	30/01/2017 || 30/01/2017	LCS-6	30/01/2017
Date analysed	-			31/01/2017	160926-8	31/01/2017 || 31/01/2017	LCS-6	31/01/2017
TRHC$_6$ - C$_9$	mg/kg	25	Org-016	<25	160926-8	<25 || <25	LCS-6	115%
TRHC$_6$ - C$_{10}$	mg/kg	25	Org-016	<25	160926-8	<25 || <25	LCS-6	115%
Benzene	mg/kg	0.2	Org-016	<0.2	160926-8	<0.2 || <0.2	LCS-6	128%
Toluene	mg/kg	0.5	Org-016	<0.5	160926-8	<0.5 || <0.5	LCS-6	129%
Ethylbenzene	mg/kg	1	Org-016	<1	160926-8	<1 || <1	LCS-6	108%
m+p-xylene	mg/kg	2	Org-016	<2	160926-8	<2 || <2	LCS-6	105%
o-Xylene	mg/kg	1	Org-016	<1	160926-8	<1 || <1	LCS-6	105%
naphthalene	mg/kg	1	Org-014	<1	160926-8	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	118	160926-8	119 || 120 || RPD: 1	LCS-6	119%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/01/2017	160926-8	30/01/2017 || 30/01/2017	LCS-6	30/01/2017
Date analysed	-			30/01/2017	160926-8	31/01/2017 || 31/01/2017	LCS-6	30/01/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	50	Org-003	<50	160926-8	<50 || <50	LCS-6	100%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	Org-003	<100	160926-8	<100 || <100	LCS-6	98%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	Org-003	<100	160926-8	<100 || <100	LCS-6	97%
TRH>C$_{10}$-C$_{16}$	mg/kg	50	Org-003	<50	160926-8	<50 || <50	LCS-6	100%
TRH>C$_{16}$-C$_{34}$	mg/kg	100	Org-003	<100	160926-8	<100 || <100	LCS-6	98%
TRH>C$_{34}$-C$_{40}$	mg/kg	100	Org-003	<100	160926-8	<100 || <100	LCS-6	97%
Surrogate o-Terphenyl	%		Org-003	103	160926-8	104 || 104 || RPD: 0	LCS-6	106%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/01/2017	160926-8	30/01/2017 || 30/01/2017	LCS-6	30/01/2017
Date analysed	-			31/01/2017	160926-8	31/01/2017 || 31/01/2017	LCS-6	31/01/2017
Naphthalene	mg/kg	0.1	Org-012	<0.1	160926-8	<0.1 || <0.1	LCS-6	88%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	160926-8	<0.1 || <0.1	LCS-6	92%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	160926-8	<0.1 || <0.1	LCS-6	105%
Anthracene	mg/kg	0.1	Org-012	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	160926-8	<0.1 || <0.1	LCS-6	93%
Pyrene	mg/kg	0.1	Org-012	<0.1	160926-8	<0.1 || <0.1	LCS-6	90%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	160926-8	<0.1 || <0.1	LCS-6	97%
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012	<0.2	160926-8	<0.2 || <0.2	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	160926-8	<0.05 || <0.05	LCS-6	78%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	112	160926-8	81 || 106 || RPD: 27	LCS-6	119%
QUALITY CONTROL PAHs in Soil - Low Level	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/01/2017	[NT]	[NT]	LCS-6	30/01/2017
Date analysed	-			31/01/2017	[NT]	[NT]	LCS-6	31/01/2017
Naphthalene	mg/kg	0.01	Org-012	<0.01	[NT]	[NT]	LCS-6	88%
Acenaphthylene	mg/kg	0.01	Org-012	<0.01	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	0.01	Org-012	<0.01	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	0.01	Org-012	<0.01	[NT]	[NT]	LCS-6	92%
Phenanthrene	mg/kg	0.01	Org-012	<0.01	[NT]	[NT]	LCS-6	105%
Anthracene	mg/kg	0.01	Org-012	<0.01	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	0.01	Org-012	<0.01	[NT]	[NT]	LCS-6	93%
Pyrene	mg/kg	0.01	Org-012	<0.01	[NT]	[NT]	LCS-6	90%
Benzo(a)anthracene	mg/kg	0.01	Org-012	<0.01	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	0.01	Org-012	<0.01	[NT]	[NT]	LCS-6	97%
Benzo(b,j+k) fluoranthene	mg/kg	0.02	Org-012	<0.02	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.01	Org-012	<0.01	[NT]	[NT]	LCS-6	78%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.01	Org-012	<0.01	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.01	Org-012	<0.01	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.01	Org-012	<0.01	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	112	[NT]	[NT]	LCS-6	119%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/01/2017	160926-8	30/01/2017 || 30/01/2017	LCS-6	30/01/2017
Date analysed	-			30/01/2017	160926-8	30/01/2017 || 30/01/2017	LCS-6	30/01/2017
HCB	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	LCS-6	97%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	LCS-6	104%
Heptachlor	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	LCS-6	102%
delta-BHC	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	LCS-6	98%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	LCS-6	102%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	LCS-6	104%
Dieldrin	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	LCS-6	109%
Endrin	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	LCS-6	101%
pp-DDD	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	LCS-6	97%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	LCS-6	104%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	120	160926-8	123 || 125 || RPD: 2	LCS-6	91%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/01/2017	160926-8	30/01/2017 || 30/01/2017	LCS-6	30/01/2017
Date analysed	-			30/01/2017	160926-8	30/01/2017 || 30/01/2017	LCS-6	30/01/2017
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	160926-8	<0.1 || <0.1	LCS-6	120%
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	160926-8	<0.1 || <0.1	LCS-6	88%
Dimethoate	mg/kg	0.1	Org-008	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	160926-8	<0.1 || <0.1	LCS-6	104%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	160926-8	<0.1 || <0.1	LCS-6	115%
Malathion	mg/kg	0.1	Org-008	<0.1	160926-8	<0.1 || <0.1	LCS-6	102%
Parathion	mg/kg	0.1	Org-008	<0.1	160926-8	<0.1 || <0.1	LCS-6	125%
Ronnel	mg/kg	0.1	Org-008	<0.1	160926-8	<0.1 || <0.1	LCS-6	80%
Surrogate TCMX	%		Org-008	120	160926-8	123 || 125 || RPD: 2	LCS-6	122%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/01/2017	160926-8	30/01/2017 || 30/01/2017	LCS-6	30/01/2017
Date analysed	-			30/01/2017	160926-8	30/01/2017 || 30/01/2017	LCS-6	30/01/2017
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	160926-8	<0.1 || <0.1	LCS-6	111%
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	160926-8	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	120	160926-8	123 || 125 || RPD: 2	LCS-6	122%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			30/01/2017	160926-8	30/01/2017 || 30/01/2017	LCS-6	30/01/2017
Date analysed	-			31/01/2017	160926-8	31/01/2017 || 31/01/2017	LCS-6	31/01/2017
Arsenic	mg/kg	4	Metals-020	<4	160926-8	<4 || <4	LCS-6	117%
Cadmium	mg/kg	0.4	Metals-020	<0.4	160926-8	<0.4 || <0.4	LCS-6	107%
Chromium	mg/kg	1	Metals-020	<1	160926-8	4 || 4 || RPD: 0	LCS-6	113%
Copper	mg/kg	1	Metals-020	<1	160926-8	4 || 4 || RPD: 0	LCS-6	112%
Lead	mg/kg	1	Metals-020	<1	160926-8	8 || 8 || RPD: 0	LCS-6	97%
Mercury	mg/kg	0.1	Metals-021	<0.1	160926-8	<0.1 || <0.1	LCS-6	92%
Nickel	mg/kg	1	Metals-020	<1	160926-8	2 || 2 || RPD: 0	LCS-6	102%
Zinc	mg/kg	1	Metals-020	<1	160926-8	13 || 12 || RPD: 8	LCS-6	105%

QUALITY CONTROL Misc Soil - Inorg	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			30/01/2017	160926-8	30/01/2017 || 30/01/2017	LCS-1	30/01/2017
Date analysed	-			30/01/2017	160926-8	30/01/2017 || 30/01/2017	LCS-1	30/01/2017
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	160926-8	<5 || <5	LCS-1	102%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	160926-24	30/01/2017 || 30/01/2017	160926-10	30/01/2017
Date analysed	-	160926-24	30/01/2017 || 30/01/2017	160926-10	30/01/2017
HCB	mg/kg	160926-24	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	160926-24	<0.1 || <0.1	160926-10	105%
gamma-BHC	mg/kg	160926-24	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	160926-24	<0.1 || <0.1	160926-10	107%
Heptachlor	mg/kg	160926-24	<0.1 || <0.1	160926-10	95%
delta-BHC	mg/kg	160926-24	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	160926-24	<0.1 || <0.1	160926-10	103%
Heptachlor Epoxide	mg/kg	160926-24	<0.1 || <0.1	160926-10	105%
gamma-Chlordane	mg/kg	160926-24	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	160926-24	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	160926-24	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	160926-24	<0.1 || <0.1	160926-10	108%
Dieldrin	mg/kg	160926-24	<0.1 || <0.1	160926-10	112%
Endrin	mg/kg	160926-24	<0.1 || <0.1	160926-10	103%
pp-DDD	mg/kg	160926-24	<0.1 || <0.1	160926-10	122%
Endosulfan II	mg/kg	160926-24	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	160926-24	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	160926-24	<0.1 || <0.1	[NR]	[NR]

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Endosulfan Sulphate	mg/kg	160926-24	<0.1 || <0.1	160926-10	105%
Methoxychlor	mg/kg	160926-24	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%	160926-24	123 || 123 || RPD: 0	160926-10	124%
QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	160926-24	30/01/2017 || 30/01/2017	160926-10	30/01/2017
Date analysed	-	160926-24	30/01/2017 || 30/01/2017	160926-10	30/01/2017
Azinphos-methyl (Guthion)	mg/kg	160926-24	<0.1 || <0.1	[NR]	[NR]
Bromophos-ethyl	mg/kg	160926-24	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	160926-24	<0.1 || <0.1	160926-10	118%
Chlorpyriphos-methyl	mg/kg	160926-24	<0.1 || <0.1	[NR]	[NR]
Diazinon	mg/kg	160926-24	<0.1 || <0.1	[NR]	[NR]
Dichlorvos	mg/kg	160926-24	<0.1 || <0.1	160926-10	70%
Dimethoate	mg/kg	160926-24	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	160926-24	<0.1 || <0.1	160926-10	112%
Fenitrothion	mg/kg	160926-24	<0.1 || <0.1	160926-10	110%
Malathion	mg/kg	160926-24	<0.1 || <0.1	160926-10	96%
Parathion	mg/kg	160926-24	<0.1 || <0.1	160926-10	128%
Ronnel	mg/kg	160926-24	<0.1 || <0.1	160926-10	82%
Surrogate TCMX	%	160926-24	123 || 123 || RPD: 0	160926-10	124%
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	160926-10	30/01/2017
Date analysed	-	[NT]	[NT]	160926-10	30/01/2017
Aroclor 1016	mg/kg	[NT]	[NT]	[NR]	[NR]
Aroclor 1221	mg/kg	[NT]	[NT]	[NR]	[NR]
Aroclor 1232	mg/kg	[NT]	[NT]	[NR]	[NR]
Aroclor 1242	mg/kg	[NT]	[NT]	[NR]	[NR]
Aroclor 1248	mg/kg	[NT]	[NT]	[NR]	[NR]
Aroclor 1254	mg/kg	[NT]	[NT]	160926-10	109%
Aroclor 1260	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%	[NT]	[NT]	160926-10	124%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	160926-24	30/01/2017 || 30/01/2017	160926-10	30/01/2017
Date analysed	-	160926-24	31/01/2017 || 31/01/2017	160926-10	31/01/2017
Arsenic	mg/kg	160926-24	<4 || <4	160926-10	97%
Cadmium	mg/kg	160926-24	<0.4 || <0.4	160926-10	99%
Chromium	mg/kg	160926-24	2 || 2 || RPD: 0	160926-10	103%
Copper	mg/kg	160926-24	2 || 2 || RPD: 0	160926-10	109%
Lead	mg/kg	160926-24	3 || 3 || RPD: 0	160926-10	80%
Mercury	mg/kg	160926-24	<0.1 || <0.1	160926-10	92%
Nickel	mg/kg	160926-24	1 || <1	160926-10	95%
Zinc	mg/kg	160926-24	7 || 6 || RPD: 15	160926-10	96%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	LCS-5	30/01/2017
Date analysed	-	[NT]	[NT]	LCS-5	31/01/2017
Arsenic	mg/kg	[NT]	[NT]	LCS-5	115%
Cadmium	mg/kg	[NT]	[NT]	LCS-5	105%
Chromium	mg/kg	[NT]	[NT]	LCS-5	110%
Copper	mg/kg	[NT]	[NT]	LCS-5	110%
Lead	mg/kg	[NT]	[NT]	LCS-5	98%
Mercury	mg/kg	[NT]	[NT]	LCS-5	90%
Nickel	mg/kg	[NT]	[NT]	LCS-5	101%
Zinc	mg/kg	[NT]	[NT]	LCS-5	103%

Report Comments:

Asbestos: Excessive sample volume was provided for asbestos analysis. A portion of the supplied sample was sub-sampled according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.

Note: Samples 160926-8, 10, 12, 16, 18 were sub-sampled from bags provided by the client.

Asbestos ID was analysed by Approved Identifier:	Lucy Zhu
Asbestos ID was authorised by Approved Signatory:	Paul Ching

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client Details	
Client	Douglas Partners Pty Ltd Smeaton Grange
Attention	Emily McGinty

Sample Login Details	
Your Reference	76744.01, Menangle Park North
Envirolab Reference	**164266**
Date Sample Received	28/03/2017
Date Instructions Received	28/03/2017
Date Results Expected to be Reported	**04/04/2017**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	8 waters
Turnaround Time Requested	Standard
Temperature on receipt (°C)	23.6
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolabservices.com.au	Email: jhurst@envirolabservices.com.au

Sample and Testing Details on following page

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

Sample Id	*vTRH(C6-C10)/BTEXN in Water*	*svTRH (C10-C40) in Water*	*PAHs in Water*	*OCP in water*	*OP Pesticides in water*	*PCBs in Water*	*Total Phenolics in Water*	*HM in water - dissolved*	*Cations in water Dissolved*	*Explosives in Water*
MW1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TB	✓									
TS	✓									
DUP1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY

Project Name:	Menangle Park North			**To:**	Envirolab Services
Project No:	76744.01	**Sampler:**	CLN		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	EMG	**Mob. Phone:**	0418 651 227	**Attn:**	Tania Notaras
Email:	emily.mcginty@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Combo 8	Explosives	Al, Sr, Ba, Fe, Mg							Notes/preservation
MW1	1	28.03.17	W	G	x	x	x							
MW2	2	27.03.17	W	G	x	x	x							
MW3	3	27.03.17	W	G	x	x	x							
MW4	4	27.03.17	W	G	x	x	x							
MW5	5	28.03.17	W	G	x	x	x							
TB	6	28.03.17	W	G	x	x	x							
TS	7	28.03.17	W	G	x	x	x							
DUP1	16	28.03.17	W	G	x	x	x							

ENVIROLAB

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 164266
Date Received: 28/03
Time Received: 17.45
Received by: YAG
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Lab Report No:			
Send Results to:	Douglas Partners Pty Ltd	**Address** 18 Waler Crescent, Smeaton Grange 2567	**Phone:** (02) 4647 0075 **Fax:** (02) 4646 1886
Relinquished by:	CLN	**Transported to laboratory by:**	
Signed:		**Date & Time:** 28.03.17	**Received by:** ELS

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 164266

Client:

Douglas Partners Pty Ltd Smeaton Grange
18 Waler Crescent
Smeaton Grange
NSW 2567

Attention: Emily McGinty

Sample log in details:

Your Reference:	**76744.01, Menangle Park North**		
No. of samples:	8 waters		
Date samples received / completed instructions received	28/03/17	/	28/03/17

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	4/04/17	/	4/04/17
Date of Preliminary Report:	Not Issued		

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Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

vTRH(C6-C10)/BTEXN in Water						
Our Reference:	UNITS	164266-1	164266-2	164266-3	164266-4	164266-5
Your Reference	---------- -	MW1	MW2	MW3	MW4	MW5
Date Sampled	----------	28/03/2017	27/03/2017	27/03/2017	27/03/2017	28/03/2017
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	29/03/2017	29/03/2017	29/03/2017	29/03/2017	29/03/2017
Date analysed	-	30/03/2017	30/03/2017	30/03/2017	30/03/2017	30/03/2017
TRHC$_6$ - C$_9$	µg/L	<10	<10	<10	<10	<10
TRHC$_6$ - C$_{10}$	µg/L	<10	<10	<10	<10	<10
TRHC$_6$ - C$_{10}$ less BTEX (F1)	µg/L	<10	<10	<10	<10	<10
Benzene	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
o-xylene	µg/L	<1	<1	<1	<1	<1
Naphthalene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	112	112	114	112	113
Surrogate toluene-d8	%	97	99	98	97	99
Surrogate 4-BFB	%	90	86	86	85	86

vTRH(C6-C10)/BTEXN in Water				
Our Reference:	UNITS	164266-6	164266-7	164266-8
Your Reference	---------- -	TB	TS	DUP1
Date Sampled	----------	28/03/2017	28/03/2017	28/03/2017
Type of sample		Water	Water	Water
Date extracted	-	29/03/2017	29/03/2017	29/03/2017
Date analysed	-	29/03/2017	29/03/2017	30/03/2017
TRHC$_6$ - C$_9$	µg/L	<10	[NA]	<10
TRHC$_6$ - C$_{10}$	µg/L	<10	[NA]	<10
TRHC$_6$ - C$_{10}$ less BTEX (F1)	µg/L	<10	[NA]	<10
Benzene	µg/L	<1	85%	<1
Toluene	µg/L	<1	77%	<1
Ethylbenzene	µg/L	<1	70%	<1
m+p-xylene	µg/L	<2	72%	<2
o-xylene	µg/L	<1	75%	<1
Naphthalene	µg/L	<1	[NA]	<1
Surrogate Dibromofluoromethane	%	107	102	112
Surrogate toluene-d8	%	97	97	100
Surrogate 4-BFB	%	88	105	82

svTRH (C10-C40) in Water						
Our Reference:	UNITS	164266-1	164266-2	164266-3	164266-4	164266-5
Your Reference	----------	MW1	MW2	MW3	MW4	MW5
Date Sampled	- ----------	28/03/2017	27/03/2017	27/03/2017	27/03/2017	28/03/2017
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	30/03/2017	30/03/2017	30/03/2017	30/03/2017	30/03/2017
Date analysed	-	30/03/2017	30/03/2017	30/03/2017	30/03/2017	30/03/2017
TRHC$_{10}$ - C$_{14}$	µg/L	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	µg/L	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	µg/L	<100	<100	<100	<100	<100
TRH>C$_{10}$ - C$_{16}$	µg/L	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	µg/L	<50	<50	<50	<50	<50
TRH>C$_{16}$ - C$_{34}$	µg/L	<100	<100	<100	<100	<100
TRH>C$_{34}$ - C$_{40}$	µg/L	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	84	73	75	70	93

svTRH (C10-C40) in Water		
Our Reference:	UNITS	164266-8
Your Reference	----------	DUP1
Date Sampled	- ----------	28/03/2017
Type of sample		Water
Date extracted	-	30/03/2017
Date analysed	-	30/03/2017
TRHC$_{10}$ - C$_{14}$	µg/L	<50
TRHC$_{15}$ - C$_{28}$	µg/L	<100
TRHC$_{29}$ - C$_{36}$	µg/L	<100
TRH>C$_{10}$ - C$_{16}$	µg/L	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	µg/L	<50
TRH>C$_{16}$ - C$_{34}$	µg/L	<100
TRH>C$_{34}$ - C$_{40}$	µg/L	<100
Surrogate o-Terphenyl	%	83

PAHs in Water Our Reference: Your Reference	UNITS ----------	164266-1 MW1	164266-2 MW2	164266-3 MW3	164266-4 MW4	164266-5 MW5
Date Sampled	----------	28/03/2017	27/03/2017	27/03/2017	27/03/2017	28/03/2017
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	30/03/2017	30/03/2017	30/03/2017	30/03/2017	30/03/2017
Date analysed	-	31/03/2017	31/03/2017	31/03/2017	31/03/2017	31/03/2017
Naphthalene	µg/L	<1	<1	<1	<1	<1
Acenaphthylene	µg/L	<1	<1	<1	<1	<1
Acenaphthene	µg/L	<1	<1	<1	<1	<1
Fluorene	µg/L	<1	<1	<1	<1	<1
Phenanthrene	µg/L	<1	<1	<1	<1	<1
Anthracene	µg/L	<1	<1	<1	<1	<1
Fluoranthene	µg/L	<1	<1	<1	<1	<1
Pyrene	µg/L	<1	<1	<1	<1	<1
Benzo(a)anthracene	µg/L	<1	<1	<1	<1	<1
Chrysene	µg/L	<1	<1	<1	<1	<1
Benzo(b,j+k)fluoranthene	µg/L	<2	<2	<2	<2	<2
Benzo(a)pyrene	µg/L	<1	<1	<1	<1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1	<1	<1	<1	<1
Dibenzo(a,h)anthracene	µg/L	<1	<1	<1	<1	<1
Benzo(g,h,i)perylene	µg/L	<1	<1	<1	<1	<1
Benzo(a)pyrene TEQ	µg/L	<5	<5	<5	<5	<5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	83	77	78	78	81

PAHs in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ---------- 	 164266-8 DUP1 28/03/2017 Water
Date extracted	-	30/03/2017
Date analysed	-	31/03/2017
Naphthalene	µg/L	<1
Acenaphthylene	µg/L	<1
Acenaphthene	µg/L	<1
Fluorene	µg/L	<1
Phenanthrene	µg/L	<1
Anthracene	µg/L	<1
Fluoranthene	µg/L	<1
Pyrene	µg/L	<1
Benzo(a)anthracene	µg/L	<1
Chrysene	µg/L	<1
Benzo(b,j+k)fluoranthene	µg/L	<2
Benzo(a)pyrene	µg/L	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1
Dibenzo(a,h)anthracene	µg/L	<1
Benzo(g,h,i)perylene	µg/L	<1
Benzo(a)pyrene TEQ	µg/L	<5
Total +ve PAH's	µg/L	NIL (+)VE
Surrogate p-Terphenyl-d14	%	76

OCP in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ----------	164266-1 MW1 28/03/2017 Water	164266-2 MW2 27/03/2017 Water	164266-3 MW3 27/03/2017 Water	164266-4 MW4 27/03/2017 Water	164266-5 MW5 28/03/2017 Water
Date extracted	-	30/03/2017	30/03/2017	30/03/2017	30/03/2017	30/03/2017
Date analysed	-	30/03/2017	30/03/2017	30/03/2017	30/03/2017	30/03/2017
HCB	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
alpha-BHC	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
gamma-BHC	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
beta-BHC	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Heptachlor	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
delta-BHC	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Aldrin	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Heptachlor Epoxide	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
gamma-Chlordane	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
alpha-Chlordane	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endosulfan I	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
pp-DDE	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Dieldrin	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
pp-DDD	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endosulfan II	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
pp-DDT	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin Aldehyde	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Endosulfan Sulphate	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Methoxychlor	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Surrogate TCMX	%	101	95	94	87	112

OCP in water		
Our Reference:	UNITS	164266-8
Your Reference	----------	DUP1
	-	
Date Sampled	----------	28/03/2017
Type of sample		Water
Date extracted	-	30/03/2017
Date analysed	-	30/03/2017
HCB	µg/L	<0.2
alpha-BHC	µg/L	<0.2
gamma-BHC	µg/L	<0.2
beta-BHC	µg/L	<0.2
Heptachlor	µg/L	<0.2
delta-BHC	µg/L	<0.2
Aldrin	µg/L	<0.2
Heptachlor Epoxide	µg/L	<0.2
gamma-Chlordane	µg/L	<0.2
alpha-Chlordane	µg/L	<0.2
Endosulfan I	µg/L	<0.2
pp-DDE	µg/L	<0.2
Dieldrin	µg/L	<0.2
Endrin	µg/L	<0.2
pp-DDD	µg/L	<0.2
Endosulfan II	µg/L	<0.2
pp-DDT	µg/L	<0.2
Endrin Aldehyde	µg/L	<0.2
Endosulfan Sulphate	µg/L	<0.2
Methoxychlor	µg/L	<0.2
Surrogate TCMX	%	98

OP Pesticides in water Our Reference: Your Reference	UNITS ----------	164266-1 MW1	164266-2 MW2	164266-3 MW3	164266-4 MW4	164266-5 MW5
Date Sampled	----------	28/03/2017	27/03/2017	27/03/2017	27/03/2017	28/03/2017
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	30/03/2017	30/03/2017	30/03/2017	30/03/2017	30/03/2017
Date analysed	-	30/03/2017	30/03/2017	30/03/2017	30/03/2017	30/03/2017
Azinphos-methyl (Guthion)	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos ethyl	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyriphos	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyriphos-methyl	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Diazinon	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Dichlorovos	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Ethion	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Fenitrothion	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Ronnel	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Surrogate TCMX	%	101	95	94	87	112

