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Report on
Detailed Site (Contamination) Investigation

Western Sydney Cricket NSW and Community Centre
Wilson Park, 4 Newington Road, Silverwater

Prepared for
Cox Architecture Pty Ltd

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

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Report on Detailed Site (Contamination) Investigation
Western Sydney Cricket NSW and Community Centre
Wilson Park, 4 Newington Road, Silverwater

1. Introduction

This report presents the results of a detailed site (contamination) investigation (DSI) undertaken for the proposed Western Sydney Cricket and Community Centre development at Wilson Park, 4 Newington Road, Silverwater. The investigation was commissioned in an email dated 15 August 2019 by John Ferendinos of Cox Architecture Pty Ltd on behalf of the client, NSW Cricket Association and was undertaken in accordance with Douglas Partners Pty Ltd (DP) proposal SYD190618 dated 15 August 2019.

This report supports a State Significant Development Application (SSDA) submitted to the Minister for Planning and Public Spaces, pursuant to Part 4.7 of the Environmental Planning and Assessment Act 1979 (EP&A Act). This SSDA seeks consent for the design, construction and operation of a new Cricket NSW Cricket Centre (CNSWCC) at Wilson Park, within Sydney Olympic Park.

The CNSWCC will comprise a state-of-the-art, dedicated, year-round cricket, training and administration facility that services both regional and metropolitan cricketers, as well as providing facilities for aspiring junior cricketers to support sport, social, health and educational programs. The proposed development area (the site) is shown on Drawing 3, Appendix A. Further details on the proposed development are provided in Section 5.

DP completed a preliminary site investigation (PSI) for the project (DP Reference 86694.00.R.001.Rev0, dated 11 April 2019), including a review of historical reports and documents relevant to the contamination issues at the site. The PSI recommended a detailed site investigation which includes groundwater and soil gas assessment to assess the suitability of the site for the proposed development.

The primary objective of the DSI was to assess the suitability of the site for the proposed development, to discuss how the site can be made suitable for the proposed development, and to provide additional information to inform a contamination management plan (CMP), which will be required for the proposed development. The objective of the DSI is also to meet the requirements of the Secretary's Environmental Assessment Requirements (SEARs), issued as a result of the State Significant Development Application (SSDA). In relation to contamination, Clause 15 of the SEARs document (modification date 20 September 2019) states the following:

The EIS shall:

- *Demonstrate compliance with the requirements of requirements of State Environmental Planning Policy No.55 – Remediation of Land and the Contaminated Land Management Act 1997 Notice Number: 28040 issued in relation to the site and regulated by the NSW Environment Protection Authority (EPA), and associated Remediation Land Management Plan;*
- *Provide detailed contamination and geotechnical assessments, to be prepared for the full development area and reviewed by an EPA accredited site auditor. The reports must assess the*

site's subsurface conditions, including any soil and groundwater contamination. Due to historical contamination of the site, and proposed land use which includes building occupation, the detailed contamination assessments must include environmental sampling and analysis of soil vapour, groundwater and soil, at sufficient sampling density to characterise the site in accordance with the NSW EPA Sampling Design Guidelines. If these guidelines are not adhered to, detailed justification must be provided;

- *The detailed contamination assessments must determine the suitability of the site for the proposed development and provide recommendations for any remedial works if required. If remediation is required, the EIS must be accompanied by a Remedial Action Plan and Section B Site Audit Statement, to be reviewed by an EPA accredited site auditor;*
- *Delineate areas of heavier contamination within or adjacent to the proposed development area, such as known tar pits, and describe how any risks from such areas will be managed as part of the construction and operation of the proposal; and*
- *Include a hazardous materials survey of all existing structures and infrastructure prior to any demolition or site preparation works.*

In the preparation of this report, reference has been made to the following guidelines endorsed by the NSW EPA:

- National Environment Protection Council (NEPC) *National Environment Protection (Assessment of site Contamination), Measure 1999 (as amended in 2013),* (NEPC, 2013); and
- NSW Office of Environment and Heritage (OEH, *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* (OEH, 2011).

2. Scope of Work

The scope of work for this DSI comprised:

- A review of relevant previous reports and drawings prepared for the site;
- Assess previously reported analytical results (as made available) against the current thresholds relevant to a commercial land use (building footprints and hardstand), in addition to an open space / recreational land use (playing and training fields and landscaping areas);
- A review of published geological, soils, acid sulphate soils and hydrogeological maps;
- Collection of groundwater samples for contamination testing from the four existing monitoring wells (MP1 to MP4);
- Analysis of the groundwater samples for metals, Total recoverable hydrocarbons (TRH), Benzene, toluene, ethylbenzene and total xylenes (BTEX), Polycyclic aromatic hydrocarbons (PAH), phenols, and volatile organic compounds (VOC);
- A review of Dial Before You Dig Plans and underground service location to identify underground services at proposed drilling locations;
- Set out and survey of test locations using a differential global positioning system (dGPS);

- Drilling of three boreholes (BH6a, BH7a and BH10a) with a Geoprobe drill rig at the southern end of the mound formed in the north-east quarter of Wilson Park, assessing soil conditions within the site due to the proposed fence realignment;
- Collection of soil samples at regular depth intervals or upon signs of contamination at the three locations. Selected samples were analysed for metals, TRH, BTEX, PAH, phenols and VOC;
- Analysis of one intra-laboratory and one inter-laboratory soil/groundwater replicate, one trip spike sample and one trip blank sample;
- Screening of selected soil samples collected with a photoionisation detector (PID) to assess the likely presence or absence of volatile organic compounds;
- Conduct soil gas (vapour) sampling at the following locations. Samples were analysed for general VOC, TRH (F1 and F2) and BTEX:
  - Four locations (SV1 to SV4) in the footprint of the proposed main building, with locations lined up (where possible) with previously reported (1999) higher concentrations of soil gas (refer Drawing 1, Appendix A);
  - Four locations (SV5, SV6, SV7, SV10) at and close to the proposed fence line adjustment at the southern end of the western most soil mound in the north-east quarter of Wilson Park; and
  - Two locations (SV8 and SV9) in the footprint of the proposed maintenance sheds (and carpark) in the north-east portion of the site.
- Analysis of two shroud samples for isopropyl alcohol; and
- Assessment of the site's suitability for the proposed land use / development.

3. Site Information

3.1 Site Identification and Description

The site is located at Wilson Park, in the suburb of Sydney Olympic Park, within the Cumberland Local Government Area (LGA) and is situated at the north western corner of the Sydney Olympic Park (SOP) precinct. The site is located in proximity to a number of regionally significant facilities and amenities including the Olympic Park Railway Station, ANZ Stadium, Qudos Bank Arena and Sydney Showground, which are all approximately 2.5km south east of the site. Further to this, the site is located approximately 2km west of Wentworth Point.

The site's locational context is shown in Figure 1 below.

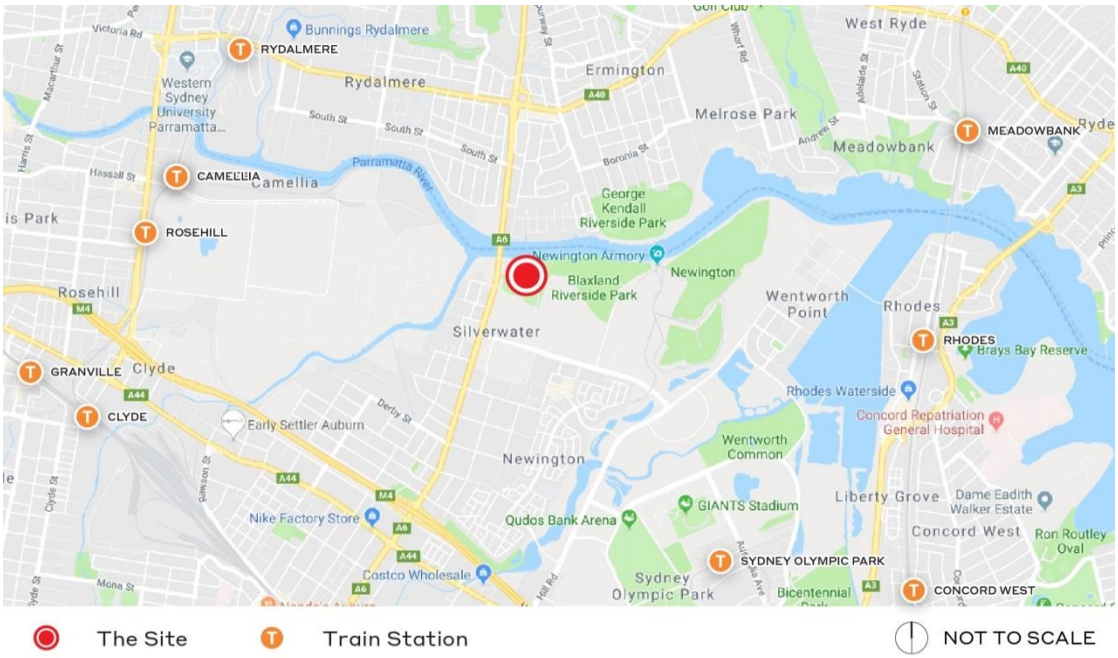


Figure 1: Locational Context

Wilson Park is irregular in shape and comprises a single allotment of land with an area of 119,894m2 and a leased area where development will occur (the site) with a site area of 65,768m2. The leased area excludes the portion of the Wilson Park site that is used for remediation purposes, as shown in the aerial image of the site provided at Figure 2. The site is currently owned by the Sydney Olympic Park Authority (SOPA) and it is legally described as Lot C in DP 421320 (with the exception of a fence line realignment as discussed below). The site is bounded by the Parramatta River to the north, Silverwater Correctional Complex to the east, a busway and industrial lands to the south and Silverwater Road to the west.

Figure 2: Site Aerial

The site is currently zoned as RE1 Public Recreation and SP2 Infrastructure (north east portion of Wilson Park) under the Auburn Local Environmental Plan 2010 and the SEPP – State Significant Precincts 2005. It is noted that the land zoned as SP2 Infrastructure has been declared as not suitable for any beneficial use.

Figure 3: Current Zoning

The parcel of land in between the proposed fence line and the existing fence line associated with the bioremediation area is shown on Figure 4 below. The total area is approximately 0.13 ha, with coordinates at each corner shown on Drawing ASK012 – SP VE3 in Appendix A.

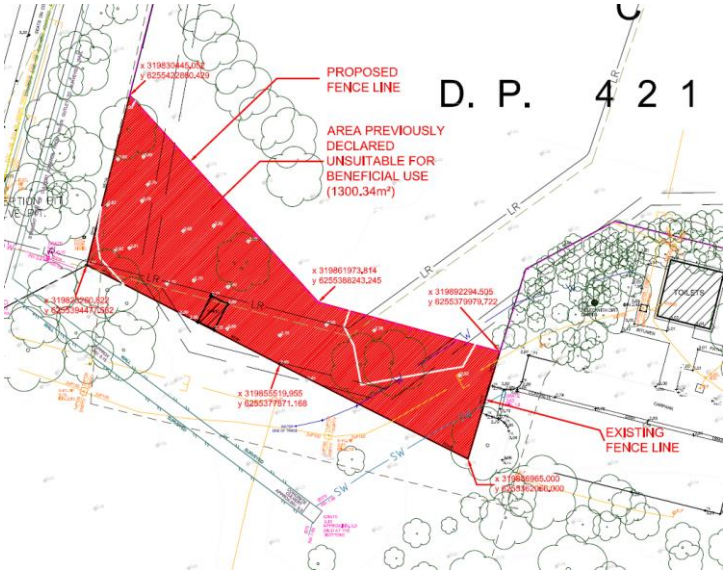


Figure 4: Portion of land in between of the existing fence line and proposed fence line

The site is one of ten engineered remediated landfill areas managed by Sydney Olympic Park (SOPA) under the Remediated Lands Management Plan, January 2009. The site falls under a 'maintenance of remediation notice' issued by the NSW EPA under Section 26 of the *Contaminated Lands Management Act 1997* (CLM Act).

It is noted that Wilson Park comprises north-west, north-east, south-west and south-east quarters, as referenced during previous investigations since 1999. The north-east quarter comprises the SP2 zoned land as described above. This part of Wilson Park falls outside the boundaries of the "site" with the exception of a minor fence line adjustment in the south-western part of this quarter, as discussed in Section 5 and shown on Drawing 3, Appendix A.

The site is occupied by Wilson Park with both entry and exit access points available from Newington Road. The majority of the site is currently used as playing fields, with mature trees generally located around the peripheries. A concrete paved car park and amenities building are located in north-west section of the site, and an asphalt surface car park and amenities building is located in the south-eastern section of the site.

It is understood from SOPA that the existing fields in the north-west quarter of Wilson Park are maintained through the use of a range of fungicides, pesticides, herbicides as well as growth regulators. Depending on the plant's requirements the fertilizers range from quick releasing straight elements (nitrogen) to slow releasing (coated) blended fertilizer. Soil amendments (gypsum / lime) are used regularly depending on the findings of soil testing. Multiple fertilizer blends and liquid fertilizers are used depending on season and the field condition.

The north-east quarter of Wilson Park is fenced off from the remainder of the park and has two prominent mounds, a site office for the landfill treatment plant with demountable site sheds accessed

by an unsealed (road base) driveway. The landfill leachate treatment plant is essentially landscaped and/or vegetated with trees and shrubs in a health condition.

The site is surrounded by the following:

- North: Parramatta River;
- East: Blaxland bioremediation pond and Silverwater correctional complex;
- South: Industrial/commercial land uses; and
- West: Silverwater Road.

At the time of the investigation, the surface level of the site was generally flat with a slight rise to the south-west towards the car parking area, ranging from approximately RL 2 m to RL 4 m relative to the Australian Height Datum (AHD).

The site occupies a total area of approximately 6.6 hectares.

3.2 Geology, Topography and Hydrogeology

Reference to the Sydney 1:100 000 Geology Sheet indicates the site is underlain by disturbed terrain characterised by level plain to hummocky terrain, extensively disturbed by human activity, including complete disturbance, removal or burial of soil. Local relief is typically < 10 m, and slopes usually less than 30%. Landfill includes soil, rock, building and waste materials. The map also indicates that the natural sequence beneath the fill comprises alluvial sediments overlying shale bedrock.

Reference to the Sydney 1:100 000 Soil Landscape Sheet indicates the site consists of disturbed terrain, while the Atlas of Australian Soils classifies the site under undulating Sodosol. This consists of hard acidic yellow mottled soil, often containing ironstone gravels throughout the profile.

The majority of the site is classified as having low probability (6-70%) of acid sulphate soils (ASS), with a small area to the north-west having high probability (>70%) of ASS, with reference to the Atlas of Australian Acid Sulfate Soils.

A search of the NSW Department of Primary Industries Office of Water database was undertaken as part of the PSI for bores within a 500 m radius of the site. Eleven registered groundwater bore was identified within the 500 m radius of the site. Standing water levels reported for the nearest wells ranged typically between 0.25 m and 1.5m below ground level.

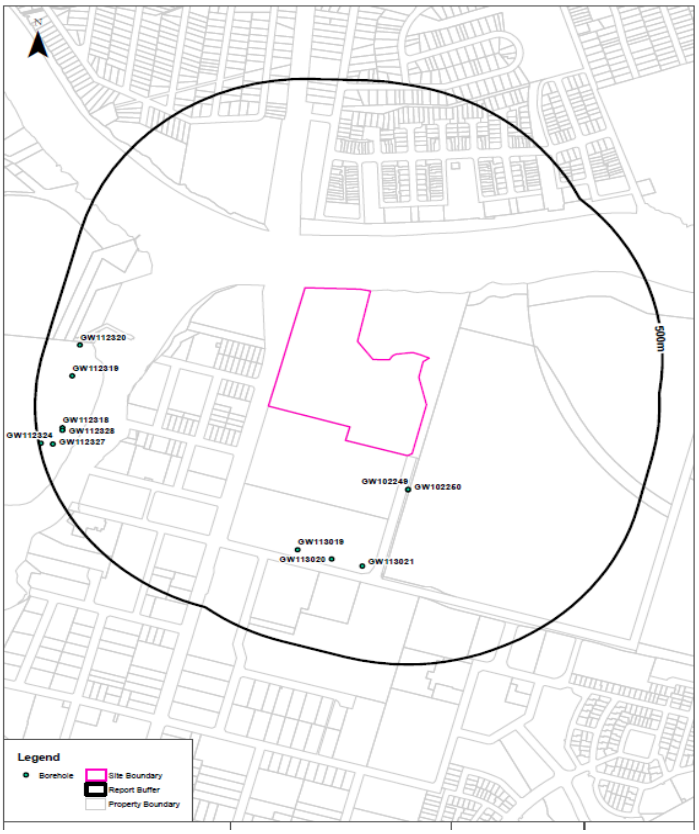


Figure 5: Groundwater Boreholes within 500m of the site

The registered groundwater boreholes within this radius are summarised below:

Table 1: Registered groundwater boreholes within 500 m of the site

Well	Water level (m b.g.l.)	Well depth (b.g.l)	Authorised Purpose	Competed Date	Distance from site (m)	Direction from site
GW102249	1.49	9.1	Monitoring	28/02/1998	82	South East
GW102250	0.25	11.0	Monitoring	28/02/1998	82	South East
GW113021	-	8.0	Monitoring	18/11/2004	281	South
GW113020	-	8.0	Monitoring	18/11/2004	282	South
GW113019	-	8.0	Monitoring	18/11/2004	282	South
GW112319	-	4.0	Monitoring	15/02/1994	426	West
GW112320	-	6.0	Monitoring	17/03/1994	428	West
GW112318	-	4.15	Monitoring	01/10/1991	444	West
GW112328	-	4.0	Monitoring	15/07/1996	445	West
GW112327	-	4.0	Monitoring	15/07/1996	471	West
GW112324	-	1.3	Monitoring	16/07/1996	495	West

The Waste Service NSW, *Wilson Park Draft Remediation Action Plan – Stage 2*, May 1999 (WS 1999) states that:

'The fill at the Park is reported as mainly comprised of dredged estuarine sand and mud, demolition rubble, industrial and household waste. The fill thickness had been shown by previous investigations to range from 0.5 to 1.5 metres in depth and generally consisting of clayey gravels and sands. Dutch cone penetration tests carried out in 1997 indicated that fill is present to depths of approximately 2.8 metres in parts of the Park.

Below the fill, as evident by previous investigations, is a sequence of Quaternary alluvium (generally comprised of organic muds and peats and sandy clays with variable shell contents). The thickness of the alluvium is variable across the site, however, there is a general thickening of the sands, clays and peats towards the north i.e., Parramatta River. It is thought that cut and fill activities may have locally changed the fill and alluvium profile, which varies in depth along the foreshore between 4.5 to 7 metres.

Below the alluvial sediments, there is expected to be a sequence of Pleistocene clay with interbedded shales, approximately 6 to 7 metres thick which extends into weathered shale and the underlying bedrock of the Wianamatta formation (Ashfield Shales).'

Furthermore, WS (1999) states that:

'*The Parramatta River is tidally influenced at Silverwater and mean tidal variations are in the order of 1 to 1.5 metres depending upon neap or spring conditions. The degree of hydraulic connection between the river and groundwater system is not clear but is likely to be poor as indicated by previous sampling of river foreshore sediments*.'

The site is underlain by a sequence of fill overlying saturated alluvial sediments that conformably overlie shale bedrock. The bedrock in the region - the Ashfield Shale is a fissured rock with a low potential for groundwater movement, and hence is not considered to be a potential source of groundwater for beneficial use. Previous reports indicate that salinity in the shale, being greater than 14,000 mg/L TDS, would render the groundwater unsuitable for any use.

Groundwater has been found in previous investigations to be present at shallow levels in the northern part of the site, where fill has been laid over the estuarine sediments. The groundwater levels fluctuate between clayey sand units (alluvium) and deposited fill, i.e. between 2 and 3 m depth and this water bearing zone may be influenced by tidal and rainfall variations. At a deeper depth (approximately 6 m) the Pleistocene clay was reported to contain intermittent saturated sand layers that tend to be confined within the clay and in some instances are at artesian pressures.

Environmental assessments performed by Groundwater Technology (GT) during 1994 and 1995 indicate that the groundwater flows in a northerly direction towards the Parramatta River at Wilson Park. From the groundwater contours GT determined that hydraulic gradients range from approximately 1 in 30 to 1 in 80. The anticipated hydraulic conductivity of clayey sands was in the range of 10^{-5} to 10^{-7} m/s.

4. Review of Previous Reports

4.1 Summary of PSI (DP, 2019a)

As part of the DSI, the previous PSI *Report on Preliminary Site Investigation, Western Sydney Cricket NSW and Community Centre, Wilson Park, Silverwater NSW,* Report 86694.00 dated 11 April 2019 (DP, 2019a) was reviewed and is summarised below.

The PSI included a review of previous investigation and Audit reports made available at the time of reporting. The relevant reports reviewed and summarised are listed in Section 4.2.

The following Table 2 presents a review of historical aerial photography.

Table 2: Aerial Photograph Review

Year	Site Features	Surrounding Features
1943	The site appears to be cleared land.	Neighbouring land to the south and north-east appear to be undeveloped land. Several structures can be seen to the south west and south east of the site, possibly used as residences or farm houses. Parramatta River is immediately to the north of the site.
1955	Several structures and a large above ground tank can be seen within the south-eastern portion of the site, possibly used as gas work /manufactory facilities.	The surrounding land use remains largely unchanged since the 1943 photograph with the exception of some additional above ground tanks to the north-east of the site.
1961	The site has been subject to significant development since 1955 with the construction of additional industrial facilities. Several pipelines and additional facilities can be seen in the south eastern section of the site, although most of the north-western portion of the site remains vacant.	Silverwater Road appears to be under construction to the north west of the site. Vegetation to the south west of the site has been cleared to build several warehouses. Two pits are present to the south-east of the site, possibly use for the tar sludge disposal. Additional structures and tanks appear to have been present immediately to the south of the site as part of the industrial activity onsite.
1965	It appears that additional structures have been built within the north western portion of the site since the 1961 aerial image, possibly used as an oil recycling depot.	The surrounding land use remained largely unchanged since the 1961 photograph. Silverwater Road can be seen to the north west of the site.
1970	The site remained largely unchanged since the 1965 photograph.	The surrounding land use remained largely unchanged since the 1965 photograph. One of the ponds to the north east of the site had been backfilled. The industrial activities have continued to undergo further development, with additional structures and tanks evident to the south of the site.

