Data Gap Investigation

445-459 Canterbury Road,
Campsie NSW

NE30028

Prepared for
HPG Australia Pty Ltd

23 March 2021

Cardno

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Document Information

Prepared for	HPG Australia Pty Ltd
Project Name	445-459 Canterbury Road, Campsie NSW
File Reference	NE30028_R002_Campsie_DGI_Rev1.docx
Job Reference	NE30028
Date	23 March 2021
Version Number	Rev1

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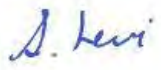
Effective Date 23/03/2021

Approved By:



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Date Approved 23/03/2021

Document History

Version	Effective Date	Description of Revision	Prepared by	Reviewed by
A	4/11/2020	Draft for Internal Review	TM	CC, BC
B	4/11/2020	Draft for External Review	TM, CC	BC, Site Auditor
C	23/02/21	Draft for External Review	CC	SL, Site Auditor
1	23/03/21	Final	CC	SL

Executive Summary

Cardno (NSW / ACT) Pty Ltd (Cardno) has been engaged by HPG Australia Pty Ltd (HPG) to resolve outstanding contamination issues with regards to their site located at 445-459 Canterbury Road, Campsie NSW. HPG intends to redevelop the site from the current mixed commercial land-use to a hospital with two basement parking levels. A sampling analysis and quality plan (SAQP) was prepared (Cardno, 2020) and approved by the NSW EPA-accredited Site Auditor to guide the sampling approach and methodology that was undertaken by Cardno.

The site at 445-459 Canterbury Road, Campsie is bound by residential and light commercial buildings to the north and north east, Stanley Street to the west, followed by residential properties, and Canterbury Road to the south followed again by residential properties. For the purpose of this assessment, soil investigations were conducted in the north-western corner of the site in the unsealed carpark.

The purpose of this Data Gap Investigation is to resolve the outstanding contamination issues for the above noted site to identify on-site and potential off-site contaminants in soil and groundwater. In order to achieve this purpose, the objective of this investigation was to gather sufficient additional data on site contamination to make a statement on site suitability and risk to onsite and offsite receptors.

To address the above objective, a scope of work was completed which included a review of previous investigation, intrusive samples of site soils and groundwater, installation of additional groundwater wells and preparation of this report.

Based on the findings of this report, there are no human health risks to future and current site users however given the presence of metals, benzo(a)pyrene and total recoverable hydrocarbons (TRH) exceeding the adopted ecological criteria for groundwater, there is potential for a complete source pathway receptor (SPR) linkage. Due to the distance between the site and receiving surface water environments, the risk of a complete source pathway receptor link is unlikely. The soil results were also used to provide an indicative waste classification and generally classed the materials investigated as General Solid Waste (non-putrescible).

Cardno considers that at the time of undertaking the data gap investigation, the site is suitable for the proposed land use.

Based upon the findings of this data gap investigation and with reference to the proposed future land-use on the site, the following recommendations are made:

- Complete Stage 2 and Stage 3 as outlined and approved in the SAQP.
  - Stage 2: Assessment of soils within the existing structure footprint and additional sample to clarify waste classification of previous locations. From the findings of this investigation a Remediation Action Plan or other excavation guidance may also be prepared.
  - Stage 3: Consulting and environmental support during construction to ensure that materials are managed for offsite disposal as per excavation guidance and classifications. Further visual and sampling assessment of unexpected finds and final excavation surfaces may also be made to confirm site suitability.
- Preparation of a Construction Environmental Management Plan (CEMP) with an Unexpected Finds Protocol which considers risk to site workers during construction. With respect to site contamination, controls and management within the CEMP should include:
  - Use of contractors appropriately licenced in the removal of any hazardous materials identified including in residual structures and site soils; and
  - Demolition and / or removal of any hazardous materials prior to undertaking general demolition or bulk earthworks activities.

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Tables

1 Introduction

Cardno (NSW / ACT) Pty Ltd (Cardno) was engaged by HPG Australia Pty Ltd (HPG) to resolve outstanding contamination data gaps with regards to their site located at 445-459 Canterbury Road, Campsie NSW. HPG intends to redevelop the site from the current mixed commercial land-use to a hospital with two basement parking levels. A sampling analysis and quality plan (SAQP) was prepared (Cardno, 2020) and approved by the NSW EPA-accredited Site Auditor to guide the sampling approach and methodology that was undertaken by Cardno.

The location and Site features are shown in **Figure 1** in **Appendix A**, Cardno understands that Melissa Porter of Senversa Pty Ltd has been engaged as the NSW Environment Protection Authority (EPA) accredited Site Auditor for the project.

1.1 Background

Cardno has previously undertaken a Detailed Site Investigation (Cardno, 2017) on the site to provide HPG with preliminary advice on the contamination status of the site and the consequent implications for its intended use.

The 2017 investigation identified total recoverable hydrocarbons (TRH) C_{16} to C_{34}, benzo(a)pyrene and arsenic in exceedance of generic ecological screening criteria (ESL) and ecological investigation levels (EIL) derived from the *National Environmental Protection (Assessment of Site Contamination) Measure 1999* (NEPM). Copper and zinc were also identified in soil in exceedance of the lowest possible EIL criteria with site specific soil criteria not generated for the purposes of the assessment. Groundwater results identified copper and zinc in exceedance of ANZECC (2000) 95% species protection freshwater criteria.

Potential sources for the above identified contamination include current and historically removed underground storage tanks (USTs), fill materials and an active mechanical workshop.

The proposed site redevelopment includes the construction of a private hospital facility on the site with basement parking. From a review of plans and in discussion with HPG it is understood that the majority of the site is to be boxed out to a depth of between 6 and 9 metres below ground level. This process will remove any potential source-pathway-receptor linkages for ecological receptors however from the above identified contaminant sources, potential for offsite contamination due to unidentified TRH impact.

Based on the proposed site design; the management option for the site is to remove the material from site as waste, classified in accordance with the NSW EPA (2014) Waste Classification Guidelines or as virgin excavated natural material (VENM).

1.2 Purpose and objectives

The purpose of this Data Gap Investigation (DGI) was to provide HPG with updated information on the contamination status of soil and groundwater on-site to provide advice on risk to offsite receptors and planning of the proposed development.

During preparation of the SAQP upon which this DGI is based, Cardno reviewed the current and historical activities undertaken at the Site and provided an assessment of the potential for soil contamination to be present on the Site. The objective of the data gap investigation is to delineate the existing contamination on site and determine whether further investigation/ remediation is needed.

1.3 Scope of works

In order to meet the objective of this investigation, Cardno carried out the following scope of work:

- Service location in the north-west corner of the site to identify underground utilities before commencing drilling and attempted to confirm the location or absence of a UST in the area;
  - Ground penetrating radar was used to identify UST location and extents near BH5 in the site workshop and their reported removal, adjacent north of the workshop.
- Gauging of existing wells MW1, MW2 and MW3 to determine serviceability. Gauging was undertaken using an interface probe and groundwater levels recorded.
- Installed three wells in the north-western corner of the site with a screen interval that captures the perched water at the soil-rock interface.

  - Well bores were initially advanced using push tube methodology to allow for collection of undisturbed soil samples. Solid flight augers were used once the push tube reached refusal to achieve the target depth.
  - Groundwater bores were constructed in general accordance with the NUDLC (2012) *Minimum Construction Requirements for Water Bores in Australia 3rd ed.* from 50 mm PVC-U screen and casing

> A soil bore was drilled in the vicinity of BH4 (drilled in the 2017 works) to prove the base of the TRH impact in this location.

> Groundwater samples were collected a week after well development from all six wells using a low-flow peristaltic pump. A water quality meter with flow cell was used to measure water parameters prior to samples.

> Laboratory analysis of collected samples at a NATA accredited laboratory for a suite of contaminants of concern.

> Prepared a conceptual site model to identify the potential risks to human health and the environment;

> Assessed the need for further investigations, remediation, management or risk assessment.

1.4 Guidelines and legislation

The scope of this data gap investigation was developed in accordance with the following guidelines and legislation:

> National Environment Protection (Assessment of Site Contamination) Measure 1999. National Environmental Protection Council.

> NSW EPA (2020) *Consultants reporting on contaminated sites: Contaminated land guidelines*

> NSW EPA (2017) *Contaminated Land Management, Guidelines for the NSW Site Auditor Scheme (3rd Edition)*

> Standards Australia (2005) *Australian Standard AS 4482.1-2005 – Guide to the investigation and sampling of sites with potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds*

> Standards Australia (1999) *Australian Standard AS 4482.2-1999 - Guide to the sampling and investigation of potentially contaminated soil. Part 2: Volatile substances*

- CRC Care (2011*) Technical Report No. 10 Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater Part 1: Technical Development Document*

> CRC Care (2011) *Technical Report No. 39 Risk-Based Management and Remediation Advice for Benzo(a)pyrene*

- NSW Department of Urban Affairs and Planning (1998) *Managing Land Contamination: Planning Guidelines: SEPP 55 Remediation of Land*, 1998
- WA DOH, 2009. *Guidelines for Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia,* Western Australia Department of Health (WA DOH)
- ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments

2 Site identification

2.1 Site details

Details related to the Site are included in **Table 2-1**, below whilst **Figure 1, Appendix A** shows the site features.

Table 2-1 Site Information

Details	Comments
Site address	445-459 Canterbury Road, Campsie NSW 2194
Lot and Deposited Plan	Lot 3 DP 337683 Lot 13 & 15 DP3995 Lot A & B DP 355656 Lot A & B DP 416123 Lot A & B DP 391661
Current Land use	Mixed commercial tenancies including car mechanic, furniture retail and mattress manufacture and food bank
Proposed Land use	Hospital
Local Government Authority (LGA)	Canterbury – Bankstown City Council
Current Zoning - Canterbury Local Environment Plan (2012)	B6 – Enterprise Corridor
Site Area	Approximately 4,400 m^2
Site Coordinates (GDA2020 MGA 56)	South-west site corner E: 324892 N: 6245371
Current Site Owner	HPG Australia Pty Ltd

2.2 Site information

Site information available from public datasets and extracted from the DSI (Cardno, 2017) is summarised in **Table 2-2**.

Table 2-2 Site description

Item	Information
Site slope and drainage features (Nearmap, 2019)	The topography was observed to generally slope slightly away from the Site towards the north-east with an approximate elevation of ~26 mAHD at the north-eastern boundary and ~29 mAHD at the south-western. The southern carparking area was observed to be constructed so as to slope slightly towards Canterbury Road to the south. Surface water is collected on roof tops and impervious hardstand surfaces, then channeled via kerb and guttering. Surface water infrastructure was not observed within the north-western portion of the Site; however, a drainage system was observed within the north-eastern portion of the Site and within the mechanics workshop. Surface water infiltration is likely to occur through areas of exposed soil within the north-western portion of the Site, as well as cracks and fractures in the hardstand.
Nearby water bodies (NSW DFSI, Spatial Services)	Cup and Saucer Creek and the Cooks River are located approximately 640 metres and 1 kilometre to the south and north-east of the Site respectively. Previous reports identified groundwater beneath the site at between 1.39 and 2.08 m BGL.

Item	Information
Site soil landscapes (NSW OEH, 2013)	The site is shown as being underlain by the Blacktown soil landscape which is described as having gently undulating rises on Wianamatta Group shales and Hawkesbury shale. Local relief is up to 30 m with slope of usually <5% and broad rounded crests and ridges with gently inclined slopes. Vegetation is cleared eucalypt woodland and tall open-forest (wet sclerophyll forests). Soil are shallow to moderately deep (<100 cm) red and brown podzolic soils on crests, upper slopes and well-drained areas with deep (150-300 cm) yellow podzolic soils and soloths on lower slopes and in areas of poor drainage. Limitations for the landscape include moderately reactive, highly plastic subsoil, low soil fertility and poor soil drainage.
Site surface geology (GS NSW, 2018)	The site is shown as being underlain by the Triassic, Ashfield Shale of the Wianamatta Group which is described as black to light grey shale and laminate.
Acid sulfate soils	A review of the Canterbury Local Environment Plan (LEP) 2012 showed that the site is not in an area requiring development consent as a result of actual or potential acid sulfate soil risk.
Flooding potential	A review of the Canterbury Local Environment Plan (LEP) 2012 shows that the site is not in an area requiring development consent as a result of flooding risk.

2.3 Observations summary

Site observations in relation to specific site issues are summarised in **Table 2-3** and are based on the findings of the DSI (Cardno, 2017) and Cardno's site visit on 2 July 2020.

Table 2-3 Observations summary table

Item	Observations
Site surface coverings	With the exception of the north-western portion of the Site adjacent to the mechanics workshop and mattress factory the Site is completely covered by hardstand in the form of the building slabs, parking areas and pavements. Hardstand areas were observed to be in moderate to good condition throughout the Site.
Site cut and fill	During the DSI fill materials were encountered in the boreholes advanced across the Site and consisted of gravelly sands, sandy clays and clays. Building materials (bricks, ceramic etc.) were observed within fill materials. Subfloor areas were accessed during the site visit on 2 July 2020 with some fill materials observed as containing brick and concrete fragments. From observations during this visit fill materials were inferred to be primarily located beneath the southern and north-eastern carparking areas. The lower level of the existing site structure appears to have been cut into the slope to some degree but material volumes generated by this cut is estimated to be significant less than anticipated fill volumes.
Buildings	The Site comprises light commercial facilities with frontage to Canterbury Road to the south, Stanley Street to the west and low density residential to the north and east. The Site is comprised of a concrete and brick warehouse style building divided into four portions with a separate business operating in each portion
Potential hazardous building materials	The single structure onsite appeared to be of primarily brick and concrete construction with some metal cladding. Based on the style and inferred age of the structure it is considered likely that asbestos containing materials and lead based paints were used in its construction. Further to this the proximity of the site to a major Sydney arterial road makes lead containing dust in ceiling cavities likely also.
Manufacturing, industrial or chemical processes and infrastructure	Manufacturing of mattresses was observed to be undertaken within the warehouse building, however is not expected to result in soil impacts as operations appeared to primarily consist of stuffing and sewing of mattresses. Operation of the automobile mechanics is expected to include the handling of petroleum and waste oils. Whilst the majority of work is expected to be undertaken within the workshop, which is underlain by a concrete slab, potential for soil impacts due to leakages is possible within the adjacent north-western parking area.
Fuel storage tanks (USTs/ASTs)	Anecdotal evidence of two large (approximately 10,000L) USTs being removed from the north-western portion of the Site was obtained during the Site inspection. Evidence of hydrocarbon contamination was also observed during the advancement of boreholes within the north-western portion of the Site. A small (approximately 1.5m by 1.5 m) structure, potentially a tank, was identified during service location adjacent to the mechanics workshop western roller door.

Item	Observations
Dangerous goods	With the exception of the above noted USTs and oil and chemical use associated with the mechanic, no observations of dangerous goods use or storage were identified onsite.
Solid waste deposition	Site solid waste is managed through municipal and commercial waste streams with no waste materials appearing to be stored or buried onsite long term.
Liquid waste disposal features	Liquid waste is currently disposed of through disposal to the Sydney Water operated sewer systems
Evidence of previous site contamination investigations	Monitoring well gatic covers and reinstated bores were identified during the 2 July 2020 site visit and are consistent with locations identified in the DSI, no evidence of additional investigations was noted.
Evidence of land contamination (staining or odours)	Odours were not recorded during the DSI site walkover or the 2 July 2020 site visit. However, during the DSI intrusive investigation, hydrocarbon odours and staining were observed within boreholes BH2, BH3, BH4 and MW1 advanced within the north-western portion of the Site.
Evidence of groundwater contamination	No evidence of groundwater contamination was identified.
Groundwater use	No evidence of groundwater use onsite was identified and the site is connected to the town water supply.
Vegetation	Minor amounts of landscaped vegetation consisting of native and introduced tree, shrub and grass species were observed adjacent to the Site. No evidence of impacts on vegetation due to contamination were identified during the DSI and site visit.
Site fencing	The northern, eastern and southern boundaries to the Site were bound by fencing, with the warehouse building directly abutting the western boundary (frontage to Stanley).

2.4 Inaccessible areas

Due to access limitations and site operations the following areas were not visually assessed in detail during our site visit:

Table 2-4 Inaccessible areas during site walkover.

Area	Justification
Operational internal areas of the current commercial tenancies	Request from HPG to avoid tenancy areas until structure is unoccupied and removed.
Areas covered by hardstand and / or structures	Partially assessed by DSI and to be assessed in detail once structure is removed.

2.5 Surrounding land uses

The area surrounding the Site generally low-density residential area. Land uses surrounding the site are detailed in **Table 2-5**.

Table 2-5 Surrounding Land Use

Direction	Land Use or Activity
North	Low density residential houses and an industrial building
South	Generally low density residential houses with one large apartment block.
East	Low density residential housing, beyond which is a service station
West	Stanley Street, beyond which is low density residential houses.

3 Previous reports

Cardno is aware of the following reports prepared with information relevant to the contamination status of the site:

- SMEC Testing Services (2014) – Preliminary Geotechnical Assessment
- TRACE Environmental (2014) – Preliminary Site Investigation
- Cardno (2017) – Detailed Site Investigation

These reports are summarised below in **Sections 3.1** to **3.3**

3.1 SMEC (2014) Preliminary geotechnical assessment

SMEC Testing Services Pty Ltd (SMEC) were commissioned by Lone Star Construction Pty Ltd (SPBC) to undertake a preliminary geotechnical assessment of 445-459 Canterbury Road, Campsie NSW.

The purpose of the investigation was to assess potential subsurface conditions at the site, classify the site in accordance with AS2870; make comment on temporary and permanent support of the proposed excavation, recommend foundation design parameters and assess potential issues regarding rock excavation.

SMEC undertook a site walkover and desktop investigation of the site. Intrusive investigations were not undertaken as part of the assessment.

SMEC Concluded that:

- Construction of the basement may require excavation near to the site boundaries, and therefore in close proximity to adjacent buildings.
- There is the potential for medium or high strength rock to be encountered which may necessitate the use of rock excavation equipment.
- Care should be taken so to not damage buildings or other developments on adjacent properties when excavating rock. This may require the adoption of excavation methods which limit ground vibrations.
- Due to the proximity of the excavation to property boundaries, temporary support will be required for soils.
- The base of the proposed excavation is likely to be very stiff silty clays or weathered shale. In order to ensure compliance with bearing values, care should be taken to ensure the base of the excavations is free of loose material prior to concerting.

3.2 TRACE (2014) Preliminary site investigation

TRACE Environmental Pty Ltd (TRACE) were commissioned by Lone Star Construction Pty Ltd to prepare a Preliminary Site Investigation (PSI) for 445-459 Canterbury Road, Campsie NSW.

TRACE concluded that:

- The site has been used for commercial purposes since the 1960's which included automobile service and maintenance. Prior to this the site was used for low density residential purposes.
- At least two underground storage tanks were historically operating at the site, with both potentially still on site. The presence and historic use of USTs may be a source of subsurface impacts.
- Historic car maintenance and servicing activities, importation of uncontrolled fill and the presence of asbestos containing building materials may also be sources of potential soil impacts.
- The environmental site setting was considered to be moderately sensitive based on the preliminary CSM.
- The site is not located in an area of known acid sulfate soils.
- TRACE Recommended a detailed Site Investigation (DSI) be undertaken.

3.3 Cardno (2017) Detailed site investigation

Cardno were commissioned by HPG to undertake a DSI for 445-459 Canterbury Road, Campsie NSW.

The purpose of this investigation was to provide the Client with advice on the contamination status of the Site and the consequent implications for its intended use.

Cardno undertook a scope of work that included:

- A review of previous reports and site information;
- An intrusive investigation by advancing 13 boreholes as follows:
  - Eight boreholes to a maximum depth of 3.1 m below ground level (m BGL) using a drill rig;
  - Two boreholes to a maximum depth of 0.5 m BGL using a hand auger; and
  - Three boreholes to a maximum depth of 6.3 m BGL and conversion to groundwater monitoring wells.
- Analysis of 20 primary soil samples by a NATA accredited laboratory for:
  - Total Petroleum Hydrocarbons (TPH) / Benzene, Toluene, Ethylbenzene, Xylenes, Naphthalene (BTEXN)
  - Polycyclic Aromatic Hydrocarbons (PAHs)
  - Phenol
  - Metals (arsenic, cadmium, chromium, nickel, zinc, lead, mercury)
  - Organochlorine Pesticides (OCP) / Polychlorinated biphenyls (PCBs)
  - Asbestos.
- Analysis of 3 primary groundwater samples by a NATA accredited laboratory for:
  - TPH / BTEXN
  - PAHs
  - Metals (arsenic, cadmium, chromium, nickel, copper, zinc, lead, mercury)
  - PCB / OCP.

Cardno (2017) concluded that:

- The site was covered by between 0.1 to 3.3 of fill material. This fill material was described as dark brown sandy clay and gravelly sand.
- Shallow perched groundwater was encountered between 1.39 and 2.08 m BGL.
- With the exception of the following, concentrations of COPC were below the adopted site assessment criteria:
  - TRH concentrations exceeded the adopted Ecological Screening Level ESL in boreholes BH3 and MW 1 at depths of 1.8 and 0.8 m BGL respectively. TRH in sample location BH4 exceeded management limits at depths of 1.5 m BGL and 2.5 m BGL.
  - Benzo(a)pyrene exceeded NEPM 2013 Ecological Screening Level for an Urban Residential / Public Open Space land use setting at BH6/1.2 (2.5 mg/kg), BH8/0.5 (4.3 mg/kg) and MW1/0.8 (0.7 mg/kg).
  - Elevated concentrations of arsenic, copper and zinc were reported in some samples, while all other metals remain below adopted assessment criteria. Exceedances of the adopted Ecological Investigation Levels for heavy metals were generally observed in fill materials to a depth of 1.5 m BGL.
  - Slight exceedances of the adopted ANZECC freshwater criteria for dissolved copper and zinc were observed within the three groundwater monitoring wells sampled, with an exceedance of the adopted drinking water guidelines criteria also reported for nickel in monitoring well MW1. Given the substantial distance of the site to sensitive groundwater receptors, the slightly elevated metal concentrations are unlikely to pose a risk to human health or the environment.

NOTE: The above identified exceedances are not considered significant and are primarily the result of a conservative application of the assessment criteria. A more thorough approach, including calculation of material specific added contaminant limits (ACL) for copper and zinc as well as adopting high-reliability criteria for benzo(a)pyrene (CRC CARE, 2017), would likely remove most identified exceedances.

Recommendations included:

- Lateral and vertical delineation of the identified impacts with consideration of towards the need for waste classification due to the need to remove material from site as part of the proposed design.

- Preparation of a Remedial Action Plan (RAP) to include an Unexpected Finds Protocol (UFP)
- Undertake a soil validation assessment at the completion of excavation and dewatering with recommendations of the validation approach to be detailed in the RAP.

4 Data quality

4.1 Data quality objectives

The NEPM 1999 (Schedule B2) requires that Data Quality Objectives (DQOs) be identified for all assessment and remediation programs be prepared which is a process endorsed by the NSW EPA under s105 of the *Contaminated Land Management Act 1997*. The DQO process as adopted by the NSW EPA is described within US EPA (2000) *Guidance for the Data Quality Objectives Process and Data Quality Objectives Process for Hazardous Waste Site Investigations*.