OP Pesticides in water Our Reference: Your Reference	UNITS ----------	164266-8 DUP1
Date Sampled	----------	28/03/2017
Type of sample		Water
Date extracted	-	30/03/2017
Date analysed	-	30/03/2017
Azinphos-methyl (Guthion)	µg/L	<0.2
Bromophos ethyl	µg/L	<0.2
Chlorpyriphos	µg/L	<0.2
Chlorpyriphos-methyl	µg/L	<0.2
Diazinon	µg/L	<0.2
Dichlorovos	µg/L	<0.2
Dimethoate	µg/L	<0.2
Ethion	µg/L	<0.2
Fenitrothion	µg/L	<0.2
Malathion	µg/L	<0.2
Parathion	µg/L	<0.2
Ronnel	µg/L	<0.2
Surrogate TCMX	%	98

PCBs in Water						
Our Reference:	UNITS	164266-1	164266-2	164266-3	164266-4	164266-5
Your Reference	----------	MW1	MW2	MW3	MW4	MW5
	-					
Date Sampled	----------	28/03/2017	27/03/2017	27/03/2017	27/03/2017	28/03/2017
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	30/03/2017	30/03/2017	30/03/2017	30/03/2017	30/03/2017
Date analysed	-	30/03/2017	30/03/2017	30/03/2017	30/03/2017	30/03/2017
Aroclor 1016	µg/L	<2	<2	<2	<2	<2
Aroclor 1221	µg/L	<2	<2	<2	<2	<2
Aroclor 1232	µg/L	<2	<2	<2	<2	<2
Aroclor 1242	µg/L	<2	<2	<2	<2	<2
Aroclor 1248	µg/L	<2	<2	<2	<2	<2
Aroclor 1254	µg/L	<2	<2	<2	<2	<2
Aroclor 1260	µg/L	<2	<2	<2	<2	<2
Surrogate TCLMX	%	101	95	94	87	112

PCBs in Water		
Our Reference:	UNITS	164266-8
Your Reference	----------	DUP1
	-	
Date Sampled	----------	28/03/2017
Type of sample		Water
Date extracted	-	30/03/2017
Date analysed	-	30/03/2017
Aroclor 1016	µg/L	<2
Aroclor 1221	µg/L	<2
Aroclor 1232	µg/L	<2
Aroclor 1242	µg/L	<2
Aroclor 1248	µg/L	<2
Aroclor 1254	µg/L	<2
Aroclor 1260	µg/L	<2
Surrogate TCLMX	%	98

Total Phenolics in Water						
Our Reference:	UNITS	164266-1	164266-2	164266-3	164266-4	164266-5
Your Reference	----------	MW1	MW2	MW3	MW4	MW5
	-					
Date Sampled	----------	28/03/2017	27/03/2017	27/03/2017	27/03/2017	28/03/2017
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	29/03/2017	29/03/2017	29/03/2017	29/03/2017	29/03/2017
Date analysed	-	29/03/2017	29/03/2017	29/03/2017	29/03/2017	29/03/2017
Total Phenolics (as Phenol)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05

Total Phenolics in Water		
Our Reference:	UNITS	164266-8
Your Reference	----------	DUP1
	-	
Date Sampled	----------	28/03/2017
Type of sample		Water
Date extracted	-	29/03/2017
Date analysed	-	29/03/2017
Total Phenolics (as Phenol)	mg/L	<0.05

HM in water - dissolved Our Reference: Your Reference	UNITS ----------	164266-1 MW1	164266-2 MW2	164266-3 MW3	164266-4 MW4	164266-5 MW5
Date Sampled	----------	28/03/2017	27/03/2017	27/03/2017	27/03/2017	28/03/2017
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	29/03/2017	29/03/2017	29/03/2017	29/03/2017	29/03/2017
Date analysed	-	29/03/2017	29/03/2017	29/03/2017	29/03/2017	29/03/2017
Arsenic-Dissolved	µg/L	<1	<1	<1	<1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1	<1	<1	<1
Copper-Dissolved	µg/L	3	<1	1	<1	<1
Lead-Dissolved	µg/L	<1	<1	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	13	<1	9	<1	<1
Zinc-Dissolved	µg/L	67	<1	29	3	3
Aluminium-Dissolved	µg/L	190	140	<10	<10	<10
Barium-Dissolved	µg/L	550	17	220	63	62
Iron-Dissolved	µg/L	1,200	270	790	<10	<10
Strontium-Dissolved	µg/L	91	22	270	99	98

HM in water - dissolved Our Reference: Your Reference	UNITS ----------	164266-8 DUP1
Date Sampled	----------	28/03/2017
Type of sample		Water
Date prepared	-	29/03/2017
Date analysed	-	29/03/2017
Arsenic-Dissolved	µg/L	<1
Cadmium-Dissolved	µg/L	<0.1
Chromium-Dissolved	µg/L	<1
Copper-Dissolved	µg/L	3
Lead-Dissolved	µg/L	1
Mercury-Dissolved	µg/L	<0.05
Nickel-Dissolved	µg/L	12
Zinc-Dissolved	µg/L	68
Aluminium-Dissolved	µg/L	220
Barium-Dissolved	µg/L	640
Iron-Dissolved	µg/L	1,100
Strontium-Dissolved	µg/L	100

Cations in water Dissolved						
Our Reference:	UNITS	164266-1	164266-2	164266-3	164266-4	164266-5
Your Reference	---------- -	MW1	MW2	MW3	MW4	MW5
Date Sampled	----------	28/03/2017	27/03/2017	27/03/2017	27/03/2017	28/03/2017
Type of sample		Water	Water	Water	Water	Water
Date digested	-	29/03/2017	29/03/2017	29/03/2017	29/03/2017	29/03/2017
Date analysed	-	29/03/2017	29/03/2017	29/03/2017	29/03/2017	29/03/2017
Magnesium - Dissolved	mg/L	16	1.3	26	6.6	6.6

Cations in water Dissolved		
Our Reference:	UNITS	164266-8
Your Reference	---------- -	DUP1
Date Sampled	----------	28/03/2017
Type of sample		Water
Date digested	-	29/03/2017
Date analysed	-	29/03/2017
Magnesium - Dissolved	mg/L	16

Explosives in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ---------- 	164266-1 MW1 28/03/2017 Water	164266-2 MW2 27/03/2017 Water	164266-3 MW3 27/03/2017 Water	164266-4 MW4 27/03/2017 Water	164266-5 MW5 28/03/2017 Water
Date Extracted	-	29/04/2017	29/04/2017	29/04/2017	29/04/2017	29/04/2017
Date analysed	-	29/04/2017	29/04/2017	29/04/2017	29/04/2017	29/04/2017
HMX	µg/L	<20	<20	<20	<20	<20
RDX	µg/L	<20	<20	<20	<20	<20
1,3,5-Trinitrobenzene	µg/L	<20	<20	<20	<20	<20
1,3-Dinitrobenzene	µg/L	<20	<20	<20	<20	<20
Tetryl	µg/L	<20	<20	<20	<20	<20
2,4,6-Trinitrotoluene	µg/L	<20	<20	<20	<20	<20
4-Amino-2,6-dinitrotoluene	µg/L	<20	<20	<20	<20	<20
2-Amino-4,6-dinitrotoluene	µg/L	<20	<20	<20	<20	<20
4-&2-AM-DNT(Isomeric Mixture)	µg/L	<20	<20	<20	<20	<20
2,4-Dinitrotoluene	µg/L	<20	<20	<20	<20	<20
2,6-Dinitrotoluene	µg/L	<20	<20	<20	<20	<20
2,4&2,6-DNT(Isomeric Mixture)	µg/L	<20	<20	<20	<20	<20
Nitrobenzene	µg/L	<20	<20	<20	<20	<20
2-Nitrotoluene	µg/L	<20	<20	<20	<20	<20
3-Nitrotoluene	µg/L	<20	<20	<20	<20	<20
4-Nitrotoluene	µg/L	<20	<20	<20	<20	<20
Nitroglycerine	µg/L	<200	<200	<200	<200	<200
PETN	µg/L	<200	<200	<200	<200	<200
Surrogate (o-Dinitrobenzene)	%	124	101	114	117	121

Explosives in Water		
Our Reference:	UNITS	164266-8
Your Reference	---------- -	DUP1
Date Sampled	----------	28/03/2017
Type of sample		Water
Date Extracted	-	29/04/2017
Date analysed	-	29/04/2017
HMX	µg/L	<20
RDX	µg/L	<20
1,3,5-Trinitrobenzene	µg/L	<20
1,3-Dinitrobenzene	µg/L	<20
Tetryl	µg/L	<20
2,4,6-Trinitrotoluene	µg/L	<20
4-Amino-2,6-dinitrotoluene	µg/L	<20
2-Amino-4,6-dinitrotoluene	µg/L	<20
4-&2-AM-DNT(Isomeric Mixture)	µg/L	<20
2,4-Dinitrotoluene	µg/L	<20
2,6-Dinitrotoluene	µg/L	<20
2,4&2,6-DNT(Isomeric Mixture)	µg/L	<20
Nitrobenzene	µg/L	<20
2-Nitrotoluene	µg/L	<20
3-Nitrotoluene	µg/L	<20
4-Nitrotoluene	µg/L	<20
Nitroglycerine	µg/L	<200
PETN	µg/L	<200
Surrogate (o-Dinitrobenzene)	%	125

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-022	Determination of various metals by ICP-MS.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-020	Determination of various metals by ICP-AES.
Ext-011	Subcontracted to ALS.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/03/2017	[NT]	[NT]	LCS-W1	29/03/2017
Date analysed	-			30/03/2017	[NT]	[NT]	LCS-W1	30/03/2017
TRH C_6 - C_9	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W1	93%
TRH C_6 - C_{10}	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W1	93%
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	104%
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	97%
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	87%
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	LCS-W1	89%
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	89%
Naphthalene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-016	110	[NT]	[NT]	LCS-W1	103%
Surrogate toluene-d8	%		Org-016	102	[NT]	[NT]	LCS-W1	102%
Surrogate 4-BFB	%		Org-016	85	[NT]	[NT]	LCS-W1	100%

QUALITY CONTROL svTRH (C10-C40) in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/03/2017	[NT]	[NT]	LCS-W1	30/03/2017
Date analysed	-			30/03/2017	[NT]	[NT]	LCS-W1	30/03/2017
TRH C_{10} - C_{14}	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	102%
TRH C_{15} - C_{28}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	96%
TRH C_{29} - C_{36}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	100%
TRH >C_{10} - C_{16}	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	102%
TRH >C_{16} - C_{34}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	96%
TRH >C_{34} - C_{40}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	100%
Surrogate o-Terphenyl	%		Org-003	70	[NT]	[NT]	LCS-W1	91%

QUALITY CONTROL PAHs in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/03/2017	[NT]	[NT]	LCS-W2	30/03/2017
Date analysed	-			31/03/2017	[NT]	[NT]	LCS-W2	31/03/2017
Naphthalene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W2	74%
Acenaphthylene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Fluorene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W2	73%
Phenanthrene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W2	90%
Anthracene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W2	89%
Pyrene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W2	86%
Benzo(a)anthracene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL PAHs in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Chrysene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W2	72%
Benzo(b,j +k)fluoranthene	µg/L	2	Org-012	<2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W2	76%
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	72	[NT]	[NT]	LCS-W2	80%
QUALITY CONTROL OCP in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/03/2017	[NT]	[NT]	LCS-W1	30/03/2017
Date analysed	-			30/03/2017	[NT]	[NT]	LCS-W1	30/03/2017
HCB	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
alpha-BHC	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	88%
gamma-BHC	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
beta-BHC	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	93%
Heptachlor	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	91%
delta-BHC	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
Aldrin	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	86%
Heptachlor Epoxide	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	86%
gamma-Chlordane	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
alpha-Chlordane	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
Endosulfan I	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
pp-DDE	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	91%
Dieldrin	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	100%
Endrin	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	92%
pp-DDD	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	90%
Endosulfan II	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
pp-DDT	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	LCS-W1	88%
Methoxychlor	µg/L	0.2	Org-005	<0.2	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%		Org-005	84	[NT]	[NT]	LCS-W1	117%

QUALITY CONTROL OP Pesticides in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/03/2017	[NT]	[NT]	LCS-W1	30/03/2017
Date analysed	-			30/03/2017	[NT]	[NT]	LCS-W1	30/03/2017
Azinphos-methyl (Guthion)	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NR]	[NR]
Bromophos ethyl	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NR]	[NR]
Chlorpyriphos	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	LCS-W1	84%
Chlorpyriphos-methyl	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NR]	[NR]
Diazinon	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NR]	[NR]
Dichlorovos	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	LCS-W1	88%
Dimethoate	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	[NR]	[NR]
Ethion	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	LCS-W1	91%
Fenitrothion	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	LCS-W1	104%
Malathion	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	LCS-W1	91%
Parathion	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	LCS-W1	105%
Ronnel	µg/L	0.2	Org-008	<0.2	[NT]	[NT]	LCS-W1	80%
Surrogate TCMX	%		Org-008	84	[NT]	[NT]	LCS-W1	111%

QUALITY CONTROL PCBs in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			30/03/2017	[NT]	[NT]	LCS-W1	30/03/2017
Date analysed	-			30/03/2017	[NT]	[NT]	LCS-W1	30/03/2017
Aroclor 1016	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Aroclor 1221	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Aroclor 1232	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Aroclor 1242	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Aroclor 1248	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Aroclor 1254	µg/L	2	Org-006	<2	[NT]	[NT]	LCS-W1	94%
Aroclor 1260	µg/L	2	Org-006	<2	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%		Org-006	84	[NT]	[NT]	LCS-W1	111%

QUALITY CONTROL Total Phenolics in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			29/03/2017	[NT]	[NT]	LCS-W1	29/03/2017
Date analysed	-			29/03/2017	[NT]	[NT]	LCS-W1	29/03/2017
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	[NT]	[NT]	LCS-W1	97%
QUALITY CONTROL HM in water - dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			29/03/2017	[NT]	[NT]	LCS-W2	29/03/2017
Date analysed	-			29/03/2017	[NT]	[NT]	LCS-W2	29/03/2017
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	96%
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	LCS-W2	103%
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	94%
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	96%
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	98%
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	LCS-W2	92%
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	94%
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	96%
Aluminium-Dissolved	µg/L	10	Metals-022	<10	[NT]	[NT]	LCS-W2	92%
Barium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	86%
Iron-Dissolved	µg/L	10	Metals-022	<10	[NT]	[NT]	LCS-W2	91%
Strontium-Dissolved	µg/L	1	Metals-022	<1.0	[NT]	[NT]	LCS-W2	94%
QUALITY CONTROL Cations in water Dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date digested	-			29/03/2017	164266-3	29/03/2017 || 29/03/2017	LCS-W1	29/03/2017
Date analysed	-			29/03/2017	164266-3	29/03/2017 || 29/03/2017	LCS-W1	29/03/2017
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	164266-3	26 || 25 || RPD: 4	LCS-W1	105%
QUALITY CONTROL Explosives in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date Extracted	-			29/03/2017	[NT]	[NT]	LCS-W1	29/03/2017
Date analysed	-			29/03/2017	[NT]	[NT]	LCS-W1	29/03/2017
HMX	µg/L	20	Ext-011	<20	[NT]	[NT]	LCS-W1	98.5%
RDX	µg/L	20	Ext-011	<20	[NT]	[NT]	[NR]	[NR]
1,3,5-Trinitrobenzene	µg/L	20	Ext-011	<20	[NT]	[NT]	[NR]	[NR]
1,3-Dinitrobenzene	µg/L	20	Ext-011	<20	[NT]	[NT]	[NR]	[NR]
Tetryl	µg/L	20	Ext-011	<20	[NT]	[NT]	[NR]	[NR]
2,4,6-Trinitrotoluene	µg/L	20	Ext-011	<20	[NT]	[NT]	LCS-W1	118%
4-Amino-2,6-dinitrotoluene	µg/L	20	Ext-011	<20	[NT]	[NT]	LCS-W1	105%

QUALITY CONTROL Explosives in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
2-Amino-4,6-dinitrotoluene	µg/L	20	Ext-011	<20	[NT]	[NT]	[NR]	[NR]
4-&2-AM-DNT(Isomeric Mixture)	µg/L	20	Ext-011	<20	[NT]	[NT]	[NR]	[NR]
2,4-Dinitrotoluene	µg/L	20	Ext-011	<20	[NT]	[NT]	LCS-W1	93.3%
2,6-Dinitrotoluene	µg/L	20	Ext-011	<20	[NT]	[NT]	[NR]	[NR]
2,4&2,6-DNT(Isomeric Mixture)	µg/L	20	Ext-011	<20	[NT]	[NT]	[NR]	[NR]
Nitrobenzene	µg/L	20	Ext-011	<20	[NT]	[NT]	LCS-W1	86.9%
2-Nitrotoluene	µg/L	20	Ext-011	<20	[NT]	[NT]	[NR]	[NR]
3-Nitrotoluene	µg/L	20	Ext-011	<20	[NT]	[NT]	[NR]	[NR]
4-Nitrotoluene	µg/L	20	Ext-011	<20	[NT]	[NT]	[NR]	[NR]
Nitroglycerine	µg/L	200	Ext-011	<200	[NT]	[NT]	[NR]	[NR]
PETN	µg/L	200	Ext-011	<200	[NT]	[NT]	LCS-W1	97.7%
Surrogate (o-Dinitrobenzene)	%		Ext-011	[NT]	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL Total Phenolics in Water	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	164266-1	29/03/2017 || 29/03/2017
Date analysed	-	164266-1	29/03/2017 || 29/03/2017
Total Phenolics (as Phenol)	mg/L	164266-1	<0.05 || <0.05

QUALITY CONTROL HM in water - dissolved	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	164266-1	29/03/2017 || 29/03/2017	164266-2	29/03/2017
Date analysed	-	164266-1	29/03/2017 || 29/03/2017	164266-2	29/03/2017
Arsenic-Dissolved	µg/L	164266-1	<1 || <1	164266-2	97%
Cadmium-Dissolved	µg/L	164266-1	<0.1 || <0.1	164266-2	104%
Chromium-Dissolved	µg/L	164266-1	<1 || <1	164266-2	95%
Copper-Dissolved	µg/L	164266-1	3 || 3 || RPD: 0	164266-2	94%
Lead-Dissolved	µg/L	164266-1	<1 || <1	164266-2	104%
Nickel-Dissolved	µg/L	164266-1	13 || 13 || RPD: 0	164266-2	93%
Zinc-Dissolved	µg/L	164266-1	67 || 69 || RPD: 3	164266-2	97%
Aluminium-Dissolved	µg/L	164266-1	190 || 200 || RPD: 5	164266-2	#
Barium-Dissolved	µg/L	164266-1	550 || 610 || RPD: 10	164266-2	88%
Iron-Dissolved	µg/L	164266-1	1200 || 1100 || RPD: 9	164266-2	#
Strontium-Dissolved	µg/L	164266-1	91 || 96 || RPD: 5	164266-2	95%

QUALITY CONTROL Explosives in Water	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date Extracted	-	164266-1	29/04/2017 || 29/04/2017
Date analysed	-	164266-1	29/04/2017 || 29/04/2017
HMX	µg/L	164266-1	<20 || <20
RDX	µg/L	164266-1	<20 || <20
1,3,5-Trinitrobenzene	µg/L	164266-1	<20 || <20
1,3-Dinitrobenzene	µg/L	164266-1	<20 || <20
Tetryl	µg/L	164266-1	<20 || <20
2,4,6-Trinitrotoluene	µg/L	164266-1	<20 || <20
4-Amino-2,6-dinitrotoluene	µg/L	164266-1	<20 || <20
2-Amino-4,6-dinitrotoluene	µg/L	164266-1	<20 || <20
4-&2-AM-DNT(Isomeric Mixture)	µg/L	164266-1	<20 || <20
2,4-Dinitrotoluene	µg/L	164266-1	<20 || <20
2,6-Dinitrotoluene	µg/L	164266-1	<20 || <20
2,4&2,6-DNT(Isomeric Mixture)	µg/L	164266-1	<20 || <20
Nitrobenzene	µg/L	164266-1	<20 || <20
2-Nitrotoluene	µg/L	164266-1	<20 || <20
3-Nitrotoluene	µg/L	164266-1	<20 || <20
4-Nitrotoluene	µg/L	164266-1	<20 || <20
Nitroglycerine	µg/L	164266-1	<200 || <200
PETN	µg/L	164266-1	<200 || <200

QUALITY CONTROL HM in water - dissolved	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	164266-5	29/03/2017 || 29/03/2017
Date analysed	-	164266-5	29/03/2017 || 29/03/2017
Arsenic-Dissolved	µg/L	164266-5	<1 || <1
Cadmium-Dissolved	µg/L	164266-5	<0.1 || <0.1
Chromium-Dissolved	µg/L	164266-5	<1 || <1
Copper-Dissolved	µg/L	164266-5	<1 || <1
Lead-Dissolved	µg/L	164266-5	<1 || <1
Nickel-Dissolved	µg/L	164266-5	<1 || <1
Zinc-Dissolved	µg/L	164266-5	3 || 3 || RPD: 0
Aluminium-Dissolved	µg/L	164266-5	<10 || <10
Barium-Dissolved	µg/L	164266-5	62 || 61 || RPD: 2
Iron-Dissolved	µg/L	164266-5	<10 || <10
Strontium-Dissolved	µg/L	164266-5	98 || 94 || RPD: 4

QUALITY CONTROL Explosives in Water	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date Extracted	-	[NT]	[NT]	164266-1	29/03/2017
Date analysed	-	[NT]	[NT]	164266-1	29/03/2017
HMX	µg/L	[NT]	[NT]	164266-1	100%
RDX	µg/L	[NT]	[NT]	[NR]	[NR]
1,3,5-Trinitrobenzene	µg/L	[NT]	[NT]	[NR]	[NR]
1,3-Dinitrobenzene	µg/L	[NT]	[NT]	[NR]	[NR]
Tetryl	µg/L	[NT]	[NT]	[NR]	[NR]
2,4,6-Trinitrotoluene	µg/L	[NT]	[NT]	164266-1	106%
4-Amino-2,6-dinitrotoluene	µg/L	[NT]	[NT]	164266-1	104%
2-Amino-4,6-dinitrotoluene	µg/L	[NT]	[NT]	[NR]	[NR]
4-&2-AM-DNT(Isomeric Mixture)	µg/L	[NT]	[NT]	[NR]	[NR]
2,4-Dinitrotoluene	µg/L	[NT]	[NT]	164266-1	96.8%
2,6-Dinitrotoluene	µg/L	[NT]	[NT]	[NR]	[NR]
2,4&2,6-DNT(Isomeric Mixture)	µg/L	[NT]	[NT]	[NR]	[NR]
Nitrobenzene	µg/L	[NT]	[NT]	164266-1	94.7%
2-Nitrotoluene	µg/L	[NT]	[NT]	[NR]	[NR]
3-Nitrotoluene	µg/L	[NT]	[NT]	[NR]	[NR]
4-Nitrotoluene	µg/L	[NT]	[NT]	[NR]	[NR]
Nitroglycerine	µg/L	[NT]	[NT]	[NR]	[NR]
PETN	µg/L	[NT]	[NT]	164266-1	109%
Surrogate (o-Dinitrobenzene)	%	[NT]	[NT]	[NR]	[NR]

Report Comments:

8 HM in Water - Dissolved:
Percent recovery is not possible to report due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Dissolved Metals: no filtered, preserved sample was received, therefore the unpreserved sample was filtered through 0.45um filter at the lab.
Note: there is a possibility some elements may be underestimated.