Year	Site Features	Surrounding Features
1982	The industrial facilities have been demolished, the site appeared to be mainly vacant with exception of the north western corner.	The majority of the structures and tanks to the south of the site observed in the 1970 aerial image have been demolished and replaced with large buildings. Oil tanks can be seen to the further south of the site.
1991	The site appeared to be developed with playing fields.	The surrounding land use remained largely unchanged since the 1982 photograph with expectation of the construction of Silverwater Correctional Complex.
2003	The site remained largely unchanged since the 1991 photograph with the exception of the construction of the concrete paved carpark with associated access road along the western boundary of the site. A small structure is present at the north eastern corner of the site, possibly used as a site office for the remediation plant.	The surrounding land use remained largely unchanged since the 1991 photograph. The landfill remediation plant can be seen to the north east of the site. The neighbouring land appeared to be similar to its current layout.
2009	The site remained largely unchanged since the 2003 photograph. Vegetation at the north-east portion of the site had been cleared to build a car park area	The surrounding land use remained largely unchanged since the 2003 photograph
2012	The site remained largely unchanged since the 2009 photograph. The site appeared to be similar to its current layout	The surrounding land use remained largely unchanged since the 2009 photograph
2018	The site remained largely unchanged since the 2012 photograph. The site appeared to be similar to its current layout	The surrounding land use remained largely unchanged since the 2012 photograph

The EPA publishes records of contaminated sites under section 58 of the *Contaminated Land Management Act* 1997 (CLM Act) on a public database accessed via the internet. The notices relate to investigation and/or remediation of sites considered to be significantly contaminated under the definition in the CLM Act. More specifically the notices cover the following:

- Actions taken by the EPA under sections 15, 17, 19, 21, 23, 26 or 28 of the CLM Act;
- Actions taken by the EPA under sections 35 or 36 of the Environmentally Hazardous Chemicals Act 1985; and
- Site audit statements provided to the EPA under section 52 of the CLM Act on sites subject to an in-force remediation order.

A search of the public database indicated that the site was listed as a contaminated site (former gas plant site) as discussed throughout this report. It is noted that there were nine other sites currently listed as contaminated sites located within 1 km of the site. These are presented in the PSI report.

The NSW EPA also issues environmental protection licenses under section 308 of the *Protection of the Environment Operations Act* 1997 (POEO Act). The register contains:

- Environmental protection licenses;

- Applications for new licenses and to transfer or vary existing licenses;
- Environment protection and noise control licenses;
- Convictions in prosecutions under the POEO Act;
- The result of civil proceedings;
- License review information;
- Exemptions from provisions of the POEO Act or Regulations;
- Approvals granted under Clause 9 of the POEO (Control of Burning) Regulation; and
- Approvals granted under Clause 7a of the POEO (Clean Air) Regulation.

A search of the public register undertaken in the Lotsearch Report indicated that there were eleven current Environment Protection Licences issued to sites within a 500 m search buffer as listed in the PSI report.

A search of the EPA PFAS Investigation Programme found no sites were under investigation within the 1 km search buffer of the site.

A search of the Dangerous Goods and Stored Chemical Information Database held by SafeWork NSW was requested by DP. Correspondence from SafeWork NSW dated 21 February 2019 indicated that no records pertaining to the site were located.

4.2 Previous Reports Reviewed in the PSI

As part of the scope of works of the PSI, DP conducted a review of the following reports made available at the time of preparing this report:

- Waste Service NSW, *Wilson Park Draft Remediation Action Plan – Stage 2*, May 1999 (WS 1999);
- DP *Soil Investigation, Wilson Park, Newington Road, Silverwater*, dated 11 October 1999 (DP 1999);
- URS Australia Pty Ltd, Report on *Summary Site Audit Report, Wilson Park, Silverwater Road, Auburn* dated February 2001 (URS 2001); and
- Sydney Olympic Authority, *Remediated Lands Management Plan*, January 2009, part extract only (SOPA 2009.

4.2.1 WS (1999)

WS (1999) is a draft remediation action plan. As such, the review of this document focussed on the background, history, and subsurface profiles. The review of actual remediation outcomes is presented in the review of URS (2001).

WS (1999) was prepared in relation to the whole of Wilson Park, comprising 11.9 ha, as shown on Drawing 1, Appendix A. The report states that the park was closed in 1994 due to public health risks,

and that the Olympic Coordination Authority required remediation works to (a) restore Wilson Park (the Park) to a suitable state for public open use; and (b) mitigate off-site migration of contaminants.

The history of the Park was summarised as follows:

1920s: The current Park was largely cleared farm land, partly covered with an undulating mangrove swamp area bordering the Parramatta River. The area was generally poorly drained with lower portions of the site being only slightly above high tide level;

1930s: The lower areas were reclaimed to form the Carnarvon Golf Club;

1940s: Large portions of the golf course adjacent to Parramatta River were resumed and occupied by the armed services;

1950s: Petroleum and Chemical Corporation Australia Limited (PACCAL) took control of the unused site, constructing a Semet-Solvay Oil Gas Plant to supply Australian Gas Light Company with domestic gas. This process used crude oil as feedstock resulting in bituminous and tar by-products. This activity impacted upon the surrounding suburbs with air and water pollution problems, generated by poorly maintained manufacturing processes and wastes were disposed on-site in exposed sludge pits;

1970s: Having been served with some fifty legal notices under the Clean Air Act, PACCAL was forced to close due the advent of natural gas. Some of the sludge in the tar pits was mixed with crushed sandstone and used to level the north-west corner of the site. The remainder of the sludge remained buried in the tar pits which were covered with sand, clay and hard fill;

Late 1970s: Lots A, B and C were offered for public auction. Lot C (the original PACCAL site) failed to sell. Auburn Council were made trustees of the site and it was subsequently converted to playing fields and open parkland;

Early 1990s: Auburn Council park employees noticed signs of pollution at Wilson Park and subsequent investigations led to the park's closure in 1994; and

1997: The first stage of remediation was carried out to mitigate pollution of the Parramatta River by placing a "U" shaped clay cut-off wall around the main body of the buried wastes to intercept off-site flows and by the removal of contaminated foreshore sediments.

The north eastern quarter of the Park (to the north east of the subject site) had two mounds which are approximately 100 to 110 m in length. These mounds partially cover the old sludge pits and were approximately 3 metres in height. In 1997 as part of Stage 1 remediation works at Wilson Park, a leachate treatment dam was constructed between the two mounds. This dam is approximately 65 m long, 35 m wide and 2 m deep. A coffer dam was also constructed along the north eastern quarter of the Parramatta River foreshore.

Generally, the nature of the contamination over Wilson Park has been well documented, particularly in the north-eastern quarter of the Park where the tar ponds are located. The pollution causing environmental and human concern at the Park consists of groundwater, sands and clays, contaminated to varying degrees with:

- Crude oil and thermally cracked crude oil, behaving as a dense non-aqueous phase liquid (DNAPL);
- Polyaromatic hydrocarbons;
- Benzene, Toluene, Ethyl-benzene and Xylene (BTEX); and
- Phenols.

Chemicals of concern that have been identified in contaminated soil samples taken from the Park include:

- Petroleum hydrocarbon tars (TPH), up to 1,000 ppm;
- PAH, up to 16,000 ppm;
- BTEX, up to 1,000 ppm;
- Phenolics (phenols, cresols, xylenols, trimethyl phenols), up to 50 ppm;
- Pentachlorophenol (PCP), up to 1 ppm;
- Octachloredibenzodioxin (OCDD), up to 730 ppb (1.3 ppb TEQ); and
- Heavy metals (zinc, lead, cadmium, chromium and copper), generally at or below the concentrations set out in regulatory guidelines.

Chemicals of concern that have been identified in contaminated groundwater adjacent to the two buried tar ponds (presumably in the north eastern part of the Park) are:

- PAH, up to 3 ppm;
- BTEX, up to 50 ppm; and
- Phenolics (phenols, cresols, xylenols, trimethyl phenols), up to 5 ppm.

Volatile organic compounds found at the Park are generated by the evaporation of low molecular weight organic components found in the petroleum DNAPL phase that contaminate soil and sediments. Chemicals of environmental and human concern being primarily the carcinogen benzene, the principal component of BTEX.

In April 1997, the Stage 1 Remediation works at Wilson Park were commenced, and involved:

- Excavation and installation of an impermeable clay cut-off wall, surrounding the migration pathways of tar emanating from the two buried sludge pits into the Parramatta River;
- Installation of a clay coffer dam surrounding the contaminated foreshores of the Parramatta River adjacent to tar pit 2;
- Excavation of the contaminated foreshores and replacement with compacted validated clean clay;
- Containment and capping of all contaminated excavated materials over the original two tar ponds;
- Construction of a leachate treatment pond between the two disposal mounds;
- Installation of nine piezometers outside the cut-off wall to monitor efficiency; and
- Over-covering the western landfill site with fertile topsoil and the eastern landfill with fertiliser and hydromulch grass seed.

Further investigation of the Park was carried out in 1999 (refer Section 4.2.2) to clarify the full extent of contamination over the site, particularly over the southern half and the north-western quarter of the Park. Further testing was also conducted over the north-eastern quarter of the site in order to clarify the location of sub-surface features [it is noted that the subject site comprises the north-west, south-west and south-east quarters of the Park as referred in WS (1999)]. Pertinent results reported are summarised below:

- The soil gas probe readings in the south-west quarter ranged from 0.0 - 41.0 ppm. Overall, the results showed effective bio-remediation of VOCs occurring through the nutrient rich surface of this quarter;
- The soil gas probe readings in the south-east quarter ranged from 0.0 - 7.8 ppm, however, the majority of readings at 0.5 m and 0.2 m were non detect. Here, effective bio-remediation was also shown to be taking place; and
- The soil gas probe readings in the north-west quarter ranged from 0.0 - 163 ppm. The elevated readings at a depth of 0.5 m generally occurred in areas where only a thin cover of soil exists. However, overall, the results showed effective bio-remediation of VOCs occurring through the nutrient rich surface of this quarter.

Twelve groundwater monitoring wells were installed over Wilson Park during investigations in 1994 and 1995 (refer Section 4.2.3). All wells showed some degree of hydrocarbon contamination. Those adjacent or within the tar pond area in the north-east quarter showed elevated readings of total PAH (MW4, 182 ppm), while those in the southern half showed low level total PAH contamination (MW10, 15 ppb).

The proposed remediation works included:

- Any necessary upgrading of site features installed as part of Stage 1 remediation works;
- Covering of the Park with a suitable barrier which will promote bio-remediation of volatile pollutants such as BTEX and phenolics;
- Minimisation of leachate generation potential from the infiltration of surface water over the site; and
- Interception, treatment and disposal of leachate.

4.2.2 DP (1999)

DP (1999) was a factual report, reporting on the results of a soil sampling and testing exercise conducted across the subject site as part of the remediation programme outlined in Section 4.2.1. Sampling was undertaken at 75 locations spaced in a 30 m grid pattern across the site, as shown on Drawing C1, Appendix B. Samples were recovered from the surface to 0.1 m and at 0.5 m depth. The samples were analysed for a range of contaminants of concern.

The results were presented to Waste Service for interpretation (refer to discussion under the validation section in Section 4.2.3 below).

4.2.3 URS (2001)

URS (2001) is a site audit report (SAR) which included a review of previous investigations, risk analyses, and remediation plans, and validation reports for the Park between 1992 and 2001, prepared by various consultants. The primary reports reviewed in URS (2001), which relate to the subject site, included the following:

- Hanitro Pty Ltd (1992) *Stage 1 Environmental Assessment, Wilson Park Site History*;
- Groundwater Technology Pty Ltd (1995) *Stage 3 Environmental Assessment Wilson Park (NE, SE & SW Corners);*
- Egis Consulting (1999) *Stage 1A, Groundwater Assessment and Field Investigations*; and
- Waste Service NSW (1999) *Draft Remediation Action Plan – Stage 2*.

Additional Historical Information

In line with the history timeline presented in Section 4.2.1, the report states that in 1988 the site was converted to playing fields and open parkland by Auburn Council. In 1992, evidence of residual contamination was noticed by park maintenance staff, specifically in the north-east corner of the Park. In addition, surface eruptions of tar were occurring in the playing fields and a strong tarry odour could be detected at low tide in the north east corner. The Park was subsequently closed in 1992.

Contaminants of Concern

The former petrochemical plant housed two large tar pits located in the north east portion of the Park. Residues from the gasworks, including tar and spent oxide were apparently deposited in the tar pits or as filling across the site, and therefore have the potential to contaminate the surrounding soil and groundwater via leaching. It is also known that the eastern corner of one of the pits waste water was allowed to separate by gravity in the concrete lined pit, which was 7 m deep and thought to probably have cracks in the base. Therefore, it was considered that there was a potential for DNAPL to have migrated downward in this area.

There is also some evidence to suggest that ammonia liquors, organic solvents and acidic waste may have been deposited in the scrubber pit located along the central northern boundary of the Park.

Other potential contaminant sources included oil and tar leaks from gas holders, underground storage tanks and pipelines associated with the former catalytic cracking plant.

Furthermore, the mixing of tar with crushed sandstone and dispersing as a fill layer across the Park may have resulted in widespread contamination. It is understood that after the plant closed in the mid-seventies, the area was subsequently used as a general waste depot, receiving about a 1 to 2 m thick layer of mixed fill.

Fieldwork and Testing

No intrusive works were conducted as part of Hanitro (1992).

A total of 42 boreholes were positioned across the site as part of GT (1995). The bore and monitoring well locations (combined with those drilled in the NE quarter of the Park) are shown on Figure 14 (from

the SAR), included in Appendix A of this report). Samples were collected in the depth range of 0.5 m to 5 m, but predominantly in the 1 to 2 m range. It is noted that four groundwater monitoring wells were installed within the subject site as part of the overall investigation of the Park. Soil samples were analysed for TPH, BTEX, PAH, PCB, OCP, phenols, metals and metalloids, cyanide and pH. Two samples were analysed for dioxins.

A total of 18 boreholes were installed as part of Egis (1999), although all locations were within the north east quarter of the Park. These finds are not discussed further in this summary.

The fieldwork and testing component of Waste (1999) included soil gas probes (using a PID) and flux hood measurements across the subject site to assess the distribution of sub-soil and surface hydrocarbon contamination. The locations are shown on Figures 8a, 8b and 8c (from the SAR). Air samples collected using flux hood were analysed for organic solvents (including BTEX) and PAH.

The SAR noted that notwithstanding the QA/QC limitations identified in the previous reports, the Auditor considers that the overall quality of the field and analytical data is suitable for the purpose of characterising site contamination in soil, soil vapour and groundwater at the site.

Soil and Groundwater Contamination – South West Quarter

A total of eight sampling locations were positioned in this part of the Park. Test results presented in GT (1994 and 1995) indicated the presence of TPH (C_{10}-C_{36}) exceeding the NSW EPA (1994) guidelines at two bore locations not far from one of the tar pits in the north east quarter. The presence of tar was noted in one bore at a depth of 1 m. All BTEX concentrations were low. Concentrations of PAH, metals, OCP, PCB and cyanide were low.

Flux hood measurements noted low level VOC migrating through the surface at three locations.

Although the results are based on a relatively small number of sample points (a total of eight), they indicate that there is negligible hydrocarbon or metals contamination in this part of the Park, except for the north-east corner closest to one of the tar pits. The results are supported by the site history information which indicated that minimal production activities occurred in this area.

Concentrations of PAH and some metals recorded in groundwater in the single well on this part of the Park exceeded ANZECC (1992) guidelines for the protection of marine waters. PCB and phenols were detected above the laboratory detection limits.

Based on the presence of sludge pits beneath adjacent lands, it is possible that contamination in the well may have derived from an off-site source.

Soil and Groundwater Contamination – South East Quarter

A total of 11 sampling locations were positioned in this part of the Park as part of GT (1994 and 1995). Concentrations of TPH (C_{10}-C_{36}) exceeded the NSW EPA (1994) guidelines at six locations, mostly in the depth range of 1 to 2 m. BTEX concentrations also exceeded the same guidelines in three of the samples.

Four samples submitted for PAH analysis exceeded the NEHF guidelines for parks and open space, whilst metals and cyanide concentrations were below the same guidelines. OCP, PCB and phenol concentrations were below laboratory detection limits.

The observed contamination was found in both the northern and southern parts of this area (most in the north). The distribution may be a factor of the sampling locations which were concentrated in the northern part.

Flux hood measurements of VOCs were all below detection limits.

Concentrations of some metals recorded in groundwater in the single well on the site exceeded ANZECC (1992) guidelines for the protection of marine waters. No exceedances were reported for PAH or hydrocarbons. PCB and phenols were detected above the laboratory detection limits.

Soil and Groundwater Contamination – North West Quarter

A total of 24 sampling locations were positioned in this part of the Park as part of GT (1994 and 1995). Concentrations of TPH (C_{10}-C_{36}) exceeded the NSW EPA (1994) guidelines at nine locations; mostly in the depth range of 1 to 2 m. BTEX concentrations also exceeded the same guidelines in five of the samples.

Three of the seven samples submitted for PAH analysis exceeded the NEHF guidelines for parks and open space (NEHF E), whilst metals and cyanide concentrations were below the same guidelines, apart from nickel in three composite samples. OCP, PCB and phenol concentrations were either below laboratory detection limits or below the NEHF E criteria.

A soil sample from a depth of 2 m in the north-western car park following observations of a white precipitate found high concentrations of TPH, BTEX and PAH, exceeding NEHF E.

A single soil sample analysed for dioxin revealed a concentration of 2,3,4,5-tetrachloroibenzo-p-dioxin was below the detection limit.

Flux hood measurements were below detection limits for all but two locations, with VOC concentrations decreasing towards the surface.

The presence of variable contaminated soils across this quarter is supported by the historical information which indicated that extensive parts of the area were levelled with a mixture of crushed sandstone and tar.

Concentrations of some metals recorded in groundwater in the single well on the site exceeded ANZECC (1992) guidelines for the protection of marine waters. PCB and phenols were detected above the laboratory detection limits.

Soil and Groundwater Contamination – North East Quarter (outside the subject site)

Concentrations of TPH, BTEX and PAH exceed the NEHF E criteria in soils across the whole quarter. The contamination is primarily associated with the two original tar sludge pits. Metals, cyanide OCP, PCB and phenols concentrations were below the NEHF E criteria. Two soil samples analysed for

dioxin revealed concentrations of 2,3,4,5-tetrachloroibenzo-p-dioxin below the chemical control order threshold.

Contamination in this area was observed to extend to the shallow water table. The presence of LNAPL and DNAPL was observed at several locations in this area.

The presence of variable contaminated soils across this quarter is supported by the history information which indicated that extensive parts of the area were levelled with a mixture of crushed sandstone and tar.

A total of 25 wells were installed in the north east quarter.

TPH and BTEX concentrations exceeding the NSW EPA (1994) guidelines were reported in groundwater from ten of the wells. DNAPL was present in the base on one well, whilst DNAPL was present in two of the wells. PAH contamination was present in 15 of the wells, and metals were reported to exceed ANZECC (1992) guidelines for marine water protection in all the wells. Phenols exceeded the same guidelines in five samples of groundwater.

The majority of the groundwater contamination at the site appeared to be associated with the two former sludge pits situated in the north east quarter.

Contaminant Migration

The results of previous investigations indicated that off-site migration of contaminants into the Parramatta River was occurring in the form of contaminated groundwater and DNAPL.

Stage 1 remediation works included the installation of a clay cut-off wall around the outer perimeter of the two sludge pits (refer Drawing 085-G-G-0001 REV.P, Appendix A) to prevent continued migration via the shallow groundwater system. The wall was apparently keyed into the residual clay layer beneath the Park.

However, additional investigations conducted after the installation of the wall revealed that dissolved TPH, BTEX and PAH and phase separated hydrocarbons extended beneath Parramatta River via the deeper groundwater within the sand lens.

While the number of groundwater monitoring wells in the southern half and north western portions of the Park was minimal, the results indicate that off-site migration of site contamination is not occurring in these areas of the Park.

The results of soil vapour monitoring and flux hood sampling over much of the site indicates that the potential for migration of contaminant vapours off site is negligible.

Stage 1 Remediation

The Stage 1 remediation works comprised the following:

- The construction of a clay cut-off wall to depths of between 4.5 m and 7 m, on the down gradient side of the tar sludge pits;

- Installation of contaminated groundwater sub-surface drainage and pump out pits on the inner perimeter of the cut-off wall, to capture shallow contaminated groundwater associated with the tar pits;
- Construction of a coffer dam surrounding the contaminated foreshore, and the excavation of the contaminated material;
- Re-instatement of the seawall and foreshores;
- Installation of segregated drains and nine monitoring wells on the outer perimeter of the cut-off wall to monitor efficiency of the wall; and
- Capping of contaminated soil stockpiles.

The contaminated material generated from the excavations associated with the cut-off wall and the foreshore generated an estimated 8,000 m^3. The materials were stockpiled above the tar pits and capped with 1 m of clean imported clay and sandstone fill.