The DQOs for the SAQP are summarised in **Table 4-1**, below.

Table 4-1 Data Quality Objectives

DQO Step	Discussion
Step 1: State the Problem	HPG intend to redevelop the site from a mixed commercial land-use to a hospital with two basement parking levels. Previous investigations have identified contamination impact to soils surrounding building footprints, however access to areas under site structures is currently preventing characterisation of soils in these areas. Therefore, a targeted site assessment is required to determine: ▪ If there is impact to offsite receptors as a result of TRH impacted soils and groundwater; and USTs in the north-west of the site; ▪ The waste or beneficial re-use classification of site soils to allow for appropriate removal from site; and ▪ If further remediation is required to make the site suitable for the proposed development.
Step 2: Identify the decision / goal of the study	Our default assumption (null hypothesis) for the purpose of the study is that: ▪ The site is impacted by contamination of land that would make it unsuitable for the proposed use. We aim to show, that: ▪ The site is not impacted by contamination at a level that represents a risk to current and / or future onsite and offsite receptors. If this can be shown, then the subject to the limitations of the investigation methodology, the Site will be considered suitable for the proposed site development. If this cannot be shown then the following decisions will be made: ▪ Is remediation (in addition to the excavation of material for the basement parking levels) necessary to render the Site suitable for the intended land use? ▪ Is further investigation required to determine extent of impacted soils and or groundwater? ▪ What are the extents and locations of material classified as waste for offsite disposal?
Step 3: Identify the information inputs	The primary inputs to the decisions described above are: ▪ Guidelines made or approved by the NSW EPA; as listed in **Section 1.4**. ▪ Results of previous assessments conducted on the site; as summarised in **Section 3**. ▪ Information gathered during the assessment of fill and natural soils. ▪ Laboratory analysis of soil and groundwater samples for relevant COPCs, based on historical land use; ▪ Assessment of the suitability of the analytical data obtained, against the Data Quality Indicators (DQIs) outlined below; and ▪ Aesthetic observations of soils, including odours, staining and waste inclusions.
Step 4: Define the boundaries of the study	The boundaries of the study are: ▪ Lateral - the intrusive investigation is limited to the boundaries of the property identified in **Table 2-1**. ▪ Vertical – the maximum anticipated depth of soil sampling will be 9 m BGL on the Canterbury Road boundary of the site. This will be achieved following excavation of the site and will be considered as part of the validation process to determine final site suitability. ▪ Temporal – Utilising the full dataset available the temporal boundaries of the assessment are 2017 until the completion of excavation works. The results will remain valid as long as the land use remains passive and no new sources of contamination are introduced to the Site.

DQO Step	Discussion
Step 5: Develop the analytical approach	The intrusive investigation analytical program is detailed in **Section 1.3**.
Step 6: Specify performance or acceptance criteria	Two primary decision error-types may occur due to uncertainties or limitations in the project dataset: ▪ Type I - A sample / area may be deemed to pass the nominated criteria, when in fact it does not. This may occur if contamination is 'missed' due to limitations in the sampling plan, or if the project analytical data set is unreliable. ▪ Type II - A sample / area may be deemed to fail the nominated criteria, when in fact it does not. This may occur if the project analytical dataset is unreliable due to inappropriate sampling, sample handling or analytical procedures. The following aspects were considered when establishing the acceptable limits on decision errors: ▪ The null hypothesis for the project is: the sample / investigation area is deemed to be contaminated. Sufficient weight of evidence, via the uses of statistical analysis (e.g. 95% upper confidence limit of the mean (UCL)) and / or gathering multiple lines of evidence (e.g. desktop review and laboratory analytical data), would be required to reject / disapprove the null hypothesis. ▪ A quality assurance / quality control (QA/QC) assessment evaluating the reliability and useability of data, which are expressed as five data quality indicators (DQI) summarised in **Section 8**.
Step 7: Develop the plan for obtaining data.	The recommended assessment strategy is designed to meet the project objectives in Section 1.3 and the DQOs outlined above. The assessment scope will be optimised based on the ground conditions encountered during the field sampling program. To achieve the DQOs and DQIs, a detailed assessment plan is detailed in **Section 1.3**.

4.2 Data quality indicators

The following Data Quality Indicators (DQIs), referenced in Step 6 in **Table 4-1**, have been adopted in accordance with the NSW EPA (2017) *Guidelines for the NSW Site Auditor Scheme (3rd Edition)*. The DQIs outlined in **Table 4-2** assist with decisions regarding the contamination status of the Site, including the quality of the laboratory data obtained.

Table 4-2 Data Quality Indicators

Data Quality Indicator	Frequency	Data Acceptance Criteria
Completeness		
Field documentation correct	All samples	The work will be documented in accordance with Cardno SOPs
Soil bore and test pit logs complete and correct	All samples	The work will be documented in accordance with Cardno SOPs including review by senior staff prior to issue
Suitably qualified and experience sampler	All samples	Person deemed competent by Cardno collecting and logging samples
Appropriate lab methods and limits of reporting (LORs)	All samples	Samples will be analysed using NATA approved methods
Chain of custodies (COCs) completed appropriately	All samples	Transfer of all samples will be in accordance with Cardno SOPs
Sample holding times complied with	All samples	The samples are required to submitted for extraction within holding times specified by the NATA laboratory
Proposed/critical locations sampled	-	Critical locations have been identified in Section 6

Data Quality Indicator	Frequency	Data Acceptance Criteria
Comparability		
Consistent standard operating procedures for collection of each sample. Samples should be collected, preserved and handled in a consistent manner	All samples	All works will be undertaken in accordance with Cardno SOP's
Experienced sampler	All samples	Person deemed competent by Cardno collecting and logging samples
Climatic conditions (temp, rain etc) recorded and influence on samples quantified (if required)	All samples	Climatic conditions documented in field sheets
Consistent analytical methods, laboratories and units	All samples	Sample analysis is to be in accordance with NATA approved methods
Representativeness		
Sampling appropriate for media and analytes (appropriate collection, handling and storage)	All samples	Sample analysis is to be in accordance with NATA approved methods
Samples homogenous	All samples	All works undertaken in accordance with Cardno SOP's. Samples are not to be collected across strata
Detection of laboratory artefacts, e.g. contamination blanks	-	Laboratory artefacts assessed and impact on results determined
Precision		
Blind duplicates (inter and intra-laboratory duplicates)	1 per 20 samples	<30% RPD (Inorganics) <50% RPD (Organics) No Limit RPD Result <10 × LOR
Laboratory duplicates	1 per 20 samples	<20% RPD Result > 20 × LOR <50% RPD Result 10-20 × LOR No Limit RPD Result <10 × LOR
Accuracy (Bias)		
Split duplicates (inter-laboratory duplicates)	1 per 20 samples	<30% RPD (Inorganics) <50% RPD (Organics) No Limit RPD Result <10 × LOR
Surrogate spikes	All organic samples	50-150%
Matrix spikes	1 per 20 samples	70-130%
Laboratory control samples	1 per 20 samples	70-130%
Method blanks	1 per 20 samples	<LOR

4.3 Quality assurance / quality control

To meet the DQOs and DQIs outlined in **Section 3**, the following additional Quality Assurance / Quality Control (QA/QC) procedures will be undertaken**.**

Table 4-3 Summary of Data Quality Indicators

Requirement	Comments
Equipment calibration	Provision of calibration certificates. The scientific instruments that will be used for the Site investigation, such as a PID and water quality meter, will be calibrated by the manufacturer and zeroed calibrated on the day in the form of a 'bump test' where the PID will be connected to a canister of isobutylene. The records of the calibration(s) will be presented in the report.

Requirement	Comments
Equipment decontamination	Decontamination of sampling equipment where needed. Sampling equipment that is not disposable, such as hand tools, will undergo the following decontamination process: Wash equipment in soapy water that contains a mixture of water and Decon 90, with the objective to remove sediments and particulate from the equipment. A brush should be utilised where necessary. Rinse decontaminated equipment with potable or deionised water.
Soil logging	Logging soils in general accordance with the Unified Soil Classification System including sample information recording on the geological log sheets.
Sample media identification	Samples to be marked with a unique identifier including project number, sample location, depth and date.
QA/QC Field duplicates/ triplicates/field blanks and trip spikes	Duplicate samples will be collected at a rate of 1 every 20 primary samples completed at the primary intra-laboratory; and triplicate samples at a rate of 1 every 20 samples to be analysed at the secondary inter-laboratory. One laboratory provided trip blank and trip spike will be submitted at a rate of 1 per sample dispatch.
Sample preservation	Collected soil and water samples placed in a chilled icebox with ice for storage and transport to the laboratory.
Chain of Custody (COC documentation	COC forms detailing sample identification, collection date, sampler and laboratory analysis required. The COC form to be signed off and returned to Cardno by the laboratory staff upon receipt of all the samples.
NATA accredited methods	NATA accredited laboratories will analyse the samples in accordance with NATA accredited methods.
Rinsates (where sampling equipment is reused)	Rinsate samples to be collected at least once a day per one device used for sampling (e.g. hand tools). Rinsate sampling containers and rinsate water will be supplied by the primary analytical laboratory.

5 Assessment criteria

5.1 Soil

The soil data in will be compared to the screening criteria included in the following guidelines:

5.1.1 Human health criteria

NEPM 1999, Health investigation levels – Residential B

Health investigations levels (HIL) B have been adopted to assess the risk to site users based on the current and range of proposed land uses.

- HIL B criteria are to be used due to the proposed sensitive land uses i.e. a hospital. These are less than HIL D – Commercial / Industrial criteria and therefore are also protective of site users under the current site scenario
- HIL C – Recreational criteria may also be applied if final designs identify areas of the site where soils are to be retained onsite for landscaping and parkland purposes. As site soils will be accessible in this case HIL C will be used to account for direct contact and interaction with site soils.

NEPM 1999, Health screening level – Soil Vapour, Low – Commercial / Industrial D

Health screening level (HSL) D for soil vapour has been adopted to assess the potential for a vapour intrusion risk to be present from site soils.

- These criteria consider current and future site occupants and users and may allow for potential redevelopment or reuse of soil under the proposed redevelopment.
  - Consideration of future occupants is consistent with the design including a carpark in all lower floors, if design changes result in continually occupied spaces being in contact with residual ground surfaces then a more sensitive criteria may need to be adopted.
- Based on the material descriptions collected during field work and to account for potential mixing during construction and earthworks, samples will be screened against criteria for sand-based soils.

CRC Care – Technical Report 10 Health screening levels for petroleum hydrocarbons – Direct contact – Intrusive maintenance worker

Intrusive Maintenance Worker direct contact criteria have been adopted to assess the risk associated with direct contact with hydrocarbon impacted soils.

- These criteria consider current and future site occupants and users including construction workers and during the proposed redevelopment.
- Based on the proposal to box out the site risk of direct contact with buried and impacted materials is considered to only exist for future maintenance and construction workers. If soils with hydrocarbon impact are to be re-used in surface areas then a more sensitive criteria may need to be considered.

5.1.2 Waste and reuse criteria

NSW EPA (2014) Waste classification guidelines

The waste classification guidelines will be utilised in Stage 2 of the investigation to inform the preparation of an EMP and disposal of material as waste.

NSW EPA (2014) Excavated natural material order

The ENM order will be used to assess material that may not immediately meet the definition of VENM, (i.e. due to potential reworking) but may be suitable for beneficial re-use offsite.

Protection of the Environment Operations Act (1997) Virgin excavated natural material definition

The VENM definition provided within the POEO Act will be used to guide the classification of suitable material on the site as VENM for beneficial re-use offsite.

- For the purposes of this assessment Cardno will analyse the upper 0.5 m to 1.0 m of the natural soil / rock profile for contamination. If these return results below laboratory LOR for organic contaminants (i.e.

volatile and semi volatile organic compounds) or below the ENM order for inorganic contaminants (i.e. metals) then underlying materials will be considered VENM provided no other contaminant indicators are identified.

5.1.3 Other soil criteria

NEPM 1999, Ecological Investigation Levels and Ecological Screening levels – Urban residential and public open space

Ecological Investigation Levels (EIL) and Ecological Screening Levels (ESL) will be adopted to assess the risk to future ecological receptors only if site areas and soils are identified as being retained for landscaping purposes and will be in the accessible, upper 2 m of the soil profile.

- Based on the site locality, neighbouring land uses and the proposed future land use it is unlikely to result in restoration of the site to a high ecological value scenario.
- The application of the urban residential and public open space EIL and ESL are considered appropriate to capture risk to unidentified ecological receptors.
- Due to the intention to box out the site to between 6 and 9 m generic EIL were utilised for all analytes.
- As no evidence of fresh (within the last two years) contaminant application was identified, aged EIL screening criteria will be applied.

CRC CARE 2017, Ecological Screening Levels - Fresh benzo(a)pyrene – Urban residential and public open space

The ESL for fresh benzo(a)pyrene will be adopted as a secondary screening criterion to assess the risk to future ecological receptors (i.e. flora and fauna in landscaped areas) only if benzo(a)pyrene is identified in exceedance of NEPM 1999 ESL criteria and if site areas and soils are identified as being retained for landscaping purposes and will be in the accessible, upper 2 m of the soil profile.

- This is a high-reliability criterion based on updated inputs compared to the criteria available within the NEPM (1999) which are classified as low-reliability.
- The updated criteria are for fresh benzo(a)pyrene, which is generally considered to be more toxic than aged impacts, further to this no criteria exist for aged impact. It is considered likely that any impact that may be identified on the site would be considered aged and therefore the use of fresh criteria could be considered conservative for this site.
- These criteria are higher than those identified in the NEPM (1999), as a result they are less likely to trigger unnecessary remedial actions.

NEPM 1999, TRH Management Limits – Residential, parkland and public open space

The management limits will be adopted as a final screening level to identify TRH concentrations that may present a risk to the physical and built environment and tend to be higher concentrations than human health and ecological risk criteria.

Management limits are protective of the following hazards or risks:

- formation of observable light non-aqueous phase liquids (LNAPL),
- fire and explosive hazards and
- effects on buried infrastructure e.g. penetration of, or damage to, in-ground services by hydrocarbons.

NEPM 1999, Aesthetic criteria

Should there be no exceedances of other criteria that make site soils unsuitable for use onsite, soil will also be assessed for aesthetic suitability. Acceptable aesthetic criteria will vary depend on final material location within the planned site setting but generally material will be considered acceptable if at surface:

- There is no visible staining or detectable odour;
- There are no remains of dead or buried animals; and
- No visible quantities of anthropogenic materials such as demolition rubble or other wastes in surface materials.

5.2 Groundwater

5.2.1 Human health criteria

NEPM 1999, Health screening level – Soil Vapour, Low – Residential A/B

HSL A/B for soil vapour has been adopted to assess the potential for a vapour intrusion risk to be present from site groundwater impacted by hydrocarbons.

- HSL A/B criteria consider current neighbouring residential occupants to the north which may be impacted by migration of hydrocarbon contamination of groundwater across the site boundary.
- These criteria are less than those for HIL D – Commercial / Industrial land uses such as the current site use and neighbouring commercial premises as a result they are considered protective of current site occupants and occupants of any neighbouring premises under a commercial / industrial setting.
  - As any proposed construction on the site will be likely located below any potential impacted groundwater aquifer hydrocarbon vapour risk will be screened using the drinking water criteria below.
- Based on the material descriptions collected during field work and to account for potential mixing during construction and earthworks, samples will be screened against criteria for sand-based soils.

NHMRC 2011, Australian Drinking Water Guidelines (ADWG), Health Criteria

Drinking water guidelines have been adopted to assess potential risk to human health from direct contact with groundwater during construction

- ADWG criteria are based on long-term exposure through consumption of waters though guidelines recommend assessment of exceedances to assess acute short-term impacts.
- Aesthetic criteria in the context of water are primarily related to taste and odour of water and do not reflect potential impacts to human health, as such they will not be applied at this time.
- These guidelines are being utilised to initially screen for potential risk to human health from groundwaters through a direct contact and vapour inhalation scenario as it is unlikely that the waters will be consumed as a drinking water source.
- Exceedance of these criteria would trigger a more detailed assessment of specific risk to human health and may include application of drinking water criteria at 10 times concentration as allowed in Section 9.3.2 of the *Guidelines for Managing Risks in Recreational Water* (NHMRC, 2008) for assessing exposure scenarios that involve lower exposure than drinking.

5.2.2 Ecological health criteria

ANZG (2018) Freshwater 95% / 99% ecosystem protection default guideline values (DGVs)

Ecosystem protection guidelines have been adopted to assess potential ecological risk associated with the discharge of groundwaters into downgradient water bodies.

- The 99% ecosystem criteria have been adopted only in the case of bio-accumulative contaminants as these can present a significant risk to ecological receptors at low concentrations.
- The adopted 95% criteria for remaining contaminants are recommended for application in slightly to moderately disturbed surface water ecosystems. Based on the regional history of urban and residential development and the application of these criteria to groundwater, a more conservative approach is not considered appropriate.
- Exceedances within will be considered in the context of their potential interaction with down-gradient ecosystems.

6 Site Investigation

6.1 Investigation Program

Cardno conducted the intrusive investigation and the collection of soil samples on 30 September 2020 and collection of groundwater samples on the 7 October 2020. Information pertaining to the work is summarised in **Table 2-1** below. Sampling locations are shown on **Figure 2** in **Appendix A**.

Table 6-1 Investigation Activity Summary

Activity	Details
Dates of Field Activity	Advancement of boreholes and soil sample collection: 30 September 2020 Groundwater monitoring and sample collection 7 October 2020.
Service Location	An underground services locator was contracted to locate and mark services in the proposed borehole areas on the 29 September 2020
Borehole Drilling	Boreholes were advanced using a Comacchio GeoProbe with a push tube to collect undisturbed samples and to assess subsurface conditions. Three locations were opened up using solid flight auger following soil sample collection to allow for installation of groundwater wells.
Boreholes and Target Depths	Four Boreholes were advanced with three of these boreholes developed into groundwater wells on site at locations shown in **Figure 2, Appendix A**. All locations were advanced to a depth of 6.0 m BGL or soil/rock interface.
Soil Logging	Soils encountered during drilling were described and logged in accordance with Cardno's SOPs. Borehole Logs are presented in Appendix C.
Soil Sampling	A total of twenty-three (23) soil samples were collected from four borehole locations across the site. Undisturbed samples were directly from disposable push tube liners using a new disposable nitrile gloved hand for each sample to eliminate cross contamination risk. A total of eight (8) primary soil samples were analysed by Eurofins for contaminants of potential concern (CoPC). One (1) intra-laboratory sample was collected for analysis by Eurofins.
Groundwater sampling	Existing groundwater wells on the site (MW1, MW2 and MW3) were gauged for serviceability on 30 September 2020 and found to be suitable for sampling. The wells were developed on this date using a bailer to remove residual drilling fluids and establish formation groundwater flow. All wells were sampled in a single event on 7 October 2020. Sampling was conducted using a peristaltic low-flow pump and disposable tubing for each location to minimise potential for cross-contamination. Wells were purged using the low flow pump until water quality parameters, assessed using a water quality meter with flow cell, stabilised over 3 continuous readings. The flow cell was then removed from the pump and samples were then collected directly into laboratory supplied sampling container. All equipment in direct contact with samples (i.e. tubing) was disposable and not re-used between locations. All metals samples were collected unfiltered and field filtered. A total of six (6) primary water samples were analysed by Eurofins for contaminants of potential concern (CoPC). One (1) intra-laboratory sample was collected for analysis by Eurofins.
Borehole reinstatement.	BH11 was backfilled with soil removed during drilling to level the area. Remaining locations were developed into groundwater monitoring wells with spoil remaining onsite. Wells installed as part of this assessment were constructed with 50 mm PVC-U to 0.5 m BGL followed by 50 mm PVC-U screen to termination. Annular was filled with washed and graded sand to the top of screen above which the well was sealed with bentonite slurry. Remaining annular was backfilled with drill cuttings from near surface before all wells were finished with a gatic cover flush with ground surface.
Sample analysis selection	General sample analysis selection was based initially on contaminant indicators such as odours, staining or anthropogenic materials mixed through the soil / fill profile.

	Where contaminant indicators were not present sample analysis selection was based on horizontal and vertical spread through the assessment area.
Sample Preservation and Transport	Samples were placed in laboratory supplied containers and stored on ice in an esky while on site and in transit to the laboratory under standard Chain of Custody documentation. Laboratory testing comprised the following ▪ Submission of seven (7) soil samples for: – Total recoverable hydrocarbons (TRH); – Benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN); and – Polycyclic aromatic hydrocarbons (PAHs); ▪ Submission of one (1) soil sample for: – Total recoverable hydrocarbons (TRH); and – Benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN); ▪ Submission of six (6) groundwater samples for: – Metals (As, CD, Cr, Cu, Pb, Ni, Hg and Zn); – Polycyclic aromatic hydrocarbons (PAHs); – Total recoverable hydrocarbons (TRH); and – Benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN);

6.2 Well construction details

The following table summarises the well construction details for the borehole wells sampled as part of this program. MW1, MW2 and MW3 were installed as part of previous investigations with remaining wells installed as part of this program.

Table 6-2 Well construction details summary

Location	Screen interval	Filter-pack interval	Bentonite interval	Backfill / Grout interval
MW01	3.0 to 6.0 m BGL	2.3 to 6.0 m BGL	0.5 to 2.3 m BGL	Surface to 0.5 m BGL
MW02	2.2 to 1.2 m BGL	0.9 to 4.2 m BGL	0.7 to 0.9 m BGL	Surface to 0.7 m BGL
MW03	2.9 to 5.9 m BGL	2.6 to 5.9 m BGL	2.3 to 2.6 m BGL	Surface to 2.3 m BGL
MW04	1.0 to 3.0 m BGL	0.5 to 3.0 m BGL	0.2 to 0.5 m BGL	Surface to 0.2 m BGL
MW05	1.0 to 3.0 m BGL	0.5 to 3.0 m BGL	0.2 to 0.5 m BGL	Surface to 0.2 m BGL
MW06	1.0 to 3.0 m BGL	0.5 to 3.0 m BGL	0.2 to 0.5 m BGL	Surface to 0.2 m BGL

7 Results

7.1 Field Observations

Soil conditions observed during the soil sampling program are summarised in **Table 7-1** below. Detailed soil descriptions are provided in the borehole logs in **Appendix E**. Site location shown in **Figure 1, Appendix A**.

Table 7-1 Typical Soil Profile

Subsurface Horizon	Typical Depth Range (m BGL)	Description
Unsealed ground cover	0.0 – 0.2	Silty sand with gravels and asphalt, pale grey
Fill	0.2 – 1.0 >5.0 MW06 only	Clay with silt, trace gravels, brick fragment, low-moderate plasticity Sand at MW05 (0.1-0.4 m BGL) MW06 Inferred to be tank pit back fill.
Residual Soil	1.0	Clay, high plasticity, plant organics (wood piece), clay gravels brown-dark brown mottle, moist
Soil/Rock interface	4.0	Clay, dry, crumbly, orange (hydrocarbon odour at BH11)
Groundwater	1.6	Groundwater was observed, potential perched water sitting on soil / rock interface.
Asbestos Observed	-	No asbestos observed

7.2 Groundwater Levels

Groundwater standing water levels and non-aqueous phase liquids (NAPL) thickness (if present) were recorded on the field sheets and are presented in **Table 7-2**.