Explosives analysed by ALS. Report No.ES1707470.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
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SAMPLE RECEIPT ADVICE

Client Details	
Client	Douglas Partners Pty Ltd Smeaton Grange
Attention	Emily McGinty

Sample Login Details	
Your Reference	76744.01, Menangle Park North
Envirolab Reference	**162120**
Date Sample Received	17/02/2017
Date Instructions Received	17/02/2017
Date Results Expected to be Reported	**24/02/2017**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	75 Soils
Turnaround Time Requested	Standard
Temperature on receipt (°C)	26
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolabservices.com.au	Email: jhurst@envirolabservices.com.au

Sample and Testing Details on following page

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Sample Id	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides	PCBs in Soil	Acid Extractable metals in soil	Total Phenolics (as Phenol)	Asbestos ID - soils	Asbestos ID - materials	On Hold
100-1-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
100-1-0.5-0.6											✓
100-2-0-0.1	✓	✓					✓				
100-2-0.4-0.5											✓
100-3-0-0.1	✓	✓					✓				
100-3-0.4-0.5											✓
100-4-0-0.1	✓	✓					✓				
100-4-0.4-0.5											✓
100-5-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
100-5-0.4-0.5											✓
100-6-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
100-6-0.4-0.5											✓
100-12-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
100-12-0.4-0.5											✓
100-13-0-0.1	✓	✓					✓				
100-13-0.4-0.5											✓
100-14-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
100-14-0.4-0.5											✓
100-15-0-0.1	✓	✓					✓				
100-15-0.4-0.5											✓
100-16-0-0.1	✓	✓					✓				
100-16-0.4-0.5											✓
100-17-0-0.1	✓	✓					✓				
100-17-0.4-0.5											✓
100-18-0-0.1	✓	✓					✓				
100-18-0.4-0.5											✓
100-19-0-0.1	✓	✓					✓				
100-19-0.4-0.5											✓
100-20-0-0.1	✓	✓					✓				
100-20-0.4-0.5											✓
100-21-0-0.1	✓	✓					✓				

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Sample Id	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides	PCBs in Soil	Acid Extractable metals in soil	Total Phenolics (as Phenol)	Asbestos ID - soils	Asbestos ID - materials	On Hold
100-21-0.4-0.5											✓
100-SP1-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
100-SP2-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
100-SP2-0.4-0.5											✓
100-SP3-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
100-SP4-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
100-SP4-0.4-0.5											✓
100-SP2										✓	
200-1-0-0.1	✓	✓					✓				
200-1-0.4-0.5											✓
200-2-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
200-2-0.4-0.5											✓
200-3-0-0.1	✓	✓					✓				
200-3-0.4-0.5											✓
200-4-0-0.1	✓	✓					✓				
200-4-0.4-0.5											✓
200-5-0-0.1	✓	✓					✓				
200-5-0.4-0.5											✓
200-6-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
200-6-0.4-0.5											✓
BD1/150217											✓
BD1/140217											✓
BD1/01/0217											✓
BD1/020217											✓
BD1/030217											✓
300-1-0-0.1											✓
300-1-0.4-0.5											✓
300-3-1.0-1.1											✓
300-11-0-0.1											✓
300-11-0.4-0.5											✓
300-10-1.3-1.4											✓
300-14A-0-0.1											✓
300-14A-0.6-0.7											✓

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Sample Id	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides	PCBs in Soil	Acid Extractable metals in soil	Total Phenolics (as Phenol)	Asbestos ID - soils	Asbestos ID - materials	On Hold
300-15-1.4-1.5											✓
300-17-2.0-2.1											✓
300-27-2.0-2.1											✓
400-1-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
400-1-0.4-0.5											✓
400-2-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
400-2-0.4-0.5											✓
400-3-0-0.1	✓	✓					✓				
400-3-0.4-0.5											✓
400-4-0-0.1	✓	✓					✓				
400-4-0.4-0.5											✓

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY

Project Name:	Menangle Park North (Precinct 100 - 400)			**To:**	Envirolab Services
Project No:	76744.01	**Sampler:**	CLN		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	EMG	**Mob. Phone:**	0418 651 227	**Attn:**	Tania Notaras
Email:	emily.mcginty@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type	Container Type	Analytes									Notes/preservation
			S - soil W - water	G - glass P - plastic	Metals, OCP, OPP	Combo 8a	Combo 4L	Metals - Leachate	TRH - Leachate	HOLD	Asbestos ID	Combo 1M		
100-1/0-0.1	1	15/02/17	S	G/P		x								
100-1/0.5-0.6	2	15/02/17	S	G/P						x				
100-2/0-0.1	3	15/02/17	S	G/P								x		
100-2/0.4-0.5	4	15/02/17	S	G/P						x				
100-3/0-0.1	5	13/02/17	S	G/P								x		
100-3/0.4-0.5	6	13/02/17	S	G/P						x				
100-4/0-0.1	7	14/02/17	S	G/P								x		
100-4/0.4-0.5	8	14/02/17	S	G/P						x				
100-5/0-0.1	9	14/02/17	S	G/P		x								
100-5/0.4-0.5	10	14/02/17	S	G/P						x				

ENVIROLAB GROUP
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 162120
Date Received: 170217
Time Received: 1450
Received by: EMS
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Lab Report No:			
Send Results to:	Douglas Partners Pty Ltd	**Address** 18 Waler Crescent, Smeaton Grange 2567	**Phone:** (02) 4647 0075 **Fax:** (02) 4646 1886
Relinquished by:	CLN	**Transported to laboratory by:**	
Signed:		**Date & Time:** 16.02.17	**Received by:** Ellen WG EJS 170217 1450

Douglas Partners
Geotechnies / Environment / Groundwater

CHAIN OF CUSTODY

Project Name:	Menangle Park North (Precinct 100 - 400)			**To:**	Envirolab Services
Project No:	76744.01	**Sampler:**	CLN		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	EMG	**Mob. Phone:**	0418 651 227	**Attn:**	Tania Notaras
Email:	emily.mcginty@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type	Container Type	Analytes									Notes/preservation
			S - soil W - water	G - glass P - plastic	Metals, OCP, OPP	Combo 8a	Combo 4L	Metals - Leachate	TRH - Leachate	HOLD	Asbestos ID	Combo 1M		
#162120														
100-6/0-0.1	11	14/02/17	S	G/P		x								
100-6/0.4-0.5	12	14/02/17	S	G/P						x				
100-12/0-0.1	13	13.02.2017	S	G/P		x								
100-12/0.4-0.5	14	13.02.2017	S	G/P						x				
100-13/0-0.1	15	13.02.2017	S	G/P								x		
100-13/0.4-0.5	16	13.02.2017	S	G/P						x				
100-14/0-0.1	17	13.02.2017	S	G/P		x								
100-14/0.4-0.5	18	13.02.2017	S	G/P						x				
100-15/0-0.1	19	13.02.2017	S	G/P								x		
100-15/0.4-0.5	20	13.02.2017	S	G/P						x				

Lab Report No:					
Send Results to:	Douglas Partners Pty Ltd	**Address** 18 Waler Crescent, Smeaton Grange 2567		**Phone:** (02) 4647 0075	**Fax:** (02) 4646 1886
Relinquished by:	CLN		**Transported to laboratory by:**		
Signed:		**Date & Time:** 16.02.17	**Received by:**		

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY

Project Name:	Menangle Park North (Precinct 100 - 400)			**To:**	Envirolab Services
Project No:	76744.01	**Sampler:**	CLN		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	EMG	**Mob. Phone:**	0418 651 227	**Attn:**	Tania Notaras
Email:	emily.mcginty@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type	Container Type	Analytes									Notes/preservation
# 162120			S - soil W - water	G - glass P - plastic	Metals, OCP, OPP	Combo 8a	Combo 4L	Metals - Leachate	TRH - Leachate	HOLD	Asbestos ID	Combo 1M		
100-16/0-0.1	21	13.02.2017	S	G/P								x		
100-16/0.4-0.5	22	13.02.2017	S	G/P						x				
100-17/0-0.1	23	13.02.2017	S	G/P								x		
100-17/0.4-0.5	24	13.02.2017	S	G/P						x				
100-18/0-0.1	25	13.02.2017	S	G/P								x		
100-18/0.4-0.5	26	13.02.2017	S	G/P						x				
100-19/0-0.1	27	13.02.2017	S	G/P								x		
100-19/0.4-0.5	28	13.02.2017	S	G/P						x				
100-20/0-0.1	29	13.02.2017	S	G/P								x		
100-20/0.4-0.5	30	13.02.2017	S	G/P						x				

Lab Report No:					
Send Results to:	Douglas Partners Pty Ltd	**Address** 18 Waler Crescent, Smeaton Grange 2567		**Phone:** (02) 4647 0075	**Fax:** (02) 4646 1886
Relinquished by:	CLN			**Transported to laboratory by:**	
Signed:		**Date & Time:**	16.02.17	**Received by:**	

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY

Project Name:	Menangle Park North (Precinct 100 - 400)			**To:**	Envirolab Services
Project No:	76744.01	**Sampler:**	CLN		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	EMG	**Mob. Phone:**	0418 651 227	**Attn:**	Tania Notaras
Email:	emily.mcginty@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID # 162120	Lab ID	Date Sampled	Sample Type	Container Type	Analytes									Notes/preservation
			S - soil W - water	G - glass P - plastic	Metals, OCP, OPP	Combo 8a	Combo 4L	Metals - Leachate	TRH - Leachate	HOLD	Asbestos ID	Combo 1M		
100-21/0-0.1	31	13.02.2017	S	G/P								x		
100-21/0.4-0.5	32	13.02.2017	S	G/P						x				
100-SP1/0-0.1	33	15/02/17	S	G/P		x								
100-SP2/0-0.1	34	15/02/17	S	G/P		x								
100-SP2/0.4-0.5	35	15/02/17	S	G/P						x				
100-SP3/0-0.1	36	15/02/17	S	G/P		x								
100-SP4/0-0.1	37	14/02/17	S	G/P		x								
100-SP4/0.4-0.5	38	14/02/17	S	G/P						x				
100-SP2	39	15/02/17	fragment								x			
200-1/0-0.1	40	15/02/17	S	G/P								x		
200-1/0.4-0.5	41	15/02/17	S	G/P						x				
200-2/0-0.1	42	15/02/17	S	G/P		x								
200-2/0.4-0.5	43	15/02/17	S	G/P						x				
200-3/0-0.1	44	13/02/17	S	G/P								x		
200-3/0.4-0.5	45	13/02/17	S	G/P						x				
200-4/0-0.1	46	13/02/17	S	G/P								x		

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY

Project Name:	Menangle Park North (Precinct 100 - 400)			**To:**	Envirolab Services
Project No:	76744.01	**Sampler:**	CLN		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	EMG	**Mob. Phone:**	0418 651 227	**Attn:**	Tania Notaras
Email:	emily.mcginty@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type	Container Type	Analytes									Notes/preservation
			S - soil W - water	G - glass P - plastic	Metals, OCP, OPP	Combo 8a	Combo 4L	Metals - Leachate	TRH - Leachate	HOLD	Asbestos ID	Combo 1M		
#162120														
200-4/0.4-0.5	47	13/02/17	S	G/P						x				
200-5/0-0.1	48	13/02/17	S	G/P								x		
Send Results to:	Douglas Partners Pty Ltd		**Address** 18 Waler Crescent, Smeaton Grange 2567							**Phone:** (02) 4647 0075		**Fax:** (02) 4646 1886		
Relinquished by:	CLN									**Transported to laboratory by:**				
Signed:			**Date & Time:** 27.01.17							**Received by:**				
200-5/0.4-0.5	49	13/02/17	S	G/P						x				
200-6/0-0.1	50	13/02/17	S	G/P		x								
200-6/0.4-0.5	51	13/02/17	S	G/P						x				
BD1/150217	52	15.02.2017	S	G/P						x				
BD1/140217	53	14.02.2017	S	G/P						x				
BD1/010217	54	01.02.2017	S	G/P						x				
BD1/020217	55	02.02.2017	S	G/P						x				
BD1/030217	56	03.02.2017	S	G/P						x				
	8													
300-1/0-0.1	57	15/02/17	S	G/P						x				
300-1/0.4-0.5	58	15/02/17	S	G/P						x				
300-3/1.0-1.1	59	13.02.2017	S	G/P						x				

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY

Project Name:	Menangle Park North (Precinct 100 - 400)			**To:**	Envirolab Services
Project No:	76744.01	**Sampler:**	CLN		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	EMG	**Mob. Phone:**	0418 651 227	**Attn:**	Tania Notaras
Email:	emily.mcginty@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID # 162120	Lab ID	Date Sampled	Sample Type: S - soil W - water	Container Type: G - glass P - plastic	Analytes: Metals, OCP, OPP	Combo 8a	Combo 4L	Metals - Leachate	TRH - Leachate	HOLD	Asbestos ID	Combo 1M		Notes/preservation
300-11/0-0.1	60	14/02/17	S	G/P						x				
300-11/0.4-0.5	61	14/02/17	S	G/P						x				
Send Results to:	Douglas Partners Pty Ltd		**Address** 18 Waler Crescent, Smeaton Grange 2567							**Phone:** (02) 4647 0075			**Fax:** (02) 4646 1886	
Relinquished by:	CLN									**Transported to laboratory by:**				
Signed:			**Date & Time:**	#REF!	**Received by:**									
300-10/1.3-1.4	62	13.02.2017	S	G/P						x				
300-14A/0-0.1	63	13.02.2017	S	G/P						x				
300-14A/0.6-0.7	64	13.02.2017	S	G/P						x				
300-15/1.4-1.5	65	13.02.2017	S	G/P						x				
300-17/2.0-2.1	66	13.02.2017	S	G/P						x				
300-27/2.0-2.1	67	13.02.2017	S	G/P						x				
400-1/0-0.1	68	13.02.2017	S	G/P		x								
400-1/0.4-0.5	69	13.02.2017	S	G/P						x				
400-2/0-0.1	70	13.02.2017	S	G/P		x								
400-2/0.4-0.5	71	13.02.2017	S	G						x				
400-3/0-0.1	72	13.02.2017	S	G/P								x		
400-3/0.4-0.5	73	13.02.2017	S	G/P						x				

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY

Project Name:	Menangle Park North (Precinct 100 - 400)			**To:**	Envirolab Services
Project No:	76744.01	**Sampler:**	CLN		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	EMG	**Mob. Phone:**	0418 651 227	**Attn:**	Tania Notaras
Email:	emily.mcginty@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type	Container Type	Analytes									Notes/preservation
			S - soil W - water	G - glass P - plastic	Metals, OCP, OPP	Combo 8a	Combo 4L	Metals - Leachate	TRH - Leachate	HOLD	Asbestos ID	Combo 1M		
#162120														
400-4/0-0.1	74	13.02.2017	S	G/P								x		
400-4/0.4-0.5	75.	13.02.2017	S	G/P						x				

Send Results to:	Douglas Partners Pty Ltd	**Address** 18 Waler Crescent, Smeaton Grange 2567		**Phone:** (02) 4647 0075	**Fax:** (02) 4646 1886
Relinquished by:	CLN		**Transported to laboratory by:**		
Signed:		**Date & Time:** #REF!	**Received by:**		

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 162120

Client:

Douglas Partners Pty Ltd Smeaton Grange
18 Waler Crescent
Smeaton Grange
NSW 2567

Attention: Emily McGinty

Sample log in details:

Your Reference:	**76744.01, Menangle Park North**
No. of samples:	75 Soils
Date samples received / completed instructions received	17/02/2017 / 17/02/2017

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	24/02/17 / 28/02/17
Date of Preliminary Report:	Not Issued

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Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	162120-1	162120-3	162120-5	162120-7	162120-9
Your Reference	---------- -	100-1	100-2	100-3	100-4	100-5
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		15/02/2017	15/02/2017	13/02/2017	14/02/2017	14/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	95	86	97	82	106

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	162120-11	162120-13	162120-15	162120-17	162120-19
Your Reference	---------- -	100-6	100-12	100-13	100-14	100-15
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		14/02/2017	13/02/2017	13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	76	91	82	87	89

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	162120-21	162120-23	162120-25	162120-27	162120-29
Your Reference	---------- -	100-16	100-17	100-18	100-19	100-20
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13/02/2017	13/02/2017	13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	84	94	81	97	103

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	162120-31	162120-33	162120-34	162120-36	162120-37
Your Reference	---------- -	100-21	100-SP1	100-SP2	100-SP3	100-SP4
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13/02/2017	15/02/2017	15/02/2017	15/02/2017	14/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	97	106	85	107	86

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	162120-40	162120-42	162120-44	162120-46	162120-48
Your Reference	---------- -	200-1	200-2	200-3	200-4	200-5
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		15/02/2017	15/02/2017	13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	94	113	106	85	97

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	162120-50	162120-68	162120-70	162120-72	162120-74
Your Reference	---------- -	200-6	400-1	400-2	400-3	400-4
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13/02/2017	13/02/2017	13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	113	93	108	100	100

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	162120-1	162120-3	162120-5	162120-7	162120-9
Your Reference	---------- -	100-1	100-2	100-3	100-4	100-5
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		15/02/2017	15/02/2017	13/02/2017	14/02/2017	14/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	92	83	83	83	84

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	162120-11	162120-13	162120-15	162120-17	162120-19
Your Reference	---------- -	100-6	100-12	100-13	100-14	100-15
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		14/02/2017	13/02/2017	13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	20/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	85	82	83	84	83

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	162120-21	162120-23	162120-25	162120-27	162120-29
Your Reference	---------- -	100-16	100-17	100-18	100-19	100-20
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13/02/2017	13/02/2017	13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	83	83	93	83	84

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	162120-31	162120-33	162120-34	162120-36	162120-37
Your Reference	---------- -	100-21	100-SP1	100-SP2	100-SP3	100-SP4
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13/02/2017	15/02/2017	15/02/2017	15/02/2017	14/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	83	83	83	82	84

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	162120-40	162120-42	162120-44	162120-46	162120-48
Your Reference	---------- -	200-1	200-2	200-3	200-4	200-5
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		15/02/2017	15/02/2017	13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	83	85	84	87	83

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	162120-50	162120-68	162120-70	162120-72	162120-74
Your Reference	---------- -	200-6	400-1	400-2	400-3	400-4
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13/02/2017	13/02/2017	13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	83	83	83	85	80

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	162120-1 100-1 0-0.1 15/02/2017 Soil	162120-9 100-5 0-0.1 14/02/2017 Soil	162120-11 100-6 0-0.1 14/02/2017 Soil	162120-13 100-12 0-0.1 13/02/2017 Soil	162120-17 100-14 0-0.1 13/02/2017 Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.4	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	0.4	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	0.3	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.1	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	<0.05	1.5	<0.05	<0.05	<0.05
Surrogate p-Terphenyl-d14	%	93	98	99	98	97

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	162120-33 100-SP1 0-0.1 15/02/2017 Soil	162120-34 100-SP2 0-0.1 15/02/2017 Soil	162120-36 100-SP3 0-0.1 15/02/2017 Soil	162120-37 100-SP4 0-0.1 14/02/2017 Soil	162120-42 200-2 0-0.1 15/02/2017 Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate p-Terphenyl-d14	%	96	98	98	98	96

PAHs in Soil				
Our Reference:	UNITS	162120-50	162120-68	162120-70
Your Reference	----------	200-6	400-1	400-2
	-			
Depth	----------	0-0.1	0-0.1	0-0.1
Date Sampled		13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05
Surrogate p-Terphenyl-d14	%	99	98	99

Organochlorine Pesticides in soil						
Our Reference:	UNITS	162120-1	162120-9	162120-11	162120-13	162120-17
Your Reference	----------	100-1	100-5	100-6	100-12	100-14
	-					
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		15/02/2017	14/02/2017	14/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	20/02/2017	21/02/2017	21/02/2017	21/02/2017
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	78	85	85	83	83

Organochlorine Pesticides in soil						
Our Reference:	UNITS	162120-33	162120-34	162120-36	162120-37	162120-42
Your Reference	---------- -	100-SP1	100-SP2	100-SP3	100-SP4	200-2
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		15/02/2017	15/02/2017	15/02/2017	14/02/2017	15/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	84	84	79	85	85

Organochlorine Pesticides in soil				
Our Reference:	UNITS	162120-50	162120-68	162120-70
Your Reference	---------- -	200-6	400-1	400-2
Depth	----------	0-0.1	0-0.1	0-0.1
Date Sampled		13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017
HCB	mg/kg	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	86	83	83

Organophosphorus Pesticides						
Our Reference:	UNITS	162120-1	162120-9	162120-11	162120-13	162120-17
Your Reference	---------- -	100-1	100-5	100-6	100-12	100-14
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		15/02/2017	14/02/2017	14/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	20/02/2017	21/02/2017	21/02/2017	21/02/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	78	85	85	83	83

Organophosphorus Pesticides						
Our Reference:	UNITS	162120-33	162120-34	162120-36	162120-37	162120-42
Your Reference	---------- -	100-SP1	100-SP2	100-SP3	100-SP4	200-2
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		15/02/2017	15/02/2017	15/02/2017	14/02/2017	15/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	84	84	79	85	85

Organophosphorus Pesticides Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	162120-50 200-6 0-0.1 13/02/2017 Soil	162120-68 400-1 0-0.1 13/02/2017 Soil	162120-70 400-2 0-0.1 13/02/2017 Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	86	83	83

PCBs in Soil						
Our Reference:	UNITS	162120-1	162120-9	162120-11	162120-13	162120-17
Your Reference	----------	100-1	100-5	100-6	100-12	100-14
	-					
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		15/02/2017	14/02/2017	14/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	20/02/2017	21/02/2017	21/02/2017	21/02/2017
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	78	85	85	83	83

PCBs in Soil						
Our Reference:	UNITS	162120-33	162120-34	162120-36	162120-37	162120-42
Your Reference	----------	100-SP1	100-SP2	100-SP3	100-SP4	200-2
	-					
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		15/02/2017	15/02/2017	15/02/2017	14/02/2017	15/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	84	84	79	85	85

PCBs in Soil				
Our Reference:	UNITS	162120-50	162120-68	162120-70
Your Reference	----------	200-6	400-1	400-2
	-			
Depth	----------	0-0.1	0-0.1	0-0.1
Date Sampled		13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCLMX	%	86	83	83

Acid Extractable metals in soil						
Our Reference:	UNITS	162120-1	162120-3	162120-5	162120-7	162120-9
Your Reference	----------	100-1	100-2	100-3	100-4	100-5
Depth	- ----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		15/02/2017	15/02/2017	13/02/2017	14/02/2017	14/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
Arsenic	mg/kg	5	6	6	7	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	13	10	15	15	6
Copper	mg/kg	30	24	14	21	25
Lead	mg/kg	39	19	23	21	19
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	18	15	10	12	10
Zinc	mg/kg	190	51	60	24	48

Acid Extractable metals in soil						
Our Reference:	UNITS	162120-11	162120-13	162120-15	162120-17	162120-19
Your Reference	----------	100-6	100-12	100-13	100-14	100-15
Depth	- ----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		14/02/2017	13/02/2017	13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
Arsenic	mg/kg	5	5	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	13	14	14	15	16
Copper	mg/kg	21	23	18	28	35
Lead	mg/kg	24	18	20	18	21
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	15	18	14	22	18
Zinc	mg/kg	63	56	57	66	48

Acid Extractable metals in soil						
Our Reference:	UNITS	162120-21	162120-23	162120-25	162120-27	162120-29
Your Reference	---------- -	100-16	100-17	100-18	100-19	100-20
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13/02/2017	13/02/2017	13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
Arsenic	mg/kg	<4	7	5	7	7
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	12	13	11	13	16
Copper	mg/kg	14	23	12	12	27
Lead	mg/kg	15	26	17	27	66
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
Nickel	mg/kg	14	16	6	6	11
Zinc	mg/kg	39	61	23	31	71

Acid Extractable metals in soil						
Our Reference:	UNITS	162120-31	162120-33	162120-34	162120-36	162120-37
Your Reference	---------- -	100-21	100-SP1	100-SP2	100-SP3	100-SP4
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13/02/2017	15/02/2017	15/02/2017	15/02/2017	14/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
Arsenic	mg/kg	4	7	5	<4	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	9	12	12	13	13
Copper	mg/kg	9	30	27	29	28
Lead	mg/kg	17	19	12	14	14
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	4	15	12	13	17
Zinc	mg/kg	28	54	37	41	53

Acid Extractable metals in soil						
Our Reference:	UNITS	162120-40	162120-42	162120-44	162120-46	162120-48
Your Reference	---------- -	200-1	200-2	200-3	200-4	200-5
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		15/02/2017	15/02/2017	13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
Arsenic	mg/kg	<4	<4	6	<4	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	2	2	6	2	7
Copper	mg/kg	2	2	22	3	32
Lead	mg/kg	5	4	14	5	27
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	1	5	3	5
Zinc	mg/kg	4	7	12	9	20

Acid Extractable metals in soil						
Our Reference:	UNITS	162120-50	162120-68	162120-70	162120-72	162120-74
Your Reference	---------- -	200-6	400-1	400-2	400-3	400-4
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13/02/2017	13/02/2017	13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
Arsenic	mg/kg	<4	7	4	10	7
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	1	14	12	14	16
Copper	mg/kg	27	10	8	25	15
Lead	mg/kg	27	20	15	26	16
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	7	7	18	7
Zinc	mg/kg	8	21	20	74	16

Acid Extractable metals in soil		
Our Reference:	UNITS	162120-76
Your Reference	----------	100-1 - [TRIPLICATE]
	-	
Depth	----------	0-0.1
Date Sampled		15/02/2017
Type of sample		Soil
Date prepared	-	20/02/2017
Date analysed	-	21/02/2017
Arsenic	mg/kg	5
Cadmium	mg/kg	<0.4
Chromium	mg/kg	13
Copper	mg/kg	28
Lead	mg/kg	41
Mercury	mg/kg	<0.1
Nickel	mg/kg	19
Zinc	mg/kg	250