Stage 2 Remediation

The Stage 2 remediation works comprised the following:

- Validation of the southern half of the Park;
- Extensions of the Stage 1 clay cut-off wall to completely surround the tar pits;
- Covering the north-west quadrant with 0.5 m of artificial topsoil and validation;
- Installation of a sheet pile wall between the cut-off wall and Parramatta River to reduce migration of contaminants through the deeper groundwater;
- Installation of a pumping system to reduce groundwater levels to 0.5 m below mean tide level;
- Construction of two additional treatment ponds in the north-east quadrant;
- Stormwater improvements; and
- Revegetation and landscaping.

The guidelines used to develop the validation criteria for soils imported to the site for use in the surface included ANZECC (1992), Dutch guidelines (1992), the NEHF E guidelines, and the NSW EPA Guidelines for the Site Auditor Scheme (1998). The threshold levels adopted for the acceptance of imported soils are generally more stringent than those adopted in the current guidelines.

Based on the investigations carried out in the south-west and south-east quarters of the Park, minimal remediation was required. It was proposed that a shallow drain running east-west would be installed, and that soils excavated in the process will be relocated to the north-east quarter to be capped. The Site Auditor considered that subject to appropriate management of these measures, and validation of the soils for the intended land use, the southern half of the Park would be suitable for release to the public.

The distribution of contamination (TPH, BTEX, PAH) in soil greater than 0.5 m depth, across the north-west quarter was variable and primarily related to crushed sandstone and tar mixed fill. It was proposed to grade this quarter, cap with a cover of crushed sandstone and clay, then 0.1 m of topsoil.

It was also proposed to pre-load the cap in the hope of bringing hydrocarbon impacted shallow soils to the surface for excavation and relocation to the north-east quarter to be capped.

The details of the proposed remediation of the north-east quarter have not been discussed further as this area falls outside of the subject site.

The Auditor concluded that he was satisfied that:

- The implementation of the remediation strategy in accordance with the Stage 2 RAP and associated design drawings would render the south-west, south-east and north-west portions of the Park suitable for recreational and open space land use; and
- The strategies proposed in relation to ongoing remediation and management of contamination in the north-east portion of the Park will minimise the potential for further off-site migration of contamination;

Subject to:

- Preparation and implementation of an Auditor approved Environmental Management and Monitoring Plan;
- Access to a proposed foreshore footpath is restricted to the public until monitoring justifies release; and
- Low level access to the wetland.

Validation (excluding north-east quarter)

As indicated in Section 4.2.2, DP conducted grid based sampling and testing of shallow soils as part of the remediation and validation process. A total of 75 sampling locations were position in a grid across the subject site.

For the southern half of the Park, contaminant concentrations were within the adopted remediation criteria with the exception of sample location A4 for lead and PAH, and sample location A5 for TPH and PAH. These two locations were in the line of the proposed shallow drain and were therefore removed as part of the drain construction works and relocated to the north-east quarter. A hot spot was also excavated from adjacent to the cricket pitch and validated upon removal.

Following the completion of the validation assessment of the southern half of the Park (refer Section 4.2.3) the Auditor considered that area to be suitable for the proposed recreational open space use.

For the north-west quarter of the Park, contaminant concentrations were within the adopted remediation criteria with the exception of four sample locations for TPH, arsenic, chromium, and/or PAH. Statistically all results were within the remediation criteria.

The Auditor considered that the existing surficial soil meet the validation criteria and was therefore suitable for re-use following remedial activities.

Sandstone and shale was imported to the site for crushing and mixing with compost to form the artificial capping of the north-west quarter. The materials were imported from various sites and validated as being suitable to use at the Park. A total of 25 samples were recovered by HLA to validate the imported materials. The samples were analysed for metals, TPH, BTEX, PAH, OCP OPP and

phenols. All concentrations were below the criteria specified in the RAP. The Auditor concurred that the materials were suitable for use at the Park.

Site Audit Statement

On the basis of the outcomes reported in the Site Audit Report, the Site Auditor issued a Site Audit Statement (SAS) under the Contaminated Land Management Act 1997, which states that the south-east, south-west and north-west quarters of the Park are suitable for recreational, open space and park uses, subject to:

- Preparation and implementation of an auditor approved Environmental Management Plan including but not limited to controls to alterations of landforms and excavations below a depth of 0.5 m; and
- Implementation of an auditor approved groundwater monitoring programme to assess the impact of residual soil contamination on groundwater quality and potential risk of harm to the environment.

4.3 SOPA (2009)

The extract from SOP (2009) *Remediated Lands Management Plan* made available to DP included the following pertinent statements:

- As at November 2007 the landfill and bioremediation systems (in the north-east quarter of the Park) were operating effectively;
- The Park is serviced by two groundwater interception and leachate collection systems for the shallow and deeper aquifers. Collected leachate drains via gravity to pumping pits, which pump into treatment ponds, where it is treated via bioremediation. The treated leachate is disposed to Parramatta River under an environmental protection licence (EPL); and
- The north-west quarter is graded to direct runoff to the centre of the park in the direction of the shallow drain which collects the water and directs it to an interception pit. Depending on analytic test results, the collected water is then either pumped to Parramatta River or to one of the treatment ponds in the north-east quarter. Given trace levels of PAH, all water to date has been directed to the treatment ponds.

There are further details documented around the management of the landfill, cut-off walls and leachate in the north east quarter which are not part of the subject site.

4.4 Summary of Geotechnical Investigation (DP, 2019)

DP was commission in 2019 to conduct a preliminary geotechnical investigation to provide information on the subsurface conditions across the site, with reference to the proposed Western Sydney Cricket and Community Centre development. The scope of work included 44 cone penetration tests (CPTs) with pore pressure measurement (piezocones) to refusal as well as sampling and laboratory testing at 14 of the CPT locations. Details of the field work, comments relevant to design and construction, as well as factual reporting on sampling and laboratory testing undertaken for the turf design (by others)

are given in the report. The cone and sampling locations are shown on Drawing 101, Appendix A (an extract from the geotechnical report). A copy of logs has been included in Appendix D.

Fieldwork results indicated that fill was encountered in all shallow bores and piezocones and comprised variable mixtures of sandy clay and clayey sand with layers of clay/sand/gravel. In some locations there was a distinct change in material at between 0.7 m and 1.5 m depth, which has been inferred to be the change from the capping layer to general filling. A distinct capping layer was not encountered at all test locations. The maximum depth of filling at the sampling locations was 4.2 m.

A trace amount of suspected asbestos containing material (ACM) was observed in the fill at CBR 27 (at greater than 0.15 m depth), and at CBR 39 (within the upper 0.8 m of fill).

4.5 Summary of SAQP (DP, 2019)

A sampling and analysis quality plan (SAQP) has been prepared (Report ref: 86694.03.R.001.Rev0), which outlines a plan to investigate soil, soil vapour and groundwater conditions at the site building on the existing information to assess the suitability of the site for the proposed development.

Sampling methodology and suitable guidelines were adopted in accordance with the SAQP, a copy of which has been included in Appendix G.

5. Proposed Development

The proposal relates to a State Significant Development Application (SSDA) to facilitate the development of a Cricket Centre for Cricket NSW at the Wilson Park site. Specifically, the works that are proposed for the SSDA include:

- A two storey cricket centre including an internal atrium, gymnasium, community facilities, sports science and sports medicine facilities and business offices;
- An International Cricket Council (ICC) compliant cricket oval 136m long x 144m wide (16,040m^2) and associated seating;
- A community cricket oval with a diameter of 95m (6365m^2);
- Outdoor practice nets with 71 wickets;
- A double height (8m) indoor training facility with 15 wickets;
- A single storey shed for machinery;
- Associated car parking, landscaping and public domain works; and
- Extension and augmentation of services and infrastructure as required.

The detailed proposed development is shown on Drawing C06-P3, Appendix A. This drawing also shows the planned surface drainage arrangement which is independent of the treatment system in the north-east quarter. There is proposed a subsurface system for the ovals and a surface collection system connecting to the existing council culvert system. Stormwater will be treated via filtration systems prior to discharge to councils system in accordance with council's DCP.

As shown on the preliminary Drawing C07, Appendix A, the proposed development will involve filling from current levels generally by around 0.5 m, with some cut into existing the existing mounds in the south-east quarter of the site. The existing internal parking, and existing and proposed internal roads will remain essentially at the current ground surface levels.

The main building for the development is understood to be located in the north-east quarter as shown on Drawing 3, Appendix A. It is understood that the ground floor slab will be at grade (following the planned filling as discussed above) and will be a suspended slab supported on piles bearing on bedrock.

Some localised trenching will be required for the main in ground stormwater system, as shown on Drawing C06-P3 in Appendix A. Trench excavations are anticipated to depths of up to 2 to 3 m below current ground levels. It is noted that the drainage line that currently exists at the site and extends towards the bioremediation area in the north-east quadrant, between the two proposed ovals, will be diverted at Node 4 (as shown on Drawing C06-P3, Appendix A) to the drainage line further to the west.

As part of the proposed development, a fence realignment is proposed at the south-west corner of the north-eastern quarter of Wilson Park, as shown on Drawings 1 to 4 and drawing ASK012, Appendix A. The fence realignment is designed to accommodate vehicular thoroughfare and at grade car parking, as shown on Drawing 3, Appendix A. The coordinates at each point for the fence realignment is as follows:

Point 1: Easting- 319830445; Northing-6255422860;

Point 2: Easting- 319861973; Northing-6255388243; and

Point 3: Easting- 319892294; Northing-6255379979

The site is located within the Sydney Olympic Park precinct, which is identified as a State Significant site in Schedule 2 of State Environmental Planning Policy (State and Regional Development) 2011. As the proposed development has a capital investment value exceeding $10 million, it is declared to be State Significant Development (SSD) for the purposes of the EP&A Act, with the Minister for Planning and Public Spaces the consent authority for the project.

It is noted that an interception pit (PP22) is located in the north-west quarter of the site, which connects to a rain infiltration interception drain along the centre of Wilson Park. It is understood that PP22 was diverted to the irrigation storage tank for the current sport oval irrigation in 2009. It is understood that this pit is not regulated by the EPA for the purpose of the Contaminated Lands Management Act Notice. It is understood that the pit will be relocated in consultation with SOPA.

6. Conceptual Site Model

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

6.1 Potential Contamination Sources and Contaminants of Concern

Based on the previous investigations, the following potential sources of contamination and associated contaminants of concern have been identified.

Table 3: Potential Contamination Sources and Contaminants of Concern

Potential Source	Description of Potential Contaminating Activity	Contaminants of Concern
S1 - Large scale filling	Filling has occurred across the site as documented in the previous reports and summarised in Section 4.0. Much of the fill (at least in the north west) is below a depth of 1 m and comprises a mixture of crushed sandstone and tar. A capping layer of imported sandstone and shale, with validated surface soils, exists in the north-west portion.	Based on the results of previous investigations at the site the main contaminants of concern include metals, TPH, BTEX and PAH. Other contaminants that may be present in the fill, but have not been found to any significant degree to date, include asbestos, OCP, OPP, PCB, phenols and VOC.
S2 - Historic site use (Industrial)	The site was used for manufacturing of gas, road tars and other organic chemicals. Disposal of wastes and associated by-products (tar sludge) occurred in filling across at least the north west portion, and in tar pits in the north east portion of the Park.	Metals, TRH, BTEX, PAH, OCP, VOC, OPP, PCB, phenols, PFAS.
S3 - Moderate to high risk activities surrounding the site	EPA contaminated listed sites are located adjacent to and in the general region of the site. It is possible therefore that groundwater beneath the site (being located down gradient from some of these source sites) could be impacted. Test of groundwater in previous reports does not show significant contamination in groundwater at the site.	Metals, TRH, BTEX, PAH, Phenols, VOC.

6.2 Potential Receptors

6.2.1 Human Health Receptors

R 1 Current site users (general public);

R 2 Construction and maintenance workers;

R 3 Future site users (general public); and

R 4 Adjacent site users (general public, workers).

6.2.2 Environmental Receptors

R5 Soil Organisms;

R6 Groundwater; and

R7 Surface water (Parramatta River) including aquatic organisms.

6.2.3 Potential Pathways

Potential pathways for the identified contamination to impact on the receptors include the following:

P1 Ingestion and dermal contact;

P2 Inhalation of dust;

P3 Inhalation of ground gas/vapour;

P4 Leaching of contaminants and vertical migration into groundwater; and

P5 Lateral migration of groundwater to surface water receptors.

6.3 Summary of Preliminary CSM

A ‘source – pathway – receptor’ approach has been used to assess the potential risks of harm being caused to human, water or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways. The possible pathways between the above sources (S1 to S3) and receptors (R1 to R7) are provided in Table 4 below.

Table 4: Summary of Potential Complete Pathways

Potential Source and Contaminants of Concern	Pathway	Receptor	Comments
S1 – Large scale filling	P1 – Ingestion and dermal contact P2 – Inhalation of dust P3 – Inhalation of ground gas/vapours	R1 – Current site users R2 - Construction and maintenance workers R3 - Future site users R6 – Groundwater R7 – Surface Water including aquatic organisms	Following the Stage 1 and Stage 2 remediation (refer Section 4), the SAR did not identify compete exposure pathways, associated with the recreational land use that was assessed at that time. The proposed fence realignment encroaches into the north-east quarter of Wilson Park, which has been declared unsuitable for public access. As such, the source-pathway-receptor linkages may exist in this part of the site, and in other parts of the site as a result of the proposed development. Potential complete pathways are to be managed through the processes outlined in a contamination management plan (CMP).
S2 – Historic site use (Industrial) S3 – Moderate to high risk activities surrounding the site	P1 – Ingestion and dermal contact	R2 - Construction and maintenance workers R3 - Future site users	
	P2 – Inhalation of dust P3 – Inhalation of ground gas/vapours	R1 - Current users R2 - Construction and maintenance workers R3 - Future site users R4 – Adjacent site users	
	P4 – Leaching and vertical migration into groundwater P5- Lateral Migration of Groundwater	R6 – Groundwater R7 – Surface Water including aquatic organisms	

7. Fieldwork, Analytical Rationale and Method

7.1 Data Quality Objectives and Project Quality Procedures

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

- Stating the Problem;
- Identifying the Decision;
- Identifying Inputs to the Decision;
- Defining the Boundary of the Assessment;
- Developing a Decision Rule;
- Specifying Acceptable Limits on Decision Errors; and
- Optimising the Design for Obtaining Data.

An evaluation of the DQO is presented in Appendix C.

7.2 Data Quality Indicators

The performance of the investigation in achieving the DQO was assessed through the application of Data Quality Indicators (DQI), defined as follows:

Precision: A quantitative measure of the variability (or reproducibility) of data;

Accuracy: A quantitative measure of the closeness of reported data to the “true” value;

Representativeness: The confidence (expressed qualitatively) that data are representative of each media present on the site;

Completeness: A measure of the amount of useable data from a data collection activity; and

Comparability: The confidence (expressed qualitatively) that data can be considered equivalent for each sampling and analytical event.

An evaluation of the DQI is presented in Appendix C.

7.3 Sample Locations and Rationale

The soil, soil vapour and groundwater sampling locations undertaken as part of this current investigation, and rationale are detailed in the SAQP in Appendix G.

A summary of the sampling density (both previous and current) of soil, groundwater and soil vapour is listed in below:

Soil: 117 sampling locations in the previous investigations and 3 additional locations in the current investigation, which complies with the NSW EPA *Sampling Design Guidelines* (a minimum of 73 sampling locations for a site of area of 6.6 hectares);

Groundwater monitoring; 4 sampling locations at both up gradient and down gradient, 1 round of groundwater sampling has been undertaken for this investigation and biannually groundwater monitoring events completed by SOPA since 2000;

Soil Vapour: 10 sampling locations for the current investigation. Soil gas testing was undertaken generally in the upper 0.5 m soil profile from 83 locations during previous investigations. One round of testing was undertaken in 1999, and one round from the 10 sampling locations in 2019.

7.4 Soil Sampling and Analysis Details

7.4.1 Sampling Methodology

The field work was carried out under the supervision of an environmental scientist from DP on the 27 August 2019, and consisted of:

- Setting and scanning for buried services at all borehole locations;
- Drilling of three boreholes (BH6a and BH7a) to depths of 2.3 m and 2.2 m respectively, being a nominal 0.5m into natural soil;
- Drilling of one bore (BH10a) to a depth of 3.0 m, which was terminated in fill. The bore was terminated to avoid potential penetrating a tar pit (i.e. a pre-determined maximum termination depth);
- The bores were constructed as continuous sampling push-tubes using a Geoprobe rig; and
- Soil samples were collected for each observed soil type, and at regular depth intervals. Observations were made and recorded on the borehole logs (see Appendix D) for staining, odours, PID readings and anthropogenics.

All sampling data was recorded on DP's borehole logs. The general sampling procedure adopted for the collection of soil samples was as follows:

- Collection of soil samples from the continuous tubes using disposable sampling equipment;
- Transfer of samples into laboratory-prepared glass jars, completely filled to ensure the headspace within the sample jar was minimised, and capped immediately to minimise loss of volatiles;
- Labelling of sample containers with individual and unique identification, including project number, sample location and sample depth; and
- Placement of the glass jars, with Teflon lined lid, into a cooled, insulated and sealed container for transport to the laboratory.

Replicate samples were collected in zip-lock bags for PID screening.

Given that the surface at the borehole locations was covered with grass and topsoil with significant grass roots (i.e. 0-0.1m), samples from this depth were not collected. Collection of surface soil samples will form part of the overall validation of the site, post development.

Borehole locations and levels were determined using a differential GPS (DGPS) receiver.

7.4.2 Analytical Rationale

All soil samples that were selected for analysis were from fill given that field observations suggested that contamination is more likely to be associated with the fill than natural soil.

At least one soil sample from each bore was selected for analysis, with more samples selected where fill was deepest or signs of potential contamination observed.

Samples were analysed for the primary COPC including metals, TRH, BTEX, PAH, VOC and phenols. Additionally pH and CEC were analysed on selected samples to determine environmental investigation levels.

7.5 Groundwater Sampling and Analysis Details

SOPA has provided the results of regular groundwater monitoring data for monitoring wells MP1 to MP4, the table is presented in Appendix B and these results are discussed in Section 11.

Groundwater sampling was undertaken on 27 August 2019. An interface probe was first used to measure the standing water level (SWL) of the monitoring wells and also to detect light non-aqueous phase liquids (LNAPL), if present.

Sampling was undertaken using low-flow sampling techniques utilising a peristaltic pump and LDPE tubing. The pumps were set to the lowest possible flow rate that could produce laminar flow. Prior to sampling, field parameters (pH, temperature, dissolved oxygen (DO), conductivity, turbidity (NTU) and redox), which were measured using a calibrated water quality meter, were first allowed to stabilise.

Samples were transferred directly into appropriately preserved bottles, with minimum aeration. For analysis of metals, the relevant sample fraction was filtered using an in-line disposable 0.45 µm filter that was changed between samples to minimise the risk of cross-contamination.

The sample handling and management comprised the following:

- Sample bottles were labelled with individual and unique identification including project number, Well ID and date of sampling;
- The bottles were placed in an insulated cooler and maintained at a cool temperature using ice until transported to the analytical laboratory, and
- Chain-of-custody documentation was maintained at all times and countersigned by the receiving laboratory on transfer of samples.

Details of the groundwater sampling are also provided on the groundwater field sheets provided in Appendix D.

7.5.1 Analytical Rationale

The analytical scheme was designed to obtain an indication of the potential presence of the identified COPC identified in the CSM, being metals, TPH, BTEX, PAH, phenols, PCB and VOC.

7.6 Soil Gas/Vapour Sampling and Analysis Details

The soil gas / vapour installation procedure is outlined the SAQP in Appendix G.

The soil vapour sampling was undertaken in general accordance with CRC Care Technical Report No. 13 *Field Assessment of Vapours* (August 2009) and CRC Care Technical Report No. 23 *Petroleum Hydrocarbon Vapour Intrusion Assessment Australian Guidance* (July 2013) and as follows ASTM D7663-12 *Standard Practice for Active Soil Gas Sampling in the Vadose Zone for Vapour Intrusions* and current industry best practice. The sampling and analytical methodology adopted was as follows:

- Performance of sampling train shut in tests on the sampling train prior to sampling to demonstrate that there are no leaks in the sampling train;
- Purging of the vapour probe prior to sampling by removing one volume of air/vapour from the probe and sampling tube. Care will be taken not to purge more than the volume of the tubing and the internal part of the implant (only a small volume);
- Introduction of liquid isopropyl alcohol (IPA) into a sampling shroud to be placed over the sampling equipment at the point that the probe intersects with the ground to act as a tracer gas for leaks in the soil vapour ports and/or the sampling train. All samples will be analysed for IPA as part of the TO15 analysis;
- Field screening of the shroud and sampling line using a PID;
- Sampling of vapours from the vapour probe, undertaken by an experienced environmental scientist;
- Primary samples collected directly from the by connecting the sampling tube directly to 1L Summa Canisters with a flow regulator set by the analytical laboratory (at approximately 0.1 L/min). The regulators will be supplied by the analytical laboratory and decontaminated by the laboratory prior to shipment;
- Back-up samples were collected directly into solid carbon tubes using an SKC constant flow air-sampling pump, low flow adapter and rotameter to confirm the flowrate (0.1 L/min);
- Collection of two shroud samples to a carbon tube to conduct analysis for IPA and determine the concentration of the tracer compound in the shroud;
- Collection and analysis of a field sample duplicate for intra-laboratory duplicate analysis as per the SAQP;
- Field reading of general gases will be measured for a period of up to 5 minutes using a GA5000 and methane, oxygen, carbon dioxide, carbon monoxide and hydrogen sulphide levels will be recorded;

- Analysis for VOC was performed according to TO15 USEPA Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air Second Edition. Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS); and
- Total recoverable hydrocarbons (TRH), F1 and F2 fractions were determined by measurement of air-phase petroleum hydrocarbons and ozone precursors by GC/MS.