Table 7-2 Groundwater Gauging Data (GME Events)

Well ID	Sample Date	SWL (mTOC)	Apparent LNAPL Thickness (mm)
MW01	29/09/2020	1.63	Not present
MW01	7/10/2020	1.57	Not present
MW02	29/09/2020	3.39	Not present
MW02	7/10/2020	3.42	Not present
MW03	29/09/2020	2.65	Not present
MW03	7/10/2020	2.65	Not present
MW04	7/10/2020	1.40	Not present
MW05	7/10/2020	1.41	Not present
MW06	7/10/2020	1.63	Not present

7.3 Field Parameters – Groundwater

Physiochemical Field Parameters were recorded on the field sheets. The stabilised parameters are presented in **Table 7-3**.

Table 7-3 Stabilised Physiochemical Field Parameters

Well ID	Sample Date	pH	Electrical Cond. (µS/cm)	Dissolved Oxygen (mg/L)	Temp. (°C)	Redox Potential (mV)	Observations
MW01	7/10/2020	4.0	2288	1.5	20	359	Clear, Low turbidity, Orange sediment.
MW02	7/10/2020	4.3	553	3.5	20	269	Clear, Low turbidity

Well ID	Sample Date	pH	Electrical Cond. (µS/cm)	Dissolved Oxygen (mg/L)	Temp. (°C)	Redox Potential (mV)	Observations
MW03	7/10/2020	4.8	610	2.2	20	368	Clear, Low turbidity
MW04	7/10/2020	6.0	31714	1.7	19	97	Orange tinge, low turbidity
MW05	7/10/2020	6.2	27808	0.3	19	-7.7	Clear, Low turbidity
MW06	7/10/2020	6.6	2016	0.2	18	-71.8	Grey, silty, hydrocarbon sheen, high turbidity

7.4 Aesthetic considerations

Schedule B1 Section 3.6 of the (NEPC, 1999) provides guidance for the assessment of soils based on aesthetic values as a result of impacts from low concern or non-hazardous inert foreign material in soil or fill as a result of human activity. Areas targeted by this assessment were selected based on having an elevated risk of contamination, including the presence of or potential presence of fill materials. The assessed materials were identified to have minor quantities of fill materials including anthropogenic materials such as brick fragments. This is in addition to potentially hydrocarbon impacted deep soils with hydrocarbon odours from MW06 and BH11.

The presence of these materials and odours within the deeper soils may infer the potential for impacted soils to be present not only on-site but also may have migrated off-site. Under the proposed land use scenario and excavation of materials, site soils are unsuitable for re-use on site.

7.5 Soil human health criteria

All analytes were recorded as either below laboratory LOR or the adopted site screening criteria for human health risk outlined in **Section 5.1.1**.

All analytes with results above LOR either had individual assessment criteria or could be assessed as part of a group (i.e. Total PAH).

7.6 Soil Ecological health criteria

With the exception of the exceedances identified in Table 5-4 below, analytes were either below LOR, below adopted ecological screening criteria or were above LOR but did not have an applicable screening criterion. Benzo(a)pyrene exceedances were identified against NEPM (1999) criteria but upon comparison to the adopted higher reliability criteria (CRC CARE, 2017), no further exceedances were identified.

Table 7-4 Ecological Health criteria exceedances

	C_{16}-C_{34} (mg/kg)	Copper (mg/kg)	Nickel (mg/kg)	Zinc (mg/kg)
EQL	100	5	5	5
NEPM 1999 EIL UR/POS, aged contamination	-	60	30	70
NEPM 1999 ESL UR/POS, Coarse Soil	300	-	-	-
Sample ID				
MW05_0.2	-	650	93	390
MW06_1.2	2400	130	-	230
QA100 (Parent sample: MW05_0.2)	-	1300	97	560

7.7 Indicative waste classification

The results of the laboratory analysis of soil samples show that concentrations of COPCs were either below Laboratory LOR or below the NSW EPA Waste Classification Criteria for general solid based on classification using the CT1 or SCC1 and TCLP criteria as shown in **Table 7-5** below. Whilst these analytes

were above the CT1 but below SCC1 criteria for GSW, additional leachate testing returned results below the TCLP1 criteria indicating that materials tested have a preliminary classification as General Solid Waste (non-putrescible).

Additionally, based on the material observed and analytical results, a preliminary VENM classification can be given to materials below 5.0 m BGL. This is due to the natural Clay materials present and the absence of hydrocarbon odours recorded in BH11.

Table 7-5 Exceedances of the NSW EPA Waste Classification Guidelines.

	Benzo(a)pyrene		Lead		Nickel	
	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L
EQL	0.5	0.001	5	0.01	5	0.01
NSW 2014 General Solid Waste CT1 (No Leaching)	0.8	-	100	-	40	-
NSW 2014 General Solid Waste SCC1 (with leached)	10	-	1,500	-	1,050	-
NSW 2014 General Solid Waste TCLP1 (leached)	-	0.04	-	5	-	2
Sample ID						
MW04_0.5	1.1	<0.001	-	-	-	-
MW05_0.2	-	-	96	-	93	0.12
QA100 (Parent sample – MW05_0.2)	-	-	310	0.03	97	0.1
MW06_1.2	-	-	300	0.33	-	-

7.8 Groundwater Laboratory Results

Analytes results were either below laboratory LOR or the adopted groundwater criteria with the exception of the exceedances in **Table 7-6** which are generally metals. Whilst there are multiple exceedances for the 99% Freshwater Toxicant DGVs for mercury and drinking water guidelines for benzo(a)pyrene, these criteria are less than the laboratory LOR. The level of impact at the point of surface discharge is unlikely to be above guidelines due to the site's distance from the closest water body.

Unfiltered metals analysis will tend to higher results during analysis due to the potential for metals to be leached from sediment within samples by acid preservatives and the analysis process. Based on the general similarity between unfiltered and filtered two potential interpretations are possible, the sediment load of samples was low to nil and / or metals within site waters are primarily dissolved within groundwater.

Table 7-6 Exceedances of adopted Groundwater Criteria

	Benzo(a)pyrene (µg/L)	Arsenic (mg/L)	Cadmium (mg/L)	Cadmium (Filtered) (mg/L)	Copper (mg/L)	Copper (Filtered) (mg/L)	Lead (mg/L)	Lead (Filtered) (mg/L)	Mercury (mg/L)	Mercury (Filtered) (mg/L)	Nickel (mg/L)	Nickel (Filtered) (mg/L)	Zinc (mg/L)	Zinc (Filtered) (mg/L)
EQL	**1**	**0.001**	**0.0002**	**0.0002**	**0.001**	**0.001**	**0.001**	**0.001**	**0.0001**	**0.0001**	**0.001**	**0.001**	**0.005**	**0.005**
ANZG (2018) Freshwater 95% DGVs	-	-	0.0002	0.0002	0.0014	0.0014	0.0034	0.0034	-	-	0.011	0.011	0.008	0.008
ANZG (2018) Freshwater 99% DGVs	-	-	-	-	-	-	-	-	0.00006	0.00006	-	-	-	-
ADWG 2011 Health	0.01	0.01	0.002	0.002	2	2	0.01	0.01	0.001	0.001	0.02	0.02		
Sample ID														
MW01	<1	-	-	-	0.007	0.01	-	-	<0.0001	<0.0001	0.014	0.013	0.084	0.07
MW02	<1	-	-	-	0.024	0.022	0.005	0.004	<0.0001	<0.0001	-	-	0.034	0.032
MW03	<1	-	-	-	0.006	0.006	-	-	0.0003	<0.0001	-	-	0.01	-
MW04	<1	-	0.0009	0.0009	0.11	0.062	-	-	<0.0001	<0.0001	0.087	0.081	2.9	2.8
MW05	<1	-	0.0003	0.0002	0.035	0.002	0.017	-	<0.0001	<0.0001	0.023	0.016	0.22	0.16
MW06	<1	0.045	0.0006	-	0.17	0.002	0.53	-	0.0009	<0.0001	0.02	-	0.43	0.015

8 Quality assurance/Quality Control

8.1 Field QA/QC evaluation

The QA/QC samples collected for the sampling program are summarised in **Table 6-1**. The calculated Relative Percentile Differences between primary and duplicate samples, trip blank, spike and rinsate results are presented in **QA Table 3** in **Appendix E** with RPD exceedances summarised in **Table 6-2.**

Table 8-1 Summary of Field QA/QC Samples

Sample Type	Matrix	Primary Sample	Duplicate ID
Field Duplicate	Soil	MW05_0.2	QA100
	Water	MW03	QA100
Trip Spikes/ Trip Blanks	Water	TS/TB 07/10/2020	-
Rinsates	Water	RIN	-

Field replicate samples

Relative percentage difference (RPD), a measure of variation between samples, was calculated for each analyte within the sample pairs identified in **Table 8-2**. As less than 10 samples were selected for analysis only one intra-laboratory replicate and no inter-laboratory replicates were analysed. The absence of an inter-laboratory replicated is not considered to pose a significant data gap with respect to assessing data quality as replicates were still analysed at a rate of <1:10.With the exception of the soil and water RPD results summarised in **Table 8-2** and **Table 8-3**, calculated RPDs meet the acceptance criteria nominated in **Table 4-2.** In the case of the identified exceedances the RPD variation is considered to be the result of natural heterogeneity in soil or water sediment loads and as both results in each of the failed pairs were either above or below the nominated acceptance criteria for that analyte the variation is not considered to impact the results of this assessment. All RPD results are shown in in **QA Table 1 and 2, Appendix C.**

Table 8-2 Primary / Replicate soil sample RPD outlier summary

Primary Sample	Replicate Sample	Analyte	Primary result (mg/kg)	Replicate Results (mg/kg)	RPD (%)
MW05_0.2	QA100	C_{15}-C_{28}	<50	75	40
		C_{29}-C_{36}	71	130	59
		+C_{10}-C_{36} (Sum of total)	71	205	97
		C_{16}-C_{34}	<100	160	46
		C_{34}-C_{40}	<100	110	10
		C_{10}-C_{40} (Sum of total)	<100	270	92
		Arsenic	3.6	5.2	36
		Chromium (III + VI)	33	34	3
		Copper	650	1,300	67
		Lead	96	310	105
		Mercury	0.1	0.3	100
		Zinc	390	560	36

Table 8-3 Primary / Replicate water sample RPD outlier summary

Primary Sample	Replicate Sample	Analyte	Primary result (mg/kg)	Replicate Results (mg/kg)	RPD (%)
MW03	QA100	Copper	6	10	50
		Copper (filtered)	6	5	18
		Lead	0.001	0.002	67
		Mercury	0.0003	0.0004	29
		Nickel (filtered)	0.001	0.002	67
		Zinc	10	15	40

Trip spikes

One laboratory prepared trip spike (one water) were utilised during the sampling program. Results are shown in **QA Table 3, Appendix C.** All spike recoveries were all within the acceptance criteria nominated within **Table 4-2.**

No soil trip spikes were utilised, this is not considered a significant data gap in the assessment of data quality as field PID screening do not indicate the presence of volatile organic compounds which may have been lost in transit.

Trip blanks

One laboratory prepared trip blank (one water) were utilised during the sampling program. Results are shown in **QA Table 3, Appendix C**. The blank recoveries were all recorded as less than the laboratories limited of reporting meeting the acceptance criteria nominated within **Table 4-2.**

No soil trip blanks were utilised, this is not considered a significant data gap in the assessment of data quality as laboratory results do not indicate the presence of volatile organic compounds in any samples above laboratory LOR eliminating the potential for unidentified cross-contamination.

Rinsate

One rinsate samples were collected from the flow cell using laboratory prepared, pre-screened rinsate water. Results are shown in **QA Table 3, Appendix C.** All recoveries were less than the laboratories limited of reporting for identified COPC meeting the acceptance criteria nominated within **Table 4-2.**

No rinsate sample was collected during soil sampling as no equipment was re-used between locations, disposable push tube liners and disposable nitrile gloves were used to retrieve soils and place them in sample jars.

8.2 Laboratory QA/QC

In accordance with Cardno's Quality Assurance and Quality Control (QA/QC) procedures and AS4482.1 (2005), samples were stored in insulated transport containers containing ice and delivered to the designated laboratories under Chain of Custody documentation following sample collection. Chain of Custody records are included in **Appendix E**.

Eurofins, the chosen analytical laboratory is NATA accredited and undertook internal QA/QC procedures which include the analysis of method blanks, internal duplicate samples, laboratory control samples, matrix spikes and surrogate recovery. Additionally, laboratory QA/QC procedures include sample receipt, logging, storage, preservation and analysis within the method specified holding time.

A review of the laboratory QA/QC procedures indicated that laboratory QA/QC were recorded within acceptance criteria, samples were received and stored appropriately and all samples were analysed within the specified holding time.

With the exception of PAH, and metals in water, laboratory limits of reporting (LOR) were below the adopted assessment criteria. This is considered acceptable as the intention of this assessment was to identify gross impact to site ground waters and these not currently or intended to be used for sensitive receptors / users of site groundwater, as a result low levels of PAH, and metals in water are unlikely to preclude site suitability for the proposed land use.

8.3 Data useability

The data validation procedure employed in the assessment of the field and laboratory QA/QC data and shown above and in **QA Tables 1 to 3, Appendix C** has indicated that the reported analytical results are representative of the conditions at the sample locations and that the analytical data can be relied upon for the purpose of these additional assessment works. It is concluded that overall the quality of the analytical data produced is reliable for the purposes of characterising the site for the intended land use.

9 Discussion

9.1 Human Health Risk

9.1.1 Soil

Soils analyte concentrations were not identified in exceedance of any adopted Human Health Criteria outlined in **Section 5.1.1** based on this no risk to site users under current or future site users exists.

9.1.2 Groundwater

Total recoverable hydrocarbons

Total recoverable hydrocarbon fractions were identified in water samples from MW05 (C_{16}-C_{34}) and MW06 (C_{10}-C_{40}), these locations are in or adjacent to the approximate area of the former UST pit with MW06 believed to be installed into the backfill material of the pit. No detections above laboratory LOR were identified for petroleum hydrocarbons with direct contact human health criteria (i.e. BTEX) and groundwater was too shallow (<2 m BGL) to allow application of NEPM HSL criteria. Detections of the potentially volatile F2 fraction was only slightly above laboratory LOR (50 µg/L) in MW06 (90 µg/L) with an applicable guideline for F2 at 2 - 4m of 1,000 µg/L.

No direct contact human health criteria exist for non-volatile general TRH fractions with the World Health Organisation (WHO) (2017) *Guidelines for drinking water quality* stating "*Taste and odour will in most cases be detectable at concentrations below those of health concern, particularly with short-term exposure*".

In the absence of any evidence of groundwater use or consumption the risk to human health from the identified TRH impact is considered to be limited. Direct contact risk during construction is expected to be managed by the CEMP and related controls. Offsite risk is also limited at present with limited vapour generating potential within the measured fractions and direct contact with water at depths of 1.4 - 1.6 m BGL unlikely in low density residential scenarios.

Polyaromatic hydrocarbons

Benzo(a)pyrene recorded results were reported as exceeding the adopted Australian Drinking Water Guidelines (2011) due to the adopted assessment criterion (0.01 µg/L) being are less than the laboratory LOR (1 µg/L).

Drinking water assessment criteria were adopted as a conservative assessment criterion for human health from groundwater. In the absence of any evidence of groundwater use or consumption and based on the non-detect of benzo(a)pyrene the potential human health risk is considered low.

Metals

Arsenic, lead, nickel and filtered nickel were identified in site groundwaters above the drinking water guidelines which were adopted as a conservative human contact and health criteria. The adopted criteria assume consumption of water over an extended period of time, in order to cause significant risk to human health over a shorter time period (i.e. during construction) results would have to be substantially higher than the conservative criteria adopted. With the exception of lead at MW06 all results were less than 10 times the adopted criteria.

In the absence of any evidence of groundwater use or consumption the minor exceedances against the guideline levels suggests there is limited human health risk. If ground waters are repurposed for any activity involving direct and / or regular human contact then human health risk should be reconsidered.

Low level detections such as these are common in groundwater and may be associated with natural leaching of metals from sediments and not with any specific added anthropogenic contaminant source.

9.2 Ecological impacts

9.2.1 Soil

Total recoverable hydrocarbons

The TRH C_{16}-C_{34} has been identified in MW06 as presenting a potential ecological risk under an Urban Residential / Public Open Space scenario in the vicinity of this location in the north-western unsealed carpark area. Proposed plans include the removal of significant quantities of soil from the site, if this material is to be

removed from site as part of these works then any risk to future receptors in this area is removed. If this material is to remain on site then risk to deep rooted plants in this area should be considered however overall risk is considered low.

Copper, zinc and nickel

Two locations on site, in the unsealed carpark in the north-western area of the site were identified as having concentrations of copper, zinc and nickel in exceedance of the UR / POS EIL criteria.

These locations correlate with the location of former USTs on site, and may be associated with the removal of these tanks. Backfill materials may contain higher concentrations of these metals than background materials alternatively metal building materials may have caused leaching into soils though no significant quantities of construction and demolition waste were identified in these areas.

As noted, the proposed plans for excavation of soil materials on site identify that it is likely that these exceedances can and will be managed during removal of materials from site. Low level detections such as these are common in groundwater and may be associated with natural leaching of metals from sediments and not with any specific added anthropogenic contaminant source.

9.2.2 Groundwater

Metals

Cadmium, copper, lead, mercury, nickel and zinc were identified in groundwater samples across the site in excess of the adopted ANZG (2018) Freshwater 95% species protection criteria.

With the exception of lead all metal exceedances were returned in both filtered and unfiltered samples. The significant quantity of filtered exceedances suggests that, with the exception of lead, metals detections are the result of water chemistry rather than sediment load.

Cadmium, lead, mercury and one filtered zinc sample were identified in groundwater samples in excess of the adopted ANZG (2018) Freshwater 99% species protection criteria. All analytes with exclusion of Lead, mercury in MW03 and zinc, reported results below the laboratory LOR however exceeded this 99% criterion.

Due to the application of surface water criteria to groundwater and the significant distance to the nearest inferred surface water receptor (1 km to Cooks River), no risk to surface water ecosystems is considered to exist from the detected analytes.

9.3 Indicative waste classification

Benzo(a)pyrene, lead and nickel were detected above the CT1 criteria for General Solid Waste adopted from the NSW EPA Waste Classification (2014) Guidelines. Whilst these results were in excess of the CT1 criteria, the analytes were below the SCC1 for GSW and additional leachate testing indicated these were also below the TCLP1.

As the analytes were above the CT1 for GSW, however below the SCC1 and TCLP1 for GSW, material representative of the samples in the unsealed carpark in the north-western portion of the site have potential to be classed as General Solid Waste. This classification is only indicative only and not to be relied upon for offsite disposal.

9.4 Revised conceptual site model

A conceptual site model (CSM) provides an assessment of the fate and transport of COPCs relative to site specific, subsurface conditions with regard to their potential risk to human health and the environment. The CSM considers site-specific factors including:

- Source(s) of contamination
- Identification of COPC associated with past (and present) source(s)
  - It should be noted that the COPC listed in **Table 9-1** are a mixture of generic contaminants (i.e. typical contaminants for the identified source) and actual contaminants measured in the field
- Site specific information including soil type(s), depth to groundwater, effective porosity, groundwater flow velocity and surface water bodies and interactions;
- Location of any identified sources relative to the proposed site development; and
- Actual or potential receptors considering both current and future land use both for the site, adjacent properties and any sensitive ecological receptors.

Based on the information collected as part of this PSI, including site history information, site observations, the following preliminary CSM has been developed showing potential SPR linkages considered to be potentially complete or incomplete under our understanding of the current and future land use.

Identified receptors for the potential site contamination include:

> Ecological receptors dependent on site soils in impacted areas;

> Current site users and workers; and

> Future site users and workers.

Table 9-1 Revised CSM

Source	Contaminants	Impacted media	Pathway	Receptor
TRH impacted soil and former USTs location	TRH, PAH, metals	Soils and groundwater in north west of the site. Groundwater onsite and north-east of site inferred, based on topography.	Dispersal via groundwater Direct contact with impacted media	Potential future ecological receptors if material remains onsite. Incidental contact with groundwater by offsite receptors.
Metals, PAH, TRH and impacted soils and fill	Metals, PAH, TRH	Soils and fill materials	Direct contact with impacted media	Future site workers during excavation and soil disturbance. Potential future ecological receptors if material remains onsite.

9.5 Data Gaps

Based on the results of this investigation, the following potential data gaps in site characterisation have been identified with relevant areas illustrated in **Figure 2** in **Appendix A**.

> Depth of the soil/rock interface was unable to be reached in the advancement of MW06 due to the wet sandy clay found in that location. During the instalment of the 50mm PVC well screen and casing, the borehole collapsed, reducing its' depth. Hydrocarbon odour was noted during borehole advancement and a light sheen was seen on water extracted during well development in this location.

  Groundwater and soil results from this location indicate heavier semi and non-volatile hydrocarbon impact with no volatile fractions identified. Based on this Cardno is satisfied that no vapour risk exists however further direct assessment of material in the vicinity of this location is warranted to inform waste and disposal options.

> Cardno was unable to locate the assumed UST still existing onsite below the mechanics workshop. However anecdotal evidence from the workshop owner revealed the former UST was located in the adjacent carpark below a concrete slab and had since been removed. Further investigation with a service locator did not reveal the presence of a UST under the slab. Due to the limited reliable history for the USTs onsite, potential exposure of tanks during demolition and excavation should be considered in the site Unexpected Finds Protocol.

10 Conclusions

Cardno has completed a Data Gap Investigation including soil and groundwater sampling for the property located at 445-459 Canterbury Road, Campsie to resolve the outstanding contamination issues. Cardno understands that Melissa Porter of Senversa Pty Ltd has been engaged as the NSW Environment Protection Authority (EPA) accredited Site Auditor for the project.

This investigation was the most recent of a series of contamination assessments starting in 2014 with the scope of this assessment outlined in a SAQP approved by a NSW EPA accredited site auditor.

Based on the findings of this report, there are no complete SPR linkages that would indicate human health risk to current and future site users however given the presence of metals, benzo(a)pyrene and TRHs exceeding the adopted ecological criteria, there is potential for a complete SPR linkage to impact future ecological receptors if impacted material is retained onsite.

No offsite risks, in the form of a complete SPR linkage via the migration and movement of contaminants in groundwater were identified.

The soil results were used to provide an indicative waste classification and generally classed the materials investigated as General Solid Waste (non-putrescible).

Cardno considers that at the time of undertaking the data gap investigation, the site is suitable for the proposed land use with respect to actual or potential impacts to on and offsite receptors.