Misc Soil - Inorg						
Our Reference:	UNITS	162120-1	162120-9	162120-11	162120-13	162120-17
Your Reference	---------- -	100-1	100-5	100-6	100-12	100-14
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		15/02/2017	14/02/2017	14/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg						
Our Reference:	UNITS	162120-33	162120-34	162120-36	162120-37	162120-42
Your Reference	---------- -	100-SP1	100-SP2	100-SP3	100-SP4	200-2
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		15/02/2017	15/02/2017	15/02/2017	14/02/2017	15/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg				
Our Reference:	UNITS	162120-50	162120-68	162120-70
Your Reference	---------- -	200-6	400-1	400-2
Depth	----------	0-0.1	0-0.1	0-0.1
Date Sampled		13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil
Date prepared	-	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	20/02/2017	20/02/2017	20/02/2017
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5

Moisture						
Our Reference:	UNITS	162120-1	162120-3	162120-5	162120-7	162120-9
Your Reference	----------	100-1	100-2	100-3	100-4	100-5
	-					
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		15/02/2017	15/02/2017	13/02/2017	14/02/2017	14/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
Moisture	%	11	11	8.4	12	7.7

Moisture						
Our Reference:	UNITS	162120-11	162120-13	162120-15	162120-17	162120-19
Your Reference	----------	100-6	100-12	100-13	100-14	100-15
	-					
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		14/02/2017	13/02/2017	13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
Moisture	%	8.6	13	9.0	12	12

Moisture						
Our Reference:	UNITS	162120-21	162120-23	162120-25	162120-27	162120-29
Your Reference	----------	100-16	100-17	100-18	100-19	100-20
	-					
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13/02/2017	13/02/2017	13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
Moisture	%	6.7	13	7.1	8.9	7.9

Moisture						
Our Reference:	UNITS	162120-31	162120-33	162120-34	162120-36	162120-37
Your Reference	----------	100-21	100-SP1	100-SP2	100-SP3	100-SP4
	-					
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13/02/2017	15/02/2017	15/02/2017	15/02/2017	14/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
Moisture	%	8.4	11	13	14	10

Moisture						
Our Reference:	UNITS	162120-40	162120-42	162120-44	162120-46	162120-48
Your Reference	---------- -	200-1	200-2	200-3	200-4	200-5
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		15/02/2017	15/02/2017	13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
Moisture	%	3.6	2.7	1.6	1.8	2.5

Moisture						
Our Reference:	UNITS	162120-50	162120-68	162120-70	162120-72	162120-74
Your Reference	---------- -	200-6	400-1	400-2	400-3	400-4
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		13/02/2017	13/02/2017	13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	20/02/2017	20/02/2017	20/02/2017	20/02/2017	20/02/2017
Date analysed	-	21/02/2017	21/02/2017	21/02/2017	21/02/2017	21/02/2017
Moisture	%	0.6	5.7	6.0	12	9.1

Asbestos ID - soils						
Our Reference:	UNITS	162120-1	162120-9	162120-11	162120-13	162120-17
Your Reference	---------- -	100-1	100-5	100-6	100-12	100-14
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		15/02/2017	14/02/2017	14/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	22/02/2017	22/02/2017	22/02/2017	22/02/2017	22/02/2017
Sample mass tested	g	Approx. 30g	Approx. 25g	Approx. 25g	Approx. 15g	Approx. 20g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference:	UNITS	162120-33	162120-34	162120-36	162120-37	162120-42
Your Reference	---------- -	100-SP1	100-SP2	100-SP3	100-SP4	200-2
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		15/02/2017	15/02/2017	15/02/2017	14/02/2017	15/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	22/02/2017	22/02/2017	22/02/2017	22/02/2017	22/02/2017
Sample mass tested	g	Approx. 35g	Approx. 40g	Approx. 25g	Approx. 55g	Approx. 25g
Sample Description	-	Brown coarse-grained soil & rocks	Grey coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown sandy soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils				
Our Reference:	UNITS	162120-50	162120-68	162120-70
Your Reference	---------- -	200-6	400-1	400-2
Depth	----------	0-0.1	0-0.1	0-0.1
Date Sampled		13/02/2017	13/02/2017	13/02/2017
Type of sample		Soil	Soil	Soil
Date analysed	-	22/02/2017	22/02/2017	22/02/2017
Sample mass tested	g	Approx. 30g	Approx. 20g	Approx. 25g
Sample Description	-	Brown sandy soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - materials		
Our Reference:	UNITS	162120-39
Your Reference	----------	100-SP2
	-	
Depth	----------	-
Date Sampled		15/02/2017
Type of sample		Fragment
Date analysed	-	23/02/2017
Mass / Dimension of Sample	-	75x65x5mm
Sample Description	-	Grey compressed fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.

Method ID	Methodology Summary
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			20/02/2017	162120-1	20/02/2017 || 20/02/2017	LCS-8	20/02/2017
Date analysed	-			21/02/2017	162120-1	21/02/2017 || 21/02/2017	LCS-8	21/02/2017
TRHC$_6$ - C$_9$	mg/kg	25	Org-016	<25	162120-1	<25 || <25	LCS-8	105%
TRHC$_6$ - C$_{10}$	mg/kg	25	Org-016	<25	162120-1	<25 || <25	LCS-8	105%
Benzene	mg/kg	0.2	Org-016	<0.2	162120-1	<0.2 || <0.2	LCS-8	88%
Toluene	mg/kg	0.5	Org-016	<0.5	162120-1	<0.5 || <0.5	LCS-8	102%
Ethylbenzene	mg/kg	1	Org-016	<1	162120-1	<1 || <1	LCS-8	107%
m+p-xylene	mg/kg	2	Org-016	<2	162120-1	<2 || <2	LCS-8	115%
o-Xylene	mg/kg	1	Org-016	<1	162120-1	<1 || <1	LCS-8	115%
naphthalene	mg/kg	1	Org-014	<1	162120-1	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	88	162120-1	95 || 89 || RPD: 7	LCS-8	108%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			20/02/2017	162120-1	20/02/2017 || 20/02/2017	LCS-8	20/02/2017
Date analysed	-			21/02/2017	162120-1	20/02/2017 || 20/02/2017	LCS-8	20/02/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	50	Org-003	<50	162120-1	<50 || <50	LCS-8	105%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	Org-003	<100	162120-1	<100 || <100	LCS-8	98%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	Org-003	<100	162120-1	<100 || <100	LCS-8	91%
TRH>C$_{10}$-C$_{16}$	mg/kg	50	Org-003	<50	162120-1	<50 || <50	LCS-8	105%
TRH>C$_{16}$-C$_{34}$	mg/kg	100	Org-003	<100	162120-1	<100 || <100	LCS-8	98%
TRH>C$_{34}$-C$_{40}$	mg/kg	100	Org-003	<100	162120-1	<100 || <100	LCS-8	91%
Surrogate o-Terphenyl	%		Org-003	92	162120-1	92 || 85 || RPD: 8	LCS-8	96%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			20/02/2017	162120-1	20/02/2017 || 20/02/2017	LCS-8	20/02/2017
Date analysed	-			21/02/2017	162120-1	21/02/2017 || 21/02/2017	LCS-8	21/02/2017
Naphthalene	mg/kg	0.1	Org-012	<0.1	162120-1	<0.1 || <0.1	LCS-8	91%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	162120-1	<0.1 || <0.1	LCS-8	105%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	162120-1	<0.1 || <0.1	LCS-8	115%
Anthracene	mg/kg	0.1	Org-012	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	162120-1	<0.1 || <0.1	LCS-8	106%
Pyrene	mg/kg	0.1	Org-012	<0.1	162120-1	<0.1 || <0.1	LCS-8	107%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	162120-1	<0.1 || <0.1	LCS-8	95%
Benzo(b,j +k)fluoranthene	mg/kg	0.2	Org-012	<0.2	162120-1	<0.2 || <0.2	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	162120-1	<0.05 || <0.05	LCS-8	91%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	99	162120-1	93 || 96 || RPD: 3	LCS-8	123%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			20/02/2017	162120-1	20/02/2017 || 20/02/2017	LCS-8	20/02/2017
Date analysed	-			21/02/2017	162120-1	21/02/2017 || 21/02/2017	LCS-8	20/02/2017
HCB	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	LCS-8	80%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	LCS-8	101%
Heptachlor	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	LCS-8	90%
delta-BHC	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	LCS-8	90%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	LCS-8	94%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	LCS-8	95%
Dieldrin	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	LCS-8	99%
Endrin	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	LCS-8	99%
pp-DDD	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	LCS-8	77%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	LCS-8	74%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	81	162120-1	78 || 79 || RPD: 1	LCS-8	102%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			20/02/2017	162120-1	20/02/2017 || 20/02/2017	LCS-8	20/02/2017
Date analysed	-			21/02/2017	162120-1	21/02/2017 || 21/02/2017	LCS-8	20/02/2017
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	162120-1	<0.1 || <0.1	LCS-8	80%
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	162120-1	<0.1 || <0.1	LCS-8	98%
Dimethoate	mg/kg	0.1	Org-008	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	162120-1	<0.1 || <0.1	LCS-8	87%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	162120-1	<0.1 || <0.1	LCS-8	85%
Malathion	mg/kg	0.1	Org-008	<0.1	162120-1	<0.1 || <0.1	LCS-8	78%
Parathion	mg/kg	0.1	Org-008	<0.1	162120-1	<0.1 || <0.1	LCS-8	102%
Ronnel	mg/kg	0.1	Org-008	<0.1	162120-1	<0.1 || <0.1	LCS-8	75%
Surrogate TCMX	%		Org-008	81	162120-1	78 || 79 || RPD: 1	LCS-8	84%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			20/02/2017	162120-1	20/02/2017 || 20/02/2017	LCS-8	20/02/2017
Date analysed	-			21/02/2017	162120-1	21/02/2017 || 21/02/2017	LCS-8	20/02/2017
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	162120-1	<0.1 || <0.1	LCS-8	101%
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	162120-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	81	162120-1	78 || 79 || RPD: 1	LCS-8	84%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			20/02/2017	162120-1	20/02/2017 || 20/02/2017	LCS-8	20/02/2017
Date analysed	-			21/02/2017	162120-1	21/02/2017 || 21/02/2017	LCS-8	21/02/2017
Arsenic	mg/kg	4	Metals-020	<4	162120-1	5 || 5 || RPD: 0	LCS-8	118%
Cadmium	mg/kg	0.4	Metals-020	<0.4	162120-1	<0.4 || <0.4	LCS-8	109%
Chromium	mg/kg	1	Metals-020	<1	162120-1	13 || 15 || RPD: 14	LCS-8	115%
Copper	mg/kg	1	Metals-020	<1	162120-1	30 || 29 || RPD: 3	LCS-8	113%
Lead	mg/kg	1	Metals-020	<1	162120-1	39 || 20 || RPD: 64	LCS-8	111%
Mercury	mg/kg	0.1	Metals-021	<0.1	162120-1	<0.1 || <0.1	LCS-8	94%
Nickel	mg/kg	1	Metals-020	<1	162120-1	18 || 19 || RPD: 5	LCS-8	106%
Zinc	mg/kg	1	Metals-020	<1	162120-1	190 || 95 || RPD: 67	LCS-8	108%

QUALITY CONTROL Misc Soil - Inorg	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			20/02/2017	162120-1	20/02/2017 || 20/02/2017	LCS-1	20/02/2017
Date analysed	-			20/02/2017	162120-1	20/02/2017 || 20/02/2017	LCS-1	20/02/2017
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	162120-1	<5 || <5	LCS-1	97%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	162120-21	20/02/2017 || 20/02/2017	LCS-9	20/02/2017
Date analysed	-	162120-21	21/02/2017 || 21/02/2017	LCS-9	21/02/2017
TRHC_6 - C_9	mg/kg	162120-21	<25 || <25	LCS-9	90%
TRHC_6 - C_{10}	mg/kg	162120-21	<25 || <25	LCS-9	90%
Benzene	mg/kg	162120-21	<0.2 || <0.2	LCS-9	77%
Toluene	mg/kg	162120-21	<0.5 || <0.5	LCS-9	89%
Ethylbenzene	mg/kg	162120-21	<1 || <1	LCS-9	93%
m+p-xylene	mg/kg	162120-21	<2 || <2	LCS-9	96%
o-Xylene	mg/kg	162120-21	<1 || <1	LCS-9	96%
naphthalene	mg/kg	162120-21	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	162120-21	84 || 86 || RPD: 2	LCS-9	86%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	162120-21	20/02/2017 || 20/02/2017	LCS-9	20/02/2017
Date analysed	-	162120-21	21/02/2017 || 21/02/2017	LCS-9	21/02/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	162120-21	<50 || <50	LCS-9	105%
TRHC$_{15}$ - C$_{28}$	mg/kg	162120-21	<100 || <100	LCS-9	100%
TRHC$_{29}$ - C$_{36}$	mg/kg	162120-21	<100 || <100	LCS-9	91%
TRH>C$_{10}$-C$_{16}$	mg/kg	162120-21	<50 || <50	LCS-9	105%
TRH>C$_{16}$-C$_{34}$	mg/kg	162120-21	<100 || <100	LCS-9	100%
TRH>C$_{34}$-C$_{40}$	mg/kg	162120-21	<100 || <100	LCS-9	91%
Surrogate o-Terphenyl	%	162120-21	83 || 84 || RPD: 1	LCS-9	97%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	162120-21	20/02/2017 || 20/02/2017	LCS-9	20/02/2017
Date analysed	-	162120-21	21/02/2017 || 21/02/2017	LCS-9	21/02/2017
Arsenic	mg/kg	162120-21	<4 || 4	LCS-9	111%
Cadmium	mg/kg	162120-21	<0.4 || <0.4	LCS-9	101%
Chromium	mg/kg	162120-21	12 || 11 || RPD: 9	LCS-9	108%
Copper	mg/kg	162120-21	14 || 16 || RPD: 13	LCS-9	108%
Lead	mg/kg	162120-21	15 || 19 || RPD: 24	LCS-9	105%
Mercury	mg/kg	162120-21	<0.1 || <0.1	LCS-9	90%
Nickel	mg/kg	162120-21	14 || 16 || RPD: 13	LCS-9	100%
Zinc	mg/kg	162120-21	39 || 59 || RPD: 41	LCS-9	101%
QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	162120-42	20/02/2017 || 20/02/2017	162120-9	20/02/2017
Date analysed	-	162120-42	21/02/2017 || 21/02/2017	162120-9	21/02/2017
TRHC$_{6}$ - C$_{9}$	mg/kg	162120-42	<25 || <25	162120-9	89%
TRHC$_{6}$ - C$_{10}$	mg/kg	162120-42	<25 || <25	162120-9	89%
Benzene	mg/kg	162120-42	<0.2 || <0.2	162120-9	74%
Toluene	mg/kg	162120-42	<0.5 || <0.5	162120-9	82%
Ethylbenzene	mg/kg	162120-42	<1 || <1	162120-9	92%
m+p-xylene	mg/kg	162120-42	<2 || <2	162120-9	99%
o-Xylene	mg/kg	162120-42	<1 || <1	162120-9	98%
naphthalene	mg/kg	162120-42	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	162120-42	113 || 95 || RPD: 17	162120-9	85%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	162120-42	20/02/2017 || 20/02/2017	162120-9	20/02/2017
Date analysed	-	162120-42	21/02/2017 || 21/02/2017	162120-9	20/02/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	162120-42	<50 || <50	162120-9	99%
TRHC$_{15}$ - C$_{28}$	mg/kg	162120-42	<100 || <100	162120-9	99%
TRHC$_{29}$ - C$_{36}$	mg/kg	162120-42	<100 || <100	162120-9	88%
TRH>C$_{10}$-C$_{16}$	mg/kg	162120-42	<50 || <50	162120-9	99%
TRH>C$_{16}$-C$_{34}$	mg/kg	162120-42	<100 || <100	162120-9	99%
TRH>C$_{34}$-C$_{40}$	mg/kg	162120-42	<100 || <100	162120-9	88%
Surrogate o-Terphenyl	%	162120-42	85 || 92 || RPD: 8	162120-9	84%
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	162120-42	20/02/2017 || 20/02/2017	162120-9	20/02/2017
Date analysed	-	162120-42	21/02/2017 || 21/02/2017	162120-9	21/02/2017
Naphthalene	mg/kg	162120-42	<0.1 || <0.1	162120-9	90%
Acenaphthylene	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	162120-42	<0.1 || <0.1	162120-9	101%
Phenanthrene	mg/kg	162120-42	<0.1 || <0.1	162120-9	101%
Anthracene	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	162120-42	<0.1 || <0.1	162120-9	94%
Pyrene	mg/kg	162120-42	<0.1 || <0.1	162120-9	98%
Benzo(a)anthracene	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	162120-42	<0.1 || <0.1	162120-9	85%
Benzo(b,j+k)fluoranthene	mg/kg	162120-42	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	162120-42	<0.05 || <0.05	162120-9	87%
Indeno(1,2,3-c,d)pyrene	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	162120-42	96 || 97 || RPD: 1	162120-9	122%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	162120-42	20/02/2017 || 20/02/2017	162120-9	20/02/2017
Date analysed	-	162120-42	21/02/2017 || 21/02/2017	162120-9	20/02/2017
HCB	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	162120-42	<0.1 || <0.1	162120-9	101%
gamma-BHC	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	162120-42	<0.1 || <0.1	162120-9	123%
Heptachlor	mg/kg	162120-42	<0.1 || <0.1	162120-9	115%
delta-BHC	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	162120-42	<0.1 || <0.1	162120-9	113%
Heptachlor Epoxide	mg/kg	162120-42	<0.1 || <0.1	162120-9	117%
gamma-Chlordane	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	162120-42	<0.1 || <0.1	162120-9	118%
Dieldrin	mg/kg	162120-42	<0.1 || <0.1	162120-9	124%
Endrin	mg/kg	162120-42	<0.1 || <0.1	162120-9	126%
pp-DDD	mg/kg	162120-42	<0.1 || <0.1	162120-9	101%
Endosulfan II	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	162120-42	<0.1 || <0.1	162120-9	96%
Methoxychlor	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%	162120-42	85 || 85 || RPD: 0	162120-9	102%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	162120-42	20/02/2017 || 20/02/2017	162120-9	20/02/2017
Date analysed	-	162120-42	21/02/2017 || 21/02/2017	162120-9	20/02/2017
Azinphos-methyl (Guthion)	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Bromophos-ethyl	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	162120-42	<0.1 || <0.1	162120-9	105%
Chlorpyriphos-methyl	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Diazinon	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Dichlorvos	mg/kg	162120-42	<0.1 || <0.1	162120-9	81%
Dimethoate	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	162120-42	<0.1 || <0.1	162120-9	96%
Fenitrothion	mg/kg	162120-42	<0.1 || <0.1	162120-9	114%
Malathion	mg/kg	162120-42	<0.1 || <0.1	162120-9	90%
Parathion	mg/kg	162120-42	<0.1 || <0.1	162120-9	129%
Ronnel	mg/kg	162120-42	<0.1 || <0.1	162120-9	87%
Surrogate TCMX	%	162120-42	85 || 85 || RPD: 0	162120-9	96%

QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	162120-42	20/02/2017 || 20/02/2017	162120-9	20/02/2017
Date analysed	-	162120-42	21/02/2017 || 21/02/2017	162120-9	20/02/2017
Aroclor 1016	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Aroclor 1221	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Aroclor 1232	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Aroclor 1242	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Aroclor 1248	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Aroclor 1254	mg/kg	162120-42	<0.1 || <0.1	162120-9	102%
Aroclor 1260	mg/kg	162120-42	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	162120-42	85 || 85 || RPD: 0	162120-9	95%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	162120-42	20/02/2017 || 20/02/2017	162120-9	20/02/2017
Date analysed	-	162120-42	21/02/2017 || 21/02/2017	162120-9	21/02/2017
Arsenic	mg/kg	162120-42	<4 || <4	162120-9	102%
Cadmium	mg/kg	162120-42	<0.4 || <0.4	162120-9	98%
Chromium	mg/kg	162120-42	2 || 2 || RPD: 0	162120-9	110%
Copper	mg/kg	162120-42	2 || 2 || RPD: 0	162120-9	129%
Lead	mg/kg	162120-42	4 || 4 || RPD: 0	162120-9	111%
Mercury	mg/kg	162120-42	<0.1 || <0.1	162120-9	100%
Nickel	mg/kg	162120-42	1 || 1 || RPD: 0	162120-9	100%
Zinc	mg/kg	162120-42	7 || 8 || RPD: 13	162120-9	123%

QUALITY CONTROL Misc Soil - Inorg	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	162120-9	20/02/2017
Date analysed	-	[NT]	[NT]	162120-9	20/02/2017
Total Phenolics (as Phenol)	mg/kg	[NT]	[NT]	162120-9	99%
QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	162120-72	20/02/2017 || 20/02/2017	162120-44	20/02/2017
Date analysed	-	162120-72	21/02/2017 || 21/02/2017	162120-44	21/02/2017
TRHC$_6$ - C$_9$	mg/kg	162120-72	<25 || <25	162120-44	101%
TRHC$_6$ - C$_{10}$	mg/kg	162120-72	<25 || <25	162120-44	101%
Benzene	mg/kg	162120-72	<0.2 || <0.2	162120-44	89%
Toluene	mg/kg	162120-72	<0.5 || <0.5	162120-44	97%
Ethylbenzene	mg/kg	162120-72	<1 || <1	162120-44	103%
m+p-xylene	mg/kg	162120-72	<2 || <2	162120-44	109%
o-Xylene	mg/kg	162120-72	<1 || <1	162120-44	109%
naphthalene	mg/kg	162120-72	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	162120-72	100 || 104 || RPD: 4	162120-44	97%
QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	162120-72	20/02/2017 || 20/02/2017	162120-44	20/02/2017
Date analysed	-	162120-72	21/02/2017 || 21/02/2017	162120-44	21/02/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	162120-72	<50 || <50	162120-44	101%
TRHC$_{15}$ - C$_{28}$	mg/kg	162120-72	<100 || <100	162120-44	96%
TRHC$_{29}$ - C$_{36}$	mg/kg	162120-72	<100 || <100	162120-44	82%
TRH>C$_{10}$-C$_{16}$	mg/kg	162120-72	<50 || <50	162120-44	101%
TRH>C$_{16}$-C$_{34}$	mg/kg	162120-72	<100 || <100	162120-44	96%
TRH>C$_{34}$-C$_{40}$	mg/kg	162120-72	<100 || <100	162120-44	82%
Surrogate o-Terphenyl	%	162120-72	85 || 82 || RPD: 4	162120-44	84%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	162120-72	20/02/2017 || 20/02/2017	162120-44	20/02/2017
Date analysed	-	162120-72	21/02/2017 || 21/02/2017	162120-44	21/02/2017
Arsenic	mg/kg	162120-72	10 || 10 || RPD: 0	162120-44	102%
Cadmium	mg/kg	162120-72	<0.4 || <0.4	162120-44	105%
Chromium	mg/kg	162120-72	14 || 14 || RPD: 0	162120-44	108%
Copper	mg/kg	162120-72	25 || 26 || RPD: 4	162120-44	113%
Lead	mg/kg	162120-72	26 || 25 || RPD: 4	162120-44	108%
Mercury	mg/kg	162120-72	<0.1 || <0.1	162120-44	99%
Nickel	mg/kg	162120-72	18 || 18 || RPD: 0	162120-44	102%
Zinc	mg/kg	162120-72	74 || 71 || RPD: 4	162120-44	102%

QUALITY CONTROL Misc Soil - Inorg	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	162120-50	20/02/2017 || 20/02/2017
Date analysed	-	162120-50	20/02/2017 || 20/02/2017
Total Phenolics (as Phenol)	mg/kg	162120-50	<5 || <5

Report Comments:

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 162120-1 for Pb, Zn. Therefore a triplicate result has been issued as laboratory sample number 162120-76.

Asbestos: Excessive sample volumes were provided for asbestos analysis.
A portion of the supplied samples were sub-sampled according to Envirolab procedures.
We cannot guarantee that these sub-samples are indicative of the entire sample.
Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.
Note: Samples requested for asbestos testing were sub-sampled from bags provided by the client.