Soil vapour well logs are presented in Appendix D, attached.

8. Site Assessment Criteria

The Site Assessment Criteria (SAC) applied in the current investigation is informed by the preliminary conceptual site model which identified receptors to potential contamination (refer to Section 6). Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising investigation levels, screening levels and management limits of Schedule B1 of NEPC, 2013. The NEPC guidelines are endorsed by NSW EPA under the CLM Act 1997.

The investigation levels, screening levels and management limits are applicable to generic land use settings and include consideration of, where relevant, the soil type and the depth of contamination. The investigation and screening levels are not intended to be used as clean up levels. Rather, they establish concentrations above which further appropriate investigation (e.g. Tier 2 assessment) should be undertaken. They are intentionally conservative and are based on a reasonable worst-case scenario.

8.1 Soil

8.1.1 Health Investigation and Screening Levels

The Health Investigation Levels (HIL) and Health Screening Levels (HSL) are scientifically-based, generic assessment criteria designed to be used in the first stage (Tier 1) of an assessment of potential human health risk from chronic exposure to contaminants.

HIL are applicable to assessing health risk arising via all relevant pathways of exposure for a range of metals and organic substances. The HIL are generic to all soil types and apply generally to a depth of 3 m below the surface for residential use. Site-specific conditions may determine the depth to which HIL apply for other land uses.
HSLs are applicable to selected petroleum compounds and fractions to assess the risk to human health via the inhalation pathway. HSL have been developed in NEPC (2013) for different land uses, soil types and depths to contamination.

The generic HIL and HSL are considered to be appropriate for the assessment of contamination at the site. HIL D and HSL D have been adopted for the building and hardstand footprints; HIL C and HSL C have been adopted given the proposed use as a recreational open area.

As soil types encountered were variable, the most conservative HSL for the different soil types (sand) has been adopted. HSL for a depth of 0 m to < 1 m have been adopted as these are more conservative than those for greater depths.

The HSL for the vapour intrusion pathway has been adopted as the values are considerable more conservative than direct contact HSLs that are listed in CRC CARE documents.

The adopted HIL and HSL for the COPC are shown in Table 5.

The initial SAC for VOC was the laboratory practical quantitation limit (PQL). Any exceedance of PQL would trigger the use of NSW and National based standards for VOC in soil.

Table 5: HIL and HSL for Soil Contaminants

Contaminant	HIL D (mg/kg)	HIL C (mg/kg)	HSL D for vapour intrusion (mg/kg)
Metals and Inorganics			
Arsenic	3000	300	-
Cadmium	900	90	-
Chromium (VI)	3600	300	-
Copper	240 000	17 000	-
Lead	1500	600	-
Mercury (inorganic)	730	80	-
Nickel	6000	1200	-
Zinc	400 000	30 000	-
Phenols (Pentachlorophenol as initial screen)	660	120	-
TRH			
C_6 – C_{10} (less BTEX)	-	-	260
>C_{10}-C_{16} (less Naphthalene)	-	-	NL
BTEX			
Benzene	-	-	3
Toluene	-	-	NL
Ethylbenzene	-	-	NL
Xylenes	-	-	230
PAH			
Benzo(a)pyrene TEQ	40	3	-
Naphthalene	-	-	-
Total PAHs	4000	300	-

Note: TEQ is Toxic Equivalency Quotient.

NL is 'Not Limiting'. If the derived soil HSL exceeds the soil saturation concentration, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario. For these scenarios, the HSL is given as NL. Note that for all the nominated analytes the HSL is NL for a recreational / open space land use scenario.

8.1.2 Ecological Investigation Levels and Screening Levels

Ecological Investigation Levels (EIL) have been derived for selected metals and organic compounds and are applicable for assessing risk to terrestrial ecosystems (NEPC, 2013). EIL depend on specific soil physiochemical properties and land use scenarios and generally apply to the top 2 m of soil, which corresponds to the root zone and habitation zone of many species. The EIL is determined for a contaminant based on the sum of the ambient background concentration (ABC) and an added contaminant limit (ACL). The ABC of a contaminant is the soil concentration in a specific locality that is the sum of naturally occurring background levels and the contaminants levels that have been introduced from diffuse or non-point sources (e.g. motor vehicle emissions). The ACL is the added concentration (above the ABC) of a contaminant above which further appropriate investigation and evaluation of the impact on ecological values is required.

The EIL is calculated using the following formula:

EIL = ABC + ACL,

The ABC is determined through direct measurement at an appropriate reference site (preferred) or through the use of methods defined by Olszowy et al Trace element concentrations in soils from rural and urban areas of Australia, Contaminated Sites monograph no. 4, South Australian Health Commission, Adelaide, Australia 1995 (Olszowy et al., 1995) or Hamon et al, Geochemical indices allow estimation of heavy metal background concentrations in soils, Global Biogeochemical Cycles, vol. 18, GB1014, (Hamon, 2004). ACL is based on the soil characteristics of pH, CEC and clay content.

EIL (and ACLs where appropriate) have been derived in NEPC (2013) for only a short list of contaminants comprising arsenic, copper, chromium (III), DDT, naphthalene, nickel, lead and zinc. EIL, shown on Table 6, have been determined using the *Ecological Investigation Level Calculation Spreadsheet*, developed by the CSIRIO for NEPC. The following site specific data and assumptions have been used to determine the EILs:

- A protection level of 80% for urban residential areas and public open space has been adopted;
- Site contamination is aged (i.e.>2 years old);
- The site is in NSW and is located in an area of low traffic volume;
- The EILs will apply to the top 2 m of the soil profile (for the proposed development);
- A pH of 8.4 has been used as an input parameter, based on average pH values for soil collected across the site;
- A CEC of 5.5 $cmol_c$/kg has been used as an input parameter, based on average CEC values for soil collected across the site;
- Given the variable filling types encountered, a clay content of 10% has been assumed and is considered to be a conservative value; and
- An organic carbon content of 0.5% has been assumed as a conservative value.

Table 6: Ecological Investigation Levels (EIL)

Analyte		EIL (mg/kg)
Metals	Arsenic	100
	Copper	120
	Nickel	45
	Chromium III	410
	Lead	1100
	Zinc	330
PAH	Naphthalene	170

Ecological Screening Levels (ESL) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. ESL apply to the top 2 m of the soil profile as for EIL (for the proposed development).

ESL have been derived in NEPC (2013) for total petroleum hydrocarbon (TPH) fractions as well as BTEX and benzo(a)pyrene. The adopted ESL, from Table 1B(6), Schedule B1 of NEPC (2013) are shown in Table 7. The more conservative ESL for coarse and fine textures soils have been adopted given the variable soil types encountered.

Table 7: Ecological Screening Levels (ESL)

Analyte		ESL	Comments
TRH	C6 – C10 (less BTEX)	180*	All ESLs are low reliability apart from those marked with * which are moderate reliability
	>C10-C16	120*	
	>C16-C34	300	
	>C34-C40	5600	
BTEX	Benzene	65	
	Toluene	105	
	Ethylbenzene	125	
	Xylenes	45	
PAH	Benzo(a)pyrene	0.7	

8.1.3 Management Limits – Petroleum Hydrocarbons

In addition to appropriate consideration and application of the HSLs and ESLs, there are additional considerations which reflect the nature and properties of petroleum hydrocarbons, including:

- Formation of observable light non-aqueous phase liquids (LNAPL);
- Fire and explosion hazards; and
- Effects on buried infrastructure e.g. penetration of, or damage to, in-ground services.

Management Limits to avoid or minimise these potential effects have been adopted in NEPC (2013) as interim Tier 1 guidance. Management Limits have been derived in NEPC (2013) for the same four petroleum fractions as the HSLs (F1 to F4). The adopted Management Limits, from Table 1B(7), Schedule B1 of NEPC (2013) are shown on Table 8. The following site specific data and assumptions have been used to determine the Management Limits:

- The Management Limits will apply to any depth within the soil profile;
- The Management Limits for residential, parkland and public open space apply; and
- The soils encountered at the site comprised various types including sand and clay. A "coarse" soil texture (being the most conservative soil type) has been adopted.

Table 8: Management Limits

Analyte		Management Limit (mg/kg)
TRH	$C_6 – C_{10}$	700
	$>C_{10}-C_{16}$	1,000
	$>C_{16}-C_{34}$	2,500
	$>C_{34}-C_{40}$	10,000

8.1.4 Asbestos in Soil

Bonded asbestos containing material (ACM) is the most common form of asbestos contamination across Australia, generally arising from:

- Inadequate removal and disposal practices during demolition of buildings containing asbestos products;
- Widespread dumping of asbestos products and asbestos containing fill on vacant land and development sites; and
- Commonly occurring in historical fill containing unsorted demolition materials.

Mining, manufacturing or distribution of asbestos products may result in sites being contaminated by friable asbestos including free fibres. Severe weathering or damage to bonded ACM may also result in the formation of friable asbestos comprising fibrous asbestos (FA) and/or asbestos fines (AF).

Asbestos only poses a risk to human health when asbestos fibres are made airborne and inhaled. If asbestos is bound in a matrix such as cement or resin, it is not readily made airborne except through substantial physical damage. Bonded ACM in sound condition represents a low human health risk, whilst both FA and AF materials have the potential to generate, or be associated with, free asbestos fibres. Consequently, FA and AF must be carefully managed to prevent the release of asbestos fibres into the air.

A detailed asbestos assessment was not undertaken as part of these works as only limited soil sampling was undertaken from small diameter bores. As an initial screen, the site assessment criteria for asbestos are as follows:

- No visible asbestos cement materials (ACM) at the sampling locations.

8.2 Groundwater

The groundwater investigation levels (GIL) used for interpretation of the groundwater results are based on the risks posed by contaminated groundwater, at or down-gradient of the site, as follows:

- Risk to aquatic ecosystems - based on general site topography and interpolated groundwater flow direction, groundwater that flows beneath the site is anticipated to discharge to Parramatta River. The 'marine water' guidelines have therefore been applied for the protection of aquatic ecosystems, consistent with the marine / brackish discharge point, of the Parramatta River; and
- Vapour intrusion risk into proposed buildings resulting from potential volatile contaminants in groundwater.

Given that the site is regulated by the EPA, extraction of groundwater for any purpose at the site is likely to be prohibited, and therefore on-site uses are not considered.

As of 29 August 2018, the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG 2018) revoked the documents listed below, formerly used in deriving the NEPC (2013) groundwater investigation levels

- The Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC, November 1992); and
- The Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ, October 2000).

Consequently, the groundwater site assessment criteria are based on the water quality default guideline values (DGV) from *the Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG 2018) for the protection of aquatic ecosystems.
The adopted DGVs for groundwater for the adopted commercial/industrial land use (i.e. proposed buildings) are provided in Table E2, Appendix E.

For petroleum hydrocarbons, the groundwater HSLs for vapour intrusion were adopted as the initial investigation / screening levels. Based on the soil conditions encountered at the site, the threshold levels for sand were adopted as the appropriate screening levels. The HSL D and HSL C levels were adopted, with a depth range of 2 m - <4 m (noting groundwater depths in MP1 to MP4 ranged from about 1.6 m to 4 m below ground level). The investigation / screening levels for petroleum hydrocarbons are presented in Table 9, below.

Table 9: Groundwater HSLs for Vapour Intrusion (mg/L)

Chemical	HSL D I HSL C	
	2 to 4m	2 to 4m
Toluene	NL	NL
Ethylbenzene	NL	NL
Xylenes	NL	NL
Naphthalene	NL	NL
Benzene	5	NL

Chemical	HSL D / HSL C	
C6 – C10 (less BTEX) [F1]	6	NL
>C10-C16 (less Naphthalene) [F2]	NL	NL

Note; The above HSL guidelines are not considered to be applicable for MP4, where groundwater has been measured at a depth of 1.6 m, therefore the laboratory PQL is applied as an initial screen.

8.3 Soil Gas/Vapour

The SAC for the soil vapour investigation include:

- The interim health-based investigation levels (HIL) in NEPC (2013) for a commercial / industrial and open space / recreational land use for chlorinated hydrocarbons; and
- The soil vapour HSLs for vapour intrusion in NEPC (2013) for a commercial / industrial and open space / recreational land use for petroleum hydrocarbons.

The screening levels for chlorinated hydrocarbons are presented in Table 10, below.

Table 10: Interim Soil Vapour Health Investigation Levels for Chlorinated Compounds (mg/m^3)

Chemical	Recreational C (On-site)	Commercial / Industrial D
TCE	0.4	0.08
1,1,1 – TCA	1200	230
PCE	40	8
Cis, 1,2, -DCE	2	0.3
Vinyl chloride (VC)	0.5	0.1

For petroleum hydrocarbons, the soil vapour HSLs for vapour intrusion were adopted as the initial investigation / screening levels. Based on the soil conditions encountered at the site, the threshold levels for sand were adopted as the appropriate screening levels. The HSL D and HSL C levels were adopted. For the majority of the soil vapour results the threshold values for 0-1 m bgl were adopted (as the soil vapour implants were installed at a depth of approximately 1.0 m bgl). The investigation / screening levels for petroleum hydrocarbons are presented in Table 11, below.

Table 11: Soil Vapour HSLs for Vapour Intrusion (mg/m^3)

Chemical	HSL D / HSL C	
	0 to 1m	0 to 1m
Toluene	4800	NL
Ethylbenzene	1300	NL
Xylenes	840	NL
Naphthalene	3	410
Benzene	4	360
C6 – C10 (less BTEX) [F1]	680	86000
>C10-C16 (less Naphthalene) [F2]	500	NL

9. Fieldwork Results

9.1 Borehole Observations

The subsurface conditions encountered in the three boreholes drilled in this current investigation are presented in the bore logs in Appendix D. Notes defining descriptive terms and classification methods are included in Appendix D. The materials encountered in the boreholes (current investigation) can be described as follows:

- FILL (TOPSOIL): encountered in all boreholes, and comprised of dark silty clay with fine to medium igneous gravel and rootlets, between 0.03 m and 0.1 m bgl;
- FILL: was encountered in all three bores and comprised variable mixtures of sandy clay, sand, and clay fill, typically brown to dark brown, with medium to coarse igneous gravel and sandstone gravel, trace concrete fragments and slag / tar to depths of between 1.6 m and 3.2 m. Light yellow crushed sandstone was observed in BH10a from 0.64m to 1.5m; and
- RESIDUAL SOILS: typically stiff to very stiff clay, low to medium plasticity. Residual soil was encountered in BH6a and BH7a.

From the profile encountered, it would be reasonable to assume that the upper 0.7 m (BH6a) to 1.5 m (BH10a) is the capping layer placed over the tar impacted soils.

Hydrocarbon odour was noted at depths of greater than 1 m in BH6a and BH7a, however, PID results were all <1ppm.

Asbestos containing material was not observed, however, concrete fragments were observed in the filling and asbestos contamination can sometimes be associated with building rubble.

Groundwater was not encountered in any of the shallow bores.

9.2 Groundwater Sampling Observations

Groundwater levels were measured in the monitoring wells in MP1 to MP4 at time of the sampling event on 27 August 2019. The field measurements (including stabilised field parameters) are summarised in Table 12 below (refer to field sheets presented in Appendix D).

Regular groundwater monitoring data from SOPA is also attached in Appendix B. It is noted that the location names presented in the SOPA database do not correlate with those in this report, however, it is confirmed with SOPA that MP1 to MP4 are the same locations as Piezometer 1 to Piezometer 4, respectively. The June 2019 monitoring report (for all SOPA regulated lands) is included in Appendix B. The report has a discussion on data quality control and quality assurance and it appears that the data presented in that report is reliable. The Quality control and quality assurance report is included in Appendix C. SOPA indicated that every groundwater sampling event was conducted with applying the procedure outlined in the report (Ref: Environmental Earth Sciences NSW, Sydney Olympic Park Authority dated September 2017, project number: 117088)
.
It is also noted that non-aqueous phase liquids (NAPL) have been identified at a number of monitoring wells (MP6A, MP6B, MP7A, MP7B, PP21 and PP24) identified to exist at Wilson Park, however, these locations are not within the current site boundary and located essentially down gradient of the site ,as shown on Drawing 4, Appendix A.

Table 12: Groundwater Details and Water Levels

Well	Water level (m b.g.l.)	Well depth (b.g.l)	Temp (oC)	DO (mg/L)	EC (µS or mS/cm)	pH	Redox (Eh)
MP1	3.99	5.97	19.5	1.42	31.3	5.28	110
MP2	2.49	5.72	19.2	7.31	16.83	2.63	472
MP3	2.07	5.96	19.9	0.34	69.7	4.87	127
MP4	1.6	5.8	19.2	0.39	13.89	6.35	82

All water in the wells was found to be light brown to clear. No hydrocarbon or other odours were observed.

9.3 Soil Vapour Observations

There were no signs of significant contamination (such as chemical stains or odours) identified during the drilling of the test bores or installation of the soil vapour monitoring wells. The bore logs are presented in Appendix D. The subsurface profile observed in the bores generally comprised topsoil overlying sandstone / sandy clay / clayey sand fill (the capping layer in some instances) overlying fill with trace tar in SV6 and SV7.

Furthermore, there were no chemical odours encountered during soil vapour sampling, with the exception of a slight odour in SV6, however, slightly elevated hydrocarbon dioxide was detected,

which maybe an indication of hydrocarbon break down of the soil. The field parameters are summarized in Table 13 below. Field sheets are attached in Appendix D.

Table 13: Soil Vapour Field Observations

Soil Vapour ID	CH4 (%)	CO2 (%)	O2 (%)	H2S(ppm)	CO(ppm)
SV1	0	2.0	19.6	0	0
SV2	0	7.9	10.7	0	0
SV3	0	0.1	21	0	6
SV4	0	1.9	11.2	0	1
SV5	0	3.9	15.6	0	0
SV6	0	5.6	11.8	0	0
SV7	0	6.5	12	0	0
SV8	0	2.5	18.8	0	0
SV9	0	8.1	14.7	0	0
SV10	0	2.4	17.7	0	0

10. Laboratory Results

The results of laboratory analysis for the current sampling program are summarised in the following tables in Appendix E:

- Table E1: Summary of Analytical Results – Soil;
- Table E2: Summary Analytical Results – Groundwater; and
- Table E3: Summary of Analytical Results – Soil Vapour.

The laboratory certificates together with the chain of custody and sample receipt advice are provided in Appendix F.

The Data Quality Assessment including the Quality Assurance and Quality Control findings is provided in Appendix C. The results of this assessment indicate that the results are suitable for the purpose of the investigation.

11. Discussion of Results

11.1 Soil

Reported concentrations of metals, TRH, VOC, BTEX and phenols were below the adopted SAC.

Reported concentrations of PAHs were below the SAC with the exception of:

- Benzo(a)pyrene TEQ in samples BH10a/1.5-1.6 (17 mg/kg), BH10a/2.1-2.2 (8.6 mg/kg), BH10a/2.9-3.0 (14 mg/kg), BH6a/1.0-1.1(140 mg/kg) - exceeding the adopted HIL C (3 mg/kg);
- Benzo(a)pyrene in samples BH7a/0.95-1.0 (0.97 mg/kg), BH10a/0.9-1.0 (1.5 mg/kg), BH10a/1.5-1.6 (12 mg/kg), BH10a/2.1-2.2 (6.4 mg/kg), BH6a/1.0-1.1 (99 mg/kg) - exceeding the adopted ESL (0.7 mg/kg);
- Total PAHs in BH6a/1.0-1.1 (1300 mg/kg) - exceeding the adopted HILC (300 mg/kg);
- Nickel in sample BH6a/1.0-1.1 (150 mg/kg) – exceeding the adopted EIL (45 mg.kg);
- TRH (>C16-C34) in samples BH6a/1.0-1.1 (470 mg/kg), BH10a/1.5-1.6 (380 mg/kg) and BH10a/2.9-3.0 (340 mg/kg) - exceeding the adopted ESL (300 mg/kg); and
- Reported concentration of F3 ((>C16-C34) in sample BH6a/1.0-1.1 (8900 mg/kg)- exceeding the adopted ML (2500 mg/kg).

As stated in Section 9.1 there appears to be a capping layer in this area of between 0.7 m and 1.5 m depth. All of the above exceedances appear to have occurred in the uncontrolled fill/waste layers beneath the capping layer. The elevated concentrations are considered likely to be related to either the presence of contaminated filling or the historical use of the site (i.e. former tar pits in the vicinity of the soil sample locations, and the mixing of tar residue with the fill).

Previous sampling locations are shown on Figure C1, Appendix B. A review of previous results indicated the soil samples collected at the north west quarter were all below the adopted SAC (HIL D and HSL D outlined in Section 8. The associated laboratory results are provided in Appendix B.

The reported contaminant concentrations in the collected samples for the south east and south west quarters were all below the adopted SAC, with exception of:

- Lead in sample A4 (0.0-0.1m) – exceeding the adopted HIL C;
- Benzo(a)pyrene in samples A4(0.2-0.5m) and A5(0.2-0.5m) - exceeding the adopted HIL C; and
- Total PAHs in sample A5 (0.2-0.5m - exceeding the adopted HIL C.

The associated laboratory results are provided in Appendix B.

According the SAR, soil in locations A4 and A5 was excavated and placed in the mounds within the north east quarter which was fenced to prevent public access. The excavated areas were backfilled and covered with a minimum of 0.5 m of artificial soil as part of the remediation work.

Previous validation work at the north east quarter (as shown on Figure D1, Appendix B) comprised contamination sampling from 29 test pits, four of which are in the current site (TP26 to TP29). The reported contaminant concentrations in the collected samples for these four locations were all below

the adopted SAC (HIL C and HSL C outlined in Section 8). Associated laboratory results are included in Appendix B.