10.1 Recommendations

Based upon the findings of this data gap investigation and with reference to the proposed future land-use on the site, the following recommendations are made:

- Complete Stage 2 and Stage 3 as outlined and approved in the SAQP.
  - Stage 2: Assessment of soils within the existing structure footprint and additional sample to clarify waste classification of previous locations.
    - Additional monitoring from wells installed on the northern boundary to confirm or identify change in TRH detections. Care should be taken during demolition to not disturb or damage these wells.
  - From the findings of this investigation a Remediation Action Plan (RAP) or other excavation guidance may also be prepared. Stage 3: Consulting and environmental support during construction to ensure that materials are managed for offsite disposal as per excavation guidance and classifications. Further visual and sampling assessment of unexpected finds and final excavation surfaces may also be made to confirm site suitability.
- Preparation of a Construction Environmental Management Plan (CEMP) with an Unexpected Finds Protocol which considers risk to site workers during construction. With respect to site contamination, controls and management within the CEMP should include:
  - Use of contractors appropriately licenced in the removal of any hazardous materials identified including in residual structures and site soils; and
  - Demolition and / or removal of any hazardous materials prior to undertaking general demolition or bulk earthworks activities.

11 References

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GS NSW. (2018). *NSW Statewide Seamless Geology*. Retrieved from Minview: minview.geoscience.nsw.gov.au

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NSW EPA. (2014). *Waste Classification Guidelines, Part 1: Classifying Waste.* NSW Environment Protection Authority.

NSW OEH. (2013). *Soil Landscapes of Central and Eastern NSW, version 2*. Retrieved from eSpade v2.0: https://www.environment.nsw.gov.au/eSpade2WebApp

WHO. (2017). *Guidelines for Drinking-water Quality, 4th Edition.* World Health Organisation.

12 Limitations

This assessment has been undertaken in general accordance with the current "industry standards" for a Detailed Site Investigation for the purpose and objectives and scope identified in this report. These standards are set out in:

- National Environment Protection [Assessment of Site Contamination] Measure (NEPM), December 1999, National Environment Protection Council (NEPC).
- National Environment Protection (Assessment of Site Contamination) Measure (NEPM) 1999 (NEPC, 1999) as varied May 2013 (the 'NEPM 2013').
- Consultants reporting on contaminated land, Contaminated land guidelines, NSW EPA (2020)
- AS4482.1- 2005: Guide to the sampling and investigation of potentially contaminated soil Part 1: Non-volatile and semi-volatile compounds. Standards Australia (2005).

The agreed scope of this assessment has been limited for the current purposes of the Client. The assessment may not identify contamination occurring in all areas of the Site, or occurring after sampling was conducted. Subsurface conditions may vary considerably away from the sample locations where information has been obtained.

This Document has been provided by Cardno subject to the following limitations:

- This Document has been prepared for the particular purpose outlined in Cardno's proposal and no responsibility is accepted for the use of this Document, in whole or in part, in other contexts or for any other purpose.
- The scope and the period of Cardno's services are as described in Cardno's proposal, and are subject to restrictions and limitations. Cardno did not perform a complete assessment of all possible conditions or circumstances that may exist at the Site referenced in the Document. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Cardno in regards to it.
- Conditions may exist which were undetectable given the limited nature of the enquiry Cardno was retained to undertake with respect to the Site. Variations in conditions may occur between investigatory locations, and there may be special conditions pertaining to the Site which have not been revealed by the investigation and which have not therefore been taken into account in the Document. Accordingly, additional studies and actions may be required.
- In addition, it is recognised that the passage of time affects the information and assessment provided in this Document. Cardno's opinions are based upon information that existed at the time of the production of the Document. It is understood that the services provided allowed Cardno to form no more than an opinion of the actual conditions of the Site at the time this Document was prepared and cannot be used to assess the effect of any subsequent changes in the quality of the Site, or its surroundings, or any laws or regulations.
- Any assessments made in this Document are based on the conditions indicated from published sources and the investigation described. No warranty is included, either express or implied, that the actual conditions will conform exactly to the assessments contained in this Document.
- Where data supplied by the client or other external sources, including previous site investigation data, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by Cardno for incomplete or inaccurate data supplied by others.
- Cardno may have retained sub consultants affiliated with Cardno to provide services for the benefit of Cardno. To the maximum extent allowed by law, the Client acknowledges and agrees it will not have any direct legal recourse to, and waives any claim, demand, or cause of action against, Cardno's affiliated companies, and their employees, officers and directors.

This assessment report is not any of the following:

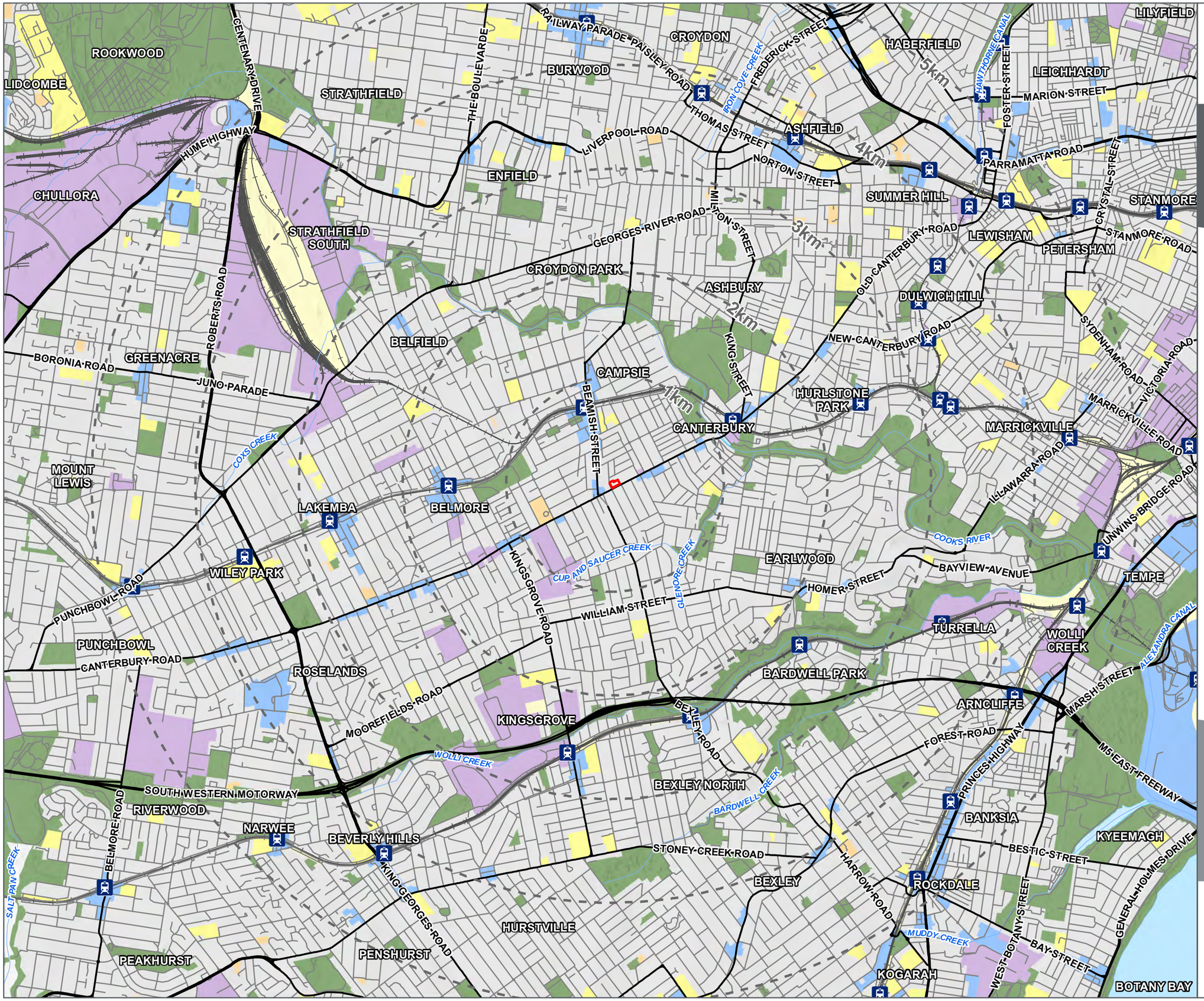
- A Preliminary Site Investigation, Remediation Action Plan or Validation Report.

- A Site Audit Report or Site Audit Statement (SAR/SAS) as defined under the Contaminated Land Management Act, 1997 or an assessment sufficient for an Environmental Auditor to be able to conclude a SAR/SAS.
- A geotechnical report and the bore logs/test pit logs may not be sufficient for geotechnical advice.
- A detailed hydrogeological assessment in conformance with NSW DEC (2007) Contaminated Sites: Guidelines for the Assessment and Management of Groundwater Contamination.
- An assessment of groundwater contaminants potentially arising from other sites or sources nearby.

A total assessment of the Site to determine suitability of the entire parcel of land at the Site for one or more beneficial uses of land.

APPENDIX A

FIGURES



HPG AUSTRALIA

Location Plan

453-459 CANTERBURY ROAD, CAMPSIE NSW

Legend

- Site Boundary
- Railway Station (NSW SS)
- Distance Buffer
- Major Road (NSW SS)
- Local Road (NSW SS)
- Major Watercourses (LPI)
- Railway (NSW SS)

Land Use (ABS, 2016)

- Other
- Commercial
- Education
- Hospital/Medical
- Industrial
- Parkland
- Primary Production
- Residential
- Water

FIGURE 1

1:35,000 Scale at A3

km: 0 | 0.5 | 1 | 1.5 | 2

N

Cardno

Map Produced by Cardno NSW/ACT Pty Ltd (NW&E)
Date: 2020-11-09 | Project: NE30028
Coordinate System: GDA 1994 MGA Zone 56
Map: NE30028-GS-005-LocationPlan.mxd 01
Basemap supplied by Esri and other thrid party suppliers

Site Plan

453-459 CANTERBURY ROAD, CAMPSIE NSW

Legend

- Site Boundary
- Inferred Groundwater Flow Direction
- Groundwater Contours (mAHD)
- 1m Contours (LPI LiDAR, 2013)
- Approximate Area of UST Impact
- Potential Waste Oil UST
- Cadastre (NSW SS, 2019)

FIGURE 2

1:400 Scale at A3

m
0 5 10 15 20

N

Cardno

Map Produced by Cardno NSW/ACT Pty Ltd (NW&E)
Date: 2020-11-09 | Project: NE30028
Coordinate System: GDA 1994 MGA Zone 56
Map: NE30028-GS-003-SiteMap.mxd 01
Aerial imagery supplied by Nearmap (October. 2020)

HPG AUSTRALIA

Sample and Monitoring Locations

453-459 CANTERBURY ROAD, CAMPSIE NSW

Legend

- Site Boundary
- Borehole Sample Location
- Groundwater Monitoring Well
- Approximate Area of UST Impact
- Potential Waste Oil UST
- Cadastre (NSW SS, 2019)

FIGURE 3

1:400 Scale at A3

m
0 5 10 15 20

N

Cardno

Map Produced by Cardno NSW/ACT Pty Ltd (NW&E)
Date: 2020-11-09 | Project: NE30028
Coordinate System: GDA 1994 MGA Zone 56
Map: NE30028-GS-002-SampleLocation.mxd 01
Aerial imagery supplied by Nearmap (October. 2020)

APPENDIX B

PHOTOGRAPHS

Photograph 1: Existing Monitoring Well on site at the south end of the site – MW3

Photograph 2: Existing Noise Monitoring on site

Photograph 3: Well Condition Check – MW3

Photograph 4: Well condition check – MW1

Photograph 5: Well Condition Check – MW2

Photograph 6: Anecdotal evidence of former UST below this slab of concrete

Photograph 7: Push tube samples in BH11 into the soil/rock interface – hydrocarbon impacted clay down to natural clays.

Photograph 8: Solid flight auger into natural clay

Photograph 9: Excess materials from MW06 borehole – former UST location. Borehole collapse on well installation due to instability.

Photograph 10: Groundwater extracted from MW06 showing sheen on the water.

APPENDIX C

RESULTS TABLES

		BTEX						TRH					CRC Care TRH Fractions						
		Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	C6 - C9	C10 - C14	C15 - C28	C29-C36	+C10 - C36 (Sum of total)	C6-C10	C10-C16	C16-C34	C34-C40	C10 - C40 (Sum of total)	F1: C6-C10 less BTEX	F2: >C10-C16 less Naphthalene
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR		0.1	0.1	0.1	0.2	0.1	0.3	20	20	50	50	50	20	50	100	100	100	20	50
CRCCARE 2011 Soil HSL for Direct Contact, Intrusive (0-1m)		1100	120000	85000			130000						82000	62000	85000	120000			
NEPM 1999 HIL, Residential B																			
NEPM 1999 Soil HSL Com./Ind. D, for Vapour Intrusion, Sand																			
1-2m		3	NL	NL			NL											370	NL
NEPM 1999 Management Limits, R/P&POS, Coarse Soil								700	1000				700	1000	2500	10000			
Field ID	**Sample Date**																		
BH11_3.2	30/09/2020	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50
BH11_4.5	30/09/2020	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	190	370	560	<20	<50	450	270	720	<20	<50
BH11_5.0	30/09/2020	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50
MW04_0.5	30/09/2020	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	62	80	142	<20	<50	110	<100	110	<20	<50
MW04_1.2	30/09/2020	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50
MW05_0.2	30/09/2020	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	71	71	<20	<50	<100	<100	<100	<20	<50
MW05_3.0	30/09/2020	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50
MW06_1.2	30/09/2020	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	25	1100	1700	2825	<20	<50	2400	960	3360	<20	<50
QA100	30/09/2020	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	75	130	205	<20	<50	160	110	270	<20	<50
Statistical Summary																			
Maximum Concentration		<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	25	1100	1700	2825	<20	<50	2400	960	3360	<20	<50
Average Concentration		0.05	0.05	0.05	0.1	0.05	0.15	10	12	172	272	434	10	25	374	182	523	10	25

		PAH																			
		Benzo(b+j)fluoranthene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	BaP TEQ (zero)	Benzo(a)pyrene TEQ (half LOR)	Benzo(a)pyrene TEQ (upper bound)	PAHs (Sum of total)
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
CRCCARE 2011 Soil HSL for Direct Contact, Intrusive (0-1m)															29000						
NEPM 1999 HIL, Residential B																			4		400
NEPM 1999 Soil HSL Com./Ind. D, for Vapour Intrusion, Sand																					
1-2m															NL						
NEPM 1999 Management Limits, R/P&POS, Coarse Soil																					
Field ID	**Sample Date**																				
BH11_3.2	30/09/2020	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5
BH11_4.5	30/09/2020	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5
BH11_5.0	30/09/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-
MW04_0.5	30/09/2020	0.8	<0.5	<0.5	<0.5	1	1.1	0.8	1.1	1	<0.5	1.9	<0.5	0.7	<0.5	0.7	2	1.5	1.7	2	11.1
MW04_1.2	30/09/2020	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5
MW05_0.2	30/09/2020	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5
MW05_3.0	30/09/2020	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5
MW06_1.2	30/09/2020	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	0.6	1.2	0.6
QA100	30/09/2020	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5
Statistical Summary																					
Maximum Concentration		0.8	<0.5	<0.5	<0.5	1	1.1	0.8	1.1	1	<0.5	1.9	<0.5	0.7	<0.5	0.7	2	1.5	1.7	2	11.1
Average Concentration		0.32	0.25	0.25	0.25	0.34	0.36	0.32	0.36	0.34	0.25	0.46	0.25	0.31	0.25	0.31	0.51	0.41	0.74	1.3	1.7

		Metals							
		Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR		2	0.4	5	5	5	0.1	5	5
CRCCARE 2011 Soil HSL for Direct Contact, Intrusive (0-1m)									
NEPM 1999 HIL, Residential B		500	150		30000	1200	120	1200	60000
NEPM 1999 Soil HSL Com./Ind. D, for Vapour Intrusion, Sand									
1-2m									
NEPM 1999 Management Limits, R/P&POS, Coarse Soil									
Field ID	**Sample Date**								
BH11_3.2	30/09/2020	<2	<0.4	12	16	16	<0.1	<5	16
BH11_4.5	30/09/2020	9.2	<0.4	17	29	35	<0.1	<5	61
BH11_5.0	30/09/2020	-	-	-	-	-	-	-	-
MW04_0.5	30/09/2020	8.1	<0.4	32	20	56	<0.1	11	61
MW04_1.2	30/09/2020	14	<0.4	54	10	34	<0.1	8.4	8.5
MW05_0.2	30/09/2020	3.6	<0.4	33	650	96	0.1	93	390
MW05_3.0	30/09/2020	15	<0.4	46	22	38	<0.1	5	19
MW06_1.2	30/09/2020	20	<0.4	19	130	300	0.5	25	230
QA100	30/09/2020	5.2	<0.4	34	1300	310	0.3	97	560
Statistical Summary									
Maximum Concentration		20	<0.4	54	1300	310	0.5	97	560
Average Concentration		9.5	0.2	31	272	111	0.14	31	168

		BTEX						TRH					CRC Care TRH Fractions						
		Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	C6 - C9	C10 - C14	C15 - C28	C29-C36	+C10 - C36 (Sum of total)	C6-C10	C10-C16	C16-C34	C34-C40	C10 - C40 (Sum of total)	F1: C6-C10 less BTEX	F2: >C10-C16 less Naphthalene
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR		0.1	0.1	0.1	0.2	0.1	0.3	20	20	50	50	50	20	50	100	100	100	20	50
NEPM 1999 EIL UR/POS, low pH, CEC, clay content - aged (0-2m)																			
NEPM 1999 ESL UR/POS, Coarse Soil (0-2m)		50	85	70			105							120	300	2800		180	
CRC Care 2017 Technical Report 39																			
Field ID	**Sample Date**																		
BH11_3.2	30/09/2020	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50
BH11_4.5	30/09/2020	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	190	370	560	<20	<50	450	270	720	<20	<50
BH11_5.0	30/09/2020	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50
MW04_0.5	30/09/2020	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	62	80	142	<20	<50	110	<100	110	<20	<50
MW04_1.2	30/09/2020	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50
MW05_0.2	30/09/2020	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	71	71	<20	<50	<100	<100	<100	<20	<50
MW05_3.0	30/09/2020	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	<50	<50	<50	<20	<50	<100	<100	<100	<20	<50
MW06_1.2	30/09/2020	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	25	1100	1700	2825	<20	<50	2400	960	3360	<20	<50
QA100	30/09/2020	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<20	75	130	205	<20	<50	160	110	270	<20	<50
Statistical Summary																			
Maximum Concentration		<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	25	1100	1700	2825	<20	<50	2400	960	3360	<20	<50
Average Concentration		0.05	0.05	0.05	0.1	0.05	0.15	10	12	172	272	434	10	25	374	182	523	10	25

		PAH																			
		Benzo(b+j)fluoranthene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Benzo(a)pyrene TEQ (zero)	Benzo(a)pyrene TEQ (half LOR)	Benzo(a)pyrene TEQ (upper bound)	PAHs (Sum of total)
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NEPM 1999 EIL UR/POS, low pH, CEC, clay content - aged (0-2m)															170						
NEPM 1999 ESL UR/POS, Coarse Soil (0-2m)							0.7														
CRC Care 2017 Technical Report 39							20														
Field ID	**Sample Date**																				
BH11_3.2	30/09/2020	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5
BH11_4.5	30/09/2020	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5
BH11_5.0	30/09/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-	-	-	-
MW04_0.5	30/09/2020	0.8	<0.5	<0.5	<0.5	1	1.1	0.8	1.1	1	<0.5	1.9	<0.5	0.7	<0.5	0.7	2	1.5	1.7	2	11.1
MW04_1.2	30/09/2020	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5
MW05_0.2	30/09/2020	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5
MW05_3.0	30/09/2020	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5
MW06_1.2	30/09/2020	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	0.6	1.2	0.6
QA100	30/09/2020	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.5
Statistical Summary																					
Maximum Concentration		0.8	<0.5	<0.5	<0.5	1	1.1	0.8	1.1	1	<0.5	1.9	<0.5	0.7	<0.5	0.7	2	1.5	1.7	2	11.1
Average Concentration		0.32	0.25	0.25	0.25	0.34	0.36	0.32	0.36	0.34	0.25	0.46	0.25	0.31	0.25	0.31	0.51	0.41	0.74	1.3	1.7

		Metals							
		Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR		2	0.4	5	5	5	0.1	5	5
NEPM 1999 EIL UR/POS, low pH, CEC, clay content - aged (0-2m)		100		190	60	1100		30	70
NEPM 1999 ESL UR/POS, Coarse Soil (0-2m)									
CRC Care 2017 Technical Report 39									
Field ID	**Sample Date**								
BH11_3.2	30/09/2020	<2	<0.4	12	16	16	<0.1	<5	16
BH11_4.5	30/09/2020	9.2	<0.4	17	29	35	<0.1	<5	61
BH11_5.0	30/09/2020	-	-	-	-	-	-	-	-
MW04_0.5	30/09/2020	8.1	<0.4	32	20	56	<0.1	11	61
MW04_1.2	30/09/2020	14	<0.4	54	10	34	<0.1	8.4	8.5
MW05_0.2	30/09/2020	3.6	<0.4	33	650	96	0.1	93	390
MW05_3.0	30/09/2020	15	<0.4	46	22	38	<0.1	5	19
MW06_1.2	30/09/2020	20	<0.4	19	130	300	0.5	25	230
QA100	30/09/2020	5.2	<0.4	34	1300	310	0.3	97	560
Statistical Summary									
Maximum Concentration		20	<0.4	54	1300	310	0.5	97	560
Average Concentration		9.5	0.2	31	272	111	0.14	31	168

		BTEX						TRH					CRC Care TRH Fractions						
		Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	C6 - C9	C10 - C14	C15 - C28	C29-C36	+C10 - C36 (Sum of total)	C6-C10	C10-C16	C16-C34	C34-C40	C10 - C40 (Sum of total)	F1: C6-C10 less BTEX	F2: >C10-C16 less Naphthalene
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR		1	1	1	2	1	3	20	50	100	100	100	20	50	100	100	100	20	50
ADWG 2011 Health		1	800	300			600												
NEPM 2013 GW HSL Residential A&B, for Vapour Intrusion, Sand (2-4m)		800	NL	NL			NL											1000	1000
Field ID	**Sample Date**																		
MW01	7/10/2020	<1	<1	<1	<2	<1	<3	<20	<50	<100	<100	<100	<20	<50	<100	<100	<100	<20	<50
MW02	7/10/2020	<1	<1	<1	<2	<1	<3	<20	<50	<100	<100	<100	<20	<50	<100	<100	<100	<20	<50
MW03	7/10/2020	<1	<1	<1	<2	<1	<3	<20	<50	<100	<100	<100	<20	<50	<100	<100	<100	<20	<50
MW04	7/10/2020	<1	<1	<1	<2	<1	<3	<20	<50	<100	<100	<100	<20	<50	<100	<100	<100	<20	<50
MW05	7/10/2020	<1	<1	<1	<2	<1	<3	<20	<50	400	<100	400	<20	<50	300	<100	300	<20	<50
MW06	7/10/2020	<1	<1	<1	<2	<1	<3	<20	60	1300	1500	2860	<20	90	2400	1000	3490	<20	90
Statistical Summary																			
Maximum Concentration		<1	<1	<1	<2	<1	<3	<20	60	1300	1500	2860	<20	90	2400	1000	3490	<20	90
Average Concentration		0.5	0.5	0.5	1	0.5	1.5	10	31	317	292	577	10	36	483	208	665	10	36