Asbestos ID was analysed by Approved Identifier:	Paul Ching, Matt Tang
Asbestos ID was authorised by Approved Signatory:	Paul Ching

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client Details	
Client	Douglas Partners Pty Ltd Smeaton Grange
Attention	Emily McGinty

Sample Login Details	
Your Reference	76744.01, Menangle Park North (Precinct 300)
Envirolab Reference	**161481**
Date Sample Received	07/02/2017
Date Instructions Received	07/02/2017
Date Results Expected to be Reported	**15/02/2017**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	52 Soils
Turnaround Time Requested	Standard
Temperature on receipt (°C)	23.6
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolabservices.com.au	Email: jhurst@envirolabservices.com.au

Sample and Testing Details on following page

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enquiries@envirolabservices.com.au
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Sample Id	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides	PCBs in Soil	Acid Extractable metals in soil	Total Phenolics (as Phenol)	Asbestos ID - soils	Asbestos ID - soils NEPM - ASB-001	On Hold
300--2-0-0.1											✓
300-2-0.4-0.5											✓
300-3-0-0.1											✓
300-3-0.4-0.5											✓
300-4-0-0.1											✓
300-4-1.1-1.2											✓
300-5-0-0.1											✓
300-5-0.4-0.5											✓
300-6-0-0.1											✓
300-6-0.4-0.5											✓
300-7-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
300-7-0.4-0.5											✓
300-8-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
300-8-0.4-0.5											✓
300-9-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
300-9-0.4-0.5											✓
300-10-0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓		
300-10-0.4-0.5											✓
300-12-0-0.1											✓
300-12-0.4-0.5											✓
300-13-0-0.1											✓
300-13-0.4-0.5											✓
300-14-0-0.1											✓
300-14-0.4-0.5											✓
300-15-0-0.1											✓
300-15-0.4-0.5											✓
300-16-0-0.1											✓
300-16-1.4-1.5											✓
300-17-0-0.1											✓
300-17-0.4-0.5											✓
300-18-0-0.1											✓
300-18-0.4-0.5											✓

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Sample Id	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides	PCBs in Soil	Acid Extractable metals in soil	Total Phenolics (as Phenol)	Asbestos ID - soils	Asbestos ID - soils NEPM - ASB-001	On Hold
300-19-0-0.1										✓	
300-19-0.4-0.5											✓
300-20-0-0.1										✓	
300-20-0.4-0.5											✓
300-21-0-0.1										✓	
300-21-0.4-0.5											✓
300-22-0-0.1				✓	✓		✓				
300-22-0.4-0.5											✓
300-23-0-0.1				✓	✓		✓				
300-23-0.4-0.5											✓
300-24-0-0.1										✓	
300-24-0.4-0.5											✓
300-25-0-0.1											✓
300-25-0.4-0.5											✓
300-26-0-0.1											✓
300-26-0.4-0.5											✓
300-28-0-0.1											✓
300-28-0.4-0.5											✓
300-SP4-0-0.1											✓
300-SP4-0.8-0.9											✓

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY

Project Name:	Menangle Park North (Precinct 300)			**To:**	Envirolab Services
Project No:	76744.01	**Sampler:**	CLN		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	EMG	**Mob. Phone:**	0418 651 227	**Attn:**	Tania Notaras
Email:	emily.mcginty@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: Metals, OCP, OPP	Combo 8a	Combo 4L	Metals - Leachate	TRH - Leachate	HOLD	Asbestos ID	Metals and BTEX		Notes/preservation
300-2/0-0.1	1	3.2.17	S	G/P						X				
300-2/0.4-0.5	2	3.2.17	S	G/P						X				
300-3/0-0.1	3	3.2.17	S	G/P										
300-3/0.4-0.5	4	3.2.17	S	G/P									X	
300-4/0-0.1	5	3.2.17	S	G/P										
300-4/1.1-1.2	6	3.2.17	S	G/P										
300-5/0-0.1	7	3.2.17	S	G/P										
300-5/0.4-0.5	8	3.2.17	S	G/P									X	
300-6/0-0.1	9	3.2.17	S	G/P										
300-6/0.4-0.5	10	3.2.17	S	G/P										
300-7/0-0.1	11	3.2.17	S	G/P	X	X								
300-7/0.4-0.5	12	3.2.17	S	G/P						X				

ENVIROLAB GROUP
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 161461
Date Received: 7.2
Time Received: 17.30
Received by: XX
Temp: ~~Cool~~/Ambient
Cooling: ~~Ice~~/~~Icepack~~
Security: ~~Intact~~/~~Broken~~/~~None~~

Lab Report No:			
Send Results to:	Douglas Partners Pty Ltd	**Address** 18 Waler Crescent, Smeaton Grange 2567	**Phone:** (02) 4647 0075 **Fax:** (02) 4646 1886
Relinquished by:	CLN	**Transported to laboratory by:**	
Signed:		**Date & Time:** 6.2.17	**Received by:** James-ELS

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY

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Email:	emily.mcginty@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type	Container Type	Analytes									Notes/preservation
			S - soil W - water	G - glass P - plastic	Metals, OCP, OPP	Combo 8a	Combo 4L	Metals - Leachate	TRH - Leachate	HOLD	Asbestos ID	Metals and BTEX		
161461														
300-8/0-0.1	13	6.2.17	S	G/P	X	X								
300-8/0.4-0.5	14	6.2.17	S	G/P						X				
300-9/0-0.1	15	6.2.17	S	G/P	X	X								
300-9/0.4-0.5	16	6.2.17	S	G/P						X				
300-10/0-0.1	17	3.2.17	S	G/P	X	X								
300-10/0.4-0.5	18	3.2.17	S	G/P						X				
300-12/0-0.1	19	2.2.17	S	G/P						↓				
300-12/0.4-0.5	20	2.2.17	S	G/P										
300-13/0-0.1	21	1.2.17	S	G/P										
300-13/0.4-0.5	22	1.2.17	S	G/P										
300-14/0 - 0.1	23	3.2.17	S	G/P										
300-14/0.4-0.5	24	3.2.17	S	G/P										
300-15/0-0.1	25	2.2.17	S	G/P										
300-15/0.4-0.5	26	2.2.17	S	G/P										
300-16/0-0.1	27	3.2.17	S	G/P										
300-16/1.4-1.5	24	3.2.17	S	G/P										

Douglas Partners
Geotechnics / Environment / Groundwater

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Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: Metals, OCP, OPP	Combo 8a	Combo 4L	Metals - Leachate	TRH - Leachate	HOLD	Asbestos ID	Metals and BTEX	Asbestos WEPAN	Notes/preservation
161461														
300-17/0-0.1	29	3.2.17	S	G/P						X				
300-17/0.4-0.5	30	3.2.17	S	G/P						↓				
300-18/0-0.1	31	2.2.17	S	G/P										
300-18/0.4-0.5	32	2.2.17	S	G/P										
300-19/0-0.1	33	6.2.17	S	P									X	
300-19/0.4-0.5	34	6.2.17	S	P										

Lab Report No:			
Send Results to:	Douglas Partners Pty Ltd	**Address** 18 Waler Crescent, Smeaton Grange 2567	**Phone:** (02) 4647 0075 **Fax:** (02) 4646 1886
Relinquished by:	CLN	**Transported to laboratory by:**	
Signed:		**Date & Time:** 6.2.17	**Received by:** James - ELS

300-20/0-0.1	35	6.2.17	S	P									X	
300-20/0.4-0.5	36	6.2.17	S	P						X				
300-21/0-0.1	37	6.2.17	S	P									X	
300-21/0.4-0.5	38	6.2.17	S	P						X				
300-22/0-0.1	39	2.2.17	S	G/P	X									
300-22/0.4-0.5	40	2.2.17	S	G/P						X				
300-23/0-0.1	41	2.2.17	S	G/P	X									

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY

Project Name:	Menangle Park North (Precinct 300)			**To:**	Envirolab Services
Project No:	76744.01	**Sampler:**	CLN		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	EMG	**Mob. Phone:**	0418 651 227	**Attn:**	Tania Notaras
Email:	emily.mcginty@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Metals, OCP, OPP	Combo 8a	Combo 4L	Metals - Leachate	TRH - Leachate	HOLD	Asbestos ID	Metals and BTEX	Asbestos 500ml	Notes/preservation
161461														
300-23/0.4-0.5	42	2.2.17	S	G/P						X				
300-24/0-0.1	43	2.2.17	S	G/P									X	
300-24/0.4-0.5	44	2.2.17	S	G/P						X				

Lab Report No:					
Send Results to:	Douglas Partners Pty Ltd	**Address** 18 Waler Crescent, Smeaton Grange 2567		**Phone:** (02) 4647 0075	**Fax:** (02) 4646 1886
Relinquished by:	CLN		**Transported to laboratory by:**		
Signed:		**Date & Time:** 6.2.17	**Received by:** James - ELS		

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY

Project Name:	Menangle Park North (Precinct 300)			**To:**	Envirolab Services
Project No:	76744.01	**Sampler:**	CLN		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	EMG	**Mob. Phone:**	0418 651 227	**Attn:**	Tania Notaras
Email:	emily.mcginty@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID (161461)	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Metals, OCP, OPP	Combo 8a	Combo 4L	Metals - Leachate	TRH - Leachate	HOLD	Asbestos ID	Metals and BTEX		Notes/preservation
300-25/0-0.1	45	1.2.17	S	G/P						X				
300-25/0.4-0.5	46	1.2.17	S	G/P						↓				
300-26/0-0.1	47	1.2.17	S	G/P										
300-26/0.4-0.5	48	1.2.17	S	G/P										
300-28/0-0.1	49	1.2.17	S	G/P										
300-28/0.4-0.5	50	1.2.17	S	G/P										
300-SP4/0-0.1	51	6.2.17	S	G/P										
300-SP4/0.8-0.9	52	6.2.17	S	G/P										

Lab Report No:					
Send Results to:	Douglas Partners Pty Ltd	**Address** 18 Waler Crescent, Smeaton Grange 2567		**Phone:** (02) 4647 0075	**Fax:** (02) 4646 1886
Relinquished by:	CLN		**Transported to laboratory by:**		
Signed:		**Date & Time:** 6.02.17	**Received by:** James - ELS		

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 161481-A

Client:

Douglas Partners Pty Ltd Smeaton Grange
18 Waler Crescent
Smeaton Grange
NSW 2567

Attention: Emily McGinty

Sample log in details:

Your Reference:	**76744.01, Menangle Park North (Precinct 300)**
No. of samples:	Additional Testing on 8 Soils
Date samples received / completed instructions received	07/02/17 / 15/02/17

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	22/02/17 / 22/02/17
Date of Preliminary Report:	Not Issued

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Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	161481-A-4 300-3 0.4-0.5 3/02/2017 Soil	161481-A-5 300-4 0-0.1 3/02/2017 Soil	161481-A-26 300-15 0.4-0.5 2/02/2017 Soil	161481-A-27 300-16 0-0.1 3/02/2017 Soil	161481-A-36 300-20 0.4-0.5 6/02/2017 Soil
Date extracted	-	16/02/2017	16/02/2017	16/02/2017	16/02/2017	16/02/2017
Date analysed	-	16/02/2017	16/02/2017	16/02/2017	16/02/2017	16/02/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate p-Terphenyl-d14	%	92	90	93	90	91

Acid Extractable metals in soil						
Our Reference:	UNITS	161481-A-4	161481-A-5	161481-A-17	161481-A-27	161481-A-36
Your Reference	----------	300-3	300-4	300-10	300-16	300-20
Depth	- ----------	0.4-0.5	0-0.1	0-0.1	0-0.1	0.4-0.5
Date Sampled		3/02/2017	3/02/2017	3/02/2017	3/02/2017	6/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	16/02/2017	16/02/2017	16/02/2017	16/02/2017	16/02/2017
Date analysed	-	17/02/2017	17/02/2017	17/02/2017	17/02/2017	17/02/2017
Aluminium	mg/kg	1,400	1,300	1,500	920	660
Strontium*	mg/kg	4	5	60	2	2
Barium	mg/kg	18	30	19	23	100
Iron	mg/kg	4,100	5,700	7,600	5,900	4,800
Magnesium	mg/kg	94	88	40	56	40

Moisture						
Our Reference:	UNITS	161481-A-4	161481-A-5	161481-A-17	161481-A-26	161481-A-27
Your Reference	---------- -	300-3	300-4	300-10	300-15	300-16
Depth	----------	0.4-0.5	0-0.1	0-0.1	0.4-0.5	0-0.1
Date Sampled		3/02/2017	3/02/2017	3/02/2017	2/02/2017	3/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	16/02/2017	16/02/2017	16/02/2017	16/02/2017	16/02/2017
Date analysed	-	17/02/2017	17/02/2017	17/02/2017	17/02/2017	17/02/2017
Moisture	%	4.4	1.6	1.0	2.8	0.7

Moisture		
Our Reference:	UNITS	161481-A-36
Your Reference	---------- -	300-20
Depth	----------	0.4-0.5
Date Sampled		6/02/2017
Type of sample		Soil
Date prepared	-	16/02/2017
Date analysed	-	17/02/2017
Moisture	%	0.7

Explosives in Soil						
Our Reference:	UNITS	161481-A-4	161481-A-5	161481-A-17	161481-A-24	161481-A-26
Your Reference	----------	300-3	300-4	300-10	300-14	300-15
Depth	- ----------	0.4-0.5	0-0.1	0-0.1	0.4-0.5	0.4-0.5
Date Sampled		3/02/2017	3/02/2017	3/02/2017	3/02/2017	2/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Extracted	-	17/02/2017	17/02/2017	17/02/2017	17/02/2017	17/02/2017
Date analysed	-	22/02/2017	22/02/2017	22/02/2017	22/02/2017	22/02/2017
HMX	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
RDX	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
1,3,5-Trinitrobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
1,3-Dinitrobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Tetryl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
2,4,6-Trinitrotoluene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
4-Amino-2,6-dinitrotoluene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
2-Amino-4,6-dinitrotoluene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
4-&2-AM-DNT(Isomeric Mixture)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
2,4-Dinitrotoluene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
2,6-Dinitrotoluene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
2,4&2,6-DNT(Isomeric Mixture)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nitrobenzene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
2-Nitrotoluene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
3-Nitrotoluene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
4-Nitrotoluene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nitroglycerine	mg/kg	<1	<1	<1	<1	<1
PETN	mg/kg	<1	<1	<1	<1	<1
Surrogate (o-Dinitrobenzene)	%	126	85	133	102	93

Explosives in Soil				
Our Reference:	UNITS	161481-A-27	161481-A-36	161481-A-48
Your Reference	----------	300-16	300-20	300-26
	-			
Depth	----------	0-0.1	0.4-0.5	0.4-0.5
Date Sampled		3/02/2017	6/02/2017	1/02/2017
Type of sample		Soil	Soil	Soil
Date Extracted	-	17/02/2017	17/02/2017	17/02/2017
Date analysed	-	22/02/2017	22/02/2017	22/02/2017
HMX	mg/kg	<0.1	<0.1	<0.1
RDX	mg/kg	<0.1	<0.1	<0.1
1,3,5-Trinitrobenzene	mg/kg	<0.1	<0.1	<0.1
1,3-Dinitrobenzene	mg/kg	<0.1	<0.1	<0.1
Tetryl	mg/kg	<0.1	<0.1	<0.1
2,4,6-Trinitrotoluene	mg/kg	<0.1	<0.1	<0.1
4-Amino-2,6-dinitrotoluene	mg/kg	<0.1	<0.1	<0.1
2-Amino-4,6-dinitrotoluene	mg/kg	<0.1	<0.1	<0.1
4-&2-AM-DNT(Isomeric Mixture)	mg/kg	<0.1	<0.1	<0.1
2,4-Dinitrotoluene	mg/kg	<0.1	<0.1	<0.1
2,6-Dinitrotoluene	mg/kg	<0.1	<0.1	<0.1
2,4&2,6-DNT(Isomeric Mixture)	mg/kg	<0.1	<0.1	<0.1
Nitrobenzene	mg/kg	<0.1	<0.1	<0.1
2-Nitrotoluene	mg/kg	<0.1	<0.1	<0.1
3-Nitrotoluene	mg/kg	<0.1	<0.1	<0.1
4-Nitrotoluene	mg/kg	<0.1	<0.1	<0.1
Nitroglycerine	mg/kg	<1	<1	<1
PETN	mg/kg	<1	<1	<1
Surrogate (o-Dinitrobenzene)	%	77	96	115

Method ID	Methodology Summary
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Metals-020	Determination of various metals by ICP-AES.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Ext-011	Subcontracted to ALS.

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/02/2017	[NT]	[NT]	LCS-6	16/02/2017
Date analysed	-			16/02/2017	[NT]	[NT]	LCS-6	16/02/2017
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-6	89%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-6	88%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-6	114%
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-6	103%
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-6	104%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-6	93%
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]	[NT]	LCS-6	92%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	99	[NT]	[NT]	LCS-6	96%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			16/02/2017	[NT]	[NT]	LCS-6	16/02/2017
Date analysed	-			17/02/2017	[NT]	[NT]	LCS-6	17/02/2017
Aluminium	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-6	97%
Strontium*	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-6	103%
Barium	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-6	103%
Iron	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-6	105%
Magnesium	mg/kg	5	Metals-020	<5	[NT]	[NT]	LCS-6	101%

QUALITY CONTROL Explosives in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date Extracted	-			17/02/2017	161481-A-48	17/02/2017 || 17/02/2017	LCS-6	17/02/2017
Date analysed	-			22/02/2017	161481-A-48	22/02/2017 || 22/02/2017	LCS-6	22/02/2017
HMX	mg/kg	0.1	Ext-011	<0.1	161481-A-48	<0.1 || <0.1	LCS-6	99.4%
RDX	mg/kg	0.1	Ext-011	<0.1	161481-A-48	<0.1 || <0.1	[NR]	[NR]
1,3,5-Trinitrobenzene	mg/kg	0.1	Ext-011	<0.1	161481-A-48	<0.1 || <0.1	[NR]	[NR]
1,3-Dinitrobenzene	mg/kg	0.1	Ext-011	<0.1	161481-A-48	<0.1 || <0.1	[NR]	[NR]

QUALITY CONTROL Explosives in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Tetryl	mg/kg	0.1	Ext-011	<0.1	161481-A-48	<0.1 || <0.1	[NR]	[NR]
2,4,6-Trinitrotoluene	mg/kg	0.1	Ext-011	<0.1	161481-A-48	<0.1 || <0.1	LCS-6	100%
4-Amino-2,6-dinitrotoluene	mg/kg	0.1	Ext-011	<0.1	161481-A-48	<0.1 || <0.1	LCS-6	106%
2-Amino-4,6-dinitrotoluene	mg/kg	0.1	Ext-011	<0.1	161481-A-48	<0.1 || <0.1	[NR]	[NR]
4-&2-AM-DNT(Isomeric Mixture)	mg/kg	0.1	Ext-011	<0.1	161481-A-48	<0.1 || <0.1	[NR]	[NR]
2,4-Dinitrotoluene	mg/kg	0.1	Ext-011	<0.1	161481-A-48	<0.1 || <0.1	LCS-6	100%
2,6-Dinitrotoluene	mg/kg	0.1	Ext-011	<0.1	161481-A-48	<0.1 || <0.1	[NR]	[NR]
2,4&2,6-DNT(Isomeric Mixture)	mg/kg	0.1	Ext-011	<0.1	161481-A-48	<0.1 || <0.1	[NR]	[NR]
Nitrobenzene	mg/kg	0.1	Ext-011	<0.1	161481-A-48	<0.1 || <0.1	LCS-6	112%
2-Nitrotoluene	mg/kg	0.1	Ext-011	<0.1	161481-A-48	<0.1 || <0.1	[NR]	[NR]
3-Nitrotoluene	mg/kg	0.1	Ext-011	<0.1	161481-A-48	<0.1 || <0.1	[NR]	[NR]
4-Nitrotoluene	mg/kg	0.1	Ext-011	<0.1	161481-A-48	<0.1 || <0.1	[NR]	[NR]
Nitroglycerine	mg/kg	1	Ext-011	<1	161481-A-48	<1 || <1	[NR]	[NR]
PETN	mg/kg	1	Ext-011	<1	161481-A-48	<1 || <1	LCS-6	90.2%
Surrogate (o-Dinitrobenzene)	%		Ext-011	[NT]	161481-A-48	115 || [N/T]	[NR]	[NR]

Report Comments:

Explosives analysed by ALS. Report number ES1703703

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Simon Song

From: Emily McGinty <Emily.McGinty@douglaspartners.com.au>
Sent: Wednesday, 15 February 2017 1:45 PM
To: Simon Song
Subject: FW: Results for Registration 161481 76744.01, Menangle Park North (Precinct 300)
Attachments: 161481-coc.pdf

Hi Simon

161481-A
Due: 22/2/17
Std TAT

Can I please request the following additional analysis for the attached job:

- Sample 4 (300-3 0.4 – 0.5): Explosives, additional metals and PAH
- Sample 5 (300-4 0 – 0.1): Explosives, additional metals and PAH
- Sample 17 (300-10 0 – 0.1): Explosives, additional metals
- Sample 24 (300-14 0.4 – 0.5): Explosives
- Sample 26 (300-15 0.4 – 0.5): Explosives, PAH
- Sample 27 (300-16 0 – 0.1): Explosives, additional metals and PAH
- Sample 36 (300-20 0.4 – 0.5): Explosives, additional metals (Al, Sr, Ba, Fe and Mg) and PAH
- Sample 48 (300-26 0.4 – 0.5): Explosives

Thanks,

Emily.

Emily McGinty | Environmental Scientist
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
18 Waler Crescent Smeaton Grange NSW 2567
P: 02 4647 0075 | F: 02 4646 1886 | E: Emily.McGinty@douglaspartners.com.au

From: Ken Nguyen [mailto:KNguyen@envirolab.com.au]
Sent: Tuesday, 14 February 2017 8:21 PM
To: Emily McGinty
Subject: Results for Registration 161481 76744.01, Menangle Park North (Precinct 300)

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the Invoice
a copy of the COC
an excel file containing the results

Please note that a hard copy will not be posted.

Enquiries should be made directly to:
customerservice@envirolab.com.au

Regards

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 161481

Client:

Douglas Partners Pty Ltd Smeaton Grange
18 Waler Crescent
Smeaton Grange
NSW 2567

Attention: Emily McGinty

Sample log in details:

Your Reference:	**76744.01, Menangle Park North (Precinct 300)**
No. of samples:	52 Soils
Date samples received / completed instructions received	07/02/17 / 07/02/17

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	15/02/17 / 14/02/17
Date of Preliminary Report:	Not Issued

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Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

vTRH(C6-C10)/BTEXN in Soil					
Our Reference:	UNITS	161481-11	161481-13	161481-15	161481-17
Your Reference	---------- -	300-7	300-8	300-9	300-10
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		3/02/2017	6/02/2017	6/02/2017	3/02/2017
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	09/02/2017	09/02/2017	09/02/2017	09/02/2017
Date analysed	-	10/02/2017	10/02/2017	10/02/2017	10/02/2017
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	91	90	88	94

svTRH (C10-C40) in Soil					
Our Reference:	UNITS	161481-11	161481-13	161481-15	161481-17
Your Reference	---------- -	300-7	300-8	300-9	300-10
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		3/02/2017	6/02/2017	6/02/2017	3/02/2017
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	09/02/2017	09/02/2017	09/02/2017	09/02/2017
Date analysed	-	10/02/2017	10/02/2017	10/02/2017	10/02/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50
Surrogate o-Terphenyl	%	83	83	84	99

PAHs in Soil					
Our Reference:	UNITS	161481-11	161481-13	161481-15	161481-17
Your Reference	----------	300-7	300-8	300-9	300-10
	-				
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		3/02/2017	6/02/2017	6/02/2017	3/02/2017
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	09/02/2017	09/02/2017	09/02/2017	09/02/2017
Date analysed	-	09/02/2017	09/02/2017	09/02/2017	09/02/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05
Surrogate p-Terphenyl-d14	%	89	85	87	79

Organochlorine Pesticides in soil						
Our Reference:	UNITS	161481-11	161481-13	161481-15	161481-17	161481-39
Your Reference	---------- -	300-7	300-8	300-9	300-10	300-22
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		3/02/2017	6/02/2017	6/02/2017	3/02/2017	2/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2017	09/02/2017	09/02/2017	09/02/2017	09/02/2017
Date analysed	-	09/02/2017	09/02/2017	09/02/2017	09/02/2017	09/02/2017
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	115	113	116	115	114

Organochlorine Pesticides in soil		
Our Reference:	UNITS	161481-41
Your Reference	----------	300-23
	-	
Depth	----------	0-0.1
Date Sampled		2/02/2017
Type of sample		Soil
Date extracted	-	09/02/2017
Date analysed	-	09/02/2017
HCB	mg/kg	<0.1
alpha-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1
Surrogate TCMX	%	112

Organophosphorus Pesticides						
Our Reference:	UNITS	161481-11	161481-13	161481-15	161481-17	161481-39
Your Reference	---------- -	300-7	300-8	300-9	300-10	300-22
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		3/02/2017	6/02/2017	6/02/2017	3/02/2017	2/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2017	09/02/2017	09/02/2017	09/02/2017	09/02/2017
Date analysed	-	09/02/2017	09/02/2017	09/02/2017	09/02/2017	09/02/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	115	113	116	115	114

Organophosphorus Pesticides		
Our Reference:	UNITS	161481-41
Your Reference	---------- -	300-23
Depth	----------	0-0.1
Date Sampled		2/02/2017
Type of sample		Soil
Date extracted	-	09/02/2017
Date analysed	-	09/02/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Chlorpyriphos	mg/kg	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Dichlorvos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Ethion	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Parathion	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Surrogate TCMX	%	112