As noted in Section 4.2, a trace amount of suspected ACM was observed in the fill during the recent geotechnical investigation at CBR 27 (at greater than 0.15 m depth), and at CBR 39 (within the upper 0.8 m of fill), as shown on Drawing 101, Appendix A.

11.2 Groundwater

Reported concentrations of BTEX, phenols, PAHs, TRH, VOC and PCB were below the PQL and therefore the SAC.

Reported concentrations of dissolved metals in all groundwater samples were below the SAC for marine water, with the exception of copper, lead, nickel and zinc;

- Copper in samples MP2 (14 µg/L), MP3 (2 µg/L), MP4 (6 µg/L) and duplicate sample BD1 (7 µg/L), which exceeded the DGV of 1.3 µg/L;
- Nickel in samples MP1 (64 µg/L), MP2 (23 µg/L), MP3 (9 µg/L), MP4 (59 µg/L) and duplicate sample BD1 (59 µg/L), which exceeded the DGV of 7 µg/L; and
- Zinc in samples MP1 (250 µg/L), MP2 (150 µg/L), MP3 (29 µg/L), MP4 (410 µg/L) and duplicate sample BD1 (410 µg/L), which exceeded the DGV of 15 µg/L.

The regular groundwater monitoring data for MP1 to MP4 from SOPA is summarised in Appendix E. Table E2, Appendix E includes the range of values for the monitoring period provided. Copper, lead and zinc concentrations were regularly above the adopted SAC in all the samples, whilst the remaining analytes were below the SAC.

The results for copper, nickel and zinc are considered to represent regional groundwater quality, common in urban environments, and are not considered to warrant remediation.

11.3 Soil Vapour

A number of soil vapour contaminants were identified. In particular, the following results are noted:

- Low levels of BTEX were detected in all the samples with the exception of SV3 and SV10, however, the concentrations were within the adopted HSL C and D;
- TPH Air/ Air Phase Hydrocarbon and 2-Propanol were detected in all the samples. TPH concentrations were below HSL C and HSL D;
- The concentrations of cis -1,2 DCE, 1,1 DCE trans 1,2 DCE and vinyl chloride were all within the adopted HIL C and D; and
- The concentration of PCE in soil vapour was below the HIL C and D in all the soil vapour samples.

There was evidence that the IPA levels at sample SV3 were higher than at other locations (25,000 µg/m^3, compared to 100-310 µg/m^3 in other locations). We note that the concentration of IPA in the

shroud at SV3 was 10,000,000 µg/m^3, i.e. the concentration of SV3 was 0.25 % of the shroud which is below what is considered acceptable in ATSM D7663-12. Furthermore, the concentrations of soil gases at the nearest test locations (SV1, SV2 and SV4) where low and within the adopted guidelines. Therefore it is considered likely that the risk of unacceptable concentrations of soil vapour contaminants at this location is low. However a precautionary approach is recommended, such that following handover of the site once the installation of a soil vapour well is feasible that a soil vapour well be installed in this location to confirm the results from the soil vapour probe sample.

A soil gas survey was conducted at the Park in 2000 after the placement of artificial soil (as discussed in Section 4). All reported concentrations were low and met the objectives of the monitoring. Subsurface monitoring for soil gas identified highest levels in the north-west quarter, at depths of 0.5 m. Those locations in which soil gas was measured by PID at concentrations of >20 ppm are shown on Drawing 1, Appendix A.

11.4 Assessment of Site Suitability

The site, with the exception of the bioremediation area in the north east quarter, was declared in the SAS as being suitable for a park and recreational land use. The bioremediation area was declared in the SAS as being unsuitable for any beneficial use.

Since completion of the Stage 1 and Stage 2 remediation works as documented in previous studies, the site has remained as recreational use, and the “capping” soils placed across the filled areas have remained intact and managed by SOPA under the RLMP. Ongoing groundwater monitoring within the site (MP 1 to MP4) has not found any contamination within the site warranting remediation or further management. The results of the soil vapour and groundwater testing during the current investigation have not identified any vapour intrusion risk at the proposed locations of the main buildings within the development. However, based on the history of the site and known existing contamination, the potential for vapour intrusion to occur as a result of the proposed development must be considered in the context of the proposed development. As such, the potential for vapour intrusion will be managed and mitigated using the protocols outlined in a contamination management plan (CMP). .At this stage, remediation is not required beyond maintaining the existing capping system and leachate management system. The CMP provides procedures for unexpected finds protocols and changes in conditions that may arise.

A small number of fragments of potential ACM were encountered during the recent geotechnical investigation and the potential for ACM in soils at the site will need to be managed through the implementation of the CMP.

The proposed fence realignment in the south-west corner of the north-east quarter of the Park will encroach into the area noted in the SAS to the unsuitable for any beneficial use. The field results of this current investigation have shown that a cap over the tar impacted soils in this area exists, and the soil vapour test results meet the adopted SAC. Whilst some elevated PAH concentrations were reported in the deeper soil profile, all soil test results for the “capping” soils were within the adopted SAC. As noted on Drawing 2, Appendix A, and as demonstrated by the bore finds, the proposed fence line realignment appears to avoid the existing covered tar pit within the north-east quarter. On this basis, the portion of the “bioremediation area” within the site, as a result of the proposed fence realignment, is considered to be suitable for the proposed development, subject to implementation of the CMP to manage the integrity of the existing cap and any potential vapour intrusion issues.

12. Updated (Post Construction) CSM

On the basis of the field and analytical results presented and discussed in previous sections, and the details of the proposed development, an updated (post construction) CSM is presented in this section. This CSM presents and discusses the likely source-pathway-receptor linkages that may exist at the site both during and post construction, together with proposed management controls that are discussed in further detail in the CSM.

The updated CSM is presented in the following Table 14.

Table 14: Summary of Likely Complete Pathways and Management Protocols

Potential Source	Pathway	Receptor	Comments / Management
Large scale filling, with some of the fill mixed with tar. Some areas of the fill are likely to contain ACM	Ingestion and dermal contact Inhalation of dust Inhalation of ground gas/vapours	Construction and maintenance workers	Environmental consultant to monitor civil works for signs of odour, vapours, ACM, both visually and using PID screening. PPE including P2 dust masks, long sleeves, gloves and safety goggles to be utilised for all workers. PPE including half face respirators to be utilised when working in trenches, excavations, near the former tar pits, and/or as directed by the Environmental Consultant.
		Future site users and visitors	A general minimum of 0.5m of validated imported soil will be used to fill (cap) the majority of the site. Area of proposed cut will be only be used in the upper 1.0 m if validated by the Environmental Consultant. New buildings to be designed with a passive soil vapour mitigation system. Excavated soils (including piling spoil) to be assessed by the Environmental Consultant for on-site re-use or off-site disposal to landfill.
	Rain infiltration and leaching of contaminants to groundwater	Aquatic ecosystems	Groundwater monitoring during and following completion of construction. Monitoring of civil works for indicators of significant contamination that could potentially leach. This would be subject to excavation and removal from site.

Potential Source	Pathway	Receptor	Comments / Management
Buried tar pits, in close proximity to the north east of the main proposed oval	Ingestion and dermal contact Inhalation of ground gas/vapours	Construction and maintenance workers	Environmental consultant to monitor civil works for signs of odour, vapours, ACM, both visually and using PID screening. PPE including half face respirators long sleeves, gloves and safety goggles to be utilised for all workers.
		Future site users and visitors	A general minimum of 0.5m of validated imported soil will be used to fill (cap) the majority of the site. New buildings to be designed with a passive soil vapour mitigation system.
	Rain infiltration and leaching of contaminants to groundwater	Aquatic ecosystems	Groundwater monitoring during and following completion of construction. Monitoring of civil works for indicators of significant contamination that could potentially leach. This would be subject to excavation and removal from site.

13. Conclusion

Based on the supported land use suitability documented in the SAS, and on the investigations and assessment summarised in this report, it is considered that the site can be made suitable for the proposed development, subject to implementation of a CMP to:

- Manage the integrity of the existing cap in the northern part of the site;
- Manage planned excavations below the cap, such that excavated soils are appropriately relocated and capped within the site, or waste classified for off-site disposal;
- Ensure that imported soils used for raising the bulk of the site are validated as being suitable;
- Ensure that any soils excavated (or cut) within the site are appropriately assessed and re-instated as directed by the Environmental Consultant;
- Manage any unexpected finds of contamination; and
- Minimise the risk of contamination exposure to workers involved in the development of the site.

In order to meet the main objectives of the CMP, as listed above, further assessment and monitoring will be required, including (but not limited to) the following:

- An Environmental Consultant will be present to monitor planned earthworks for signs of contamination in the fill (e.g. ACM, tar, odours), both visually and using PID;
- The Environmental Consultant will then direct an appropriate management approach to such a find, such that the source-pathway-receptor linkages identified in Table 13 are appropriately mitigated;
- The Environmental Consultant will review documentation provided for planned imported soil for suitability, and will conduct check sampling and testing prior to approving materials for use within the site;
- Groundwater will be sampled and tested through the course of the construction works, and for a period following, to assess potential impacts of the development (including additional fill) on the condition of groundwater;
- The proposed buildings will be fitted with a passive soil vapour mitigation system to prevent vapour intrusion into the buildings; and
- At the completion of the planned filling and compaction, the Environmental Consultant will validate the surface of the final site levels (both soil and soil vapour) to confirm suitability for the proposed site use.

This DSI report is considered to meet the requirements of SEARs as stated in Section 1, in that:

- It assesses the site's subsurface conditions, including soil and groundwater contamination, using both historical and current data. The DSI includes investigations and discussions on soil vapour, groundwater and soil, at sufficient sampling density to characterise the site. The investigations reported in GT (1995) included 42 soil sampling locations, whilst the post remediation investigations in DP (1999) included 75 locations across the site. These numbers comply with the NSW EPA Sampling Design Guidelines which recommends a minimum of 73 sampling locations for a site of area of 6.6 hectares;
- The DSI includes a statement that the site can be made suitable subject to the implementation of the CMP. No contamination requiring active remediation has been identified, and therefore a remediation action plan is not considered to be warranted;
- The proposed fence realignment will encroach into the area previously declared as unsuitable for any beneficial use, including the tar pits. The investigations documented herein confirmed that the proposed fence realignment does not encroach into the tar pits. Potential risks associated with the tar pits will be managed as outlined in the CMP and summarised in the CSM in Table 13 above.

14. References

ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality

DP (2019) Preliminary Site Investigation, Western Sydney Cricket NSW and Community Centre, Wilson Park, Silverwater NSW 2128 (Project 86694.00.R.001.Rev0, April 2019)

Waste Service NSW (1999) Stage 2 Draft Remediation Action Plan, Wilson Park dated May 1999

DP (1999) Soil Investigation, Wilson Park, Newington Road, Silverwater dated October 1999

URS Australia Pty Ltd (2001) Summary Site Audit Report, Wilson Park, Silverwater Road, Auburn dated February 2001

Sydney Olympic Authority (2009) Remediated Lands Management Plan dated January 2009 part extract only

Environmental Earth Sciences NSW (2017) Quality Control and Quality Assurance Report dated September 2017 (Ref no: 117088)

NEPC (2013) National Environment Protection (Assessment of Site Contamination) Measure 1999 amended 2013

OEH (2011) Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites

NSW EPA (1995) Sampling Design Guidelines

15. Limitations

Douglas Partners (DP) has prepared this report for this project at Wilson Park, Silverwater in accordance with DP's proposal SYD190618 dated 15 August 2019 and acceptance received from Cricket NSW. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Cricket NSW for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

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

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

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

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

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

Douglas Partners Pty Ltd

Appendix A

About This Report

Drawings

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

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

Copyright

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

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

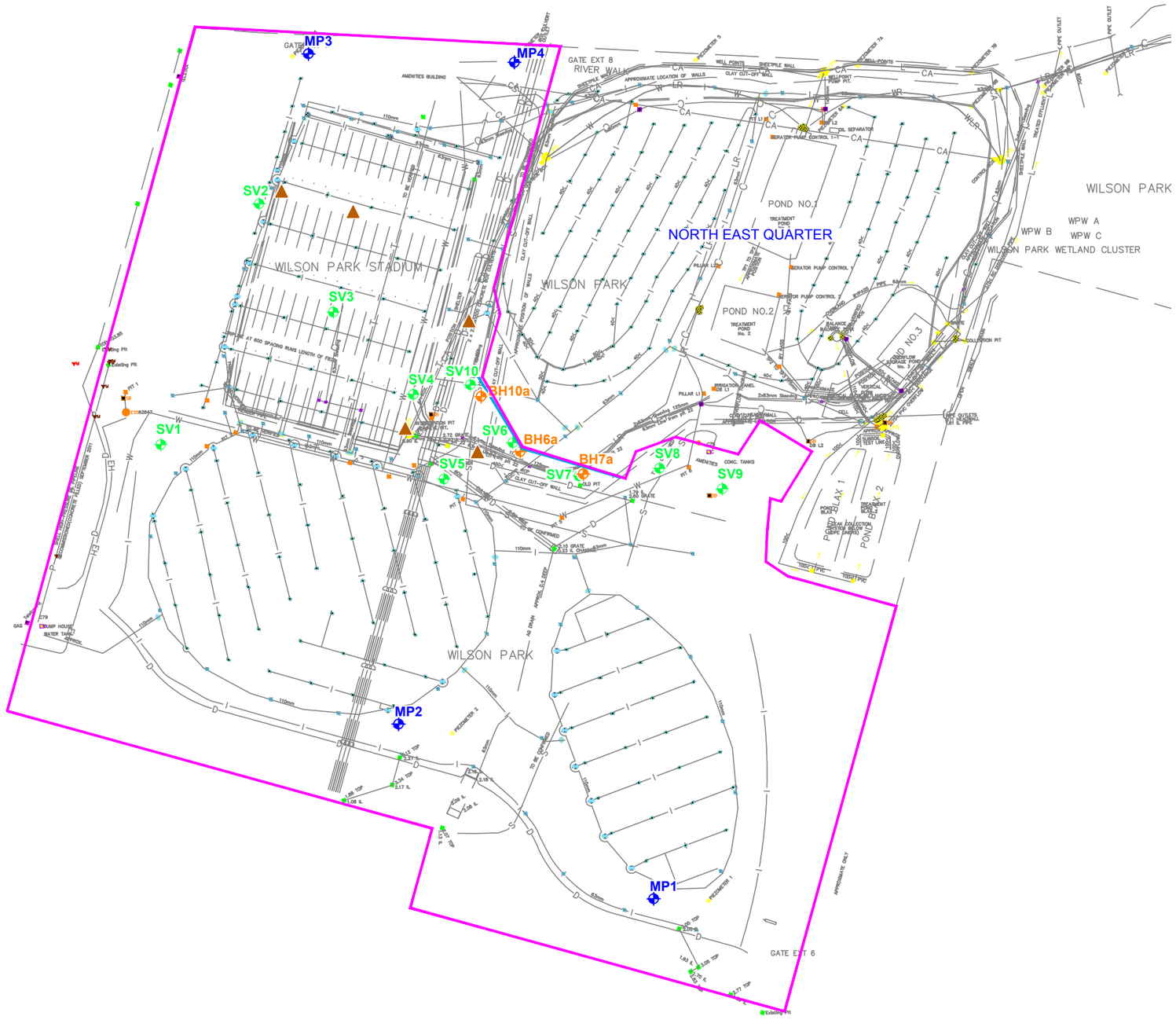
In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later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

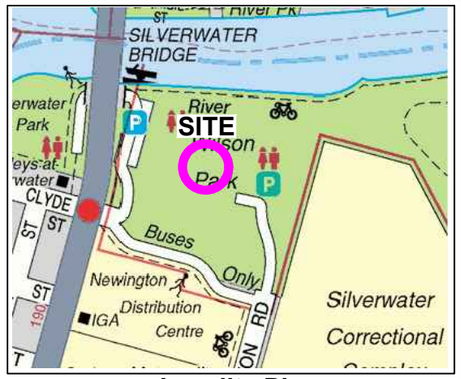
Information for Contractual Purposes

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

Site Inspection

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





Locality Plan

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NOTE:
1: Base image from Sydney Olympic Park Authority (Dwg 085-P-P-0176REV.N, Dated 2.7.2019)
2: Test locations are approximate only and have been estimated based on historical drawings with reference to existing features.

LEGEND

- Soil gas probes (10)
- Soil sampling (3)
- Groundwater monitoring well
- Soil probe locations (1999) with PID >20pm all at depths of 0.5m
- Site boundary
- Proposed fence relocation

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Cox Architecture pty Ltd		TITLE: **Test Location Plan**	PROJECT No: 86694.03
OFFICE: Sydney	DRAWN BY: PSCH	**Western Sydney Cricket and Community Centre**	DRAWING No: 1
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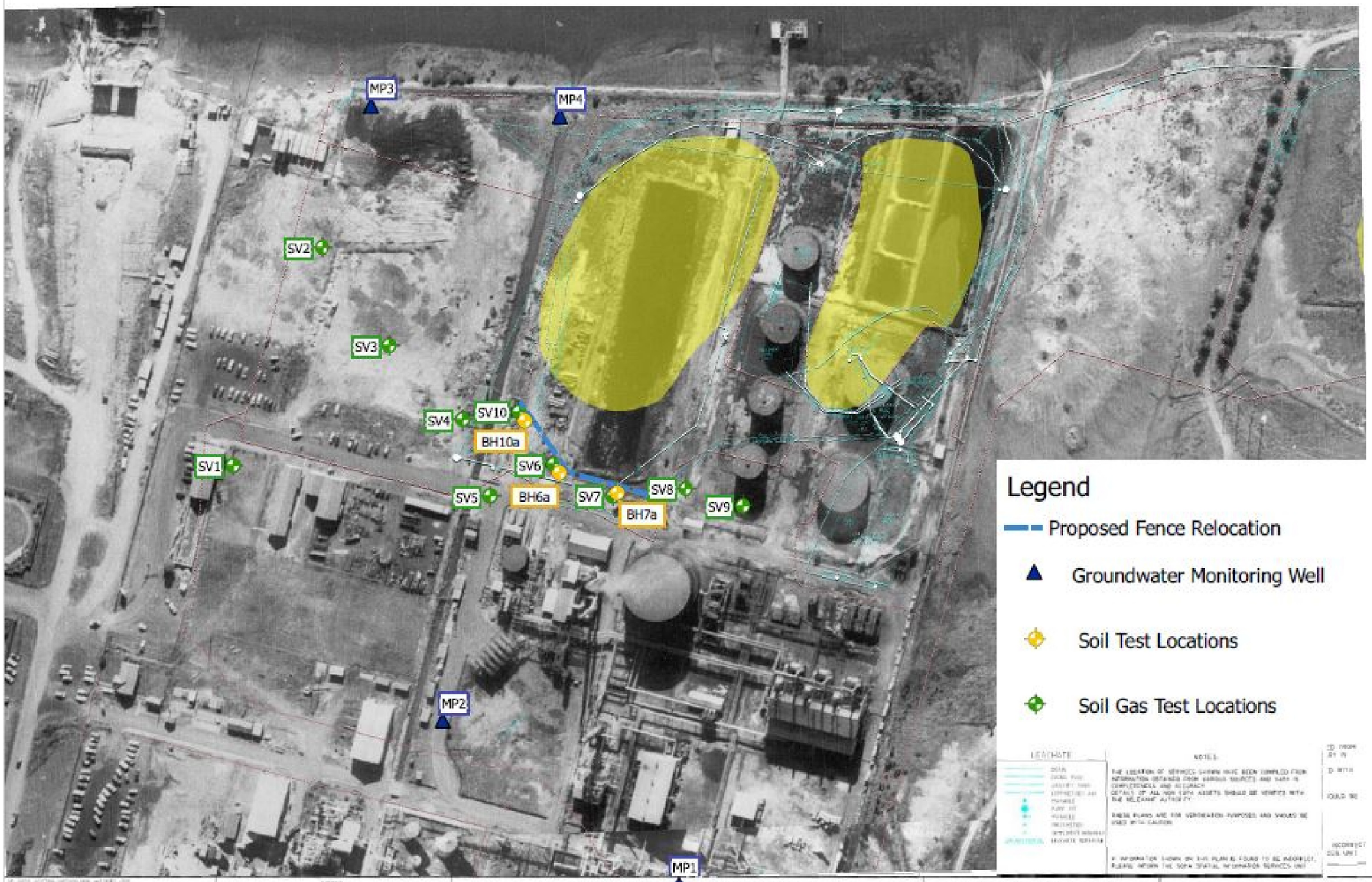