Prepared by: TM
Checked by: CC

		PAH																
		Benzo(b+j)fluoranthene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ADWG 2011 Health							0.01											
NEPM 2013 GW HSL Residential A&B, for Vapour Intrusion, Sand (2-4m)															NL			
Field ID	**Sample Date**																	
MW01	7/10/2020	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
MW02	7/10/2020	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
MW03	7/10/2020	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
MW04	7/10/2020	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
MW05	7/10/2020	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
MW06	7/10/2020	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Statistical Summary																		
Maximum Concentration		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Average Concentration		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

		Metals															
		Arsenic	Arsenic (Filtered)	Cadmium	Cadmium (Filtered)	Chromium (III+VI)	Chromium (III+VI) (Filtered)	Copper	Copper (Filtered)	Lead	Lead (Filtered)	Mercury	Mercury (Filtered)	Nickel	Nickel (Filtered)	Zinc	Zinc (Filtered)
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOR		0.001	0.001	0.0002	0.0002	0.001	0.001	0.001	0.001	0.001	0.001	0.0001	0.0001	0.001	0.001	0.005	0.005
ADWG 2011 Health		0.01	0.01	0.002	0.002			2	2	0.01	0.01	0.001	0.001	0.02	0.02		
NEPM 2013 GW HSL Residential A&B, for Vapour Intrusion, Sand (2-4m)																	
Field ID	**Sample Date**																
MW01	7/10/2020	0.002	0.001	<0.0002	<0.0002	0.001	<0.001	0.007	0.01	0.002	<0.001	<0.0001	<0.0001	0.014	0.013	0.084	0.07
MW02	7/10/2020	<0.001	0.001	<0.0002	<0.0002	0.002	0.001	0.024	0.022	0.005	0.004	<0.0001	<0.0001	0.002	0.002	0.034	0.032
MW03	7/10/2020	0.002	<0.001	<0.0002	<0.0002	0.002	<0.001	0.006	0.006	0.001	<0.001	0.0003	<0.0001	0.002	0.001	0.01	0.006
MW04	7/10/2020	0.003	0.002	0.0009	0.0009	<0.001	<0.001	0.11	0.062	0.001	<0.001	<0.0001	<0.0001	0.087	0.081	2.9	2.8
MW05	7/10/2020	0.002	0.001	0.0003	0.0002	0.002	<0.001	0.035	0.002	0.017	<0.001	<0.0001	<0.0001	0.023	0.016	0.22	0.16
MW06	7/10/2020	0.045	0.002	0.0006	<0.0002	0.014	<0.001	0.17	0.002	0.53	<0.001	0.0009	<0.0001	0.02	0.006	0.43	0.015
Statistical Summary																	
Maximum Concentration		0.045	0.002	0.0009	0.0009	0.014	0.001	0.17	0.062	0.53	0.004	0.0009	<0.0001	0.087	0.081	2.9	2.8
Average Concentration		0.0091	0.0013	0.00035	0.00025	0.0036	0.00058	0.059	0.017	0.093	0.0011	0.00023	0.00005	0.025	0.02	0.61	0.51

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445-459 Canterbury Road, Campsie

		BTEX						TRH					CRC Care TRH Fractions						
		Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	C6 - C9	C10 - C14	C15 - C28	C29-C36	+C10 - C36 (Sum of total)	C6-C10	C10-C16	C16-C34	C34-C40	C10 - C40 (Sum of total)	F1: C6-C10 less BTEX	F2: >C10-C16 less Naphthalene
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR		1	1	1	2	1	3	20	50	100	100	100	20	50	100	100	100	20	50
ANZG (2018) Freshwater 95% toxicant DGVs		950				350													
ANZG (2018) Freshwater 99% toxicant DGVs		600				200													
Field ID	**Sample Date**																		
MW01	7/10/2020	<1	<1	<1	<2	<1	<3	<20	<50	<100	<100	<100	<20	<50	<100	<100	<100	<20	<50
MW02	7/10/2020	<1	<1	<1	<2	<1	<3	<20	<50	<100	<100	<100	<20	<50	<100	<100	<100	<20	<50
MW03	7/10/2020	<1	<1	<1	<2	<1	<3	<20	<50	<100	<100	<100	<20	<50	<100	<100	<100	<20	<50
MW04	7/10/2020	<1	<1	<1	<2	<1	<3	<20	<50	<100	<100	<100	<20	<50	<100	<100	<100	<20	<50
MW05	7/10/2020	<1	<1	<1	<2	<1	<3	<20	<50	400	<100	400	<20	<50	300	<100	300	<20	<50
MW06	7/10/2020	<1	<1	<1	<2	<1	<3	<20	60	1300	1500	2860	<20	90	2400	1000	3490	<20	90
Statistical Summary																			
Maximum Concentration		<1	<1	<1	<2	<1	<3	<20	60	1300	1500	2860	<20	90	2400	1000	3490	<20	90
Average Concentration		0.5	0.5	0.5	1	0.5	1.5	10	31	317	292	577	10	36	483	208	665	10	36

Prepared by: TM
Checked by: CC

		PAH																
		Benzo(b+j)fluoranthene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ANZG (2018) Freshwater 95% toxicant DGVs															16			
ANZG (2018) Freshwater 99% toxicant DGVs															2.5			
Field ID	**Sample Date**																	
MW01	7/10/2020	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
MW02	7/10/2020	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
MW03	7/10/2020	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
MW04	7/10/2020	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
MW05	7/10/2020	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
MW06	7/10/2020	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Statistical Summary																		
Maximum Concentration		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Average Concentration		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

		Metals															
		Arsenic	Arsenic (Filtered)	Cadmium	Cadmium (Filtered)	Chromium (III+VI)	Chromium (III+VI) (Filtered)	Copper	Copper (Filtered)	Lead	Lead (Filtered)	Mercury	Mercury (Filtered)	Nickel	Nickel (Filtered)	Zinc	Zinc (Filtered)
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LOR		0.001	0.001	0.0002	0.0002	0.001	0.001	0.001	0.001	0.001	0.001	0.0001	0.0001	0.001	0.001	0.005	0.005
ANZG (2018) Freshwater 95% toxicant DGVs				0.0002	0.0002			0.0014	0.0014	0.0034	0.0034	0.0006	0.0006	0.011	0.011	0.008	0.008
ANZG (2018) Freshwater 99% toxicant DGVs				0.00006	0.00006			0.001	0.001	0.001	0.001	0.00006	0.00006	0.008	0.008	0.0024	0.0024
Field ID	**Sample Date**																
MW01	7/10/2020	0.002	0.001	<0.0002	<0.0002	0.001	<0.001	0.007	0.01	0.002	<0.001	<0.0001	<0.0001	0.014	0.013	0.084	0.07
MW02	7/10/2020	<0.001	0.001	<0.0002	<0.0002	0.002	0.001	0.024	0.022	0.005	0.004	<0.0001	<0.0001	0.002	0.002	0.034	0.032
MW03	7/10/2020	0.002	<0.001	<0.0002	<0.0002	0.002	<0.001	0.006	0.006	0.001	<0.001	0.0003	<0.0001	0.002	0.001	0.01	0.006
MW04	7/10/2020	0.003	0.002	0.0009	0.0009	<0.001	<0.001	0.11	0.062	0.001	<0.001	<0.0001	<0.0001	0.087	0.081	2.9	2.8
MW05	7/10/2020	0.002	0.001	0.0003	0.0002	0.002	<0.001	0.035	0.002	0.017	<0.001	<0.0001	<0.0001	0.023	0.016	0.22	0.16
MW06	7/10/2020	0.045	0.002	0.0006	<0.0002	0.014	<0.001	0.17	0.002	0.53	<0.001	0.0009	<0.0001	0.02	0.006	0.43	0.015
Statistical Summary																	
Maximum Concentration		0.045	0.002	0.0009	0.0009	0.014	0.001	0.17	0.062	0.53	0.004	0.0009	<0.0001	0.087	0.081	2.9	2.8
Average Concentration		0.0091	0.0013	0.00035	0.00025	0.0036	0.00058	0.059	0.017	0.093	0.0011	0.00023	0.00005	0.025	0.02	0.61	0.51

Field ID	Duplicate	Benzene	Toluene	Ethylbenzene	Xylene Total	C6 - C9	+C10 - C36 (Sum of total)	Benzo(a)pyrene		PAHs (Sum of total)
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg
LOR		0.1	0.1	0.1	0.3	20	50	0.5	0.001	0.5
NSW 2014 General Solid Waste CT1 (No Leaching)		10	288	600	1,000	650	10,000	0.8	-	200
NSW 2014 General Solid Waste SCC1 (with leached)		18	518	1,080	1,800	650	10,000	10	-	-
NSW 2014 General Solid Waste TCLP1 (leached)		-	-	-	-	-	-	-	0.04	-
BH11_3.2		<0.1	<0.1	<0.1	<0.3	<20	<50	<0.5	-	<0.5
BH11_4.5		<0.1	<0.1	<0.1	<0.3	<20	**560**	<0.5	-	<0.5
BH11_5.0		<0.1	<0.1	<0.1	<0.3	<20	<50	-	-	-
MW04_0.5		<0.1	<0.1	<0.1	<0.3	<20	**142**	**1.1**	<0.001	**11.1**
MW04_1.2		<0.1	<0.1	<0.1	<0.3	<20	<50	<0.5	-	<0.5
MW05_0.2	**QA100**	<0.1	<0.1	<0.1	<0.3	<20	**71**	<0.5	-	<0.5
MW05_3.0		<0.1	<0.1	<0.1	<0.3	<20	<50	<0.5	-	<0.5
MW06_1.2		<0.1	<0.1	<0.1	<0.3	<20	**2,825**	<0.5	-	**0.6**
QA100	**MW05_0.2**	<0.1	<0.1	<0.1	<0.3	<20	**205**	<0.5	-	<0.5

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Checked by: CC

Field ID	Duplicate	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead		Mercury	Nickel		Zinc
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/L	mg/kg
LOR		2	0.4	5	5	5	0.01	0.1	5	0.01	5
NSW 2014 General Solid Waste CT1 (No Leaching)		100	20	100	-	100	-	4	40	-	-
NSW 2014 General Solid Waste SCC1 (with leached)		500	100	1,900	-	1,500	-	50	1,050	-	-
NSW 2014 General Solid Waste TCLP1 (leached)		-	-	-	-	-	5	-	-	2	-
BH11_3.2		<2	<0.4	**12**	**16**	**16**	-	<0.1	<5	-	**16**
BH11_4.5		**9.2**	<0.4	**17**	**29**	**35**	-	<0.1	<5	-	**61**
BH11_5.0		-	-	-	-	-	-	-	-	-	-
MW04_0.5		**8.1**	<0.4	**32**	**20**	**56**	-	<0.1	**11**	-	**61**
MW04_1.2		**14**	<0.4	**54**	**10**	**34**	-	<0.1	**8.4**	-	**8.5**
MW05_0.2	**QA100**	**3.6**	<0.4	**33**	**650**	**96**	-	**0.1**	**93**	**0.12**	**390**
MW05_3.0		**15**	<0.4	**46**	**22**	**38**	-	<0.1	**5**	-	**19**
MW06_1.2		**20**	<0.4	**19**	**130**	**300**	**0.33**	**0.5**	**25**	-	**230**
QA100	**MW05_0.2**	**5.2**	<0.4	**34**	**1,300**	**310**	**0.03**	**0.3**	**97**	**0.1**	**560**

Prepared by: TM
Checked by: CC

			Field ID	MW05_0.2	QA100	
			Matrix Type	soil	soil	
			Date	30/09/2020	30/09/2020	RPD
Chemical Group	Chemical Name	Unit	EQL			
BTEX						
	Benzene	mg/kg	0.1	<0.1	<0.1	0
	Toluene	mg/kg	0.1	<0.1	<0.1	0
	Ethylbenzene	mg/kg	0.1	<0.1	<0.1	0
	Xylene (m & p)	mg/kg	0.2	<0.2	<0.2	0
	Xylene (o)	mg/kg	0.1	<0.1	<0.1	0
	Xylene Total	mg/kg	0.3	<0.3	<0.3	0
TRH						
	C6 - C9	mg/kg	20	<20	<20	0
	C10 - C14	mg/kg	20	<20	<20	0
	C15 - C28	mg/kg	50	<50	75	40
	C29-C36	mg/kg	50	71	130	59
	+C10 - C36 (Sum of total)	mg/kg	50	71	205	97
CRC Care TPH Fractions						
	C6-C10	mg/kg	20	<20	<20	0
	C10-C16	mg/kg	50	<50	<50	0
	C16-C34	mg/kg	100	<100	160	46
	C34-C40	mg/kg	100	<100	110	10
	C10 - C40 (Sum of total)	mg/kg	100	<100	270	92
	F1: C6-C10 less BTEX	mg/kg	20	<20	<20	0
	F2: >C10-C16 less NAPHTHALENE	mg/kg	50	<50	<50	0
PAH						
	BaP TEQ (zero)	mg/kg	0.5	<0.5	<0.5	0
	Benzo(a)pyrene TEQ (half LOR)_	mg/kg	0.5	0.6	0.6	0
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG		1.2	1.2	0
	Benzo(b+j)fluoranthene	mg/kg	0.5	<0.5	<0.5	0
	Acenaphthene	mg/kg	0.5	<0.5	<0.5	0
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	0
	Anthracene	mg/kg	0.5	<0.5	<0.5	0
	Benz(a)anthracene	mg/kg	0.5	<0.5	<0.5	0
	Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	0
	Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	0
	Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	0
	Chrysene	mg/kg	0.5	<0.5	<0.5	0
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	0
	Fluoranthene	mg/kg	0.5	<0.5	<0.5	0
	Fluorene	mg/kg	0.5	<0.5	<0.5	0
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	0
	Naphthalene	mg/kg	0.5	<0.5	<0.5	0
	PAHs (Sum of total)	mg/kg	0.5	<0.5	<0.5	0
	Phenanthrene	mg/kg	0.5	<0.5	<0.5	0
	Pyrene	mg/kg	0.5	<0.5	<0.5	0
Metals						
	Arsenic	mg/kg	2	3.6	5.2	36
	Cadmium	mg/kg	0.4	<0.4	<0.4	0
	Chromium (III+VI)	mg/kg	5	33	34	3
	Copper	mg/kg	5	650	1,300	67
	Lead	mg/kg	5	96	310	105
	Mercury	mg/kg	0.1	0.1	0.3	100
	Nickel	mg/kg	5	93	97	4
	Zinc	mg/kg	5	390	560	36

HPG Australia
445-459 Canterbury Road, Campsie

			Field ID	MW03	QA100	
			Matrix Type	water	water	
			Date	7/10/2020	7/10/2020	RPD
Chemical Group	**Chemical Name**	**Unit**	EQL			
BTEX						
	Benzene	**µg/L**	1	<1	<1	0
	Toluene	**µg/L**	1	<1	<1	0
	Ethylbenzene	**µg/L**	1	<1	<1	0
	Xylene (m & p)	**µg/L**	2	<2	<2	0
	Xylene (o)	**µg/L**	1	<1	<1	0
	Xylene Total	**ug/L**	3	<3	<3	0
TRH						
	C6 - C9	**µg/L**	20	<20	<20	0
	C10 - C14	**µg/L**	50	<50	<50	0
	C15 - C28	**µg/L**	100	<100	<100	0
	C29-C36	**µg/L**	100	<100	<100	0
	+C10 - C36 (Sum of total)	**µg/L**	100	<100	<100	0
CRC Care TRH Fractions						
	C6-C10	**µg/L**	20	<20	<20	0
	C10-C16	**µg/L**	50	<50	<50	0
	C16-C34	**µg/L**	100	<100	<100	0
	C34-C40	**µg/L**	100	<100	<100	0
	C10 - C40 (Sum of total)	**µg/L**	100	<100	<100	0
	F1: C6-C10 less BTEX	**µg/L**	20	<20	<20	0
	F2: >C10-C16 less NAPHTHALENE	**µg/L**	50	<50	<50	0
PAH						
	Benzo(b+j)fluoranthene	**µg/L**	1	<1	<1	0
	Acenaphthene	**µg/L**	1	<1	<1	0
	Acenaphthylene	**µg/L**	1	<1	<1	0
	Anthracene	**µg/L**	1	<1	<1	0
	Benz(a)anthracene	**µg/L**	1	<1	<1	0
	Benzo(a)pyrene	**mg/L**	0.001	<0.001	<0.001	0
	Benzo(g,h,i)perylene	**µg/L**	1	<1	<1	0
	Benzo(k)fluoranthene	**µg/L**	1	<1	<1	0
	Chrysene	**µg/L**	1	<1	<1	0
	Dibenz(a,h)anthracene	**µg/L**	1	<1	<1	0
	Fluoranthene	**µg/L**	1	<1	<1	0
	Fluorene	**µg/L**	1	<1	<1	0
	Indeno(1,2,3-c,d)pyrene	**µg/L**	1	<1	<1	0
	Naphthalene	**µg/L**	1	<1	<1	0
	PAHs (Sum of total)	**µg/L**	1	<1	<1	0
	Phenanthrene	**µg/L**	1	<1	<1	0
	Pyrene	**µg/L**	1	<1	<1	0
Metals						
	Arsenic	**µg/L**	1	**2**	**2**	0
	Arsenic (filtered)	**µg/L**	1	<1	<1	0
	Cadmium	**µg/L**	0.2	<0.2	<0.2	0
	Cadmium (filtered)	**µg/L**	0.2	<0.2	<0.2	0
	Chromium (III+VI)	**µg/L**	1	**2**	**2**	0
	Chromium (III+VI) (filtered)	**µg/L**	1	<1	<1	0
	Copper	**µg/L**	1	**6**	**10**	**50**
	Copper (filtered)	**µg/L**	1	**6**	**5**	**18**
	Lead	**mg/L**	0.001	**0.001**	**0.002**	**67**
	Lead (filtered)	**mg/L**	0.001	<0.001	<0.001	0
	Mercury	**mg/L**	0.0001	**0.0003**	**0.0004**	**29**
	Mercury (filtered)	**mg/L**	0.0001	<0.0001	<0.0001	0
	Nickel	**mg/L**	0.001	**0.002**	**0.002**	0
	Nickel (filtered)	**mg/L**	0.001	**0.001**	**0.002**	**67**
	Zinc	**µg/L**	5	**10**	**15**	**40**
	Zinc (filtered)	**µg/L**	5	**6**	**6**	0

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Checked by: CC

			BTEX						TPH					CRC Care TPH Fractions						
			Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	C6 - C9	C10 - C14	C15 - C28	C29-C36	+C10 - C36 (Sum of total)	C6-C10	C10-C16	C16-C34	C34-C40	C10 - C40 (Sum of total)	F1: C6-C10 less BTEX	F2: >C10-C16 less NAPHTHALENE
			µg/L	µg/L	µg/L	µg/L	µg/L	ug/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR			1	1	1	2	1	3	20	50	100	100	100	20	50	100	100	100	20	50
Sample	**Matrix Type**	**Date**																		
RINSATE	**water**	**7/10/2020**	<1	<1	<1	<2	<1	<3	<20	<50	<100	<100	<100	<20	<50	<100	<100	<100	<20	<50
Trip BLANK	**water**	**7/10/2020**	<1	<1	<1	<2	<1	<3	<20	-	-	-	-	<20	-	-	-	-	<20	-
Trip SPIKE (Results as %)	**water**	**7/10/2020**	110	110	110	110	110	110	96	-	-	-	-	89	-	-	-	-	-	-

Prepared by: TM
Checked by: CC

			PAH															
			Benzo(b+j)fluoranthene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	PAHs (Sum of total)	Phenanthrene	Pyrene
			µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
LOR			1	1	1	1	1	0.001	1	1	1	1	1	1	1	1	1	1	1
Sample	**Matrix Type**	**Date**																	
RINSATE	**water**	**7/10/2020**	<1	<1	<1	<1	<1	<0.001	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trip BLANK	**water**	**7/10/2020**	-	-	-	-	-	-	-	-	-	-	-	-	-	<10	-	-	-
Trip SPIKE (Results as %)	**water**	**7/10/2020**	-	-	-	-	-	-	-	-	-	-	-	-	-	110	-	-	-

Prepared by: TM
Checked by: CC

APPENDIX

D

BOREHOLE LOGS

REPORT OF BOREHOLE: BH11

SHEET: 1 OF 1

CLIENT: Hailiang Property Group
PROJECT: 445-459 Canterbury Road
LOCATION: Canterbury Road Campsie
JOB NO: NE30028

INCLINATION: -90°
HOLE DEPTH: 6.00 m

DRILL RIG: Comacchio
CONTRACTOR: Stratacore
LOGGED: TM DATE: 30/9/20
CHECKED: TM DATE: 28/10/20

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
		0		BH11-0.3 0.30 m 5.6 PID (ppm)			FILL - SURFACE COVERING, silt with gravels, pale grey FILL - CLAY, with silt and gravels, low plasticity		
							CLAY, mottle of red and grey, low plasticity		
				BH11-0.8 0.80 m 7.2 PID (ppm)			SANDY CLAY, moist, with gravels, brown		
		1					CLAY, moderate plasticity, grey, wet, hydrocarbon odour		
				BH11-1.5 1.50 m 11.3 PID (ppm)					
		2					CLAY, dry, crumbly, pale grey, hydrocarbon odour		
				BH11-2.5 2.50 m 6.7 PID (ppm)					
		3		BH11-3.2 3.20 m 10.3 PID (ppm)					
		4					CLAY, dry, crumbly, orange, faint hydro-carbon odour		
				BH11-4.5 4.50 m 5.4 PID (ppm)					
		5		BH11-5.0 5.00 m 5.7 PID (ppm)					
				BH11-5.5 5.50 m 11.5 PID (ppm)					
		6	6.00	BH11-6.0 6.00 m 18.0 PID (ppm)			END OF BOREHOLE @ 6.00 m TARGET DEPTH		

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for contamination purposes only, without attempt to assess geotechnical properties. Any reference to geotechnical properties are for information purposes only and are not to be used for construction purposes.