PCBs in Soil					
Our Reference:	UNITS	161481-11	161481-13	161481-15	161481-17
Your Reference	---------- -	300-7	300-8	300-9	300-10
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		3/02/2017	6/02/2017	6/02/2017	3/02/2017
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	09/02/2017	09/02/2017	09/02/2017	09/02/2017
Date analysed	-	09/02/2017	09/02/2017	09/02/2017	09/02/2017
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	115	113	116	115

Acid Extractable metals in soil						
Our Reference:	UNITS	161481-11	161481-13	161481-15	161481-17	161481-39
Your Reference	---------- -	300-7	300-8	300-9	300-10	300-22
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		3/02/2017	6/02/2017	6/02/2017	3/02/2017	2/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	09/02/2017	09/02/2017	09/02/2017	09/02/2017	09/02/2017
Date analysed	-	10/02/2017	10/02/2017	10/02/2017	10/02/2017	10/02/2017
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	4	2	<1	11	6
Copper	mg/kg	4	3	<1	140	7
Lead	mg/kg	5	12	2	12	12
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	2	<1	5	5
Zinc	mg/kg	10	14	4	12	23

Acid Extractable metals in soil		
Our Reference:	UNITS	161481-41
Your Reference	---------- -	300-23
Depth	----------	0-0.1
Date Sampled		2/02/2017
Type of sample		Soil
Date prepared	-	09/02/2017
Date analysed	-	10/02/2017
Arsenic	mg/kg	5
Cadmium	mg/kg	<0.4
Chromium	mg/kg	14
Copper	mg/kg	23
Lead	mg/kg	20
Mercury	mg/kg	<0.1
Nickel	mg/kg	14
Zinc	mg/kg	40

Misc Soil - Inorg					
Our Reference:	UNITS	161481-11	161481-13	161481-15	161481-17
Your Reference	---------- -	300-7	300-8	300-9	300-10
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		3/02/2017	6/02/2017	6/02/2017	3/02/2017
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	09/02/2017	09/02/2017	09/02/2017	09/02/2017
Date analysed	-	09/02/2017	09/02/2017	09/02/2017	09/02/2017
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5

Moisture						
Our Reference:	UNITS	161481-11	161481-13	161481-15	161481-17	161481-39
Your Reference	---------- -	300-7	300-8	300-9	300-10	300-22
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		3/02/2017	6/02/2017	6/02/2017	3/02/2017	2/02/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	09/02/2017	09/02/2017	09/02/2017	09/02/2017	09/02/2017
Date analysed	-	10/02/2017	10/02/2017	10/02/2017	10/02/2017	10/02/2017
Moisture	%	2.2	2.6	0.6	0.8	3.3

Moisture		
Our Reference:	UNITS	161481-41
Your Reference	---------- -	300-23
Depth	----------	0-0.1
Date Sampled		2/02/2017
Type of sample		Soil
Date prepared	-	09/02/2017
Date analysed	-	10/02/2017
Moisture	%	9.7

Asbestos ID - soils					
Our Reference:	UNITS	161481-11	161481-13	161481-15	161481-17
Your Reference	---------- -	300-7	300-8	300-9	300-10
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		3/02/2017	6/02/2017	6/02/2017	3/02/2017
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	10/02/2017	10/02/2017	10/02/2017	10/02/2017
Sample mass tested	g	Approx. 55g	Approx. 50g	Approx. 50g	Approx. 50g
Sample Description	-	Brown sandy soil	Brown sandy soil	Brown sandy soil	Brown sandy soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils NEPM - ASB-001					
Our Reference:	UNITS	161481-33	161481-35	161481-37	161481-43
Your Reference	---------- -	300-19	300-20	300-21	300-24
Depth	----------	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		6/02/2017	6/02/2017	6/02/2017	2/02/2017
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	13/02/2017	13/02/2017	13/02/2017	13/02/2017
Sample mass tested	g	365.57	345.49	349.12	222.19
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Grey coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	Chrysotile asbestos detected Amosite asbestos detected Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	1.6041	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	See Above	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	0.5542	–	–
FA and AF Estimation*	g	–	–	–	–
ACM >7mm Estimation*	%(w/w)	<0.01	0.1604	<0.01	<0.01
FA and AF Estimation*[#2]	%(w/w)	<0.001	<0.001	<0.001	<0.001

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.

Method ID	Methodology Summary
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			09/02/2017	161481-11	09/02/2017 || 09/02/2017	LCS-2	09/02/2017
Date analysed	-			10/02/2017	161481-11	10/02/2017 || 10/02/2017	LCS-2	10/02/2017
$TRHC_6$ - C_9	mg/kg	25	Org-016	<25	161481-11	<25 || <25	LCS-2	100%
$TRHC_6$ - C_{10}	mg/kg	25	Org-016	<25	161481-11	<25 || <25	LCS-2	100%
Benzene	mg/kg	0.2	Org-016	<0.2	161481-11	<0.2 || <0.2	LCS-2	90%
Toluene	mg/kg	0.5	Org-016	<0.5	161481-11	<0.5 || <0.5	LCS-2	95%
Ethylbenzene	mg/kg	1	Org-016	<1	161481-11	<1 || <1	LCS-2	103%
m+p-xylene	mg/kg	2	Org-016	<2	161481-11	<2 || <2	LCS-2	107%
o-Xylene	mg/kg	1	Org-016	<1	161481-11	<1 || <1	LCS-2	108%
naphthalene	mg/kg	1	Org-014	<1	161481-11	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	89	161481-11	91 || 95 || RPD: 4	LCS-2	91%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			09/02/2017	161481-11	09/02/2017 || 09/02/2017	LCS-2	09/02/2017
Date analysed	-			10/02/2017	161481-11	10/02/2017 || 10/02/2017	LCS-2	10/02/2017
$TRHC_{10}$ - C_{14}	mg/kg	50	Org-003	<50	161481-11	<50 || <50	LCS-2	108%
$TRHC_{15}$ - C_{28}	mg/kg	100	Org-003	<100	161481-11	<100 || <100	LCS-2	110%
$TRHC_{29}$ - C_{36}	mg/kg	100	Org-003	<100	161481-11	<100 || <100	LCS-2	106%
$TRH>C_{10}$-C_{16}	mg/kg	50	Org-003	<50	161481-11	<50 || <50	LCS-2	108%
$TRH>C_{16}$-C_{34}	mg/kg	100	Org-003	<100	161481-11	<100 || <100	LCS-2	110%
$TRH>C_{34}$-C_{40}	mg/kg	100	Org-003	<100	161481-11	<100 || <100	LCS-2	106%
Surrogate o-Terphenyl	%		Org-003	92	161481-11	83 || 83 || RPD: 0	LCS-2	97%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			09/02/2017	161481-11	09/02/2017 || 09/02/2017	LCS-2	09/02/2017
Date analysed	-			09/02/2017	161481-11	09/02/2017 || 09/02/2017	LCS-2	09/02/2017
Naphthalene	mg/kg	0.1	Org-012	<0.1	161481-11	<0.1 || <0.1	LCS-2	97%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	161481-11	<0.1 || <0.1	LCS-2	106%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	161481-11	<0.1 || <0.1	LCS-2	110%
Anthracene	mg/kg	0.1	Org-012	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	161481-11	<0.1 || <0.1	LCS-2	108%
Pyrene	mg/kg	0.1	Org-012	<0.1	161481-11	<0.1 || <0.1	LCS-2	109%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	161481-11	<0.1 || <0.1	LCS-2	104%
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012	<0.2	161481-11	<0.2 || <0.2	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	161481-11	<0.05 || <0.05	LCS-2	76%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	86	161481-11	89 || 83 || RPD: 7	LCS-2	117%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			09/02/2017	161481-11	09/02/2017 || 09/02/2017	LCS-2	09/02/2017
Date analysed	-			09/02/2017	161481-11	09/02/2017 || 09/02/2017	LCS-2	09/02/2017
HCB	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	LCS-2	87%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	LCS-2	96%
Heptachlor	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	LCS-2	124%
delta-BHC	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	LCS-2	88%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	LCS-2	91%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	LCS-2	98%
Dieldrin	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	LCS-2	98%
Endrin	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	LCS-2	89%
pp-DDD	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	LCS-2	114%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	LCS-2	119%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	116	161481-11	115 || 115 || RPD: 0	LCS-2	104%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			09/02/2017	161481-11	09/02/2017 || 09/02/2017	LCS-2	09/02/2017
Date analysed	-			09/02/2017	161481-11	09/02/2017 || 09/02/2017	LCS-2	09/02/2017
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	161481-11	<0.1 || <0.1	LCS-2	87%
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	161481-11	<0.1 || <0.1	LCS-2	100%
Dimethoate	mg/kg	0.1	Org-008	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	161481-11	<0.1 || <0.1	LCS-2	116%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	161481-11	<0.1 || <0.1	LCS-2	116%
Malathion	mg/kg	0.1	Org-008	<0.1	161481-11	<0.1 || <0.1	LCS-2	119%
Parathion	mg/kg	0.1	Org-008	<0.1	161481-11	<0.1 || <0.1	LCS-2	91%
Ronnel	mg/kg	0.1	Org-008	<0.1	161481-11	<0.1 || <0.1	LCS-2	101%
Surrogate TCMX	%		Org-008	116	161481-11	115 || 115 || RPD: 0	LCS-2	113%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			09/02/2017	161481-11	09/02/2017 || 09/02/2017	LCS-2	09/02/2017
Date analysed	-			09/02/2017	161481-11	09/02/2017 || 09/02/2017	LCS-2	09/02/2017
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	161481-11	<0.1 || <0.1	LCS-2	126%
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	161481-11	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	116	161481-11	115 || 115 || RPD: 0	LCS-2	113%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD
Date prepared	-			09/02/2017	161481-11	09/02/2017 || 09/02/2017
Date analysed	-			10/02/2017	161481-11	10/02/2017 || 10/02/2017
Arsenic	mg/kg	4	Metals-020	<4	161481-11	<4 || <4
Cadmium	mg/kg	0.4	Metals-020	<0.4	161481-11	<0.4 || <0.4
Chromium	mg/kg	1	Metals-020	<1	161481-11	4 || 5 || RPD: 22
Copper	mg/kg	1	Metals-020	<1	161481-11	4 || 4 || RPD: 0
Lead	mg/kg	1	Metals-020	<1	161481-11	5 || 5 || RPD: 0
Mercury	mg/kg	0.1	Metals-021	<0.1	161481-11	<0.1 || <0.1
Nickel	mg/kg	1	Metals-020	<1	161481-11	3 || 3 || RPD: 0
Zinc	mg/kg	1	Metals-020	<1	161481-11	10 || 10 || RPD: 0

QUALITY CONTROL Misc Soil - Inorg	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			09/02/2017	161481-11	09/02/2017 || 09/02/2017	LCS-1	09/02/2017
Date analysed	-			09/02/2017	161481-11	09/02/2017 || 09/02/2017	LCS-1	09/02/2017
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	161481-11	<5 || <5	LCS-1	99%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	161481-13	09/02/2017
Date analysed	-	[NT]	[NT]	161481-13	10/02/2017
TRHC$_6$ - C$_9$	mg/kg	[NT]	[NT]	161481-13	99%
TRHC$_6$ - C$_{10}$	mg/kg	[NT]	[NT]	161481-13	99%
Benzene	mg/kg	[NT]	[NT]	161481-13	89%
Toluene	mg/kg	[NT]	[NT]	161481-13	93%
Ethylbenzene	mg/kg	[NT]	[NT]	161481-13	101%
m+p-xylene	mg/kg	[NT]	[NT]	161481-13	105%
o-Xylene	mg/kg	[NT]	[NT]	161481-13	107%
naphthalene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	[NT]	[NT]	161481-13	93%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	161481-13	09/02/2017
Date analysed	-	[NT]	[NT]	161481-13	10/02/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	[NT]	[NT]	161481-13	104%
TRHC$_{15}$ - C$_{28}$	mg/kg	[NT]	[NT]	161481-13	106%
TRHC$_{29}$ - C$_{36}$	mg/kg	[NT]	[NT]	161481-13	108%
TRH>C$_{10}$-C$_{16}$	mg/kg	[NT]	[NT]	161481-13	104%
TRH>C$_{16}$-C$_{34}$	mg/kg	[NT]	[NT]	161481-13	106%
TRH>C$_{34}$-C$_{40}$	mg/kg	[NT]	[NT]	161481-13	108%
Surrogate o-Terphenyl	%	[NT]	[NT]	161481-13	84%
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	161481-13	09/02/2017
Date analysed	-	[NT]	[NT]	161481-13	09/02/2017
Naphthalene	mg/kg	[NT]	[NT]	161481-13	97%
Acenaphthylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	[NT]	[NT]	161481-13	102%
Phenanthrene	mg/kg	[NT]	[NT]	161481-13	98%
Anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	[NT]	[NT]	161481-13	95%
Pyrene	mg/kg	[NT]	[NT]	161481-13	99%
Benzo(a)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	[NT]	[NT]	161481-13	92%
Benzo(b,j+k)fluoranthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	[NT]	[NT]	161481-13	67%
Indeno(1,2,3-c,d)pyrene	mg/kg	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	[NT]	[NT]	161481-13	114%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	161481-13	09/02/2017
Date analysed	-	[NT]	[NT]	161481-13	09/02/2017
HCB	mg/kg	[NT]	[NT]	[NR]	[NR]
alpha-BHC	mg/kg	[NT]	[NT]	161481-13	87%
gamma-BHC	mg/kg	[NT]	[NT]	[NR]	[NR]
beta-BHC	mg/kg	[NT]	[NT]	161481-13	95%
Heptachlor	mg/kg	[NT]	[NT]	161481-13	122%
delta-BHC	mg/kg	[NT]	[NT]	[NR]	[NR]
Aldrin	mg/kg	[NT]	[NT]	161481-13	89%
Heptachlor Epoxide	mg/kg	[NT]	[NT]	161481-13	92%
gamma-Chlordane	mg/kg	[NT]	[NT]	[NR]	[NR]
alpha-chlordane	mg/kg	[NT]	[NT]	[NR]	[NR]
Endosulfan I	mg/kg	[NT]	[NT]	[NR]	[NR]
pp-DDE	mg/kg	[NT]	[NT]	161481-13	99%
Dieldrin	mg/kg	[NT]	[NT]	161481-13	98%
Endrin	mg/kg	[NT]	[NT]	161481-13	81%
pp-DDD	mg/kg	[NT]	[NT]	161481-13	117%
Endosulfan II	mg/kg	[NT]	[NT]	[NR]	[NR]
pp-DDT	mg/kg	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	[NT]	[NT]	161481-13	118%
Methoxychlor	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%	[NT]	[NT]	161481-13	97%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	161481-13	09/02/2017
Date analysed	-	[NT]	[NT]	161481-13	09/02/2017
Azinphos-methyl (Guthion)	mg/kg	[NT]	[NT]	[NR]	[NR]
Bromophos-ethyl	mg/kg	[NT]	[NT]	[NR]	[NR]
Chlorpyriphos	mg/kg	[NT]	[NT]	161481-13	102%
Chlorpyriphos-methyl	mg/kg	[NT]	[NT]	[NR]	[NR]
Diazinon	mg/kg	[NT]	[NT]	[NR]	[NR]
Dichlorvos	mg/kg	[NT]	[NT]	161481-13	92%
Dimethoate	mg/kg	[NT]	[NT]	[NR]	[NR]
Ethion	mg/kg	[NT]	[NT]	161481-13	112%
Fenitrothion	mg/kg	[NT]	[NT]	161481-13	107%
Malathion	mg/kg	[NT]	[NT]	161481-13	99%
Parathion	mg/kg	[NT]	[NT]	161481-13	94%
Ronnel	mg/kg	[NT]	[NT]	161481-13	102%
Surrogate TCMX	%	[NT]	[NT]	161481-13	116%
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	161481-13	09/02/2017
Date analysed	-	[NT]	[NT]	161481-13	09/02/2017
Aroclor 1016	mg/kg	[NT]	[NT]	[NR]	[NR]
Aroclor 1221	mg/kg	[NT]	[NT]	[NR]	[NR]
Aroclor 1232	mg/kg	[NT]	[NT]	[NR]	[NR]
Aroclor 1242	mg/kg	[NT]	[NT]	[NR]	[NR]
Aroclor 1248	mg/kg	[NT]	[NT]	[NR]	[NR]
Aroclor 1254	mg/kg	[NT]	[NT]	161481-13	128%
Aroclor 1260	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%	[NT]	[NT]	161481-13	116%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	161481-13	09/02/2017
Date analysed	-	[NT]	[NT]	161481-13	10/02/2017
Arsenic	mg/kg	[NT]	[NT]	161481-13	121%
Cadmium	mg/kg	[NT]	[NT]	161481-13	125%
Chromium	mg/kg	[NT]	[NT]	161481-13	127%
Copper	mg/kg	[NT]	[NT]	161481-13	126%
Lead	mg/kg	[NT]	[NT]	161481-13	122%
Mercury	mg/kg	[NT]	[NT]	161481-13	102%
Nickel	mg/kg	[NT]	[NT]	161481-13	122%
Zinc	mg/kg	[NT]	[NT]	161481-13	120%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	LCS-6	09/02/2017
Date analysed	-	[NT]	[NT]	LCS-6	10/02/2017
Arsenic	mg/kg	[NT]	[NT]	LCS-6	98%
Cadmium	mg/kg	[NT]	[NT]	LCS-6	106%
Chromium	mg/kg	[NT]	[NT]	LCS-6	103%
Copper	mg/kg	[NT]	[NT]	LCS-6	101%
Lead	mg/kg	[NT]	[NT]	LCS-6	102%
Mercury	mg/kg	[NT]	[NT]	LCS-6	100%
Nickel	mg/kg	[NT]	[NT]	LCS-6	100%
Zinc	mg/kg	[NT]	[NT]	LCS-6	102%

Report Comments:

Asbestos: Excessive sample volume was provided for asbestos analysis. A portion of the supplied sample was sub-sampled according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.
Note: Samples 161481-11, 13, 15 & 17 were sub-sampled from bags provided by the client.

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.
This is reported outside our scope of NATA accreditation.

Note: All samples analysed as received. However, samples 161481-33, 35, 37 & 45 are below the minimum 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

Asbestos ID was analysed by Approved Identifier:	Paul Ching, Lucy Zhu
Asbestos ID was authorised by Approved Signatory:	Paul Ching

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client Details	
Client	Douglas Partners Pty Ltd Smeaton Grange
Attention	Emily McGinty

Sample Login Details	
Your Reference	76744.01, Menangle Park North (Precinct 500)
Envirolab Reference	**160926**
Date Sample Received	27/01/2017
Date Instructions Received	27/01/2017
Date Results Expected to be Reported	**03/02/2017**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	34 Soils, 1 Material
Turnaround Time Requested	Standard
Temperature on receipt (°C)	28.1
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolabservices.com.au	Email: jhurst@envirolabservices.com.au

Sample and Testing Details on following page

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Sample Id	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	PAHs in Soil - Low Level	Organochlorine Pesticides in soil	Organophosphorus Pesticides	PCBs in Soil	Acid Extractable metals in soil	Total Phenolics (as Phenol)	Asbestos ID - soils	Asbestos ID - materials	On Hold
500-1-0.0-0.1					✓	✓		✓				
500-2-0.0-0.1					✓	✓		✓				
500-2b-0.0-0.1					✓	✓		✓				
500-3-0.0-0.1					✓	✓		✓				
500-3-0.4-0.5												✓
500-4-0.0-0.1					✓	✓		✓				
500-4-0.4-0.5												✓
500-5-0.0-0.1	✓	✓	✓		✓	✓	✓	✓	✓	✓		
500-5-0.4-0.5												✓
500-6-0.0-0.1	✓	✓	✓		✓	✓	✓	✓	✓	✓		
500-6-0.4-0.5												✓
500-7-0.0-0.1	✓	✓	✓		✓	✓	✓	✓	✓	✓		
500-7-0.4-0.5												✓
500-8-0.0-0.1	✓	✓		✓				✓	✓			
500-8-0.4-0.5												✓
500-9-0.0-0.1	✓	✓	✓		✓	✓	✓	✓	✓	✓		
500-9-0.4-0.5												✓
500-10-0.0-0.1	✓	✓	✓		✓	✓	✓	✓	✓	✓		
500-10-0.4-0.5												✓
500-11-0.0-0.1	✓	✓		✓				✓	✓			
500-11-0.4-0.5												✓
500-12-0.0-0.1					✓	✓		✓				
500-12-0.4-0.5												✓
500-13-0.0-0.1					✓	✓		✓				
500-13-0.4-0.5												✓
500-SP1-0.0-0.1												✓
500-SP1-0.4-0.5												✓
500-SP2-0.0-0.1												✓

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enquiries@envirolabservices.com.au
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Sample Id	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	PAHs in Soil - Low Level	Organochlorine Pesticides in soil	Organophosphorus Pesticides	PCBs in Soil	Acid Extractable metals in soil	Total Phenolics (as Phenol)	Asbestos ID - soils	Asbestos ID - materials	On Hold
500-SP2-0.4-0.5												✓
500-SP2-1.2-1.3												✓
500-7-1.0-1.1												✓
500-2											✓	
BD1200117	✓							✓				
BD1230117												✓
BD1240117					✓	✓		✓				

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY

Project Name:	Menangle Park North (Precinct 500)			**To:**	Envirolab Services
Project No:	76744.01	**Sampler:**	CLN		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	EMG	**Mob. Phone:**	0418 651 227	**Attn:**	Tania Notaras
Email:	emily.mcginty@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Metals, OCP, OPP	Combo 8a	Combo 4L	Metals - Leachate	TRH - Leachate	HOLD	Asbestos ID	Metals and BTEX		Notes/preservation
500-1/0-0.1	1	25.01.17	S	G/P	x									
500-2/0-0.1	2	25.01.17	S	G/P	x									Near ACM pipe
500-2b/0-0.1	3	25.01.17	S	G/P	x									Near Water tank
500-3/0-0.1	4	24.01.17	S	G/P	x									
500-3/0.4-0.5	5	24.01.17	S	G/P						x				
500-4/0-0.1	6	24.01.17	S	G/P	x									
500-4/0.4-0.5	7	24.01.17	S	G/P						x				
500-5/0-0.1	8	24.01.17	S	G/P		x								
500-5/0.4-0.5	9	24.01.17	S	G/P						x				
500-6/0-0.1	10	23.01.17	S	G/P		x								
500-6/0.4-0.5	11	23.01.17	S	G/P						x				
500-7/0-0.1	12	20.01.17	S	G/P		x								

ENVIROLAB GROUP
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 160926
Date Received: 27.1
Time Received: 1630
Received by: JAG
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Lab Report No:			
Send Results to:	Douglas Partners Pty Ltd	**Address** 18 Waler Crescent, Smeaton Grange 2567	**Phone:** (02) 4647 0075 **Fax:** (02) 4646 1886
Relinquished by:	CLN	**Transported to laboratory by:**	
Signed:		**Date & Time:** 27.01.17	**Received by:** James - EZS

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY

Project Name:	Menangle Park North (Precinct 500)			**To:**	Envirolab Services
Project No:	76744.01	**Sampler:**	CLN		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	EMG	**Mob. Phone:**	0418 651 227	**Attn:**	Tania Notaras
Email:	emily.mcginty@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type	Container Type	Analytes									Notes/preservation
			S - soil W - water	G - glass P - plastic	Metals, OCP, OPP	Combo 8a	Combo 4L	Metals - Leachate	TRH - Leachate	HOLD	Asbestos ID	Metals and BTEX		
160092R6														
500-7/0.4-0.5	13	20.01.17	S	G/P						x				
500-8/0-0.1	14	23.01.17	S	G/P			x							
500-8/0.4-0.5	15	23.01.17	S	G/P						x				
500-9/0-0.1	16	20.01.17	S	G/P		x								
500-9/0.4-0.5	17	20.01.17	S	G/P						x				
500-10/0-0.1	18	23.01.17	S	G/P		x								
500-10/0.4-0.5	19	23.01.17	S	G/P						x				
500-11/0-0.1	20	19.01.17	S	G/P			x							
500-11/0.4-0.5	21	19.01.17	S	G/P						x				
500-12/0-0.1	22	20.01.17	S	G/P	x									
500-12/0.4-0.5	23	20.01.17	S	G/P						x				
500-13/0-0.1	24	24.01.17	S	G/P	x									

Lab Report No:					
Send Results to:	Douglas Partners Pty Ltd	**Address** 18 Waler Crescent, Smeaton Grange 2567		**Phone:** (02) 4647 0075	**Fax:** (02) 4646 1886
Relinquished by:	CLN		**Transported to laboratory by:**		
Signed:		**Date & Time:** 27.01.17	**Received by:** James ELS		

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY

Project Name:	Menangle Park North (Precinct 500)			**To:**	Envirolab Services
Project No:	76744.01	**Sampler:**	CLN		12 Ashley Street, Chatswood NSW 2067
Project Mgr:	EMG	**Mob. Phone:**	0418 651 227	**Attn:**	Tania Notaras
Email:	emily.mcginty@douglaspartners.com.au			**Phone:**	(02) 9910 6200 **Fax:** (02) 9910 6201
Date Required:	Standard			**Email:**	tnotaras@envirolabservices.com.au