Douglas Partners
Geotechnics / Environment / Groundwater

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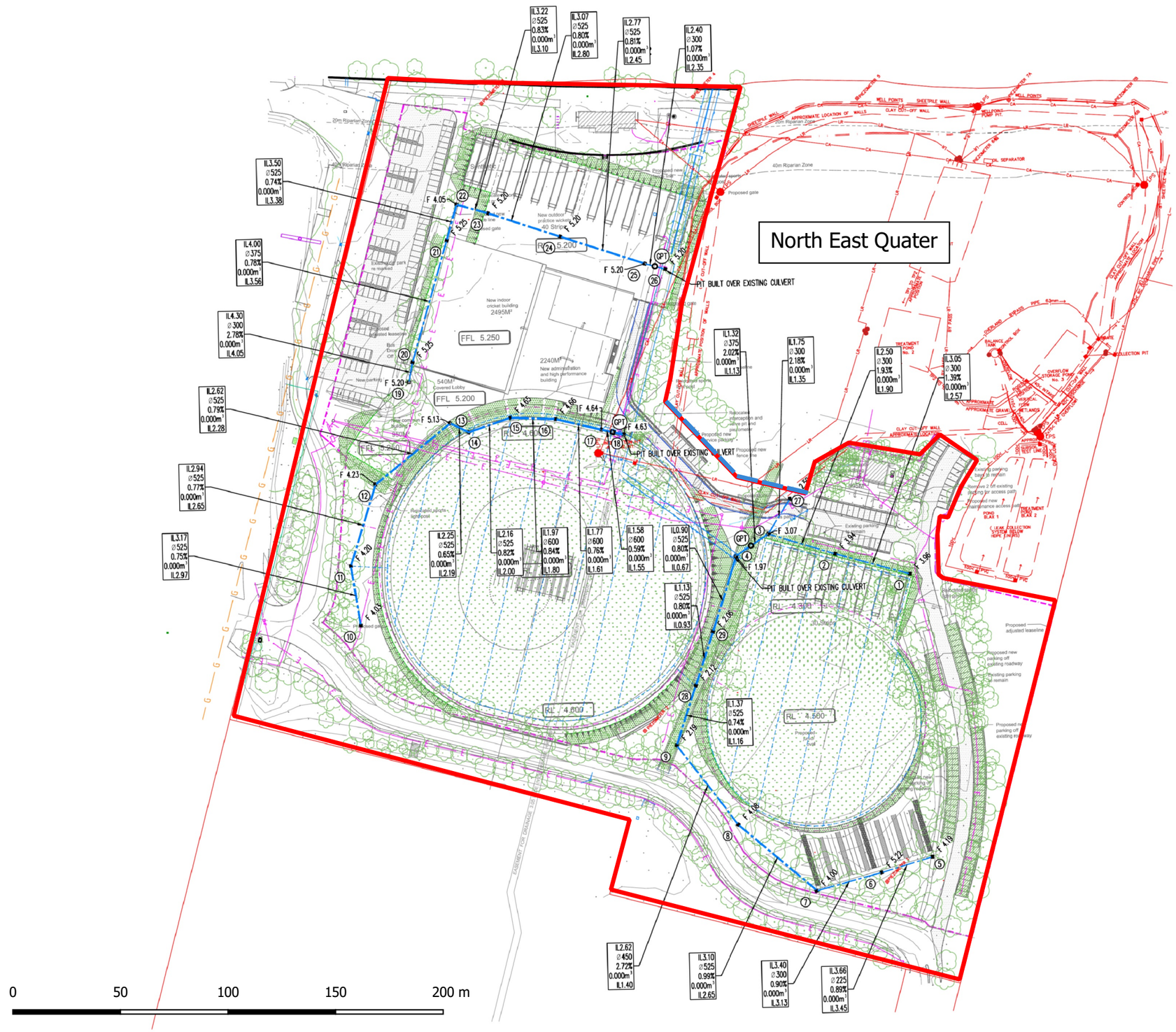
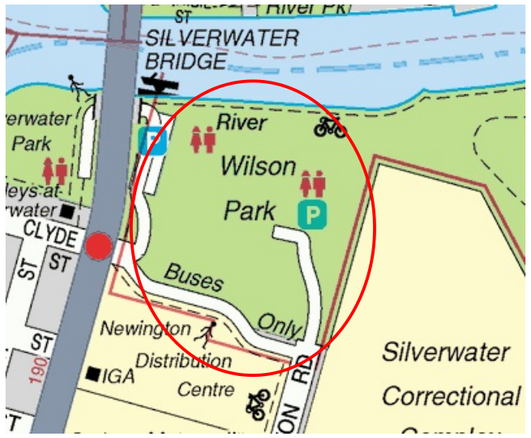
OFFICE:	Sydney	DRAWN BY: AD	
SCALE:	1:2200 @ A3	DATE:	9/9/2019

TITLE: **Test Location Plan**
Western Sydney Cricket and Community Centre
Wilson Park, SILVERWATER

N

PROJECT No:	86694.03
DRAWING No:	2
REVISION:	0





Legend

- Site Boundary
- Proposed Fence Relocation

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	Cox Architecture Pty Ltd		
OFFICE:	Sydney	DRAWN BY:	NW
SCALE:	1:2,000 @ A3	DATE:	15/10/2019

TITLE: **Proposed Development Layout**
Western Sydney Cricket and Community Centre
Wilson Park, Silverwater

N

PROJECT No:	86694.03
DRAWING No:	3
REVISION:	1

Locality Map

Note: Basemap taken from NearMap dated 1/07/2019;
Previous groundwater monitoring wells locations are approximate with referenced to previous site maps

Legend

- Site Boundary
- Proposed Fence Relocation
- Soil Test Locations
- Soil Gas Test Locations
- Groundwater Monitoring Wells

0 50 100 150 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	Cox Architecture Pty Ltd		
OFFICE:	Sydney	DRAWN BY:	CL
SCALE:	1:2500	DATE:	02.05.2018

TITLE: **Test Locations**
Western Sydney Cricket and Community Centre
Wilson Park, Silverwater

N

PROJECT No:	86694.03
DRAWING No:	4
REVISION:	0

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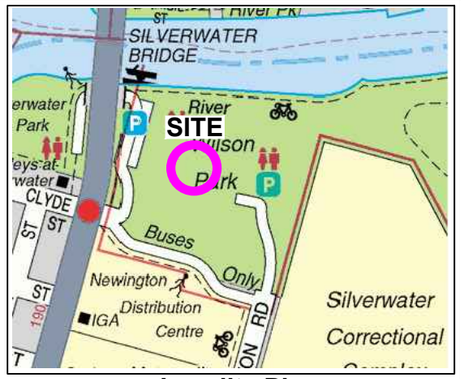
NOTE:
1: Base image from Nearmap.com (Dated 1.7.2019)
2: Test locations are approximate only and have been estimated based on historical drawings with reference to existing features.



Locality Plan

LEGEND

PREVIOUS INVESTIGATION
- DP borehole and CPT (Proj. 23775 F& J, 1999 to 2000)
- DP borehole (Proj. 35205, 2002)
- CMPS&F borehole (1998)
- Groundwater Technologies borehole (1994)
- DP borehole and DCP (Proj. 73318, 2013)
- DP borehole (Proj. 84455, 2014)
- DP borehole (Proj. 86146, 2017)

CURRENT INVESTIGATION
- CPT
- CPT and CBR/ Atterberg limits sample
- Geotechnical Cross Section A-A'

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Cox Architecture Pty Ltd		TITLE: **Test Location Plan**	PROJECT No: 86694.02
OFFICE: Sydney	DRAWN BY: PSCH	**Western Sydney Cricket and Community Centre**	DRAWING No: 101
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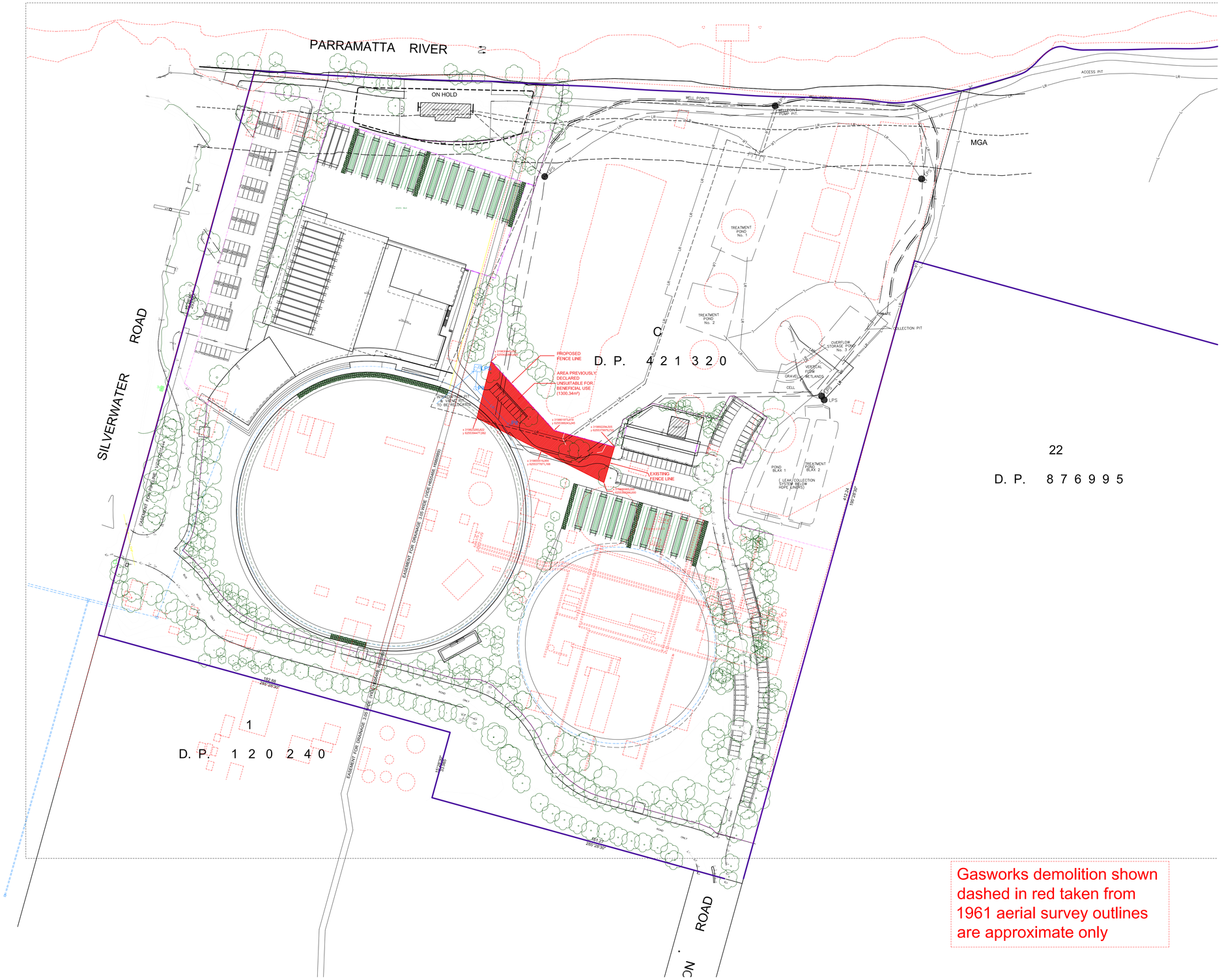

Gasworks demolition shown dashed in red taken from 1961 aerial survey outlines are approximate only

0 5 10 20 30 50 100

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Client
CRICKET NSW

Project No.
219024.00

Project
CRICKET NSW COE
WILSON PARK
SYDNEY OLYMPIC PARK
SILVERWATER NSW

Drawing Title
SITE PLAN

Document Control Status:

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Project Architect	Date 26.09.19
Project Director	Rev 1
Drawing Number ASK012_SP VE3	North

Cox Architecture Pty Ltd ACN 002 535 891

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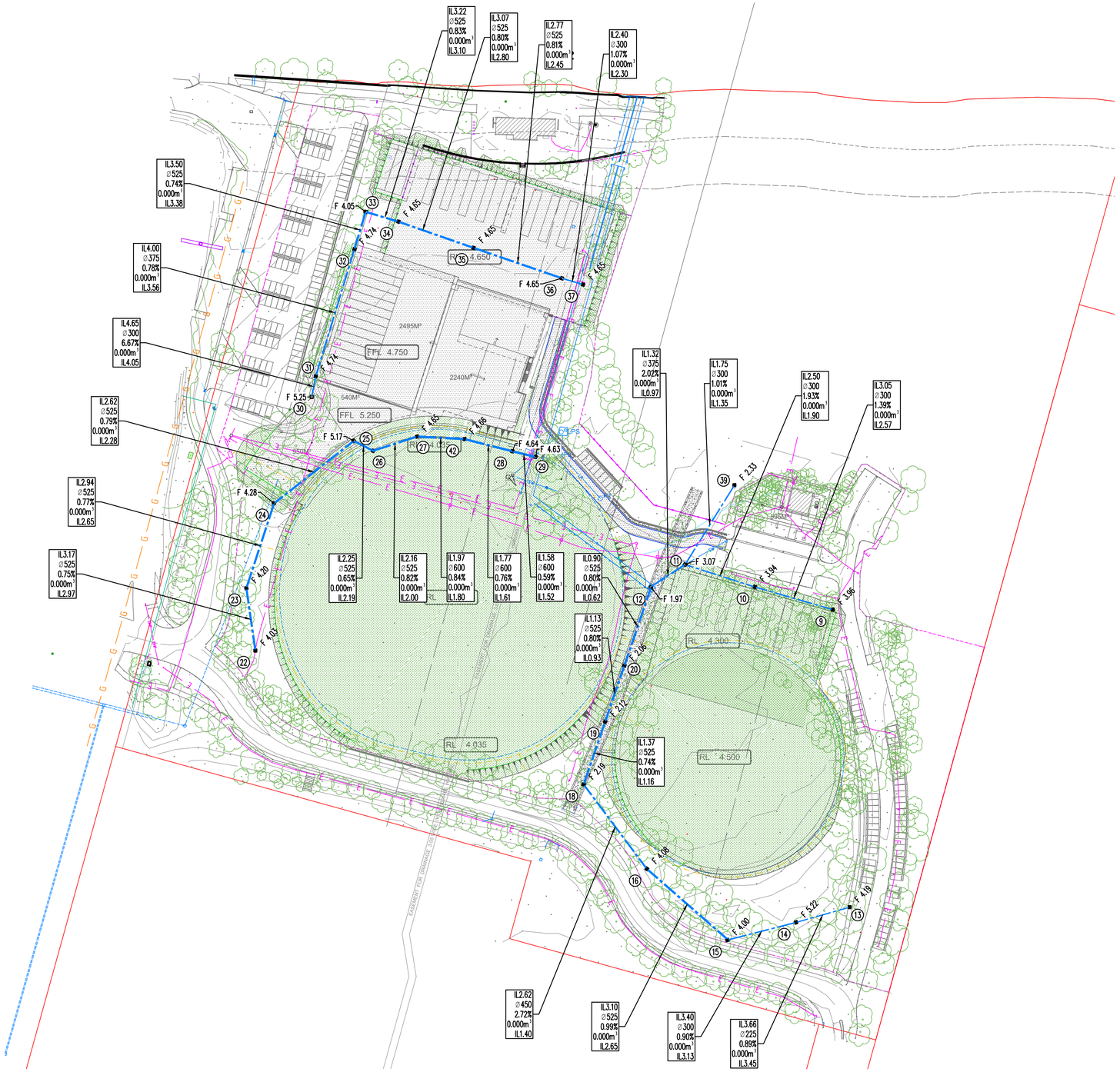

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PRELIMINARY

Rev	Description	Eng	Draft	Date
P1	PRE SSDA	SB	AS	29.08.19

Architect
COX ARCHITECTURE
155 Clarence St, Sydney NSW 2000

Civil Engineer
Taylor Thomson Whitting
612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

Project
CNSW WESTERN SYDNEY CRICKET & COMMUNITY CENTRE, SILVERWATER

Sheet Subject
OVERALL STORMWATER PLAN

Scale : A1 1:1000
Drawn AS
Authorised
Job No 191180
Drawing No C06
Revision P1
Plot File Created: Aug 29, 2019 - 2:08pm

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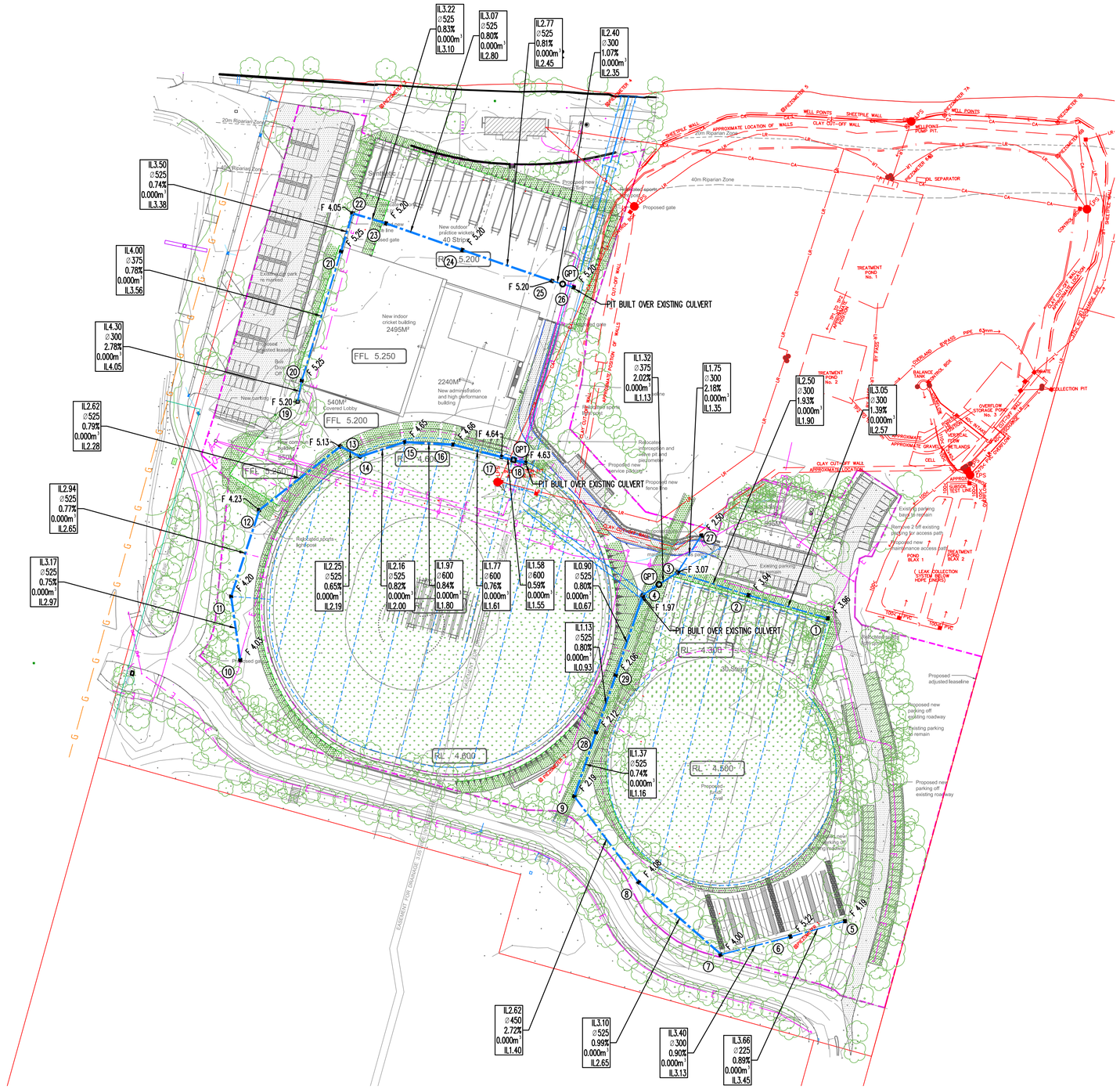

SITEWORKS LEGEND

● F22.20	Finished surface level
F22.00	Finished contour
K&G	Kerb and gutter
KO	Kerb only
DD	Dish drain
	Subsoil drainage line (100 dia)
IL10.00 600 ø 'Z' 1.25% Q=345 L/s IL9.65	Stormwater pit, flow direction and line with Invert level upstream Pipe size and class Pipe grade Flow (Litres per second) Invert level downstream
GD	Grated drain
	Concrete encased stormwater line
RW#	Blockwork retaining wall
	Grass catch drain
	Overland flow path

PAVEMENT LEGEND

NOTES

1. Asphaltic concrete shall conform to AS2150 and the specification
2. Pavement based on geotechnical report by ??????????????? Reference XYZ Date 06.06.06

P1	___mm Thickness concrete (f'c=32MPa) with SL72 fabric (40 top cover) on ___mm Compacted thickness fine crushed rock (DGB20)
P2	Car park resheet where required
P3	Reinforced grass parking zone
P4	Cricket field soil profile
P5	Grassed and planted area's to landscape architect details

SCALE 1:1000 0 10 20 30 40 50 m
AT ORIGINAL SIZE

SSDA

Rev	Description	Eng	Draft	Date
P3	SSDA	SB	AS	27.09.19
P2	SSDA	SB	AS	10.09.19
P1	PRE SSDA	SB	AS	29.08.19

Architect
COX ARCHITECTURE
155 Clarence St, Sydney NSW 2000

Civil Engineer
Taylor Thomson Whitting
612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