GAP gINT FN. F05
RL3

REPORT OF BOREHOLE: MW04

SHEET: 1 OF 1

CLIENT: Hailiang Property Group
PROJECT: 445-459 Canterbury Road
LOCATION: Canterbury Road Campsie
JOB NO: NE30028

INCLINATION: -90°
HOLE DEPTH: 3.00 m

DRILL RIG: Comacchio
CONTRACTOR: Stratacore
LOGGED: TM DATE: 30/9/20
CHECKED: TM DATE: 28/10/20

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
	07/10/20, SWL (mTOC): 1.40	0		MW04_0.1 0.10 m			FILL - SILTY SAND, with gravels and asphalt		Backfill
							FILL - CLAY, low to medium plasticity, brown, trace gravels		Bentonite
				MW04_0.5 0.50 m 3.5 PID (ppm)					
		1					CLAY, high plasticity, plant organics, brown to dark brown mottle, moist		
				MW04_1.2 1.20 m 4.5 PID (ppm)					
		2					CLAY, moderate to high plasticity, clay gravels, orange, red to pale grey mottle		Sand
				MW04_2.3 2.30 m					
			3.00						
		3		MW04_3.0 3.00 m 4.7 PID (ppm)			END OF BOREHOLE @ 3.00 m TARGET DEPTH		
		4							
		5							
		6							

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GAP gINT FN. F05
RL3

REPORT OF BOREHOLE: MW05

SHEET: 1 OF 1

CLIENT: Hailiang Property Group
PROJECT: 445-459 Canterbury Road
LOCATION: Canterbury Road Campsie
JOB NO: NE30028

INCLINATION: -90°
HOLE DEPTH: 3.00 m

DRILL RIG: Comacchio
CONTRACTOR: Stratacore
LOGGED: TM DATE: 30/9/20
CHECKED: TM DATE: 28/10/20

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
	SWL (mTOC): 1.41	0		MW05_0.2 (QA100/QA200) 0.20 m 3.2 PID (ppm)			FILL - SURFACE COVERING, gravelly silt, grey FILL - SAND WITH GRAVELS, brown		Backfill
							CLAY WITH GRAVELS, brown, low plasticity		Bentonite
		1		MW05_0.6 0.60 m			MOIST CLAY, moderate plasticity, brown		
				MW05_1.2 1.20 m 4.5 PID (ppm)					
							CLAY, moderate plasticity, red, with clay gravels		
		2		MW05_2.0 2.00 m 3.3 PID (ppm)					Sand
			3.00						
		3		MW05_3.0 3.00 m 4.2 PID (ppm)			END OF BOREHOLE @ 3.00 m TARGET DEPTH		
		4							
		5							
		6							

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for contamination purposes only, without attempt to assess geotechnical properties. Any references to geotechnical properties are for information only and are not to be used for construction purposes.

GAP gINT FN. F05
RL3

REPORT OF BOREHOLE: MW06

SHEET: 1 OF 1

CLIENT: Hailiang Property Group
PROJECT: 445-459 Canterbury Road
LOCATION: Canterbury Road Campsie
JOB NO: NE30028

INCLINATION: -90°
HOLE DEPTH: 6.00 m

DRILL RIG: Comacchio
CONTRACTOR: Stratacore
LOGGED: TM DATE: 30/9/20
CHECKED: TM DATE: 28/10/20

Drilling				Sampling		Field Material Description and Instrumentation			
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
	SWL (mTOC): 1.63	0		MW06_0.2 0.20 m 5.0 PID (ppm)			FILL - SURFACE COVER, silt with gravels FILL - SILTY CLAY, with sand, brown mottle, brick fragment		Backfill Bentonite
		1		MW06_0.6 0.60 m 4.9 PID (ppm)			FILL - CLAY, with sand and gravels, low plasticity		
				MW06_1.2 1.20 m 10.9 PID (ppm)			FILL - CLAYEY SAND, dark grey, moist, strong hydrocarbon odour		
		2		MW06_2.0 2.00 m 8.3 PID (ppm)			FILL - CLAY, orange-brown-grey mottle, moist with clay gravels		Sand
		3		MW06_3.0 3.00 m 8.7 PID (ppm)			FILL - GRAVELLY SAND, wet, dark grey with brown clay		
		4							
		5							
		6	6.00				END OF BOREHOLE @ 6.00 m TARGET DEPTH		

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for contamination purposes only, without attempt to assess geotechnical properties. Any reference to geotechnical properties are for information purposes only and are not to be used for construction purposes.

GAP gINT FN. F05
RL3

APPENDIX

E

LABORATORY CERTIFICATES

Cardno
Shaping the Future

CHAIN OF CUSTODY AND ANALYSIS REQUEST

Contact Person:	Chris Cook	**Project Name:**	445-459 Canterbury Road, Campsie
Telephone Number:	0415 753 569	**Project Number:**	NE30028
Alternative Contact:	Tiffany Mabbott	**PO No.:**	
Telephone Number:	0455 278 841	**Project Specific Quote No. :**	191218CDNN
Sampler:	Tiffany Mabbott	**Date results required:**	5 day TAT
Email Address (results and invoice):	christopher.cook@cardno.com.au; tiffany.mabbott@cardno.com.au; contamsouthcoast@com.au	**Report format:**	Electronic
Address: Level 9 - The Forum, 203 Pacific Highway, St Leonards, New South Wales 2065			

Sample information						Analysis Required											
Cardno Sample ID	Laboratory Sample ID	No. Containers	Preservation	Date sampled	Matrix	B7 TRH/BTEXN/PAH/Metals 8	TRH/BTEX	HOLD									
MW04_0.1		1	ICE	30/09/2020	Soil			X									
MW04_0.5		1	ICE	30/09/2020	Soil	1											
MW04_1.2		1	ICE	30/09/2020	Soil	1											
MW04_2.3		1	ICE	30/09/2020	Soil			X									
MW04_3.0		1	ICE	30/09/2020	Soil			X									
MW05_0.2		1	ICE	30/09/2020	Soil	1											
MW05_0.6		1	ICE	30/09/2020	Soil			X									
MW05_1.2		1	ICE	30/09/2020	Soil			X									
MW05_2.0		1	ICE	30/09/2020	Soil			X									
MW05_3.0		1	ICE	30/09/2020	Soil	1											
MW06_0.2		1	ICE	30/09/2020	Soil			X									
MW06_0.6		1	ICE	30/09/2020	Soil			X									
MW06_1.2		1	ICE	30/09/2020	Soil	1											
MW06_2.0		1	ICE	30/09/2020	Soil			X									
MW06_3.0		1	ICE	30/09/2020	Soil			X									
BH11_0.3		1	ICE	30/09/2020	Soil			X									
BH11_0.8		1	ICE	30/09/2020	Soil			X									
BH11_1.5		1	ICE	30/09/2020	Soil			X									
BH11_2.5		1	ICE	30/09/2020	Soil			X									
BH11_3.2		1	ICE	30/09/2020	Soil	1											
BH11_4.5		1	ICE	30/09/2020	Soil	1											
BH11_5.0		1	ICE	30/09/2020	Soil		1										
BH11_6.0		1	ICE	30/09/2020	Soil			X									
QA100		1	ICE	30/09/2020	Soil	1											
QA200		1	ICE	30/09/2020	Soil			X									

Relinquished by:	Tiffany Mabbott	**Received by:**		**Relinquished by:**	
(name / company)	Cardno	**(name / company)**		**(name / company**	
Date & Time:	30/09/2020 15:09	**Date & Time:**		**Date & Time:**	
Signature:	TM	**Signature:**		**Signature:**	
Received by:		**Relinquished by:**		**Received by:**	
(name / company)		**(name / company)**		**(name / company**	
Date & Time:		**Date & Time:**		**Date & Time:**	
Signature:		**Signature:**		**Signature:**	

Lina D. 30/09 5:58 pm
Eurofins

Relinquished by:
(name / company)
Date & Time:
Signature:

Lab use:
Samples Received: Cool or Ambient (circle one)
Temperature Received at: **(if applicable)** 4.5°C
Transported by: Hand delivered / courier

141501

eurofins | Environment Testing

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IANZ # 1327

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43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Sample Receipt Advice

Company name:	Cardno (NSW/ACT) Pty Ltd
Contact name:	Christopher Cook
Project name:	445-459 CANTERBURY ROAD CAMPSIE
Project ID:	NE30028
Turnaround time:	5 Day
Date/Time received	Sep 30, 2020 5:58 PM
Eurofins reference	747501

Sample Information

✓	A detailed list of analytes logged into our LIMS, is included in the attached summary table.
✓	All samples have been received as described on the above COC.
✓	COC has been completed correctly.
✓	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✓	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
✓	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
X	Split sample sent to requested external lab.
X	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

MW05_0.6 received as MW05_0.5, logged as per sample received.
Samples received by the laboratory after 5.30pm are deemed to have been received the following working day.

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Ursula Long on phone : or by email: UrsulaLong@eurofins.com

Results will be delivered electronically via email to Christopher Cook - christopher.cook@cardno.com.au.

Note: A copy of these results will also be delivered to the general Cardno (NSW/ACT) Pty Ltd email address.

Cardno (NSW/ACT) Pty Ltd
Level 9, 203 Pacific Highway
St Leonards
NSW 2065

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Christopher Cook**

Report **747501-S**
Project name 445-459 CANTERBURY ROAD CAMPSIE
Project ID NE30028
Received Date Sep 30, 2020

Client Sample ID			**MW04_0.5**	**MW04_1.2**	**MW05_0.2**	**MW05_3.0**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S20-Oc00207**	**S20-Oc00208**	**S20-Oc00211**	**S20-Oc00215**
Date Sampled			**Sep 30, 2020**	**Sep 30, 2020**	**Sep 30, 2020**	**Sep 30, 2020**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	62	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	80	< 50	71	< 50
TRH C10-C36 (Total)	50	mg/kg	142	< 50	71	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	93	77	90	79
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	110	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	110	< 100	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	1.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	1.7	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	2.0	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	1.0	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	1.1	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	0.8	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	0.8	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	1.1	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	1.0	< 0.5	< 0.5	< 0.5

Client Sample ID			MW04_0.5	MW04_1.2	MW05_0.2	MW05_3.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Oc00207	S20-Oc00208	S20-Oc00211	S20-Oc00215
Date Sampled			Sep 30, 2020	Sep 30, 2020	Sep 30, 2020	Sep 30, 2020
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	1.9	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	0.7	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	0.7	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	2.0	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	11.1	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	111	99	98	101
p-Terphenyl-d14 (surr.)	1	%	112	106	102	106
Heavy Metals						
Arsenic	2	mg/kg	8.1	14	3.6	15
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	32	54	33	46
Copper	5	mg/kg	20	10	650	22
Lead	5	mg/kg	56	34	96	38
Mercury	0.1	mg/kg	< 0.1	< 0.1	0.1	< 0.1
Nickel	5	mg/kg	11	8.4	93	5.0
Zinc	5	mg/kg	61	8.5	390	19
% Moisture	1	%	24	28	7.6	24

Client Sample ID			MW06_1.2	BH11_3.2	BH11_4.5	BH11_5.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Oc00218	S20-Oc00225	S20-Oc00226	S20-Oc00227
Date Sampled			Sep 30, 2020	Sep 30, 2020	Sep 30, 2020	Sep 30, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	25	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	1100	< 50	190	< 50
TRH C29-C36	50	mg/kg	1700	< 50	370	< 50
TRH C10-C36 (Total)	50	mg/kg	2825	< 50	560	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	81	78	84	77
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	2400	< 100	450	< 100

Client Sample ID			MW06_1.2	BH11_3.2	BH11_4.5	BH11_5.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Oc00218	S20-Oc00225	S20-Oc00226	S20-Oc00227
Date Sampled			Sep 30, 2020	Sep 30, 2020	Sep 30, 2020	Sep 30, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C34-C40	100	mg/kg	960	< 100	270	< 100
TRH >C10-C40 (total)*	100	mg/kg	3360	< 100	720	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	-
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Pyrene	0.5	mg/kg	0.6	< 0.5	< 0.5	-
Total PAH*	0.5	mg/kg	0.6	< 0.5	< 0.5	-
2-Fluorobiphenyl (surr.)	1	%	112	96	99	-
p-Terphenyl-d14 (surr.)	1	%	120	100	107	-
Heavy Metals						
Arsenic	2	mg/kg	20	< 2	9.2	-
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	-
Chromium	5	mg/kg	19	12	17	-
Copper	5	mg/kg	130	16	29	-
Lead	5	mg/kg	300	16	35	-
Mercury	0.1	mg/kg	0.5	< 0.1	< 0.1	-
Nickel	5	mg/kg	25	< 5	< 5	-
Zinc	5	mg/kg	230	16	61	-
% Moisture	1	%	18	19	17	20

Client Sample ID			QA100
Sample Matrix			Soil
Eurofins Sample No.			S20-Oc00229
Date Sampled			Sep 30, 2020
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	20	mg/kg	< 20
TRH C10-C14	20	mg/kg	< 20
TRH C15-C28	50	mg/kg	75
TRH C29-C36	50	mg/kg	130
TRH C10-C36 (Total)	50	mg/kg	205

Client Sample ID			QA100
Sample Matrix			Soil
Eurofins Sample No.			S20-Oc00229
Date Sampled			Sep 30, 2020
Test/Reference	LOR	Unit	
BTEX			
Benzene	0.1	mg/kg	< 0.1
Toluene	0.1	mg/kg	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2
o-Xylene	0.1	mg/kg	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3
4-Bromofluorobenzene (surr.)	1	%	86
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.5	mg/kg	< 0.5
TRH C6-C10	20	mg/kg	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20
TRH >C10-C16	50	mg/kg	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50
TRH >C16-C34	100	mg/kg	160
TRH >C34-C40	100	mg/kg	110
TRH >C10-C40 (total)*	100	mg/kg	270
Polycyclic Aromatic Hydrocarbons			
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2
Acenaphthene	0.5	mg/kg	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5
Anthracene	0.5	mg/kg	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5
Chrysene	0.5	mg/kg	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5
Fluorene	0.5	mg/kg	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5
Naphthalene	0.5	mg/kg	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5
Pyrene	0.5	mg/kg	< 0.5
Total PAH*	0.5	mg/kg	< 0.5
2-Fluorobiphenyl (surr.)	1	%	105
p-Terphenyl-d14 (surr.)	1	%	110
Heavy Metals			
Arsenic	2	mg/kg	5.2
Cadmium	0.4	mg/kg	< 0.4
Chromium	5	mg/kg	34
Copper	5	mg/kg	1300
Lead	5	mg/kg	310
Mercury	0.1	mg/kg	0.3
Nickel	5	mg/kg	97
Zinc	5	mg/kg	560
% Moisture	1	%	6.2

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B1			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Oct 01, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Oct 01, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Oct 01, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Oct 01, 2020	
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Sydney	Oct 01, 2020	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Metals M8	Sydney	Oct 01, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Oct 01, 2020	14 Days
- Method: LTM-GEN-7080 Moisture			

eurofins | Environment Testing

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NATA # 1261 Site # 18217

Brisbane
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Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
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Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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Rolleston, Christchurch 7675
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IANZ # 1290

Company Name: Cardno (NSW/ACT) Pty Ltd
Address: Level 9, 203 Pacific Highway
St Leonards
NSW 2065

Project Name: 445-459 CANTERBURY ROAD CAMPSIE
Project ID: NE30028

Order No.:
Report #: 747501
Phone: 0294967700
Fax: 02 9499 3902

Received: Sep 30, 2020 5:58 PM
Due: Oct 8, 2020
Priority: 5 Day
Contact Name: Christopher Cook

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						HOLD	Moisture Set	Eurofins Suite B7	Eurofins Suite B1
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	MW04_0.1	Sep 30, 2020		Soil	S20-Oc00206	X			
2	MW04_0.5	Sep 30, 2020		Soil	S20-Oc00207		X	X	
3	MW04_1.2	Sep 30, 2020		Soil	S20-Oc00208		X	X	
4	MW04_2.3	Sep 30, 2020		Soil	S20-Oc00209	X			
5	MW04_3.0	Sep 30, 2020		Soil	S20-Oc00210	X			
6	MW05_0.2	Sep 30, 2020		Soil	S20-Oc00211		X	X	
7	MW05_0.5	Sep 30, 2020		Soil	S20-Oc00212	X			
8	MW05_1.2	Sep 30, 2020		Soil	S20-Oc00213	X			
9	MW05_2.0	Sep 30, 2020		Soil	S20-Oc00214	X			

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Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
10	MW05_3.0	Sep 30, 2020		Soil	S20-Oc00215		X	X	
11	MW06_0.2	Sep 30, 2020		Soil	S20-Oc00216	X			
12	MW06_0.6	Sep 30, 2020		Soil	S20-Oc00217	X			
13	MW06_1.2	Sep 30, 2020		Soil	S20-Oc00218		X	X	
14	MW06_2.0	Sep 30, 2020		Soil	S20-Oc00219	X			
15	MW06_3.0	Sep 30, 2020		Soil	S20-Oc00220	X			
16	BH11_0.3	Sep 30, 2020		Soil	S20-Oc00221	X			
17	BH11_0.8	Sep 30, 2020		Soil	S20-Oc00222	X			
18	BH11_1.5	Sep 30, 2020		Soil	S20-Oc00223	X			
19	BH11_2.5	Sep 30, 2020		Soil	S20-Oc00224	X			
20	BH11_3.2	Sep 30, 2020		Soil	S20-Oc00225		X	X	

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Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
21	BH11_4.5	Sep 30, 2020		Soil	S20-Oc00226		X	X	
22	BH11_5.0	Sep 30, 2020		Soil	S20-Oc00227		X		X
23	BH11_6.0	Sep 30, 2020		Soil	S20-Oc00228	X			
24	QA100	Sep 30, 2020		Soil	S20-Oc00229		X	X	
25	QA200	Sep 30, 2020		Soil	S20-Oc00230	X			
Test Counts						16	9	8	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	109			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C10-C14	%	85			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	100			70-130	Pass	
Toluene	%	102			70-130	Pass	
Ethylbenzene	%	92			70-130	Pass	
m&p-Xylenes	%	92			70-130	Pass	
o-Xylene	%	96			70-130	Pass	
Xylenes - Total*	%	94			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	91			70-130	Pass	
TRH C6-C10	%	108			70-130	Pass	
TRH >C10-C16	%	70			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	110			70-130	Pass	
Acenaphthylene	%	111			70-130	Pass	
Anthracene	%	119			70-130	Pass	
Benz(a)anthracene	%	102			70-130	Pass	
Benzo(a)pyrene	%	95			70-130	Pass	
Benzo(b&j)fluoranthene	%	85			70-130	Pass	
Benzo(g.h.i)perylene	%	107			70-130	Pass	
Benzo(k)fluoranthene	%	105			70-130	Pass	
Chrysene	%	116			70-130	Pass	
Dibenz(a.h)anthracene	%	103			70-130	Pass	
Fluoranthene	%	114			70-130	Pass	
Fluorene	%	114			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	107			70-130	Pass	
Naphthalene	%	113			70-130	Pass	
Phenanthrene	%	120			70-130	Pass	
Pyrene	%	112			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	91			80-120	Pass	
Cadmium	%	96			80-120	Pass	
Chromium	%	98			80-120	Pass	
Copper	%	97			80-120	Pass	
Lead	%	101			80-120	Pass	
Mercury	%	106			80-120	Pass	
Nickel	%	97			80-120	Pass	
Zinc	%	97			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S20-Oc00183	NCP	%	114			70-130	Pass	
TRH C10-C14	S20-Oc00185	NCP	%	76			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S20-Oc00183	NCP	%	89			70-130	Pass	
Toluene	S20-Oc00183	NCP	%	89			70-130	Pass	
Ethylbenzene	S20-Oc00183	NCP	%	83			70-130	Pass	
m&p-Xylenes	S20-Oc00183	NCP	%	83			70-130	Pass	
o-Xylene	S20-Oc00183	NCP	%	88			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Xylenes - Total*	S20-Oc00183	NCP	%	84			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S20-Oc00183	NCP	%	86			70-130	Pass	
TRH C6-C10	S20-Oc00183	NCP	%	115			70-130	Pass	
TRH >C10-C16	S20-Oc00185	NCP	%	75			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S20-Oc09599	NCP	%	87			70-130	Pass	
Acenaphthylene	S20-Oc09599	NCP	%	88			70-130	Pass	
Anthracene	S20-Oc09599	NCP	%	103			70-130	Pass	
Benz(a)anthracene	S20-Oc09599	NCP	%	84			70-130	Pass	
Benzo(a)pyrene	S20-Oc09599	NCP	%	84			70-130	Pass	
Benzo(b&j)fluoranthene	S20-Oc09599	NCP	%	71			70-130	Pass	
Benzo(g.h.i)perylene	S20-Oc09599	NCP	%	81			70-130	Pass	
Benzo(k)fluoranthene	S20-Oc09599	NCP	%	88			70-130	Pass	
Chrysene	S20-Oc09599	NCP	%	95			70-130	Pass	
Dibenz(a.h)anthracene	S20-Oc09599	NCP	%	71			70-130	Pass	
Fluoranthene	S20-Oc09599	NCP	%	95			70-130	Pass	
Fluorene	S20-Oc09599	NCP	%	94			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S20-Oc09599	NCP	%	77			70-130	Pass	
Naphthalene	S20-Oc09599	NCP	%	96			70-130	Pass	
Phenanthrene	S20-Oc09599	NCP	%	97			70-130	Pass	
Pyrene	S20-Oc09599	NCP	%	94			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S20-Oc01614	NCP	%	98			75-125	Pass	
Cadmium	S20-Oc01614	NCP	%	105			75-125	Pass	
Chromium	S20-Oc01614	NCP	%	109			75-125	Pass	
Copper	S20-Oc01614	NCP	%	104			75-125	Pass	
Lead	S20-Oc01614	NCP	%	114			75-125	Pass	
Mercury	S20-Oc01614	NCP	%	110			75-125	Pass	
Nickel	S20-Oc01614	NCP	%	105			75-125	Pass	
Zinc	S20-Oc01614	NCP	%	109			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	S20-Se51987	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S20-Se51987	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S20-Se51987	NCP	mg/kg	51	< 50	6.0	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	S20-Se51987	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S20-Se51987	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S20-Se51987	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S20-Oc01586	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S20-Oc01586	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S20-Oc01586	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S20-Oc01586	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S20-Oc01586	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S20-Oc01586	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S20-Oc01586	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Benzo(k)fluoranthene	S20-Oc01586	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S20-Oc01586	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S20-Oc01586	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S20-Oc01586	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S20-Oc01586	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S20-Oc01586	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S20-Oc01586	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S20-Oc01586	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S20-Oc01586	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S20-Se52372	NCP	mg/kg	8.0	6.5	20	30%	Pass	
Cadmium	S20-Oc01613	NCP	mg/kg	0.4	0.6	26	30%	Pass	
Chromium	S20-Oc01613	NCP	mg/kg	24	32	29	30%	Pass	
Copper	S20-Oc01613	NCP	mg/kg	40	43	6.0	30%	Pass	
Lead	S20-Oc01613	NCP	mg/kg	350	380	8.0	30%	Pass	
Mercury	S20-Oc01613	NCP	mg/kg	0.9	0.9	7.0	30%	Pass	
Nickel	S20-Oc01613	NCP	mg/kg	14	15	9.0	30%	Pass	
Zinc	S20-Oc01613	NCP	mg/kg	350	400	13	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S20-Oc00218	CP	%	18	15	18	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S20-Oc00226	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S20-Oc00226	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S20-Oc00226	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S20-Oc00226	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S20-Oc00226	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S20-Oc00226	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	S20-Oc00226	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S20-Oc00226	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S20-Oc00226	CP	mg/kg	< 20	< 20	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised By

Ursula Long	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)

Glenn Jackson

General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Cardno
Shaping the Future

CHAIN OF CUSTODY AND ANALYSIS REQUEST

Contact Person:	Chris Cook	**Project Name:**	445-459 Canterbury Road, Campsie
Telephone Number:	0415 753 569	**Project Number:**	NE30028
Alternative Contact:	Tiffany Mabbott	**PO No.:**	
Telephone Number:	0455 278 841	**Project Specific Quote No. :**	191218CDNN
Sampler:	Tiffany Mabbott	**Date results required:**	5 day TAT
Email Address (results and invoice):	christopher.cook@cardno.com.au; tiffany.mabbott@cardno.com.au; contamsouthcoast@com.au	**Report format:**	Electronic
Address: Level 9 - The Forum, 203 Pacific Highway, St Leonards, New South Wales 2065			

Sample information						Analysis Required											
Cardno Sample ID	Laboratory Sample ID	No. Containers	Preservation	Date sampled	Matrix	TRH/BTEX	Suite M8*1: Metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg) - Dissolved/Total	PAH									
MW01		5	ICE	7/10/2020	WATER	X	X	X									
MW02		5	ICE	7/10/2020	WATER	X	X	X									
MW03		5	ICE	7/10/2020	WATER	X	X	X									
MW04		5	ICE	7/10/2020	WATER	X	X	X									
MW05		5	ICE	7/10/2020	WATER	X	X	X									
MW06		5	ICE	7/10/2020	WATER	X	X	X									
QA100		5	ICE	7/10/2020	WATER	X	X	X									
QA200		5	ICE	7/10/2020	WATER												PLEASE FORWARD TO ALS
RIN1		5	ICE	7/10/2020	WATER	X		X									
TRIP SPIKE		1	ICE	7/10/2020	WATER	X											
TRIP BLANK		1	ICE	7/10/2020	WATER	X											

Relinquished by:	Tiffany Mabbott	**Received by:**	M BIRKETT	**Relinquished by:**				**Relinquished by:**	
(name / company)	Cardno	**(name / company)**	EUROFINS	**(name / company**				**(name / company)**	
Date & Time:	7/10/2020 12:56	**Date & Time:**	08/10/20 12.08pm	**Date & Time:**				**Date & Time:**	
Signature:	TM	**Signature:**		**Signature:**				**Signature:**	
Received by:		**Relinquished by:**		**Received by:**				***Lab use:***	
(name / company)		**(name / company)**		**(name / company**				**Samples Received: Cool or Ambient (circle one)**	12.9°C
Date & Time:		**Date & Time:**		**Date & Time:**				**Temperature Received at:**	**(if applicable)**
Signature:		**Signature:**		**Signature:**				**Transported by: Hand delivered / courier**	

749609

eurofins | Environment Testing

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IANZ # 1290

Sample Receipt Advice

Company name:	Cardno (NSW/ACT) Pty Ltd
Contact name:	Christopher Cook
Project name:	445-459 CANTERBURY ROAD CAMPSIE
Project ID:	NE30028
Turnaround time:	5 Day
Date/Time received	Oct 8, 2020 12:08 PM
Eurofins reference	749609

Sample Information

✓	A detailed list of analytes logged into our LIMS, is included in the attached summary table.
✓	All samples have been received as described on the above COC.
✓	COC has been completed correctly.
✓	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✓	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
✗	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
✓	Split sample sent to requested external lab.
✗	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Nutrient bottle received instead of filtered metals bottle for MW02, subbed from amber bottle. QA200 forwarded to ALS.