Sample ID	Lab ID	Date Sampled	Sample Type	Container Type	Analytes									Notes/preservation
			S - soil W - water	G - glass P - plastic	Metals, OCP, OPP	Combo 8a	Combo 4L	Metals - Leachate	TRH - Leachate	HOLD	Asbestos ID	Metals and BTEX		
160926														
500-13/0.4-0.5	25	24.01.17	S	G/P						x				
500-SP1/0-0.1	26	23.01.17	S	G/P						x				
500-SP1/0.4-0.5	27	23.01.17	S	G/P						x				
500-SP2/0-0.1	28	23.01.17	S	G/P						x				
500-SP2/0.4-0.5	29	23.01.17	S	G/P						x				
500-SP2/1.2-1.3	30	23.01.17	S	G/P						x				
500-7/1-1.1	31	20.01.17	S	G/P						x				
500-2	32	25.01.17	fragment	P							x			
BD1200117	33	20.01.17	S	G								x		
BD1 230117	34	23.01.17	S	G						x				
BD1 240117	35	24.01.17	S	G	x									

Lab Report No:					
Send Results to:	Douglas Partners Pty Ltd	**Address** 18 Waler Crescent, Smeaton Grange 2567		**Phone:** (02) 4647 0075	**Fax:** (02) 4646 1886
Relinquished by:	CLN		**Transported to laboratory by:**		
Signed:		**Date & Time:** 27.01.17	**Received by:** James - ELS		

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 160926-A

Client:

Douglas Partners Pty Ltd Smeaton Grange
18 Waler Crescent
Smeaton Grange
NSW 2567

Attention: Emily McGinty

Sample log in details:

Your Reference:	**76744.01, Menangle Park North (Precinct 500)**
No. of samples:	Additional Testing on 2 Soils
Date samples received / completed instructions received	27/01/17 / 15/02/17

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	22/02/17 / 21/02/17
Date of Preliminary Report:	Not Issued

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Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

PAHs in Soil			
Our Reference:	UNITS	160926-A-27	160926-A-29
Your Reference	----------	500-SP1	500-SP2
	-		
Depth	----------	0.4-0.5	0.4-0.5
Date Sampled		23/01/2017	23/01/2017
Type of sample		Soil	Soil
Date extracted	-	16/02/2017	16/02/2017
Date analysed	-	16/02/2017	16/02/2017
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	1.1	<0.1
Anthracene	mg/kg	<0.1	<0.1
Fluoranthene	mg/kg	0.2	<0.1
Pyrene	mg/kg	0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1
Chrysene	mg/kg	0.2	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.1	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Total +ve PAH's	mg/kg	1.8	<0.05
Surrogate p-Terphenyl-d14	%	92	99

Organochlorine Pesticides in soil			
Our Reference:	UNITS	160926-A-27	160926-A-29
Your Reference	----------	500-SP1	500-SP2
	-		
Depth	----------	0.4-0.5	0.4-0.5
Date Sampled		23/01/2017	23/01/2017
Type of sample		Soil	Soil
Date extracted	-	16/02/2017	16/02/2017
Date analysed	-	17/02/2017	17/02/2017
HCB	mg/kg	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1
Surrogate TCMX	%	102	106

Organophosphorus Pesticides			
Our Reference:	UNITS	160926-A-27	160926-A-29
Your Reference	----------	500-SP1	500-SP2
	-		
Depth	----------	0.4-0.5	0.4-0.5
Date Sampled		23/01/2017	23/01/2017
Type of sample		Soil	Soil
Date extracted	-	16/02/2017	16/02/2017
Date analysed	-	17/02/2017	17/02/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1
Surrogate TCMX	%	102	106

Acid Extractable metals in soil			
Our Reference:	UNITS	160926-A-27	160926-A-29
Your Reference	----------	500-SP1	500-SP2
	-		
Depth	----------	0.4-0.5	0.4-0.5
Date Sampled		23/01/2017	23/01/2017
Type of sample		Soil	Soil
Date prepared	-	16/02/2017	16/02/2017
Date analysed	-	16/02/2017	16/02/2017
Arsenic	mg/kg	<4	6
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	1	13
Copper	mg/kg	12	22
Lead	mg/kg	13	15
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	5	13
Zinc	mg/kg	20	45

Moisture			
Our Reference:	UNITS	160926-A-27	160926-A-29
Your Reference	----------	500-SP1	500-SP2
	-		
Depth	----------	0.4-0.5	0.4-0.5
Date Sampled		23/01/2017	23/01/2017
Type of sample		Soil	Soil
Date prepared	-	16/02/2017	16/02/2017
Date analysed	-	17/02/2017	17/02/2017
Moisture	%	3.0	23

Asbestos ID - soils			
Our Reference:	UNITS	160926-A-27	160926-A-29
Your Reference	---------- -	500-SP1	500-SP2
Depth	----------	0.4-0.5	0.4-0.5
Date Sampled		23/01/2017	23/01/2017
Type of sample		Soil	Soil
Date analysed	-	20/02/2017	20/02/2017
Sample mass tested	g	Approx 35g	Approx 80g
Sample Description	-	Brown coarse-grained soil & rocks	Grey coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected

Method ID	Methodology Summary
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/02/2017	[NT]	[NT]	LCS-4	16/02/2017
Date analysed	-			16/02/2017	[NT]	[NT]	LCS-4	16/02/2017
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-4	97%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-4	99%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-4	109%
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-4	107%
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-4	107%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-4	99%
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]	[NT]	LCS-4	98%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	100	[NT]	[NT]	LCS-4	98%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/02/2017	[NT]	[NT]	LCS-4	16/02/2017
Date analysed	-			17/02/2017	[NT]	[NT]	LCS-4	17/02/2017
HCB	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-4	121%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-4	125%
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-4	116%
delta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-4	113%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-4	112%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-4	109%
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-4	119%
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-4	129%
pp-DDD	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-4	99%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-4	120%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%		Org-005	105	[NT]	[NT]	LCS-4	92%
QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/02/2017	[NT]	[NT]	LCS-4	16/02/2017
Date analysed	-			17/02/2017	[NT]	[NT]	LCS-4	17/02/2017
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-4	94%
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-4	89%
Dimethoate	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-4	95%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-4	96%
Malathion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-4	84%
Parathion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-4	94%
Ronnel	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-4	82%
Surrogate TCMX	%		Org-008	105	[NT]	[NT]	LCS-4	109%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			16/02/2017	[NT]	[NT]	LCS-4	16/02/2017
Date analysed	-			16/02/2017	[NT]	[NT]	LCS-4	16/02/2017
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	LCS-4	114%
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	LCS-4	104%
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-4	109%
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-4	113%
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-4	102%
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	LCS-4	99%
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-4	99%
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-4	101%

Report Comments:

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.

Note: Samples 160926-A-27 & 29 were sub-sampled from jars provided by the client.

Asbestos ID was analysed by Approved Identifier:	Paul Ching
Asbestos ID was authorised by Approved Signatory:	Paul Ching

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Simon Song

From: Emily McGinty <Emily.McGinty@douglaspartners.com.au>
Sent: Wednesday, 15 February 2017 1:54 PM
To: Simon Song
Subject: FW: Sample Receipt for 160926 76744.01, Menangle Park North (Precinct 500)
Attachments: 160926-coc.pdf

160926-A
Due: 22/2/17
Std TAT

Hi Simon

Please can I request the following additional analysis for the attached job:

- Sample 27 – metals, OCP, OPP, asbestos, PAH
- Sample 29 – metals, OCP, OPP, asbestos, PAH

Thanks,

Emily.

Emily McGinty | Environmental Scientist
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
18 Waler Crescent Smeaton Grange NSW 2567
P: 02 4647 0075 | F: 02 4646 1886 | E: Emily.McGinty@douglaspartners.com.au

From: Aileen Hie [mailto:AHie@envirolab.com.au]
Sent: Friday, 27 January 2017 6:19 PM
To: Emily McGinty
Subject: Sample Receipt for 160926 76744.01, Menangle Park North (Precinct 500)

Please refer to attached for a copy of your COC and our Sample Receipt Advice (SRA).
Please open and read the SRA as it contains important information.
Please let the lab know immediately if there are any issues.

Results will be available by 6.30pm on the date indicated.

PLEASE NOTE COMBO PRICES WILL ONLY APPLY IF COMBOS ARE SELECTED ON COC.

The new 2016-2017 Price List commences 1st November 2015 - please contact us if you don't have a copy.

Please note that subcontracted testing or non routine testing may take significantly longer than just the standard 5 day TAT, contact the lab to get an approximate due date.

Enquiries should be made directly to:

customerservice@envirolab.com.au

Appendix F

Summary Tables

Douglas Partners
Geotechnics | Environment | Groundwater

Table C1 - Summary of Soil and PACM Laboratory Analysis (All results in mg/kg unless otherwise stated)

Table F1 - Summary of Soil and PACM Laboratory Analysis (All results in mg/kg unless otherwise stated)

Test Pit/ Sample ID[a]	Depth	Sampling Date	Soil Type	Metals								PAH				Phenols	Total Recoverable Hydrocarbons						BTEX				Organochlorine Pesticides (OCP)								OPP	PCB	Asbestos
				Arsenic	Cadmium	Chromium (VI)[b]	Copper	Lead	Mercury	Nickel	Zinc	Naphthalene	Benzo(a) Pyrene (BaP)	BaP TEQ	Total PAH	Phenol	TRH C_6-C_{10}	TRH >C_{10}-C_{16}	F1	F2	F3	F4	Benzene	Toluene	Ethylbenzene	Total xylenes	DDT + DDD + DDE	Aldrin and Dieldrin	Chlordane	Endosulfan	Endrin	Heptachlor	HCB	Methoxychlor	Chlorpyrifos	PCB	Asbestos
	Practical Quantitation Limit (PQL)			4	0.4	1	1	1	0.1	1	1	0.1	0.05	0.5	0.05	5	25	50	25	50	100	100	0.2	0.5	1	3	0.3	0.2	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.7	
Site Assessment Criteria (SAC)																																				
HIL A				100	20	100	6000	300	40	400	7400	-	-	3	300	3000	-	-	-	-	-	-	-	-	-	-	240	6	50	270	10	6	10	300	160	1	-
HSL A & B (0 m to <1m)				-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	40	230	-	-	0.6	390	NL	95	-	-	-	-	-	-	-	-	-	-	-
EIL (urban residential and public open space)				100	-	410	210	1100	-	170	480	170	-	-	-	-	-	-	-	-	-	-	-	-	-	-	180	-	-	-	-	-	-	-	-	-	
ESL (Urban residential and public open space)				-	-	-	-	-	-	-	-	-	0.7	-	-	-	-	-	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-	-	-	-
Precinct 100																																				
100-1	0-0.1	15/02/2017	Fill	**5**	<0.4	**13**	**30**	**39**	<0.1	**18**	**190**	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
100-2	0-0.1	15/02/2017	Topsoil	**6**	<0.4	**10**	**24**	**19**	<0.1	**15**	**51**	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-
100-3	0-0.1	13/02/2017	Topsoil	**6**	<0.4	**15**	**14**	**23**	<0.1	**10**	**60**	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-
100-4	0-0.1	14/02/2017	Topsoil	**7**	<0.4	**15**	**21**	**21**	<0.1	**12**	**24**	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-
100-5	0-0.1	14/02/2017	Fill	**5**	<0.4	**6**	**25**	**19**	<0.1	**10**	**48**	<0.1	**0.1**	<0.5	**1.5**	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
100-6	0-0.1	14/02/2017	Topsoil	**5**	<0.4	**13**	**21**	**24**	<0.1	**15**	**63**	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
100-12	0-0.1	13/02/2017	Topsoil	**5**	<0.4	**14**	**23**	**18**	<0.1	**18**	**56**	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
100-13	0-0.1	13/02/2017	Topsoil	<4	<0.4	**14**	**18**	**20**	<0.1	**14**	**57**	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-
100-14	0-0.1	13/02/2017	Topsoil	<4	<0.4	**15**	**28**	**18**	<0.1	**22**	**66**	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
100-15	0-0.1	13/02/2017	Topsoil	<4	<0.4	**16**	**35**	**21**	<0.1	**18**	**48**	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-
100-16	0-0.1	13/02/2017	Topsoil	<4	<0.4	**12**	**14**	**15**	<0.1	**14**	**39**	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-
100-17	0-0.1	13/02/2017	Topsoil	**7**	<0.4	**13**	**23**	**26**	<0.1	**16**	**61**	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-
100-18	0-0.1	13/02/2017	Topsoil	**5**	<0.4	**11**	**12**	**17**	<0.1	**6**	**23**	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-
100-19	0-0.1	13/02/2017	Topsoil	**7**	<0.4	**13**	**12**	**27**	<0.1	**6**	**31**	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-
100-20	0-0.1	13/02/2017	Topsoil	**7**	<0.4	**16**	**27**	**66**	**0.2**	**11**	**71**	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-
100-21	0-0.1	13/02/2017	Topsoil	**4**	<0.4	**9**	**9**	**17**	<0.1	**4**	**28**	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-
100-SP1	0-0.1	15/02/2017	Stockpile	**7**	<0.4	**12**	**30**	**19**	<0.1	**15**	**54**	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
100-SP2	0-0.1	15/02/2017	Stockpile	**5**	<0.4	**12**	**27**	**12**	<0.1	**12**	**37**	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
100-SP3	0-0.1	15/02/2017	Stockpile	<4	<0.4	**13**	**29**	**14**	<0.1	**13**	**41**	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
100-SP4	0-0.1	14/02/2017	Stockpile	**5**	<0.4	**13**	**28**	**14**	<0.1	**17**	**53**	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
100-SP2	-	15/02/2017	fragment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**Detected**
Precinct 200																																				
200-1	0-0.1	15/02/2017	Topsoil	<4	<0.4	**2**	**2**	**5**	<0.1	**2**	**4**	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-
200-2	0-0.1	15/02/2017	Topsoil	<4	<0.4	**2**	**2**	**4**	<0.1	**1**	**7**	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
200-3	0-0.1	13/02/2017	Topsoil	**6**	<0.4	**6**	**22**	**14**	<0.1	**5**	**12**	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-

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Table C1 - Summary of Soil and PACM Laboratory Analysis (All results in mg/kg unless otherwise stated)

Table F1 - Summary of Soil and PACM Laboratory Analysis (All results in mg/kg unless otherwise stated)

Test Pit/ Sample ID[a]	Depth	Sampling Date	Soil Type	Metals								PAH				Phenols	Total Recoverable Hydrocarbons						BTEX				Organochlorine Pesticides (OCP)								OPP	PCB	Asbestos
				Arsenic	Cadmium	Chromium (VI)[b]	Copper	Lead	Mercury	Nickel	Zinc	Naphthalene	Benzo(a) Pyrene (BaP)	BaP TEQ	Total PAH	Phenol	TRH C_6-C_{10}	TRH >C_{10}-C_{16}	F1	F2	F3	F4	Benzene	Toluene	Ethylbenzene	Total xylenes	DDT + DDD + DDE	Aldrin and Dieldrin	Chlordane	Endosulfan	Endrin	Heptachlor	HCB	Methoxychlor	Chlorpyrifos	PCB	Asbestos
	Practical Quantitation Limit (PQL)			4	0.4	1	1	1	0.1	1	1	0.1	0.05	0.5	0.05	5	25	50	25	50	100	100	0.2	0.5	1	3	0.3	0.2	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.7	
Site Assessment Criteria (SAC)																																				
HIL A				100	20	100	6000	300	40	400	7400	-	-	3	300	3000	-	-	-	-	-	-	-	-	-	-	240	6	50	270	10	6	10	300	160	1	-
HSL A & B (0 m to <1m)				-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	40	230	-	-	0.6	390	NL	95	-	-	-	-	-	-	-	-	-	-	-
EIL (urban residential and public open space)				100	-	410	210	1100	-	170	480	170	-	-	-	-	-	-	-	-	-	-	-	-	-	-	180	-	-	-	-	-	-	-	-	-	
ESL (Urban residential and public open space)				-	-	-	-	-	-	-	-	-	0.7	-	-	-	-	-	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-	-	-	-
200-4	0-0.1	13/02/2017	Topsoil	<4	<0.4	**2**	**3**	**5**	<0.1	**3**	**9**	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-
200-5	0-0.1	13/02/2017	Topsoil	**5**	<0.4	**7**	**32**	**27**	<0.1	**5**	**20**	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-
200-6	0-0.1	13/02/2017	Topsoil	<4	<0.4	**1**	**27**	**27**	<0.1	<1	**8**	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
Precinct 300																																				
300-3	0.4-0.5	3/02/2017	Fill	-	-	-	-	-	-	-	-	<0.1	<0.05	<0.5	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
300-4	0-0.1	3/02/2017	Fill	-	-	-	-	-	-	-	-	<0.1	<0.05	<0.5	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
300-7	0-0.1	3/02/2017	Fill	<4	<0.4	**4**	**4**	**5**	<0.1	**3**	**10**	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
300-8	0-0.1	6/02/2017	Topsoil	<4	<0.4	**2**	**3**	**12**	<0.1	**2**	**14**	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
300-9	0-0.1	6/02/2017	Topsoil	<4	<0.4	<1	<1	**2**	<0.1	<1	**4**	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
300-10	0-0.1	3/02/2017	Fill	<4	<0.4	**11**	**140**	**12**	<0.1	**5**	**12**	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
300-15	0.4-0.5	2/02/2017	Fill	-	-	-	-	-	-	-	-	<0.1	<0.05	<0.5	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
300-16	0-0.1	3/02/2017	Fill	-	-	-	-	-	-	-	-	<0.1	<0.05	<0.5	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
300-19	0-0.1	6/02/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD
300-20	0-0.1	6/02/2017	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**Detected**
300-20	0.4-0.5	6/02/2017	Fill	-	-	-	-	-	-	-	-	<0.1	<0.05	<0.5	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
300-21	0-0.1	6/02/2017	Fill / reworked natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD
300-22	0-0.1	2/02/2017	Topsoil	<4	<0.4	**6**	**7**	**12**	<0.1	**5**	**23**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
300-23	0-0.1	2/02/2017	Topsoil	**5**	<0.4	**14**	**23**	**20**	<0.1	**14**	**40**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
300-24	0-0.1	2/02/2017	Topsoil	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD
Precinct 400																																				
400-1	0-0.1	13/02/2017	Topsoil	7	<0.4	14	10	20	<0.1	7	21	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
400-2	0-0.1	13/02/2017	Topsoil	4	<0.4	12	8	15	<0.1	7	20	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
400-3	0-0.1	13/02/2017	Topsoil	10	<0.4	14	25	26	<0.1	18	74	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-
400-4	0-0.1	13/02/2017	Topsoil	7	<0.4	16	15	16	<0.1	7	16	-	-	-	-	-	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-
Precinct 500																																				
500-1	0.0-0.1	25/01/2017	Fill	**10**	**4.2**	**15**	**89**	**110**	**0.3**	**9**	**1800**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.5**	**2.2**	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	-	-

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Table F1 - Summary of Soil and PACM Laboratory Analysis (All results in mg/kg unless otherwise stated)

Test Pit/ Sample ID[a]	Depth	Sampling Date	Soil Type	Metals								PAH				Phenols	Total Recoverable Hydrocarbons						BTEX				Organochlorine Pesticides (OCP)								OPP	PCB	Asbestos
				Arsenic	Cadmium	Chromium (VI)[b]	Copper	Lead	Mercury	Nickel	Zinc	Naphthalene	Benzo(a) Pyrene (BaP)	BaP TEQ	Total PAH	Phenol	TRH C_6-C_{10}	TRH >C_{10}-C_{16}	F1	F2	F3	F4	Benzene	Toluene	Ethylbenzene	Total xylenes	DDT + DDD + DDE	Aldrin and Dieldrin	Chlordane	Endosulfan	Endrin	Heptachlor	HCB	Methoxychlor	Chlorpyrifos	PCB	Asbestos
	Practical Quantitation Limit (PQL)			4	0.4	1	1	1	0.1	1	1	0.1	0.05	0.5	0.05	5	25	50	25	50	100	100	0.2	0.5	1	3	0.3	0.2	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.7	
Site Assessment Criteria (SAC)																																				
HIL A				100	20	100	6000	300	40	400	7400	-	-	3	300	3000	-	-	-	-	-	-	-	-	-	-	240	6	50	270	10	6	10	300	160	1	-
HSL A & B (0 m to <1m)				-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	40	230	-	-	0.6	390	NL	95	-	-	-	-	-	-	-	-	-	-	-
EIL (urban residential and public open space)				100	-	410	210	1100	-	170	480	170	-	-	-	-	-	-	-	-	-	-	-	-	-	-	180	-	-	-	-	-	-	-	-	-	
ESL (Urban residential and public open space)				-	-	-	-	-	-	-	-	-	0.7	-	-	-	-	-	180	120	1300	5600	65	105	125	45	-	-	-	-	-	-	-	-	-	-	-
500-2	0.0-0.1	25/01/2017	Fill	**5**	**0.9**	**16**	**18**	**76**	<0.1	**16**	**550**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
500-2b	0.0-0.1	25/01/2017	Fill	**7**	<0.4	**10**	**11**	**52**	<0.1	**7**	**280**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
500-3	0.0-0.1	24/01/2017	Topsoil	<4	<0.4	**12**	**4**	**9**	<0.1	**4**	**9**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
500-4	0.0-0.1	24/01/2017	Topsoil	<4	<0.4	**9**	**6**	**9**	<0.1	**5**	**14**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
500-5	0.0-0.1	24/01/2017	Topsoil	<4	<0.4	**4**	**4**	**8**	<0.1	**2**	**13**	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
500-6	0.0-0.1	23/01/2017	Topsoil	**6**	<0.4	**17**	**14**	**23**	<0.1	**11**	**45**	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
500-7	0.0-0.1	20/01/2017	Filling	<4	<0.4	**2**	**22**	**22**	<0.1	**14**	**41**	<0.1	<0.05	<0.5	**1.9**	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
500-8	0.0-0.1	23/01/2017	Filling	<4	<0.4	**2**	**20**	**20**	<0.1	**14**	**30**	**1.9**	**0.19**	**0.51**	**25**	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-
500-9	0.0-0.1	20/01/2017	Topsoil	**7**	<0.4	**11**	**22**	**20**	<0.1	**12**	**38**	<0.1	<0.05	<0.5	<0.05	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
500-10	0.0-0.1	23/01/2017	Topsoil	**6**	<0.4	**11**	**26**	**21**	<0.1	**16**	**73**	<0.1	**0.2**	<0.5	**3.8**	<5	<25	<50	<25	<50	**140**	<100	<0.2	<0.5	<1	<3	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.7	NAD
500-11	0.0-0.1	19/01/2017	filling	**4**	<0.4	**13**	**25**	**15**	<0.1	**12**	**33**	**0.02**	**0.02**	<0.5	**0.54**	<5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	-	-	-	-	-	-	-	-	-	-	-
500-12	0.0-0.1	20/01/2017	Topsoil	**5**	<0.4	**19**	**18**	**21**	<0.1	**13**	**42**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
500-13	0.0-0.1	24/01/2017	Topsoil	<4	<0.4	**2**	**2**	**3**	<0.1	**1**	**7**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	-	-
500-SP1	0.4-0.5	23/01/2017	Stockpile	<4	<0.4	**1**	**12**	**13**	<0.1	**5**	**20**	<0.1	**0.1**	<0.5	**1.8**	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	-	NAD
500-SP2	0.4-0.5	23/01/2017	Stockpile	**6**	<0.4	**13**	**22**	**15**	<0.1	**13**	**45**	<0.1	<0.05	<0.5	<0.05	-	-	-	-	-	-	-	-	-	-	-	<0.3	<0.2	<0.2	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	-	NAD

Notes

<PQL	Concentration comprises of sum of a number of individual analytes. All individual analytes below reported PQL
a	QA/QC replicate of sample listed directly below the primary sample.
b	All Chromium are assumed to exist in the stable Cr(III) oxidation state, as Cr(VI) will be too reactive and unstable under the normal environment
HIL A / HSL A & B	HIL / HSL for soil contaminants - NEPC 2013, Schedule B1, (Residential)
EIL / ESL	EIL / ESL soil for soil contaminant - NEPC 2013, Schedule B1.
NAD	No asbestos detected
-	Not Analysed

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Table FC2- Summary of Soil Laboratory Analysis - PAH (All results in mg/kg unless otherwise stated)