Project
CNSW WESTERN SYDNEY CRICKET & COMMUNITY CENTRE, SILVERWATER

Sheet Subject
OVERALL STORMWATER PLAN

Scale : A1 1:1000 | Drawn AS | Authorised

Job No 191180 | Drawing No C06 | Revision P3

Plot File Created: Sep 26, 2019 - 4:37pm

Filename: C06.dwg - USER: andreas - Plot File Created: Sep 26, 2019 - 4:37pm

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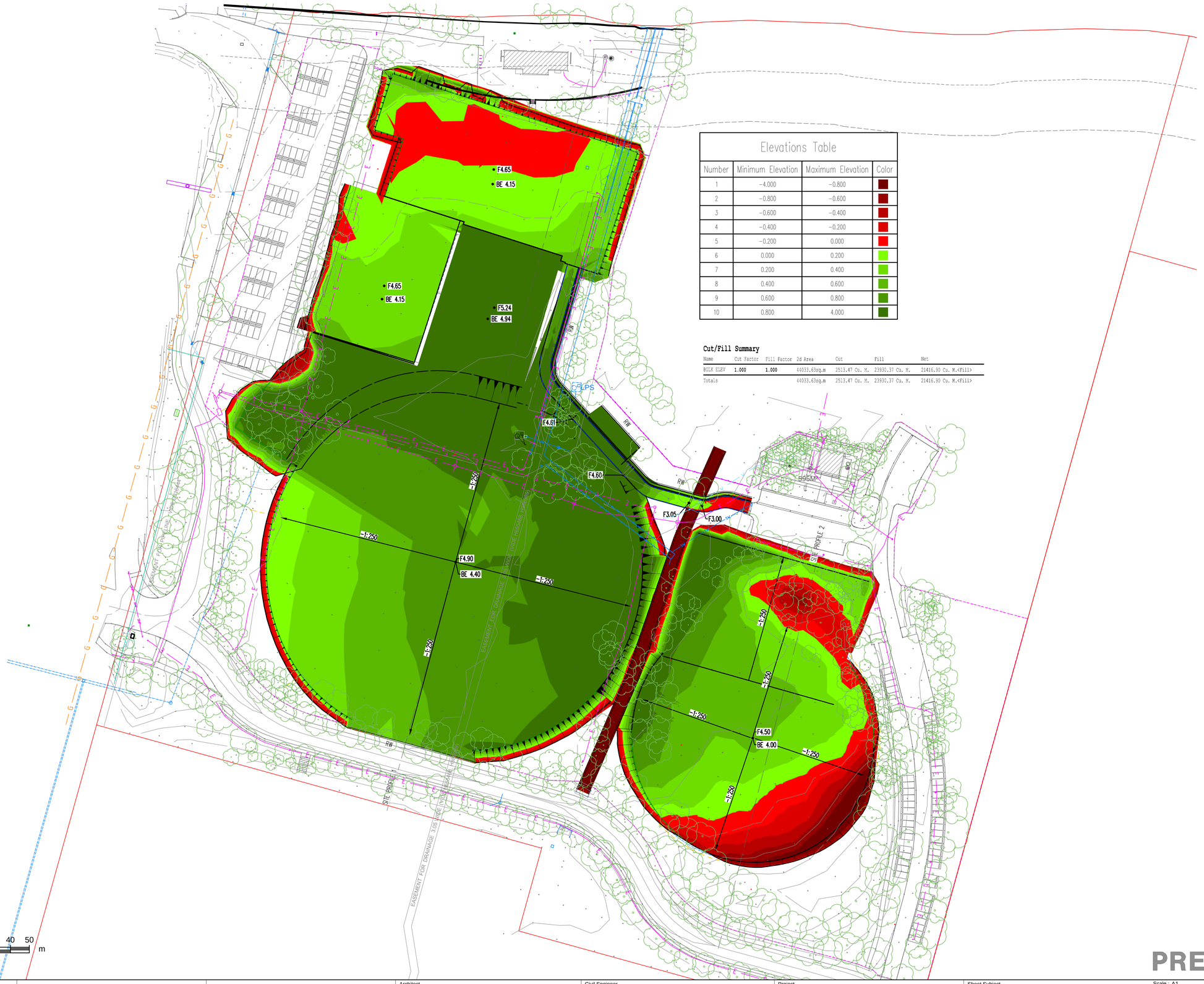
THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING C01



Elevations Table

Number	Minimum Elevation	Maximum Elevation	Color
1	-4.000	-0.800	
2	-0.800	-0.600	
3	-0.600	-0.400	
4	-0.400	-0.200	
5	-0.200	0.000	
6	0.000	0.200	
7	0.200	0.400	
8	0.400	0.600	
9	0.600	0.800	
10	0.800	4.000	

Cut/Fill Summary

Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
BULK ELEV	1.000	1.000	44033.63sq.m	2513.47 Cu. M.	23930.37 Cu. M.	21416.90 Cu. M.<Fill>
Totals			44033.63sq.m	2513.47 Cu. M.	23930.37 Cu. M.	21416.90 Cu. M.<Fill>

SCALE 1:1000 0 10 20 30 40 50 m
AT ORIGINAL SIZE

Filename: C07.dwg - USER: andress - Plot File Created: Aug 29, 2019 - 1:48pm

PRELIMINARY

Rev	Description	Eng	Draft	Date
P1	PRE SSDA	SB	AS	29.08.19

Architect
COX ARCHITECTURE
155 Clarence St, Sydney NSW 2000

Civil Engineer
Taylor Thomson Whitting
612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

Project
CNSW WESTERN SYDNEY CRICKET & COMMUNITY CENTRE, SILVERWATER

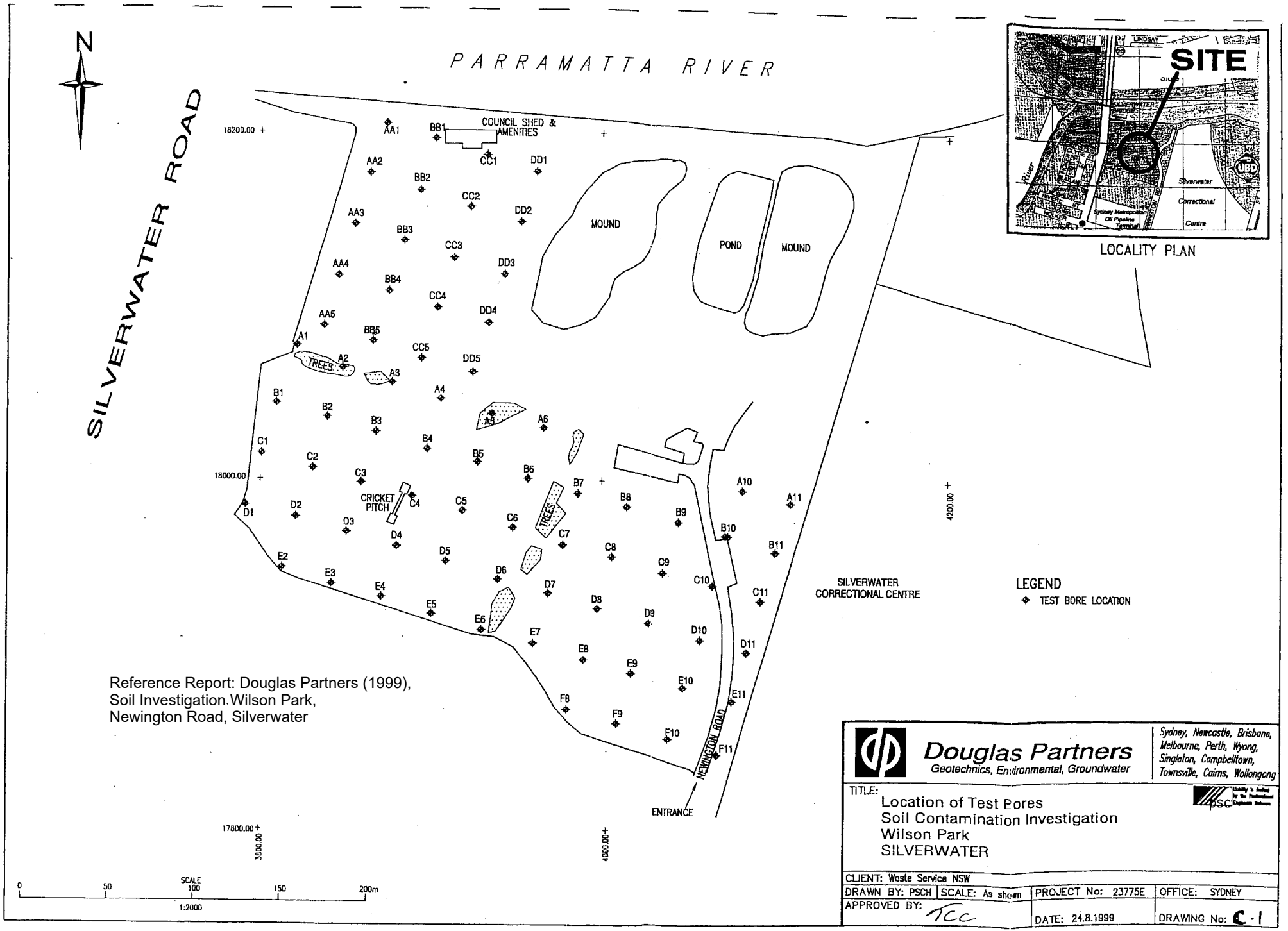
Sheet Subject
OVERALL BULK EARTHWORKS PLAN

Scale : A1: 1:1000
Drawn: AS
Authorised:
Job No: 191180
Drawing No: C07
Revision: P1
Plot File Created: Aug 29, 2019 - 1:48pm

Appendix B

Previous Laboratory Results extracted from Site Audit Report

SOPA Groundwater Monitoring Data



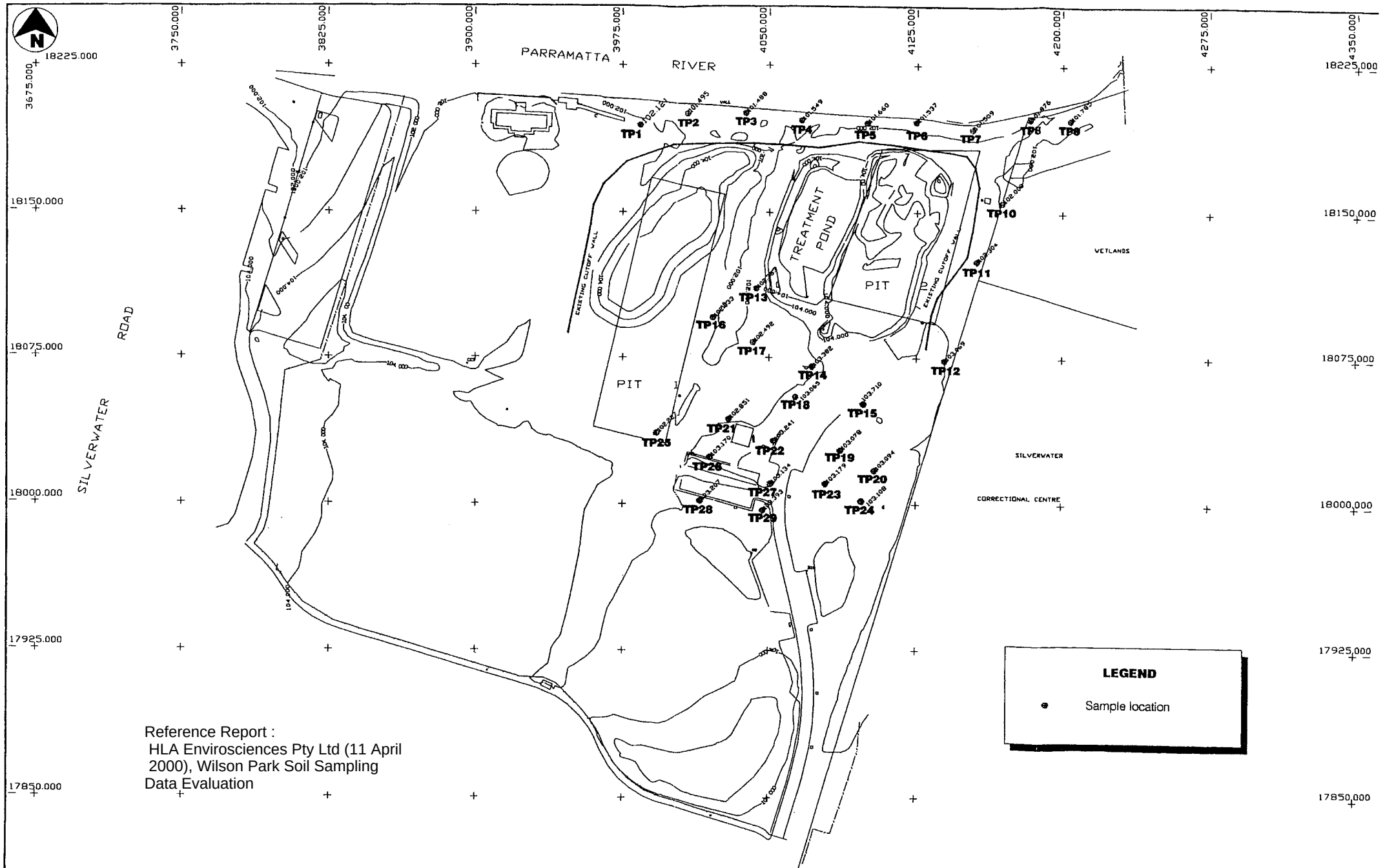
Reference Report: Douglas Partners (1999), Soil Investigation.Wilson Park, Newington Road, Silverwater

Douglas Partners
Geotechnics, Environmental, Groundwater

Sydney, Newcastle, Brisbane, Melbourne, Perth, Wyong, Singleton, Campbelltown, Townsville, Cairns, Wollongong

TITLE:
Location of Test Eores
Soil Contamination Investigation
Wilson Park
SILVERWATER

CLIENT: Waste Service NSW			
DRAWN BY: PSCH	SCALE: As shown	PROJECT No: 23775E	OFFICE: SYDNEY
APPROVED BY: TCC		DATE: 24.8.1999	DRAWING No: C-1



Reference Report :
HLA Envirosciences Pty Ltd (11 April 2000), Wilson Park Soil Sampling Data Evaluation

HLA-Envirosciences Pty Limited
55-65 Grandview Street
Pymble, NSW
(02) 9988-4422

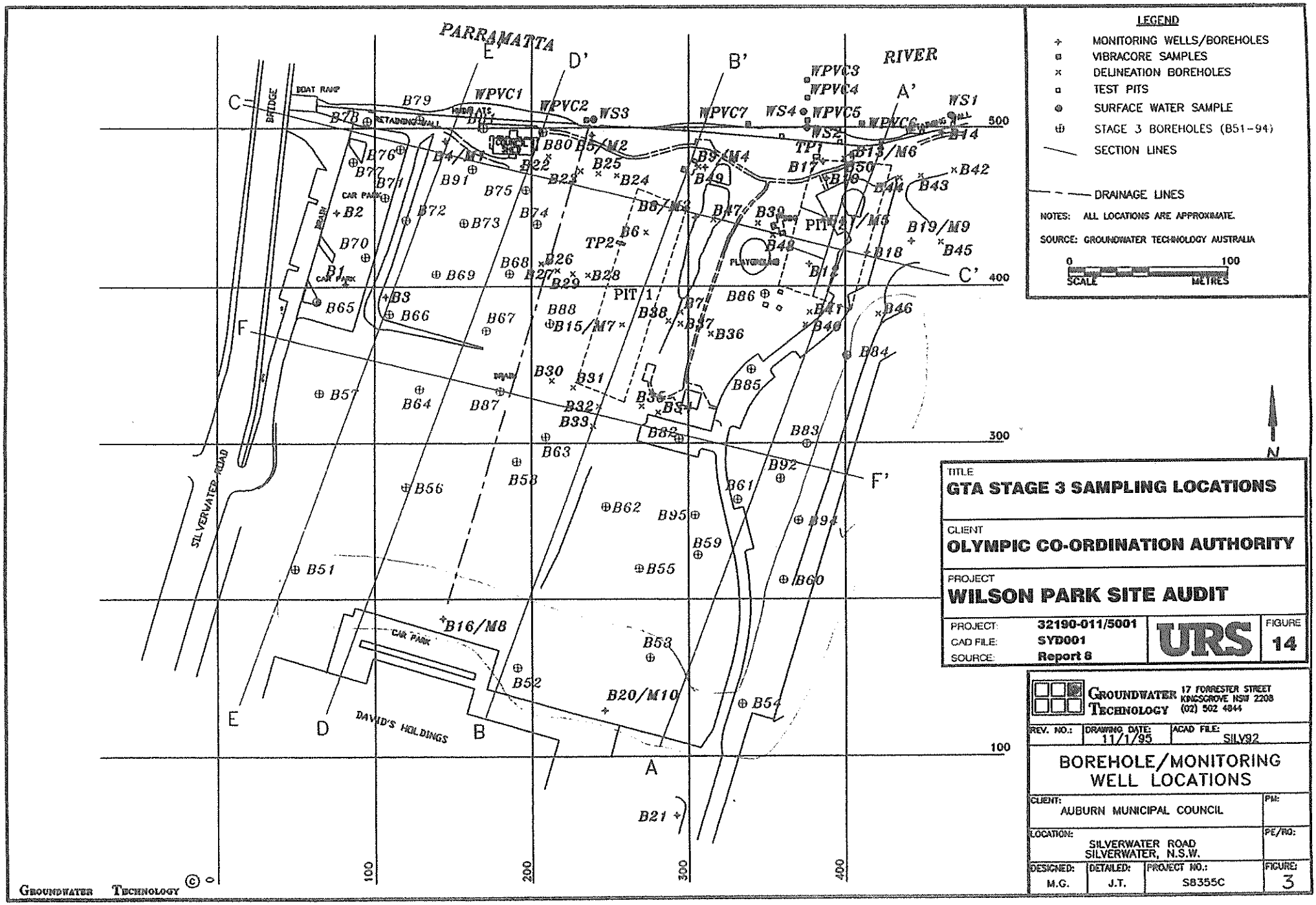
SOIL SAMPLING LOCATIONS
Wilson Park
Silverwater
New South Wales

FIGU

D.1

DRAWN | PROJECT-TASK NUMBER W282 | APPROVED | DATE April 2000 | REVISED

REFERENCE: Waste Service NSW. Plan No. 00-2-1.dwg. Feb 2000


PARRAMATTA RIVER
LEGEND
MONITORING WELLS/BOREHOLES
VIBRACORE SAMPLES
DELINEATION BOREHOLES
TEST PITS
SURFACE WATER SAMPLE
STAGE 3 BOREHOLES (B51-94)
SECTION LINES
DRAINAGE LINES
NOTES: ALL LOCATIONS ARE APPROXIMATE.
SOURCE: GROUNDWATER TECHNOLOGY AUSTRALIA
0 100
SCALE METRES
N
TITLE
GTA STAGE 3 SAMPLING LOCATIONS
CLIENT
OLYMPIC CO-ORDINATION AUTHORITY
PROJECT
WILSON PARK SITE AUDIT
PROJECT: 32190-011/5001
CAD FILE: SYD001
SOURCE: Report 8
URS
FIGURE 14
GROUNDWATER TECHNOLOGY
17 FORRESTER STREET KINGSGROVE NSW 2208 (02) 502 4844
REV. NO.:
DRAWING DATE: 11/1/95
ACAD FILE: SILV92
BOREHOLE/MONITORING WELL LOCATIONS
CLIENT: AUBURN MUNICIPAL COUNCIL
PM:
LOCATION: SILVERWATER ROAD SILVERWATER, N.S.W.
PE/RO:
DESIGNED: M.G.
DETAILED: J.T.
PROJECT NO.: S8355C
FIGURE: 3
SILVERWATER ROAD
DAVID'S HOLDINGS
CAR PARK
BRIDGE
BOAT RAMP
RETAINING WALL
PLAYGROUND
PIT 1
PIT 2
TP1
TP2
WPVC1
WPVC2
WPVC3
WPVC4
WPVC5
WPVC6
WPVC7
WS1
WS2
WS3
WS4
B15/M7
B16/M8
B20/M10
B19/M9
B13/M6
B9/M4
B4/M1
B5/M2
B7/M3
B21
B45
B42
B43
B44
B46
B54
B60
B61
B83
B84
B85
B86
B92
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B95
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B33
B36
B37
B38
B39
B40
B41
B47
B48
B49
B50
B14
A
A'
B
B'
C
C'
D
D'
E
E'
F
F'
100
200
300
400
500
100
200
300
400
© GROUNDWATER TECHNOLOGY

TITLE
SOIL GAS SAMPLING LOCATIONS (0.5m)

FIGURE 8a

CLIENT
OLYMPIC CO-ORDINATION AUTHORITY

PROJECT
WILSON PARK SITE AUDIT

PROJECT: 32190-011/5001
CAD FILE: SYD001
SOURCE: Report 25

URS

FIGURE 16

SURVEYED
DRAWN DW 9-6-99
TRACED
DESIGNED
CHECKED
PLOTTED FROM 99-6-5
DATUM AHD - 100.75

Approved

WASTE SERVICE NSW

WILSON PARK
SOIL PROBE VOCs
AT 0.5 METRES DEPTH

REDUCTION RATIO N.T.S.
PLAN No. 99-6-5A.DWG

No.	DATE	AMENDMENT	APPROVED

FIGURE 8b

TITLE
SOIL GAS SAMPLING LOCATIONS (0.2m)

CLIENT
OLYMPIC CO-ORDINATION AUTHORITY

PROJECT
WILSON PARK SITE AUDIT

PROJECT: 32190-011/5001
CAD FILE: SYD001
SOURCE: Report 25

URS

FIGURE 17

SURVEYED
DRAWN DW 9-6-99
TRACED
DESIGNED
CHECKED
PLOTTED FROM 99-6-5
DATUM AHD - 100.75

Approved

U.E.S.