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Ursula Long on phone : or by email: UrsulaLong@eurofins.com

Results will be delivered electronically via email to Christopher Cook - christopher.cook@cardno.com.au.

Note: A copy of these results will also be delivered to the general Cardno (NSW/ACT) Pty Ltd email address.

Cardno (NSW/ACT) Pty Ltd
Level 9, 203 Pacific Highway
St Leonards
NSW 2065

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Christopher Cook**

Report **749609-W**
Project name 445-459 CANTERBURY ROAD CAMPSIE
Project ID NE30028
Received Date Oct 08, 2020

Client Sample ID			MW01	MW02	MW03	MW04
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S20-Oc16734	S20-Oc16735	S20-Oc16736	S20-Oc16737
Date Sampled			Oct 07, 2020	Oct 07, 2020	Oct 07, 2020	Oct 07, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	107	102	110	101
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			MW01	MW02	MW03	MW04
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S20-Oc16734	S20-Oc16735	S20-Oc16736	S20-Oc16737
Date Sampled			Oct 07, 2020	Oct 07, 2020	Oct 07, 2020	Oct 07, 2020
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	INT	84	63	62
p-Terphenyl-d14 (surr.)	1	%	114	120	134	122
Heavy Metals						
Arsenic	0.001	mg/L	0.002	< 0.001	0.002	0.003
Arsenic (filtered)	0.001	mg/L	0.001	0.001	< 0.001	0.002
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	0.0009
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	0.0009
Chromium	0.001	mg/L	0.001	0.002	0.002	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001	0.001	< 0.001	< 0.001
Copper	0.001	mg/L	0.007	0.024	0.006	0.11
Copper (filtered)	0.001	mg/L	0.010	0.022	0.006	0.062
Lead	0.001	mg/L	0.002	0.005	0.001	0.001
Lead (filtered)	0.001	mg/L	< 0.001	0.004	< 0.001	< 0.001
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	0.0003	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.001	mg/L	0.014	0.002	0.002	0.087
Nickel (filtered)	0.001	mg/L	0.013	0.002	0.001	0.081
Zinc	0.005	mg/L	0.084	0.034	0.010	2.9
Zinc (filtered)	0.005	mg/L	0.070	0.032	0.006	2.8

Client Sample ID			MW05	MW06	QA100	RIN1
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S20-Oc16738	S20-Oc16739	S20-Oc16740	S20-Oc16741
Date Sampled			Oct 07, 2020	Oct 07, 2020	Oct 07, 2020	Oct 07, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	0.06	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	0.4	1.3	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	1.5	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	0.4	2.86	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	108	109	104	96

Client Sample ID			MW05	MW06	QA100	RIN1
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S20-Oc16738	S20-Oc16739	S20-Oc16740	S20-Oc16741
Date Sampled			Oct 07, 2020	Oct 07, 2020	Oct 07, 2020	Oct 07, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	0.09	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	0.09	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	0.3	2.4	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	1.0	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	0.3	3.49	< 0.1	< 0.1
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	88	INT	INT	53
p-Terphenyl-d14 (surr.)	1	%	130	110	116	110
Heavy Metals						
Arsenic	0.001	mg/L	0.002	0.045	0.002	-
Arsenic (filtered)	0.001	mg/L	0.001	0.002	< 0.001	-
Cadmium	0.0002	mg/L	0.0003	0.0006	< 0.0002	-
Cadmium (filtered)	0.0002	mg/L	0.0002	< 0.0002	< 0.0002	-
Chromium	0.001	mg/L	0.002	0.014	0.002	-
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Copper	0.001	mg/L	0.035	0.17	0.010	-
Copper (filtered)	0.001	mg/L	0.002	0.002	0.005	-
Lead	0.001	mg/L	0.017	0.53	0.002	-
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Mercury	0.0001	mg/L	< 0.0001	0.0009	0.0004	-
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	-
Nickel	0.001	mg/L	0.023	0.020	0.002	-
Nickel (filtered)	0.001	mg/L	0.016	0.006	0.002	-
Zinc	0.005	mg/L	0.22	0.43	0.015	-
Zinc (filtered)	0.005	mg/L	0.16	0.015	0.006	-

Client Sample ID			TRIP SPIKE	TRIP BLANK
Sample Matrix			Water	Water
Eurofins Sample No.			S20-Oc16742	S20-Oc16743
Date Sampled			Oct 07, 2020	Oct 07, 2020
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				
TRH C6-C9	0.02	mg/L	-	< 0.02
BTEX				
Benzene	0.001	mg/L	-	< 0.001
Toluene	0.001	mg/L	-	< 0.001
Ethylbenzene	0.001	mg/L	-	< 0.001
m&p-Xylenes	0.002	mg/L	-	< 0.002
o-Xylene	0.001	mg/L	-	< 0.001
Xylenes - Total*	0.003	mg/L	-	< 0.003
4-Bromofluorobenzene (surr.)	1	%	-	127
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
Naphthalene[N02]	0.01	mg/L	-	< 0.01
TRH C6-C10	0.02	mg/L	-	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	-	< 0.02
TRH C6-C10	1	%	89	-
Total Recoverable Hydrocarbons				
Naphthalene	1	%	110	-
TRH C6-C9	1	%	96	-
BTEX				
Benzene	1	%	110	-
Ethylbenzene	1	%	110	-
m&p-Xylenes	1	%	110	-
o-Xylene	1	%	110	-
Toluene	1	%	110	-
Xylenes - Total	1	%	110	-
4-Bromofluorobenzene (surr.)	1	%	125	-

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Oct 10, 2020	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Oct 10, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Oct 10, 2020	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons	Sydney	Oct 10, 2020	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Eurofins Suite B4			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Oct 10, 2020	
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Sydney	Oct 10, 2020	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Metals M8	Sydney	Oct 13, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8 filtered	Sydney	Oct 13, 2020	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

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Address: Level 9, 203 Pacific Highway
St Leonards
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Project Name: 445-459 CANTERBURY ROAD CAMPSIE
Project ID: NE30028

Order No.:
Report #: 749609
Phone: 0294967700
Fax: 02 9499 3902

Received: Oct 8, 2020 12:08 PM
Due: Oct 15, 2020
Priority: 5 Day
Contact Name: Christopher Cook

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Metals M8 filtered	Eurofins Suite B7	Eurofins Suite B4	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271										
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794										
Perth Laboratory - NATA Site # 23736										
Mayfield Laboratory										
External Laboratory										
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**					
1	MW01	Oct 07, 2020		Water	S20-Oc16734	X	X			
2	MW02	Oct 07, 2020		Water	S20-Oc16735	X	X			
3	MW03	Oct 07, 2020		Water	S20-Oc16736	X	X			
4	MW04	Oct 07, 2020		Water	S20-Oc16737	X	X			
5	MW05	Oct 07, 2020		Water	S20-Oc16738	X	X			
6	MW06	Oct 07, 2020		Water	S20-Oc16739	X	X			
7	QA100	Oct 07, 2020		Water	S20-Oc16740	X	X			
8	RIN1	Oct 07, 2020		Water	S20-Oc16741			X		
9	TRIP SPIKE	Oct 07, 2020		Water	S20-Oc16742					X

eurofins | Environment Testing

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Melbourne Laboratory - NATA Site # 1254 & 14271										
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794										
Perth Laboratory - NATA Site # 23736										
Mayfield Laboratory										
External Laboratory										
10	TRIP BLANK	Oct 07, 2020		Water	S20-Oc16743				X	
Test Counts						7	7	1	1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	111			70-130	Pass	
TRH C10-C14	%	96			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	100			70-130	Pass	
Toluene	%	99			70-130	Pass	
Ethylbenzene	%	96			70-130	Pass	
m&p-Xylenes	%	101			70-130	Pass	
o-Xylene	%	99			70-130	Pass	
Xylenes - Total*	%	101			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	119			70-130	Pass	
TRH C6-C10	%	111			70-130	Pass	
TRH >C10-C16	%	92			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	95			70-130	Pass	
Acenaphthylene	%	106			70-130	Pass	
Anthracene	%	103			70-130	Pass	
Benz(a)anthracene	%	92			70-130	Pass	
Benzo(a)pyrene	%	98			70-130	Pass	
Benzo(b&j)fluoranthene	%	88			70-130	Pass	
Benzo(g.h.i)perylene	%	96			70-130	Pass	
Benzo(k)fluoranthene	%	113			70-130	Pass	
Chrysene	%	100			70-130	Pass	
Dibenz(a.h)anthracene	%	91			70-130	Pass	
Fluoranthene	%	107			70-130	Pass	
Fluorene	%	102			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	91			70-130	Pass	
Naphthalene	%	105			70-130	Pass	
Phenanthrene	%	104			70-130	Pass	
Pyrene	%	106			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	100			80-120	Pass	
Arsenic (filtered)	%	107			80-120	Pass	
Cadmium	%	103			80-120	Pass	
Cadmium (filtered)	%	107			80-120	Pass	
Chromium	%	110			80-120	Pass	
Chromium (filtered)	%	106			80-120	Pass	
Copper	%	109			80-120	Pass	
Copper (filtered)	%	105			80-120	Pass	
Lead	%	110			80-120	Pass	
Lead (filtered)	%	106			80-120	Pass	
Mercury	%	109			80-120	Pass	
Mercury (filtered)	%	105			80-120	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Nickel			%	110			80-120	Pass	
Nickel (filtered)			%	109			80-120	Pass	
Zinc			%	106			80-120	Pass	
Zinc (filtered)			%	107			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S20-Oc16705	NCP	%	81			70-130	Pass	
Acenaphthylene	S20-Oc16705	NCP	%	89			70-130	Pass	
Anthracene	S20-Oc16705	NCP	%	92			70-130	Pass	
Benz(a)anthracene	S20-Oc16705	NCP	%	78			70-130	Pass	
Benzo(a)pyrene	S20-Oc16705	NCP	%	86			70-130	Pass	
Benzo(b&j)fluoranthene	S20-Oc16705	NCP	%	91			70-130	Pass	
Benzo(g.h.i)perylene	S20-Oc16705	NCP	%	82			70-130	Pass	
Benzo(k)fluoranthene	S20-Oc16705	NCP	%	96			70-130	Pass	
Chrysene	S20-Oc16705	NCP	%	92			70-130	Pass	
Dibenz(a.h)anthracene	S20-Oc16705	NCP	%	75			70-130	Pass	
Fluoranthene	S20-Oc16705	NCP	%	96			70-130	Pass	
Fluorene	S20-Oc16705	NCP	%	90			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S20-Oc16705	NCP	%	76			70-130	Pass	
Naphthalene	S20-Oc16705	NCP	%	80			70-130	Pass	
Phenanthrene	S20-Oc16705	NCP	%	100			70-130	Pass	
Pyrene	S20-Oc16705	NCP	%	95			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S20-Oc16237	NCP	%	108			75-125	Pass	
Arsenic (filtered)	W20-Oc15110	NCP	%	99			75-125	Pass	
Cadmium	S20-Oc16237	NCP	%	102			75-125	Pass	
Cadmium (filtered)	S20-Oc19454	NCP	%	97			75-125	Pass	
Chromium	S20-Oc16237	NCP	%	103			75-125	Pass	
Chromium (filtered)	S20-Oc19454	NCP	%	81			75-125	Pass	
Copper	S20-Oc16237	NCP	%	98			75-125	Pass	
Copper (filtered)	W20-Oc15110	NCP	%	79			75-125	Pass	
Lead	S20-Oc16237	NCP	%	101			75-125	Pass	
Lead (filtered)	S20-Oc17004	NCP	%	91			75-125	Pass	
Mercury	S20-Oc16237	NCP	%	111			75-125	Pass	
Mercury (filtered)	S20-Oc19454	NCP	%	76			75-125	Pass	
Nickel	S20-Oc16237	NCP	%	100			75-125	Pass	
Nickel (filtered)	S20-Oc17004	NCP	%	90			75-125	Pass	
Zinc	S20-Oc16237	NCP	%	98			75-125	Pass	
Zinc (filtered)	W20-Oc15110	NCP	%	82			75-125	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S20-Oc16735	CP	%	124			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S20-Oc16735	CP	%	104			70-130	Pass	
Toluene	S20-Oc16735	CP	%	100			70-130	Pass	
Ethylbenzene	S20-Oc16735	CP	%	100			70-130	Pass	
m&p-Xylenes	S20-Oc16735	CP	%	100			70-130	Pass	
o-Xylene	S20-Oc16735	CP	%	99			70-130	Pass	
Xylenes - Total*	S20-Oc16735	CP	%	100			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Naphthalene	S20-Oc16735	CP	%	105			70-130	Pass	
TRH C6-C10	S20-Oc16735	CP	%	126			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	S20-Oc16739	CP	%	112			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S20-Oc16739	CP	%	108			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S20-Oc16734	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C10-C14	S20-Oc15224	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	S20-Oc15224	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	S20-Oc15224	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S20-Oc16734	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	S20-Oc16734	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	S20-Oc16734	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	S20-Oc16734	CP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	S20-Oc16734	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total*	S20-Oc16734	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S20-Oc16734	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	S20-Oc16734	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH >C10-C16	S20-Oc15224	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	S20-Oc15224	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	S20-Oc15224	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S20-Oc16734	CP	mg/L	0.002	0.002	3.0	30%	Pass	
Arsenic (filtered)	S20-Oc16734	CP	mg/L	0.001	0.001	4.0	30%	Pass	
Cadmium	S20-Oc16734	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Cadmium (filtered)	S20-Oc16734	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	S20-Oc16734	CP	mg/L	0.001	0.001	3.0	30%	Pass	
Chromium (filtered)	S20-Oc16734	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	S20-Oc16734	CP	mg/L	0.007	0.007	7.0	30%	Pass	
Copper (filtered)	S20-Oc16734	CP	mg/L	0.010	0.010	1.0	30%	Pass	
Lead	S20-Oc16734	CP	mg/L	0.002	0.002	16	30%	Pass	
Lead (filtered)	S20-Oc16734	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	S20-Oc16734	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Mercury (filtered)	S20-Oc16734	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	S20-Oc16734	CP	mg/L	0.014	0.014	3.0	30%	Pass	
Nickel (filtered)	S20-Oc16734	CP	mg/L	0.013	0.013	2.0	30%	Pass	
Zinc	S20-Oc16734	CP	mg/L	0.084	0.076	9.0	30%	Pass	
Zinc (filtered)	S20-Oc16734	CP	mg/L	0.070	0.070	1.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	No
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised By

Ursula Long	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)

Glenn Jackson

General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

#AU04_Enviro_Sample_NSW

To: Ursula Long
Subject: RE: 3 DAY ADDITIONAL: FW: Cardno - Additional analysis request

From: Chris Cook <christopher.cook@cardno.com.au>
Sent: Monday, 19 October 2020 9:41 AM
To: Ursula Long <UrsulaLong@eurofins.com>
Subject: Cardno - Additional analysis request

EXTERNAL EMAIL*

Hey Ursula,

This one may have slipped through the cracks at my end so can you just make sure I haven't already requested it.

Can I please get the following analysis organised for samples from 745501 on a 3-day turnaround.

MW04_0.5 – TCLP Prep and B(a)P
MW05_0.2 – TCLP Prep and Nickel
MW06_1.2 – TCLP Prep and Lead
QA100 – TCLP Prep, Lead and Nickel.

Regards,

Chris Cook
ENVIRONMENTAL SCIENTIST
CARDNO

Cardno | 75 YEARS Making a difference.

Phone +61 2 4231 9600 Direct +61 2 4254 8732
Address Ground Floor, 16 Burelli Street, Wollongong, New South Wales 2500 Australia

Email christopher.cook@cardno.com.au Web www.cardno.com

CONNECT WITH CARDNO

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Site # 1254 & 14271

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NATA # 1261 Site # 18217

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NATA # 1261 Site # 20794

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NATA # 1261
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Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Sample Receipt Advice

Company name:	Cardno (NSW/ACT) Pty Ltd
Contact name:	Christopher Cook
Project name:	ADDITIONAL - 445-459 CANTERBURY ROAD CAMPSIE
Project ID:	NE30028
Turnaround time:	3 Day
Date/Time received	Oct 19, 2020 10:30 AM
Eurofins reference	751253

Sample Information

✓	A detailed list of analytes logged into our LIMS, is included in the attached summary table.
✓	All samples have been received as described on the above COC.
✓	COC has been completed correctly.
✓	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✓	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
✓	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
X	Split sample sent to requested external lab.
X	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Ursula Long on phone : or by email: UrsulaLong@eurofins.com

Results will be delivered electronically via email to Christopher Cook - christopher.cook@cardno.com.au.

Note: A copy of these results will also be delivered to the general Cardno (NSW/ACT) Pty Ltd email address.

Cardno (NSW/ACT) Pty Ltd
Level 9, 203 Pacific Highway
St Leonards
NSW 2065

Attention: **Christopher Cook**

Report **751253-L**
Project name ADDITIONAL - 445-459 CANTERBURY ROAD CAMPSIE
Project ID NE30028
Received Date Oct 19, 2020

Client Sample ID			**MW04_0.5**	**MW05_0.2**	**MW06_1.2**	**QA100**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**S20-Oc30439**	**S20-Oc30440**	**S20-Oc30441**	**S20-Oc30442**
Date Sampled			**Sep 30, 2020**	**Sep 30, 2020**	**Sep 30, 2020**	**Sep 30, 2020**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene	0.001	mg/L	< 0.001	-	-	-
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	6.4	7.3	7.7	7.8
pH (off)	0.1	pH Units	5.1	5.4	5.4	5.4
pH (USA HCl addition)	0.1	pH Units	1.8	1.8	1.7	1.7
Heavy Metals						
Lead	0.01	mg/L	-	-	0.33	0.03
Nickel	0.01	mg/L	-	0.12	-	0.10

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Polycyclic Aromatic Hydrocarbons	Sydney	Oct 19, 2020	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
USA Leaching Procedure	Sydney	Oct 19, 2020	14 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			
Heavy Metals	Sydney	Oct 20, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

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NATA # 1261 Site # 18217

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NATA # 1261 Site # 20794

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Site # 23736

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IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name:	Cardno (NSW/ACT) Pty Ltd	**Order No.:**	
Address:	Level 9, 203 Pacific Highway St Leonards NSW 2065	**Report #:**	751253
		Phone:	0294967700
		Fax:	02 9499 3902
Project Name:	ADDITIONAL - 445-459 CANTERBURY ROAD CAMPSIE		
Project ID:	NE30028		

Received:	Oct 19, 2020 10:30 AM
Due:	Oct 22, 2020
Priority:	3 Day
Contact Name:	Christopher Cook

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Benzo(a)pyrene	Lead	Nickel	USA Leaching Procedure
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	MW04_0.5	Sep 30, 2020		US Leachate	S20-Oc30439	X			X
2	MW05_0.2	Sep 30, 2020		US Leachate	S20-Oc30440			X	X
3	MW06_1.2	Sep 30, 2020		US Leachate	S20-Oc30441		X		X
4	QA100	Sep 30, 2020		US Leachate	S20-Oc30442		X	X	X
Test Counts						1	2	2	4

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Heavy Metals							
Lead	mg/L	< 0.01			0.01	Pass	
Nickel	mg/L	< 0.01			0.01	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Benzo(a)pyrene	%	124			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Lead	%	83			80-120	Pass	
Nickel	%	84			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Benzo(a)pyrene	S20-Oc25545	NCP	%	81			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Nickel	S20-Oc27403	NCP	%	94			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S20-Oc27403	NCP	%	95			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Benzo(a)pyrene	S20-Oc28264	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S20-Oc30440	CP	mg/L	0.04	0.04	7.0	30%	Pass	
Nickel	S20-Oc30440	CP	mg/L	0.12	0.11	8.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S20-Oc27400	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

Authorised By

Ursula Long	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

APPENDIX

F

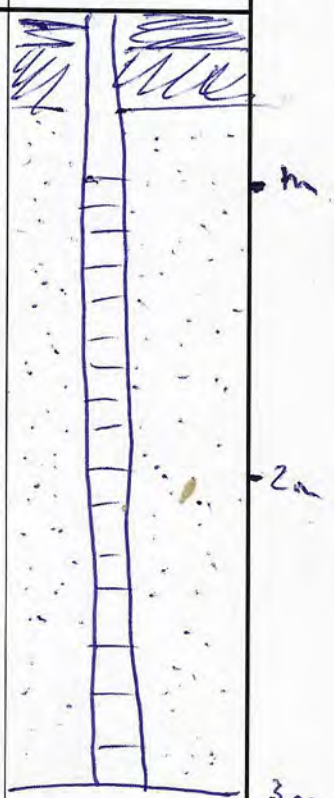
FIELD RECORDS

Cardno Borehole Fieldsheet BH No: MW04

Page: of

Project: 445 - 459 Canterbury Road, Campsie.	**Position:**	**Date Drilled:** 30.9.2020
Location:	**Surface Level:**	**Drill Rig:** Comacchio
	Top of Casing:	**Drilling Method:** Push tube / Solid flight augr.
Job No.: NE30028	**Inclination:**	**Logged/Checked:** JM