Test Pit/ Sample ID	Depth	Sampling Date	Soil Type*	PAH																		
				Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthracene	Benzo(g,h,i)perylene	Benzo(a)pyrene TEQ calc (zero)	Benzo(a)pyrene TEQ calc(half)	Benzo(a)pyrene TEQ calc(PQL)	**Total +vePAH's**
	Practical Quantitation Limit (PQL)			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.05	0.1	0.1	0.1	0.5	0.5	0.5	0.05
Site Assessment Criteria (SAC)																						
US EPA RSL				-	-	3600	2400	-	18000	-	-	0.16	16	2.18	-	0.16	0.016	-	-	-	-	-
Canadian SQG				-	-	-	-	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-
100-5	0-0.1	14/02/2017	Fill	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.4**	**0.4**	**0.2**	**0.2**	**0.3**	**0.1**	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	**1.5**
500-7	0.0-0.1	20/01/2017	Filling	<0.1	<0.1	<0.1	<0.1	**1.2**	<0.1	**0.3**	**0.1**	<0.1	**0.3**	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	**1.9**
500-8	0.0-0.1	23/01/2017	Filling	**1.9**	**0.04**	**0.13**	**0.27**	**13**	**0.14**	**2.2**	**1.5**	**0.78**	**3**	**1.5**	**0.19**	**0.05**	**0.06**	**0.16**	**0.51**	**0.51**	**0.51**	**25**
500-10	0.0-0.1	23/01/2017	Topsoil	<0.1	<0.1	**0.1**	<0.1	**1.1**	**1.1**	**0.2**	**0.2**	**0.1**	**0.4**	**0.2**	**0.2**	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	**3.8**
500-11	0.0-0.1	19/01/2017	filling	**0.02**	<0.01	<0.01	<0.01	**0.21**	**0.02**	**0.06**	**0.05**	**0.04**	**0.05**	**0.04**	**0.02**	**0.01**	<0.01	**0.02**	<0.05	<0.05	<0.05	**0.54**
500-SP1	0.4-0.5	23/01/2017	Stockpile	<0.1	<0.1	<0.1	<0.1	**1.1**	<0.1	**0.2**	**0.1**	**0.1**	**0.2**	<0.2	**0.1**	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	**1.8**

Notes

<PQL	Concentration comprises of sum of a number of individual analytes. All individual analytes below reported PQL
RSL	US EPA Residential May 2016
SQC	Canadian Soil Quality Guidelines PAH (2010)
-	Not Analysed

Table F3- Summary of Soil Laboratory Analysis - Additional Metals and Explosives (All results in mg/kg unless otherwise stated)

Test Pit/ Sample ID[a]	Depth	Sampling Date	Soil Type*	Metals					Explosives																	
				Aluminium	Strontium*	Barium	Iron	Magnesium	HMX	RDX	1,3,5-Trinitrobenzene	1,3-Dinitrobenzene	Tetryl	2,4,6-Trinitrotoluene	4-Amino-2,6-dinitrotoluene	2-Amino-4,6-dinitrotoluene	4-&2-AM-DNT(Isomeric Mixture)	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2,4&2,6-DNT(Isomeric Mixture)	Nitrobenzene	2-Nitrotoluene	3-Nitrotoluene	4-Nitrotoluene	Nitroglycerine	PETN
	Practical Quantitation Limit (PQL)			1	1	1	1	5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1	1
Site Assessment Criteria (SAC)																										
HIL A/HSL A				-	-	-	-	-	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR
EIL / ESL (urban residential and public open space)				-	-	-	-	-	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR
US EPA RSL				-	420	160	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Precinct 300																										
300-3	0.4-0.5	3/02/2017	Fill	**1400**	**4**	**18**	**4100**	**94**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1
300-4	0-0.1	3/02/2017	Fill	**1300**	**5**	**30**	**5700**	**88**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1
300-10	0-0.1	3/02/2017	Fill	**1500**	**60**	**19**	**7600**	**40**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1
300-14a	0.4-0.5	3/02/2017	Fill	**-**	**-**	**-**	**-**	**-**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1
300-15	0.4-0.5	2/02/2017	Fill	**-**	**-**	**-**	**-**	**-**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1
300-16	0-0.1	3/02/2017	Fill	**920**	**2**	**23**	**5900**	**56**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1
300-20	0.4-0.5	6/02/2017	Fill	**660**	**2**	**100**	**4800**	**40**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1
300-26	0.4-0.5	1/02/2017	Fill	**-**	**-**	**-**	**-**	**-**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<1

Notes

<PQL	Concentration comprises of sum of a number of individual analytes. All individual analytes below reported PQL
HIL A / HSL A & B	HIL / HSL for soil contaminants - NEPC 2013, Schedule B1, (Residential)
EIL / ESL	EIL / ESL soil for soil contaminant - NEPC 2013, Schedule B1.
NAD	No asbestos detected
-	Not Analysed

Table F4 - Summary of Bulk Soil Sampling and Analytical Results

Sample Number	Weight of 10 Litre Bulk Sample (kg)	Number of fragments > 7mm	Condition of Fragments (good/poor)	Size range of Fragement (mm)	Weight of Screened ACM (g)	Concentration of asbestos in ACM in soil (% w/w)*	Weight of 500mL Sample (g)	Weight of AF or FA (g)**	Concentration of FA and AF in soil (% w/w)
HSL for Asbestos in soil	-	-	-	-	-	0.010	-	-	0.001
300-19	17.2	0	-	-	-	-	365.57	-	<0.001
300-20	19.2	3	good	1 - 7 cm	42	0.033	345.49	-	<0.001
300-21	16.2	1	good	3 cm	15	0.014	349.12	-	<0.001

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Table F5 - Summary of Groundwater Laboratory Analysis (All results in ug/L unless otherwise stated)

Well ID[a]	Sampling Date	Metals								PAH				Phenols	Total Recoverable Hydrocarbons						BTEX					Organochlorine Pesticides (OCP)								OPP	PCB
		Arsenic	Cadmium	Chromium (VI)	Copper	Lead	Mercury	Nickel	Zinc	Naphthalene	Benzo(a) Pyrene (BaP)	BaP TEQ	Total PAH	Phenol	TRH C_6-C_{10}	TRH >C_{10}-C_{16}	F1	F2	F3	F4	Benzene	Toluene	Ethylbenzene	Total xylenes	DDT + DDD + DDE	Aldrin and Dieldrin	Chlordane	Endosulfan	Endrin	Heptachlor	HCB	Methoxychlor	Chlorpyrifos	PCB
		4	0.4	1	1	1	0.1	1	1	1	1	5	0.05	0.05	10	50	10	50	100	100	0.2	0.5	1	3	0.6	0.4	0.4	0.6	0.2	0.2	0.2	0.2	0.2	14
Site Assessment Criteria (SAC)																																		
Fresh Waters		13	0.2	1	1.4	3.4	0.06	11	8	16	-	-	-	-	-	-	-	-	-	-	950	-	-	200	0.0006	-	0.03	0.03	0.01	0.01	-	-	0.01	-
Precinct 300 Groundwater Wells																																		
MW1	28/03/2017	<1	<0.1	<1	**3**	<1	<0.05	**13**	**69**	<1	<1	<5	<0.05	<0.05	<10	<50	<10	<50	<100	<100	<1	<1	<1	<3	<0.6	<0.4	<0.4	<0.6	<0.2	<0.2	<0.2	<0.2	<0.2	<14
MW2	27/03/2017	<1	<0.1	<1	<1	<1	<0.05	<1	<1	<1	<1	<5	<0.05	<0.05	<10	<50	<10	<50	<100	<100	<1	<1	<1	<3	<0.6	<0.4	<0.4	<0.6	<0.2	<0.2	<0.2	<0.2	<0.2	<14
MW3	27/03/2017	<1	<0.1	<1	**1**	<1	<0.05	**9**	**29**	<1	<1	<5	<0.05	<0.05	<10	<50	<10	<50	<100	<100	<1	<1	<1	<3	<0.6	<0.4	<0.4	<0.6	<0.2	<0.2	<0.2	<0.2	<0.2	<14
MW4	27/03/2017	<1	<0.1	<1	<1	<1	<0.05	<1	**3**	<1	<1	<5	<0.05	<0.05	<10	<50	<10	<50	<100	<100	<1	<1	<1	<3	<0.6	<0.4	<0.4	<0.6	<0.2	<0.2	<0.2	<0.2	<0.2	<14
MW5	28/03/2017	<1	<0.1	<1	<1	<1	<0.05	<1	**3**	<1	<1	<5	<0.05	<0.05	<10	<50	<10	<50	<100	<100	<1	<1	<1	<3	<0.6	<0.4	<0.4	<0.6	<0.2	<0.2	<0.2	<0.2	<0.2	<14

Notes

a QA/QC replicate of sample listed directly below the primary sample.

Fresh Waters Groundwater Investigation Levels - Fresh Water - NEPC 2013 Schedule B1

Table F6 - Summary of Groundwater Laboratory Analysis- Additional Metals and Explosives (All results in ug/L unless otherwise stated)

Test Pit/ Sample ID[a]	Sampling Date	Metals					Explosives																	
		Aluminium-Dissolved	Barium-Dissolved	Iron-Dissolved	Strontium-Dissolved	Magnesium - Dissolved	HMX	RDX	1,3,5-Trinitrobenzene	1,3-Dinitrobenzene	Tetryl	2,4,6-Trinitrotoluene	4-Amino-2,6-dinitrotoluene	2-Amino-4,6-dinitrotoluene	4-&2-AM-DNT(Isomeric Mixture)	2,4-Dinitrotoluene	2,6-Dinitrotoluene	2,4&2,6-DNT(Isomeric Mixture)	Nitrobenzene	2-Nitrotoluene	3-Nitrotoluene	4-Nitrotoluene	Nitroglycerine	PETN
		10	1	10	1	0.5	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	200	200
Site Assessment Criteria (SAC)																								
HIL A/HSL A		-	-	-	-	-	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR
EIL / ESL (urban residential and public open space)		-	-	-	-	-	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR	LOR
US EPA RSL		20	3.8	14	12	-																		
Precinct 300																								
MW1	28/03/2017	**200**	**610**	**1200**	**96**	**16**	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<200	<200
MW2	27/03/2017	**140**	**17**	**270**	**22**	**1.3**	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<200	<200
MW3	27/03/2017	<10	**220**	**790**	**270**	**26**	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<200	<200
MW4	28/03/2017	<10	**63**	<10	**99**	**6.6**	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<200	<200
MW5	28/03/2017	<10	**62**	<10	**98**	**6.6**	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<200	<200

Notes

<PQL

HIL A / HSL A & B HIL / HSL for soil contaminants - NEPC 2013, Schedule B1, (Residential)

EIL / ESL EIL / ESL soil for soil contaminant - NEPC 2013, Schedule B1.

Appendix G

QAQC

Appendix H - DATA QUALITY ASSESSMENT

Q1. Data Quality Indicators

The reliability of field procedures and analytical results were assessed against the following data quality indicators (DQIs):

- Completeness – a measure of the amount of usable data from a data collection activity;
- Comparability – the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event;
- Representativeness – the confidence (qualitative) of data representativeness of media present on-site;
- Precision – a measure of variability or reproducibility of data; and
- Accuracy – a measure of closeness of the data to the 'true' value.

The DQIs were assessed as outlined in the Table Q1 below.

Table Q1: DQIs

DQI	Considerations with reference to NEPC (2013) Schedule B2	Comment
Completeness		
Field Considerations	Critical locations sampled	Samples were collected from target areas identified in the DP proposal and the CSM, and from grid based locations for general site coverage .
	Samples collected (from grid and at depth)	A limited sampling plan was followed as discussed in Appendix C – Data Quality Objectives; potentially impacted media (topsoil, fill) was sampled at all locations.
	Standard operating procedures (SOPs) appropriate and complied with	Field staff followed SOPs, and discussed further in Report Section 9
	Experienced sampler	Experienced DP environmental scientists led the field team and were given guidance from the project manager.
	Documentation correct	The DP environmental scientist completed a safe work method statement (SWMS), chain of custody, and test pit logs. The project manager reviewed the documentation.
Laboratory Considerations	Critical samples analysed according to the proposal	The DP Proposal MAC160099 dated 5 August 2016 (the proposal) was followed in the selection of samples for analysis. Samples of media initially considered to be potentially impacted by COPC were analysed. Any variation to the proposal was recorded in the report.
	Analytes analysed according to the proposal	The analytes were selected on the basis of the COPC as outlined in the proposal. Any variation has been recorded in the report.

DQI	Considerations with reference to NEPC (2013) Schedule B2	Comment
	Appropriate methods and PQLs/LOR	NATA approved methods were adopted by the selected analytical laboratory. Any non-NATA methods were recorded and the implications discussed in Section Q3.2. Limits of reporting (LORs) and practical quantitation limits (PQLs) in accordance with the method have been used by the contract laboratory.
	Sample documentation complete	Chain-of-custody (CoC) maintained and appended to the Certificates of Analysis(s). Certificates of Analysis complete and appended to the report.
	Sample holding times complied with	All samples were analysed within the holding times, as discussed in Section Q3.3.
Comparability		
Field Considerations	Same SOPs used on each occasion	Field staff followed the same SOPs for each day of sampling as defined in the proposal.
	Same types of samples collected	At all test pit locations, soil samples were collected from the test pit wall. Samples were placed in laboratory supplied jars.
Laboratory Considerations	Sample analytical methods used	The laboratory used is accredited by NATA for the analyses undertaken. Laboratory analytical methods were the same for each sample, for the same analyte, in the same laboratory, and are as stated on the Certificates of Analysis.
	Sample PQLs / LORs	PQL or LOR set by the laboratory are generally below the adopted SAC.
	Same laboratories	Envirolab Services Pty Ltd (ELS) was used for sample analysis. The reliability of the data provided by the laboratory is discussed in Section Q3.
	Same units	Laboratory results are expressed in consistent units for each media / analyte.
Representativeness		
Field Considerations	Appropriate media sampled according to the proposal	Appropriate media were sampled with reference to the proposal. This included media considered to be potentially impacted by the COPC such as topsoil and fill.
	Media identified in the proposal sampled	Media identified as requiring investigation in the proposal were sampled.
Laboratory Considerations	Samples analysed according to the proposal	Samples were analysed according to the proposal, and as stipulated in the COC.
Precision		
Field Considerations	SOPs appropriate and complied with	Field staff followed SOPs as defined in the proposal. SOPs specific for contamination investigation purposes.
Laboratory Considerations	Analysis of laboratory duplicates	Refer to Section Q3.5. The majority of duplicate results were within the laboratory acceptance standards. The relevance of those outside the standards are discussed in the same section.

DQI	Considerations with reference to NEPC (2013) Schedule B2	Comment
	Field duplicates	The majority of RPDs were within acceptable limits, as discussed in Section Q2.5. The relevance of those outside the limits are discussed in the same section.
Accuracy (bias)		
Field Considerations	SOPs appropriate and complied with	Field staff followed SOPs as defined in the proposal. SOPs specific for contamination investigation purposes.
	Analysis of reagent blanks	Refer to Section Q3.6. The reagent blank samples were generally within laboratory acceptance standards. The implications of those outside the standards are discussed in Section Q3.10
	Analysis of matrix spikes	Refer to Section Q3.7. The matrix spike samples were generally within laboratory acceptance standards. The implications of those outside the standards are discussed in Section Q3.10.
	Analysis of surrogate spikes	Refer to Section Q3.8. The surrogate spike samples were generally within laboratory acceptance standards. The implications of those outside the standards are discussed in Section Q3.10.
	Analysis of laboratory control samples	Refer to Section Q3.9. The LCS were generally within laboratory acceptance standards. The implications of those outside the standards are discussed in Section Q3.10.

Q2. FIELD QUALITY ASSURANCE AND QUALITY CONTROL

The field QC procedures for sampling as prescribed in the DP *Field Procedures Manual* were followed at all times during the investigation.

Q2.1 Sampling Team and Weather Conditions

Field sampling was undertaken by a DP Environmental Scientist / Geologist. Fieldwork was undertaken between 19 January and 15 February 2017. The DP environmental scientist was instructed by the Project Manager regarding the sampling methods to be adopted. The same approach to the sampling was applied by each team member, minimising the potential for field sampling related variations in test outcomes.

Asbestos sieving was undertaken by a competent field scientist.

Climatic or weather conditions are not considered to have impeded or significantly impacted the investigation.

Q2.2 Sample Collection

Soil

At test pit locations, samples were collected from the test pit walls, at regular intervals or where a change in soil stratification was observed. Further details of the excavation and sampling methodology are presented in Report Section 9. The QA / QC samples collected during the course of soil sampling comprised the following:

- 10 % intra-laboratory replicates (10 % of soil samples analysed);

Q2.3 Logs and Field Sheets

Logs for each soil sampling location were recorded in the field. The individual samples were recorded on the field logs along with the sample identity, depth, replicate sample locations, and observations. Logs are presented in Appendix D.

Q2.4 Chain of Custody

Chain of custody information was recorded on the Chain-of-Custody (COC) sheets which accompanied samples to the analytical laboratory. Signed copies of COCs are presented in Appendix E.

The COC documented, *inter alia*, the analytical laboratory, dispatch courier, DP dispatcher, date, sample identifications, sample type and analysis to be performed on each sample.

Q2.5 Field Replicates

Replicate samples were collected in the field as a measure of accuracy, precision and repeatability of the results.

Field replicate samples for soil were collected from the same location and an identical depth to the primary sample. Equal portions of the subject material were placed into the primary and replicate sampling jars and sealed. The sample was not homogenised so as to minimise the possible loss of volatiles. Replicate samples were labelled with a DP identification number, recorded on DP's field logs, so as to conceal their relationship to their primary sample from the analytical laboratory.

A measure of the consistency of results is derived by the calculation of relative percentage differences (RPDs) for replicate samples. A RPD of +/- 30% is generally considered acceptable for inorganic analytes by the industry, although in general a wider RPD range (50%) may be acceptable for organic analytes. RPDs above the generally acceptable limits (if applicable) are shown in **bold** on the relevant tables below.

Q2.5.1 Intra-Laboratory Analysis

Intra-laboratory replicates were analysed as an internal check of the reproducibility within the primary laboratory ELS and as a measure of consistency of sampling techniques. The comparative results of analysis between original and intra-laboratory replicate samples are summarised in Table Q2.

Note that, where both samples are < LOR/PQL the difference and RPD has been given as zero. Where one sample is reported < LOR/PQL, but a concentration is reported for the other, the LOR/PQL value has been used for calculation of the RPD for the < LOR/PQL sample.

Table Q1: Relative Percentage Difference Results – Intra-laboratory Replicates

Test Pit/ Sample ID[a]	Sampling Date	Units	Metals								Total Recoverable Hydrocarbons						BTEX			
			Arsenic	Cadmium	Chromium (VI)[b]	Copper	Lead	Mercury	Nickel	Zinc	TRH C_6-C_{10}	TRH $>C_{10}$-C_{16}	F1	F2	F3	F4	Benzene	Toluene	Ethylbenzene	Total xylenes
			4	0.4	1	1	1	0.1	1	1	25	50	25	50	100	100	0.2	0.5	1	3
500-9	0-0.1	mg/kg	7	<0.4	11	22	20	<0.1	12	38	-	-	-	-	-	-	<0.2	<0.5	<1	<3
BD1 200117	0-0.1	mg/kg	7	<0.4	11	21	20	<0.1	13	37	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3
Difference			0	0	0	1	0	0	1	1	-	-	-	-	-	-	0	0	0	0
RPD			0%	0%	0%	5%	0%	0%	8%	3%	-	-	-	-	-	-	0%	0%	0%	0%
500-13	0-0.1	mg/kg	<4	<0.4	2	2	3	<0.1	1	7	-	-	-	-	-	-	-	-	-	-
BD1 240117	0-0.1	mg/kg	<4	<0.4	2	2	3	<0.1	1	6	-	-	-	-	-	-	-	-	-	-
Difference			0	0	0	0	0	0	0	1	-	-	-	-	-	-	-	-	-	-
RPD			0%	0%	0%	0%	0%	0%	0%	15%	-	-	-	-	-	-	-	-	-	-

The calculated RPD values were within the acceptable range for all samples analysed. Overall, the intra-laboratory replicate comparisons indicate that the sampling techniques were generally consistent and repeatable.

Q3. LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

Q3.1 Chain of Custody

Chain-of-custody procedures are discussed in Section Q2.4.

Q3.2 Analytical Laboratories

Samples were submitted to the following laboratory for analysis:

- Envirolab Services Pty Ltd (ELS)

The laboratory is NATA accredited for the analysis undertaken. ELS's accreditation number is 2901 and it is accredited for compliance with ISO/IEC 17025.

It is noted, however, that some of the test methods adopted are not NATA accredited. Where no NATA accredited method exists standard international analytical methods were adopted.

Q3.3 Holding Times

A review of the laboratory certificates of analysis and chain-of-custody documentation indicated that holding times were met.

Q3.4 Analytical Methods

The laboratory analytical methods are provided on the laboratory certificates of analysis in Appendix E, along with the PQL/LOR.

Q3.5 Laboratory Replicate Results

Laboratory replicates are additional portions of a sample which are analysed in the same manner as the other samples. Laboratory replicate samples were generally analysed at a rate of 1 for every 10 samples in a batch. The laboratory acceptance criteria for replicate samples is as follows:

Table Q3: Laboratory Replicate Acceptance Criteria

Laboratory	PQL / LOR Range	Acceptance Criteria
ELS	<5 x PQL	Any RPD
	>5 x PQL	0 – 50%

The laboratory QC for laboratory replicate results, were generally within the acceptance criteria. Any non-conformities with the acceptance criteria are discussed in Section Q3.10

Q3.6 Laboratory Blank (Reagent Blank) Results

The laboratory blank, sometimes referred to as the method blank or reagent blank is the sample prepared and analysed at the beginning of every analytical run, following calibration of the analytical apparatus. This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, it can be determined by processing solvents and reagents in the same manner as for samples. Laboratory blanks are generally analysed at a frequency of 1 in 20, with a minimum of one per batch.

All results should be less than the method PQL or LOR. The report results for the method blanks were generally within the acceptance criteria. Any non-conformities with the acceptance criteria are discussed in Section Q3.10.

Q3.7 Matrix Spike

The matrix spike is a sample replicate prepared by adding a known amount of analyte prior to analysis, and then treated exactly the same as all other samples. The recovery result indicates the proportion of the known concentration of the analyte that is detected during analysis. The laboratory acceptance criteria for matrix spike recoveries is as follows:

Table Q4: Laboratory Matrix Spike Acceptance Criteria

Laboratory	Analyte(s)	Accepted Recoveries
ELS	Inorganics / metals	70 – 130%
	organics	60 – 140%
	SVOC and speciated phenols	10 – 140%

The laboratory QC for matrix spikes were generally within the acceptance criteria for the laboratory. Any non-conformities with the acceptance criteria are discussed in Section Q3.10.

Q3.8 Surrogate Spike

The surrogate spike sample is prepared by adding a known amount of surrogate, which behaves similarly to the analyte, prior to analysis of each sample. The recovery result indicates the proportion of the known concentration of the surrogate that is detected during analysis. The laboratory acceptance criteria for surrogate spike recoveries is as follows:

Table Q5: Laboratory Surrogate Spike Acceptance Criteria

Laboratory	Analyte(s)	Accepted Recoveries
ELS	Inorganics / metals	70 – 130%
	organics	60 – 140%
	SVOC and speciated phenols	10 – 140%

The laboratory QC for surrogate spikes were generally within the acceptance. Any non-conformities with the acceptance criteria are discussed in Section Q3.10.

Q3.9 Reference / Laboratory Control Sample (LCS)

This sample comprises spiking either a standard reference material or a control matrix (such as a blank of sand or water) with a known concentration of specific analytes. The LCS is then analysed and results compared against each other to determine how the laboratory has performed with regard to sample preparation and analytical procedure. LCSs are generally analysed at a frequency of 1 in 20, with a minimum of one analysed per batch.

The laboratory acceptance criteria for LCS recoveries is as follows:

Table Q6: Laboratory LCS Acceptance Criteria

Laboratory	Analyte(s)	Accepted Recoveries
ELS	Inorganics / metals	70 – 130%
	organics	60 – 140%
	SVOC and speciated phenols	10 – 140%

The laboratory QC for LCSs were generally within the acceptance criteria for the laboratory. Any non-conformities with the acceptance criteria are discussed in Section Q3.10.

Q3.10 Laboratory Comments

The laboratory QC for laboratory replicate results, reagent blanks, matrix spikes, surrogate spikes and LCS results are reported in the laboratory certificate of analysis.

The laboratory quality control samples were within the laboratory acceptance criteria. It is considered that an acceptable level of laboratory precision and accuracy was achieved and that surrogate spikes, LCS, laboratory duplicate results, laboratory blanks and matrix spike results were of an acceptable level overall. On the basis of this assessment, the laboratory data set is considered to have complied with the DQIs.

Q4. QA/QC DATA EVALUATION

An evaluation of field and laboratory QA/QC information against the stated DQOs has been undertaken. Overall, the SOPs were generally complied with in the field, and the laboratory quality control samples were generally within the laboratory acceptance criteria. The QC non-conformances, where they occurred, are not considered to have significantly impacted the quality of the results overall as they were generally minor in number compared to the overall QC data. On this basis, it is

considered that an acceptable level of laboratory precision and consistency was achieved and that the laboratory data sets are reliable and useable for this assessment.