Depth (m bgl)	Description of Strata **Soil:** (FILL), description, classification, properties, features, colour, strength, moisture condition, other features, visual or olfactory contam **Rock:** type, weathering, colour, jointing, strength, other features	Samples	PID (ppm) / Contam Ranking	Remarks
0.0 - 0.2	Silty Sand with gravels and asphalt	MW04-0.1		
0.2 - 1.0	Clay, low - moderate plasticity, brown with trace gravels.	MW04-0.5	3.5	
1.0 - 2.0	Clay, high plasticity, plant organics, brown - dark brown mottle, moist	MW04-1.2	4.5	
2.0 - 3.0	Clay, moderate - high plasticity, clay gravels, orange, red - pale grey mottle	MW04-2.3		
3		MW04-3.0	4.7	
	Terminated at 3.0m			



Screen: 1 - 3m
Casing: 0 - 1m
Sand: 0.5 - 3m
Bentonite: 0.2 - 0.5
Back fill: 0.0 - 0.2

Key:	Notes:	Groundwater Observations:
For explantion of abbreviations and symbols, refer to Cardno UCS or Rock Notes		

Cardno Borehole Fieldsheet BH No: MW05 Page: 1 of

Project: 445-459 Canterbury Road.	Position:	Date Drilled: 30.9.20
Location: 445-459 Canterbury Road	Surface Level:	Drill Rig: Conacchio
Job No.: NE30028	Top of Casing:	Drilling Method: Push tube / solid flight auger
	Inclination:	Logged/Checked: TM

Depth (m bgl)	Description of Strata **Soil:** (FILL), description, classification, properties, features, colour, strength, moisture condition, other features, visual or olfactory contam **Rock:** type, weathering, colour, jointing, strength, other features	Samples	PID (ppm) / Contam Ranking	Remarks
0.0-0.1	Surface cover, ~~silty~~ gravelly silt, grey			
0.1-0.4	Sand with gravels, brown	MW05_0.2 QA100 QA200	3.2	1m
0.4-0.6	Clay with gravels, brown, low plasticity	MW05_0.6		
0.6-1.5	Moist clay, moderate plasticity brown	MW05_1.2	4.5	2m
1.5-3.0	~~Moist~~ clay, moderate plasticity, red, with clay gravels	MW05_2.0 MW05_3.0	3.3 4.2 ~~2.3~~	3m
	Terminated @ 3m			Screen: 1-3m Casing: 0-1m Sand: 0.5-3m Bentonite: 0.2-1m Backfill: 0-0.2m

Key:	Notes:	Groundwater Observations:
For explantion of abbreviations and symbols, refer to Cardno UCS or Rock Notes		

Cardno Borehole Fieldsheet BH No: MW06

Page: of

Project: 455-459 Canterbury Road, Campsie	**Position:**	**Date Drilled:** 30.9.2020
Location: "	**Surface Level:**	**Drill Rig:** Comacchio Geo
Job No.: NE30028	**Top of Casing:**	**Drilling Method:** Push tube / Solid flight auger
	Inclination:	**Logged/Checked:** TM

Depth (m bgl)	Description of Strata **Soil:** (FILL), description, classification, properties, features, colour, strength, moisture condition, other features, visual or olfactory contam **Rock:** type, weathering, colour, jointing, strength, other features	Samples	PID (ppm) / Contam Ranking	Remarks
0.0	Surface cover, silt with gravels			
0.1				
0.1 - 0.5	Silty clay with sand, brown mottle, brick fragment	~~BH1.MW~~ MW06.0.2	5.0ppm	
0.5 - 1.22	Clay with sand and gravels, low plasticity	MW06.0.6	4.9ppm	1m
1.2 - 1.8	Clayey sand, dark grey, moist, strong hydrocarbon odour @ 1.5 becomes wet.	MW06_1.2	10.9ppm	2m
1.8 - 2.5	~~Natural~~ clay, ~~dry~~ orange-brown-grey mottle, moist with clay gravels	MW06_2.0	8.3ppm	
2.5 - 6.0	Gravelly sand, wet, dark grey with brown clay ~~no collapse~~ Bore collapsed from 3-6m	MW06_3.0	8.7ppm	3m Screen: 1-3m Casing: 0-1m Sand: 0.5-3m Bentonite: 0.2-0.5m Back fill: 0-0.2m

Key:	Notes:	Groundwater Observations:
For explantion of abbreviations and symbols, refer to Cardno UCS or Rock Notes		

Cardno Borehole Fieldsheet BH No: BH11 Page: of

Project: 445-459 Canterbury Rd, Campsie.	Position:	Date Drilled: 30.9.2020
Location: 445-459 Canterbury Rd	Surface Level:	Drill Rig: Comacchio
Job No.: NE30028	Top of Casing:	Drilling Method: Push tube / Solid flight auger
	Inclination:	Logged/Checked: TM

Depth (m bgl)	Description of Strata **Soil:** (FILL), description, classification, properties, features, colour, strength, moisture condition, other features, visual or olfactory contam **Rock:** type, weathering, colour, jointing, strength, other features	Samples	PID (ppm) / Contam Ranking	Remarks
0.0	Surface covering, silt with			
0.1	gravels, pale grey			
0.1	Clay with silt and gravels, low	BH11-0.3	5.6 ppm	
0.6	plasticity,			
0.4-0.8	Clay, mottle of red and grey, low plasticity			
0.8	Sandy clay, moist, with gravels,	BH11-0.8	7.2 ppm	
1.2	brown			
1.2	Clay, ~~high~~ moderate plasticity, grey,	BH11-1.5	11.3 ppm	
2.0	wet, hydrocarbon odour			
2.0	Clay, dry, crumbly, pale grey, hydrocarbon odour	BH11-2.5	6.7 ppm	
4.0	@ 3.2 oragnic-tree root, ~~hydroca~~	BH11-3.2	10.3 ppm	
4.0	Clay, dry, crumbly, orange, faint hydro-carbon odour	BH11-4.5	5.4 ppm	
	@ 5.0m no hydrocarbon odour	BH11-5.0	5.7 ppm	
		5.5	11.5 ppm	
	@ 6.0m no hydrocarbon odour, pale grey	BH11-6.0	18 ppm	

Key:	Notes:	Groundwater Observations:
For explantion of abbreviations and symbols, refer to Cardno UCS or Rock Notes	No well installed.	

F3.04 – Groundwater Sampling Field Record

Site / Project: 445-459 Canterbury Road, Campsie		Bore ID Number: MW1
Client: Hailiang		Job No. NE30028
Person Sampling: Tiffany Mabbott		Initials: TM

Bore / Site Details

Bore Condition / Locked? ✓✓	Type Protect. Cap / Cover: Cap	Bore Depth (bTOC): 6.015
Inner casing/screen type & diameter:	Screen interval (bgl):	SWL (bTOC) 1.565
WL Measurement Point	RL of measurement point (mAHD)	SWL Date/Time 7.10.20 10:52
Other Observations on Bore/Site		

Bore Purge Data

Purge method: Peristaltic pump	Bore Volume (L):	Purge Date:
Purge rate (L/min):	Total Purge volume (L): 0.8L	LNAPL / PSH Thickness (mm) (None) / .....mm

Purge Field Physicochemical Measurements:

	Reading1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	Reading 8
Start Time:	10:58	11:03	11:08					
DO (mg/L) ±10% (or ±0.2 if DO<2 mg/L)	1.47	1.54	1.58					
EC (µS/Cm) ±3%	2312.2	2262.4	2288.2					
pH ±0.1	4.05	3.99	4.00					
Eh (mV) ±10mV	348.3	358.1	358.9					
Temp (°C)	19.97	19.66	19.57					
SWL (m) after	1.891	2.006	2.212					
Cum. Volume (L)	0.2	0.5	0.8					
Water Colour	Clear	"	"					
Turbidity ±10%	Low	"	"					
Other Observations / Notes	orange sediment	"	"					

Sample Container & Preservation Data

Number of sample container: (Include QC samples)	1	2	3	4	5
Container Volume	2	1	1		1
Container Type	Metals total&dis	BTEX/VOCs	TRH/PAH		
Filtration	Yes	N	N		
Preservation	ICE	"	"		
Sample Number (for Lab ID):	MW1				
QC Dup Sample No.:					

F3.04 – Groundwater Sampling Field Record

Site / Project: 4		Bore ID Number: MW2
Client:		Job No. NE30028
Person Sampling: Tiffany MaDbott		Initials: TM

Bore / Site Details

Bore Condition / Locked? ✓✓	Type Protect. Cap / Cover: Cap	Bore Depth (bTOC): 4.101
Inner casing/screen type & diameter:	Screen interval (bgl):	SWL (bTOC) 3.421
WL Measurement Point	RL of measurement point (mAHD)	SWL Date/Time 7.10.2020 8:10am
Other Observations on Bore/Site: Gatic full with water.		

Bore Purge Data

Purge method: Peristatic pump	Bore Volume (L):	Purge Date: 7.10.2020
Purge rate (L/min):	Total Purge volume (L):	LNAPL / PSH Thickness (mm) (None) / .....mm

Purge Field Physicochemical Measurements:

	Reading1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	Reading 8
Start Time:	8:20	8:25	8:30	8:35	8:40	8:45		
DO (mg/L) ±10% (or ±0.2 if DO<2 mg/L)	5.89	5.77	4.39	3.63	3.49	3.50		
EC (µS/Cm) ±3%	581.5	577.6	555.3	562.8	568.3	552.8		
pH ±0.1	4.43	4.44	4.44	4.40	4.33	4.34		
Eh (mV) ±10mV	287.9	276.9	259.3	262.7	267.3	268.7		
Temp (°C)	19.10	19.32	19.36	19.39	19.47	19.53		
SWL (m) after	3.562	3.656	3.8	3.852	3.971	4.10		
Cum. Volume (L)	<0.5	0.5	1L	1.5L	1.75L			
Water Colour	Clear	Clear	"	"	Clear			
Turbidity ±10%	Low	Low	-	"	Low			
Other Observations / Notes								

Sample Container & Preservation Data

Number of sample container: (Include QC samples)	1	2	3	4	5
Container Volume	2	1	1	1	
Container Type	Metals Tot/dis	Phenols	VOCs/BTEX	TRH	
Filtration					
Preservation					
Sample Number (for Lab ID):	MW2				
QC Dup Sample No.:					

F3.04 – Groundwater Sampling Field Record

Site / Project: 445-459 Canterbury Rd, Campsie			Bore ID Number: MW3
Client: Hailiang			Job No: NE30028
Person Sampling: Tiffany Mabbott			Initials: TM
Bore / Site Details			
Bore Condition / Locked? JJ	Type Protect. Cap / Cover: Cap		Bore Depth (bTOC): 5.800
Inner casing/screen type & diameter:	Screen interval (bgl):		SWL (bTOC) 2.651
WL Measurement Point	RL of measurement point (mAHD)		SWL Date/Time 7.10.2020 9:13
Other Observations on Bore/Site			
Bore Purge Data			
Purge method:	Bore Volume (L):		Purge Date: 7.10.2020
Purge rate (L/min):	Total Purge volume (L): 0.5L		LNAPL / PSH Thickness (mm) (None) ..... mm

Purge Field Physicochemical Measurements:

	Reading1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	Reading 8
Start Time:	9:20	9:25	9:30					
DO (mg/L) ±10% (or ±0.2 if DO<2 mg/L)	2.36	2.20	2.16					
EC (µS/Cm) ±3%	611.6	609.2	610.0					
pH ±0.1	4.84	4.83	4.83					
Eh (mV) ±10mV	362.2	368.2	368.4					
Temp (°C)	19.93	19.66	19.64					
SWL (m) after	2.791	2.912	3.073					
	OIL							
Cum. Volume (L)	~~0.1L~~	0.3L	0.5L					
Water Colour	Clear	Clear	"					
Turbidity ±10%	Low	Low	"					
Other Observations / Notes								

Sample Container & Preservation Data

Number of sample container: (Include QC samples)	1	2	3	4	5
Container Volume	2	1	1		
Container Type	Metals tot/dis	TRH	VOCs/BTE		
Filtration	Yes	N	N		
Preservation	ICE	"	"		
Sample Number (for Lab ID):	MW3				
QC Dup Sample No.:	QA100 / QA200				

F3.04 – Groundwater Sampling Field Record

Site / Project:	445-459 Canterbury Road, Campsie		Bore ID Number: MW04
Client:	Hailiang		Job No. NE30028
Person Sampling:	Tiffany Maybott		Initials: TM

Bore / Site Details

Bore Condition / Locked? JJ	Type Protect. Cap / Cover: Cap	Bore Depth (bTOC): 2.931
Inner casing/screen type & diameter:	Screen interval (bgl):	SWL (bTOC) 1.391
WL Measurement Point	RL of measurement point (mAHD)	SWL Date/Time 7.10.20 9:58
Other Observations on Bore/Site		

Bore Purge Data

Purge method: Perilstatic Pump.	Bore Volume (L):	Purge Date: 7.10.2020
Purge rate (L/min):	Total Purge volume (L): 0.4L	LNAPL / PSH Thickness (mm) None / .....mm

Purge Field Physicochemical Measurements:

	Reading1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	Reading 8
Start Time:	10:05	10:10	10:15					
DO (mg/L) ±10% (or ±0.2 if DO<2 mg/L)	1.90	1.70	1.72					
EC (µS/Cm) ±3%	3173.3	3173.4	3171.4					
pH ±0.1	5.97	5.97	5.97					
Eh (mV) ±10mV	96.6	95.5	96.5					
Temp (°C)	19.39	19.13	19.14					
SWL (m) after	1.526	1.641	1.783					
Cum. Volume (L)	0.2L	0.3L	0.4					
Water Colour	Orange tinge.	"						
Turbidity ±10%	Low		"					
Other Observations / Notes								

Sample Container & Preservation Data

Number of sample container: (Include QC samples)	1	2	3	4	5
Container Volume	2	1	1		
Container Type	Metals tot/dis	VOCs/BTEX	TRH		
Filtration	Yes	N	N		
Preservation	ICE	"	"		
Sample Number (for Lab ID):	MW04				
QC Dup Sample No.:					

F3.04 – Groundwater Sampling Field Record

Site / Project: 445-459 Canterbury Rd, Campsie			Bore ID Number: MW05
Client: Hailiang			Job No. NE30028
Person Sampling: Tiffany Mabbott			Initials: TM
Bore / Site Details			
Bore Condition / Locked? J J	Type Protect. Cap / Cover: Cap		Bore Depth (bTOC): 2.786
Inner casing/screen type & diameter:	Screen interval (bgl):		SWL (bTOC) 1.412
WL Measurement Point	RL of measurement point (mAHD)		SWL Date/Time 7.10.20 10:25
Other Observations on Bore/Site			
Bore Purge Data			
Purge method: Peristaltic pump	Bore Volume (L):		Purge Date: 27.10.2020
Purge rate (L/min):	Total Purge volume (L): 0.5L		LNAPL / PSH Thickness (mm) (None) ..... mm

Purge Field Physicochemical Measurements:

	Reading1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	Reading 8
Start Time:	10:32	10:37	10:42					
DO (mg/L) ±10% (or ±0.2 if DO<2 mg/L)	0.39	0.28	0.29					
EC (µS/Cm) ±3%	27707.4	27749.3	27808					
pH ±0.1	6.14	6.17	6.21					
Eh (mV) ±10mV	-10.3	-5.4	-7.7					
Temp (°C)	19.21	18.57	18.51					
SWL (m) after	1.601	1.791	1.968					
Cum. Volume (L)	0.2	0.3	0.5					
Water Colour	Clear	"	"					
Turbidity ±10%	Low	"	"					
Other Observations / Notes								

Sample Container & Preservation Data

Number of sample container: (Include QC samples)	1	2	3	4	5
Container Volume	2	1	1		
Container Type	Metals ~~dd~~ d/s	VOCs/BTEX	TRH		
Filtration	Yes	N	N		
Preservation	Ice	"	"		
Sample Number (for Lab ID):	MW05				
QC Dup Sample No.:					

F3.04 – Groundwater Sampling Field Record

Site / Project:	445-459 Canterbury Road, Campsie		Bore ID Number: MW06
Client:	Hailiang		Job No: NE30028
Person Sampling:	~~B~~ Tiffany Mabbott		Initials: TM

Bore / Site Details

Bore Condition / Locked? ✓✓	Type Protect. Cap / Cover: Cap	Bore Depth (bTOC): 2.970
Inner casing/screen type & diameter:	Screen interval (bgl):	SWL (bTOC) 1.631
WL Measurement Point	RL of measurement point (mAHD)	SWL Date/Time 7.10.20 11:20
Other Observations on Bore/Site		

Bore Purge Data

Purge method: Peristaltic Pump	Bore Volume (L):	Purge Date: 7.10.20
Purge rate (L/min):	Total Purge volume (L): 0.4L	LNAPL / PSH Thickness (mm) (None) / .....mm

Purge Field Physicochemical Measurements:

	Reading1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	Reading 8
Start Time:	11:30	11:35	11:40					
DO (mg/L) ±10% (or ±0.2 if DO<2 mg/L)	0.35	0.23	0.19					
EC (µS/Cm) ±3%	2023.4	2002.4	2016.0					
pH ±0.1	6.58	6.64	6.62					
Eh (mV) ±10mV	-75.6	-75.7	-71.8					
Temp (°C)	19.08	18.20	18.10					
SWL (m) after	1.930	2.342	2.551					
Cum. Volume (L)	0.2L	0.2L	0.4L					
Water Colour	Pale Grey	"	Grey					
Turbidity ±10%	Low	High	"					
Other Observations / Notes	cloudy	cloudy, hydrocarbon sheen (minor)	silty					

Sample Container & Preservation Data

Number of sample container: (Include QC samples)	1	2	3	4	5
Container Volume	2	1	1		
Container Type	Metals tot/dis	BTEX/VOCs	TRH/PAH		
Filtration	Yes	N	N		
Preservation	ice	"	"		
Sample Number (for Lab ID):	MW06				
QC Dup Sample No.:					

F3.04 – Groundwater Sampling Field Record

Site / Project: 445-459 Canterbury Rd, Campsie			Bore ID Number: MW1
Client: Haileng			Job No. NE30028
Person Sampling: TM			Initials: TM
Bore / Site Details			
Bore Condition / Locked? ✓	Type Protect. Cap / (Cover:)	Bore Depth (bTOC): 6.00	
Inner casing/screen type & diameter:	Screen interval (bgl):	SWL (bTOC) 1.632	
WL Measurement Point	RL of measurement point (mAHD)	SWL Date/Time 29.9.2020 @14:00	
Other Observations on Bore/Site			
Bore Purge Data			
Purge method: Bailer	Bore Volume (L):	Purge Date:	
Purge rate (L/min):	Total Purge volume (L):	LNAPL / PSH Thickness (mm) (None) ……mm	

Purge Field Physicochemical Measurements:

	Reading1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	Reading 8
Start Time:	No readings taken.							
DO (mg/L) ±10% (or ±0.2 if DO<2 mg/L)								
EC (µS/Cm) ±3%								
pH ±0.1								
Eh (mV) ±10mV								
Temp (°C)								
SWL (m) after								
Cum. Volume (L)								
Water Colour	Pale orange with rust flakes							
Turbidity ±10%	Low							
Other Observations / Notes								

Sample Container & Preservation Data

Number of sample container: (Include QC samples)	1	2	3	4	5
Container Volume					
Container Type					
Filtration					
Preservation					
Sample Number (for Lab ID):					
QC Dup Sample No.:					

F3.04 – Groundwater Sampling Field Record

Site / Project: 445-459 Canterbury Rd, Campsie		Bore ID Number: MW2
Client: Hailiang		Job No. NE50028
Person Sampling: TM		Initials: TM

Bore / Site Details

Bore Condition / Locked? V	Type Protect. Cap / Cover:	Bore Depth (bTOC): 4.100
Inner casing/screen type & diameter:	Screen interval (bgl):	SWL (bTOC) 3.392
WL Measurement Point	RL of measurement point (mAHD)	SWL Date/Time 29.9.20 14:20
Other Observations on Bore/Site		

Bore Purge Data

Purge method: Bailer	Bore Volume (L):	Purge Date:
Purge rate (L/min):	Total Purge volume (L):	LNAPL / PSH Thickness (mm) None / .....mm

Purge Field Physicochemical Measurements:

	Reading1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	Reading 8
Start Time:	No readings taken							
DO (mg/L) ±10% (or ±0.2 if DO<2 mg/L)								
EC (µS/Cm) ±3%								
pH ±0.1								
Eh (mV) ±10mV								
Temp (°C)								
SWL (m) after								
Cum. Volume (L)								
Water Colour	Clear							
Turbidity ±10%	Low							
Other Observations / Notes								

Sample Container & Preservation Data

Number of sample container: (Include QC samples)	1	2	3	4	5
Container Volume					
Container Type					
Filtration					
Preservation					
Sample Number (for Lab ID):					
QC Dup Sample No.:					

F3.04 – Groundwater Sampling Field Record

Site / Project: 445-459 Canterbury Rd, Capsie	Bore ID Number: MW3
Client: Hailiang	Job No. NE30028
Person Sampling: TM	Initials: TM

Bore / Site Details

Bore Condition / Locked? ✓✓	Type Protect (Cap) / Cover:	Bore Depth (bTOC): 5.780
Inner casing/screen type & diameter:	Screen interval (bgl):	SWL (bTOC) 2.652
WL Measurement Point	RL of measurement point (mAHD)	SWL Date/Time 29/9/2020 12:56pm
Other Observations on Bore/Site: Access via carpark gate - dummy locked.		

Bore Purge Data

Purge method: Bailer	Bore Volume (L):	Purge Date:
Purge rate (L/min):	Total Purge volume (L):	LNAPL / PSH Thickness (mm) *None / .....mm*

Purge Field Physicochemical Measurements:

	Reading1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Reading 7	Reading 8
Start Time:	NO parameters taken							
DO (mg/L) ±10% (or ±0.2 if DO<2 mg/L)								
EC (µS/Cm) ±3%								
pH ±0.1								
Eh (mV) ±10mV								
Temp (°C)								
SWL (m) after								
Cum. Volume (L)								
Water Colour	Pale Brown							
Turbidity ±10%	Low							
Other Observations / Notes								

Sample Container & Preservation Data

Number of sample container: (Include QC samples)	1	2	3	4	5
Container Volume					
Container Type					
Filtration					
Preservation					
Sample Number (for Lab ID):					
QC Dup Sample No.:					

About Cardno

Cardno is a professional infrastructure and environmental services company, with expertise in the development and improvement of physical and social infrastructure for communities around the world. Cardno's team includes leading professionals who plan, design, manage and deliver sustainable projects and community programs. Cardno is an international company listed on the Australian Securities Exchange [ASX:CDD].

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