WASTE SERVICE NSW

WILSON PARK
SOIL PROBE VOCs
AT 0.2 METRES DEPTH

REDUCTION RATIO N.T.S.
unless in metres

PLAN No. 99-6-5B.DWG

No.	DATE	AMENDMENT	APPROVED

FIGURE 8c

TITLE
FLUX HOOD SAMPLING LOCATIONS

CLIENT
OLYMPIC CO-ORDINATION AUTHORITY

PROJECT
WILSON PARK SITE AUDIT

PROJECT: 32190-011/5001
CAD FILE: SYD001
SOURCE: Report 25

URS

FIGURE 18

SURVEYOR
DRAWN DW 9-6-99
TRACED
DESIGNED
CHECKED
PLOTTED FROM 99-6-5
DATUM AHD - 100.75

Approved

WASTE SERVICE NSW

WILSON PARK
FLUX HOOD VOCs
AT SOIL SURFACE

REDUCTION RATIO N.T.S.
lengths in metres

PLAN No. 99-6-5C.DWG

No.	DATE	AMENDMENT	APPROVED

Lab ID	Sample Number	Date Collected	Arsenic mg/kg	Cadmium mg/kg	Chromium mg/kg	Copper mg/kg	Lead mg/kg	Mercury mg/kg	Manganese mg/kg	Nickel mg/kg	m[illegible]	Chrome (VI) mg/kg	Chrome (III) mg/kg	Phenolics mg/kg	Cyanide mg/kg	HCB mg/kg	a-BHC mg/kg	g-BHC (Lindane) mg/kg	Heptac mg/kg	ldrin mg/kg	b- BHC mg/kg	Oxychlordane mg/kg	d- BHC mg/kg	Heptachlor Epoxide mg/kg	o,p-DDE mg/kg	a-Endosulfan mg/kg	trans-Chlordane mg/kg	cis-Chlordane mg/kg
PQL			5	1	5	5	5	0.05	5	4	5	2.5	5	0.1	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
11456E-126	A1	30/07/99	18	0	24	31	44	0.06	200	8	97	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-124	A2	30/07/99	7	0	32	21	32	0.07	190	0	82	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-122	A3	30/07/99	6	0	20	25	43	0.08	200	8	86	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-120	A4	30/07/99	0	0	21	31	710	0.09	350	19	60	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-118	A5	30/07/99	8	0	21	24	270	0.17	140	0	110	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-116	A6	30/07/99	6	0	17	24	53	0.08	130	6	72	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-39	A10	26/07/99	0	0	23	51	280	0.08	120	8	120	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-45	A11	27/07/99	0	0	17	41	580	0.21	120	67	440	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-98	B1	28/07/99	6	0	13	18	20	0	92	10	46	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-100	B2	28/07/99	0	0	12	13	16	0	110	6	34	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-102	B3	28/07/99	0	0	5	8	10	0	87	0	18	0	5.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-104	B4	28/07/99	0	0	5	11	13	0	100	0	23	0	5.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-112	B5	30/07/99	18	0	24	22	28	0.06	180	12	61	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-114	B6	30/07/99	0	0	24	6	20	0	8	0	6	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-23	B7	26/07/99	5	0	16	13	100	0.06	84	5	72	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-21	B8	26/07/99	10	0	15	82	56	0	150	4	53	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-19	B9	26/07/99	12	0	35	17	49	0	51	0	94	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-47	B10	27/07/99	11	0	24	22	48	3.3	120	23	79	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-49	B11	27/07/99	8	0	16	34	95	0	120	5	190	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-96	C1	28/07/99	6	0	14	18	26	0	82	7	34	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-94	C2	28/07/99	5	0	26	24	38	0	190	18	83	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-80	C3	28/07/99	0	0	6	10	11	0	130	7	26	0	6.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-78	C4	28/07/99	0	0	6	50	13	0	85	5	20	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-76	C5	28/07/99	0	0	7	17	14	0	60	5	20	0	7.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-74	C6	28/07/99	0	0	10	83	39	0	120	5	45	0	9.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-25	C7	26/07/99	6	0	25	20	39	0	130	11	48	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-35	C8	26/07/99	17	0	26	31	36	0.08	48	0	35	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-33	C9	26/07/99	0	0	35	18	53	0.07	120	13	75	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-17	C10	26/07/99	13	0	20	20	62	0.09	68	0	62	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-51	C11	27/07/99	5	0	0	23	20	0	100	5	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-86	D1	28/07/99	7	0	18	33	45	0	290	11	47	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-88	D2	28/07/99	0	0	15	19	20	0	140	12	48	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-90	D3	28/07/99	0	0	7	13	16	0	130	9	26	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-92	D4	28/07/99	0	0	9	17	22	0	95	8	26	0	9.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-70	D5	28/07/99	0	0	9	17	27	0.11	53	5	27	0	8.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-72	D6	28/07/99	0	0	8	15	27	0	49	5	31	0	8.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-27	D7	26/07/99	10	0	41	10	100	0	20	0	32	0	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-37	D8	26/07/99	0	0	25	16	36	0	68	0	55	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-31	D9	26/07/99	0	0	14	18	32	0.06	52	4	49	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-15	D10	26/07/99	10	0	25	8	28	0	34	0	30	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-53	D11	27/07/99	10	0	20	16	40	0	100	10	96	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-84	E2	28/07/99	0	0	0	8	11	0	120	5	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-82	E3	28/07/99	0	0	8	13	15	0	110	12	23	0	7.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-63	E4	27/07/99	0	0	6	20	18	0	150	6	29	0	5.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-61	E5	27/07/99	0	0	0	11	13	0	59	20	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-59	E6	27/07/99	0	0	9	20	37	0	89	16	80	0	8.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-2	E7	23/07/99	12	0	25	32	54	0	78	10	59	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-4	E8	23/07/99	9	0	22	12	69	0.25	36	6	56	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-29	E9	26/07/99	9	0	19	16	91	0.11	85	0	100	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-12	E10	23/07/99	8	0	28	17	42	0	33	6	40	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-55	E11	27/07/99	21	0	18	11	40	0	41	6	42	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-6	F8	23/07/99	15	0	20	33	92	0.21	110	9	96	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-8	F9	23/07/99	12	0	20	0	12	0	7	0	8	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-10	F10	23/07/99	0	0	10	25	33	0	97	9	88	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-57	F11	27/07/99	0	0	5	11	26	0	95	9	41	0	5.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Manganese	Nickel	Zinc	Chrome (VI)	Chrome (III)	Phenolics	Cyanide	HCB	a-BHC	g-BHC (Lindane)	Heptachlor	Aldrin	b- BHC	Oxychlordane	d- BHC	Heptachlor Epoxide	o,p-DDE	a-Endosulfan	trans-Chlordane	cis-Chlordane
average	5.27	0.00	16.73	22.16	68.44	0.10	105.93	7.91	62.04	0.00	16.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
std dev	5.94	0.00	9.34	15.49	124.43	0.44	62.89	9.82	61.83	0.00	9.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
t value	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
H value																										
Coeff Var	1.13	#DIV/0!	0.56	0.70	1.82	4.66	0.59	1.24	1.00	#DIV/0!	0.56	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
95% UCL	6.61	0.00	18.83	25.66	96.52	0.20	120.12	10.13	75.99	0.00	18.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95% UCL (Log)																										
Highest Exceedance					710.00																					
Validation Criteria	20	40	50	2000	600	30	3000	600	14000	24%	200	17000	1000					20								

Reference Report :
Waste Service NSW (15 October 1999), Memorandum to Frank Mohen - Wilson Park Soil Results;

Appendix 1 - Validation Results: Southern Sector 0.0-0.2m

Lab ID	Sample Number	Date Collected	trans-Nonachlor mg/kg	p,p-DDE mg/kg	Dieldrin mg/kg	Endrin mg/kg	o,p-DDD mg/kg	o,p-DDT mg/kg	b-Endosulpha mg/kg	DDD mg/kg	p,p-DDT mg/kg	Endosulfan Sulphate mg/kg	Endrin Aldehyde mg/kg	Methoxychlor mg/kg	Endrin Ketone mg/kg	Nap mg/kg	Acenaphthylene mg/kg	Acenaphthene mg/kg	Fluorene mg/kg	Phenanthrene mg/kg	Anthracene mg/kg	Fluoranthene mg/kg	Pyrene mg/kg	Benzo-a-Anthracene mg/kg
PQL			1.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1
11456E-126	A1	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-124	A2	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-122	A3	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0.1	0.19	0	0.23	0.26	0.16
11456E-120	A4	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.29	0	0	0.45	0.17	0.71	0.91	0.58
11456E-118	A5	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	0.14	2	0.44	3	2.8	1.5
11456E-116	A6	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-39	A10	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0.54	0.61	0.29
11456C-45	A11	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.39	0	0.65	0.72	0.32
11456D-98	B1	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-100	B2	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-102	B3	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-104	B4	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-112	B5	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-114	B6	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-23	B7	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-21	B8	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-19	B9	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-47	B10	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.17	0	0.19	0.34	0.15
11456C-49	B11	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.13	0.17	0
11456D-96	C1	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-94	C2	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-80	C3	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-78	C4	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-76	C5	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-74	C6	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.11	0
11456B-25	C7	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-35	C8	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-33	C9	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-17	C10	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	0	0.35	0.61	0.26
11456C-51	C11	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-86	D1	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.16	0.18	0
11456D-88	D2	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-90	D3	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-92	D4	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-70	D5	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-72	D6	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-27	D7	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-37	D8	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-31	D9	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-15	D10	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-53	D11	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.14	0.17	0.1
11456D-84	E2	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-82	E3	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-63	E4	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-61	E5	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-59	E6	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-2	E7	23/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.11	0
11456A-4	E8	23/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-29	E9	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-12	E10	23/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-55	E11	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.26	0.3	0.16
11456A-6	F8	23/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.62	0.1	1.1	1.4	0.64
11456A-8	F9	23/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-10	F10	23/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.12	0
11456C-57	F11	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	trans-Nonachlor	p,p-DDE	Dieldrin	Endrin	o,p-DDD	o,p-DDT	b-Endosulphan	p,p-DDD	p,p-DDT	Endosulfan Sulphate	Endrin Aldehyde	Methoxychlor	Endrin Ketone	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo-a-Anthracene
average	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.08	0.01	0.14	0.16	0.08
std dev	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.01	0.02	0.29	0.06	0.45	0.45	0.24
t value	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
H value																						
Coeff Var	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	4.67	7.42	5.27	3.59	4.98	3.20	2.80	3.13
95% UCL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.01	0.15	0.03	0.24	0.26	0.13
95% UCL (Log)																						
Highest Exceedance																						
Validation Criteria			20																			

Appendix 1 - Validation Results: Southern Sector 0.0-0.2m

Lab ID	Sample Number	Date Collected	Chrysene mg/kg	Benzo-b-Fluoranthene mg/kg	Benzo-k-fluoranthene mg/kg	Benzo-a-Pyrene mg/kg	In ,3-cd-Pyrene mg/kg	Dibenzo-ah-Anthracene mg/kg	Benzo-ghi-Perylene mg/kg	Total PAH's mg/kg	Benzene mg/kg	Toluer mg/kg	lBenzene mg/kg	Xylene mg/kg	C6-C9 mg/kg	C10-C14 mg/kg	C15-C28 mg/kg	C29-C40 mg/kg
PQL			0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	1	1	1	1	20	50	100	100
11456E-126	A1	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-124	A2	30/07/99	0	0	0	0.053	0	0	0	0.05	0	0	0	0	0	0	0	0
11456E-122	A3	30/07/99	0.14	0.18	0	0.14	0	0	0	1.6	0	0	0	0	0	0	0	0
11456E-120	A4	30/07/99	0.47	0.64	0.15	0.5	0.4	0	0.41	5.68	0	0	0	0	0	0	0	0
11456E-118	A5	30/07/99	1.2	1.3	0.56	0.96	0.57	0	0.53	15.4	0	0	0	0	0	0	0	0
11456E-116	A6	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-39	A10	26/07/99	0.32	0.19	0.12	0.22	0	0	0	2.6	0	0	0	0	0	0	0	0
11456C-45	A11	27/07/99	0.28	0.48	0.11	0.41	0.39	0	0.14	3.9	0	0	0	0	0	0	0	0
11456D-98	B1	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-100	B2	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-102	B3	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-104	B4	28/07/99	0.1	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0
11456E-112	B5	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-114	B6	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-23	B7	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-21	B8	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-19	B9	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-47	B10	27/07/99	0.2	0.2	0	0.18	0.22	0	0.12	1.8	0	0	0	0	0	0	0	0
11456C-49	B11	27/07/99	0	0.12	0	0	0.11	0	0	0.63	0	0	0	0	0	0	0	0
11456D-96	C1	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-94	C2	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-80	C3	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-78	C4	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-76	C5	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-74	C6	28/07/99	0	0	0	0.054	0	0	0	0.16	0	0	0	0	0	0	0	0
11456B-25	C7	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-35	C8	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-33	C9	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-17	C10	26/07/99	0.27	0.21	0	0.22	0.13	0	0.13	2	0	0	0	0	0	0	0	0
11456C-51	C11	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-86	D1	28/07/99	0.12	0	0	0.075	0	0	0	0.53	0	0	0	0	0	0	0	0
11456D-88	D2	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-90	D3	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-92	D4	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-70	D5	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-72	D6	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-27	D7	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-37	D8	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-31	D9	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-15	D10	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-53	D11	27/07/99	0.1	0.11	0	0.08	0	0	0	0.7	0	0	0	0	0	0	0	0
11456D-84	E2	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-82	E3	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-63	E4	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-61	E5	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-59	E6	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-2	E7	23/07/99	0	0	0	0.058	0	0	0	0	0	0	0	0	0	0	0	0
11456A-4	E8	23/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-29	E9	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-12	E10	23/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-55	E11	27/07/99	0.19	0.28	0	0.21	0.21	0	0.1	1.7	0	0	0	0	0	0	0	0
11456A-6	F8	23/07/99	0.66	0.64	0.29	0.64	0.4	0	0.37	7	0	0	0	0	0	0	0	0
11456A-8	F9	23/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-10	F10	23/07/99	0	0	0	0.057	0	0	0	0	0	0	0	0	0	0	0	0
11456C-57	F11	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Chrysene	Benzo-b-Fluoranthene	Benzo-k-fluoranthene	Benzo-a-Pyrene	Indeno-1,2,3-cd-Pyrene	Dibenzo-ah-Anthracene	Benzo-ghi-Perylene	Total PAH's	Benzene	Toluene	EthylBenzene	Xylene	C6-C9	C10-C14	C15-C28	C29-C40
average	0.07	0.08	0.02	0.07	0.04	0.00	0.03	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
std dev	0.20	0.22	0.09	0.18	0.12	0.00	0.10	2.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
t value	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
H value																
Coeff Var	2.73	2.80	3.94	2.53	2.77	#DIV/0!	3.19	3.05	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
95% UCL	0.12	0.13	0.04	0.11	0.07	0.00	0.06	1.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95% UCL (Log)																
Highest Exceedance																
Validation Criteria				2				40	1	130	50	25	65	1000	1000	1000

Appendix 2 - Validation Results : Southern Sector 0.2-0.5 m

Lab ID	Sample Number	Date Collected	Arsenic mg/kg	Cadmium mg/kg	Chromium mg/kg	Copper mg/kg	Lead mg/kg	Mercury mg/kg	Manganese mg/kg	Nickel mg/kg	Zinc mg/kg	Chrome (VI) mg/kg	Chrome (III) mg/kg	Phenolics mg/kg	Cyanide mg/kg	HCB mg/kg	a-BHC mg/kg	g-BHC (Lindane) mg/kg	Heptachlor mg/kg	Aldrin mg/kg	b- BHC mg/kg	Oxychlordane mg/kg	d- BHC mg/kg	Heptachlor Epoxide mg/kg	o,p-DDE mg/kg	a-Endosulfan mg/kg	trans-Chlordane mg/kg	cis-Chlordane mg/kg
PQL			5	1	5	5	5	0.05	5	4	5	2.5	5	0.1	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
11456E-127	A1	30/07/99	32	0	39	21	67	0.06	160	9	160	0	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-125	A2	30/07/99	19	0	28	19	27	0	200	8	48	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-123	A3	30/07/99	6	0	31	40	64	0.07	560	28	100	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-121	A4	30/07/99	0	0	18	29	40	0.11	400	110	77	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-119	A5	30/07/99	10	0	47	41	54	0.21	67	14	150	0	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-117	A6	30/07/99	0	0	13	15	24	0.16	30	0	24	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-40	A10	26/07/99	10	0	24	23	37	0	72	0	44	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-46	A11	27/07/99	0	0	12	7	300	0	19	5	88	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-99	B1	28/07/99	9	0	16	17	18	0	62	7	20	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-101	B2	28/07/99	14	0	20	14	16	0	83	6	42	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-103	B3	28/07/99	32	0	20	12	15	0	85	5	50	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-105	B4	28/07/99	7	0	9	13	30	0	15	0	18	0	9.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-113	B5	30/07/99	11	0	16	12	30	0.06	82	0	47	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-115	B6	30/07/99	7	0	31	6	16	0.06	15	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-24	B7	26/07/99	0	0	75	36	25	0	630	56	86	0	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-22	B8	26/07/99	5	0	20	17	54	0	220	14	130	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-20	B9	26/07/99	11	0	11	26	24	0	110	7	64	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-48	B10	26/07/99	6	0	12	30	16	0	67	0	54	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-50	B11	27/07/99	9	0	18	48	260	1.5	130	14	470	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-97	C1	28/07/99	5	0	39	23	18	0	160	29	33	0	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-95	C2	28/07/99	10	0	37	30	39	0	340	26	150	0	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-81	C3	28/07/99	0	0	28	41	37	0.08	240	33	89	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-79	C4	28/07/99	9	0	29	26	36	0.05	93	8	29	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-77	C5	28/07/99	0	0	15	110	46	0.11	43	16	140	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-75	C6	28/07/99	16	0	16	22	41	0	88	9	85	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-26	C7	26/07/99	16	0	35	31	84	0.06	200	14	81	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-36	C8	26/07/99	13	0	16	24	100	0	73	0	63	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-34	C9	26/07/99	11	0	44	5	66	0	20	0	25	0	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-18	C10	26/07/99	14	0	23	32	46	0.13	56	0	62	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-52	C11	27/07/99	9	0	0	22	48	0.32	95	7	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-87	D1	28/07/99	7	0	19	17	34	0	160	14	29	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-89	D2	28/07/99	0	0	9	8	22	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-91	D3	28/07/99	10	0	21	6	14	0	14	4	8	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-93	D4	28/07/99	6	0	10	18	20	0	140	13	60	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-71	D5	28/07/99	8	0	15	25	47	0	30	0	44	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-73	D6	28/07/99	9	0	16	130	400	0.15	99	7	740	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-28	D7	26/07/99	8	0	320	14	41	0	76	0	140	0	320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-38	D8	26/07/99	0	0	73	26	50	0.09	59	6	160	0	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-32	D9	26/07/99	0	0	24	7	37	0	23	0	57	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-16	D10	26/07/99	10	0	27	38	120	0	55	7	330	0	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-54	D11	27/07/99	10	0	0	13	24	0	120	0	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-85	E2	28/07/99	0	0	23	4	6	0	8	0	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-83	E3	28/07/99	7	0	10	8	14	0	6	0	5	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-64	E4	27/07/99	6	0	30	27	30	0	40	17	42	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-62	E5	27/07/99	8	0	19	22	74	0	32	8	66	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-60	E6	27/07/99	15	0	21	150	180	0.33	330	26	400	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-3	E7	23/07/99	12	0	18	14	14	0	180	6	28	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-5	E8	23/07/99	6	0	24	23	150	0.25	210	7	140	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-30	E9	26/07/99	12	0	18	33	49	0	300	18	95	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-13	E10	23/07/99	14	0	46	15	23	0	22	0	96	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-56	E11	27/07/99	8	0	15	14	46	0	78	7	52	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-7	F8	23/07/99	9	0	37	43	42	0.094	300	17	98	0	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-9	F9	23/07/99	17	0	30	8	79	0.08	33	0	47	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-11	F10	23/07/99	5	0	14	26	26	0	180	9	61	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-58	F11	27/07/99	0	0	7	6	24	0	54	11	29	0	6.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Manganese	Nickel	Zinc	Chrome (VI)	Chrome (III)	Phenolics	Cyanide	HCB	a-BHC	g-BHC (Lindane)	Heptachlor	Aldrin	b- BHC	Oxychlordane	d- BHC	Heptachlor Epoxide	o,p-DDE	a-Endosulfan	trans-Chlordane	cis-Chlordane
average	8.69	0.00	28.87	27.04	58.98	0.07	126.62	10.95	95.76	0.00	28.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
std dev	6.78	0.00	42.53	27.50	72.57	0.21	132.05	17.26	125.27	0.00	42.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
t value	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
H value																										
Coeff Var	0.78	#DIV/0!	1.47	1.02	1.23	2.93	1.04	1.58	1.31	#DIV/0!	1.47	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
95% UCL	10.22	0.00	38.47	33.24	75.36	0.12	156.43	14.84	124.04	0.00	38.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95% UCL (Log)																										
Highest Exceedance	32.00		320.00								320.00															
Validation Criteria	20	40	50	2000	600	30	3000	600	14000	24%	200	17000	1000					20								

Appendix 2 - Validation Results : Southern Sector 0.2-0.5 m

Lab ID	Sample Number	Date Collected	trans-Nonachlor mg/kg	p,p-DDE mg/kg	Dieldrin mg/kg	Endrin mg/kg	o,p-DDD mg/kg	o,p-DDT mg/kg	b-Endosulpha mg/kg	DD .g/kg	p,p-DDT mg/kg	Endosulfan Sulphate mg/kg	Endrin Aldehyde mg/kg	Methoxychlor mg/kg	Endrin Ketone mg/kg	Napl mg	Acenaphthylene mg/kg	Acenaphthene mg/kg	Fluorene mg/kg	Phenanthrene mg/kg	Anthracene mg/kg	Fluoranthene mg/kg	Pyrene mg/kg	Benzo-a-Anthracene mg/kg
PQL			1.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1
11456E-127	A1	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.18	0	0.4	0.41	0.23
11456E-125	A2	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-123	A3	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.11	0.11	0.11	0.18	0	0.43	0.43	0.26
11456E-121	A4	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	1.8	0.23	0.46	5.2	1.1	5.7	10	5.4
11456E-119	A5	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	530	110	210	170	1100	200	590	970	320
11456E-117	A6	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.5	0	0	1.4	0.34	2	3.5	1.4
11456B-40	A10	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-46	A11	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	0.21	1.4	1.2	0.58
11456D-99	B1	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.32	0	0.57	0.61	0.3
11456D-101	B2	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-103	B3	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-105	B4	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-113	B5	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-115	B6	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-24	B7	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-22	B8	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-20	B9	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-48	B10	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-50	B11	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0.23	0.83	0.15	0.62	6.5	1.2	6.6	7.1	2.8
11456D-97	C1	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.17	0	0	0.38	0.15	1.1	1.2	0.63
11456D-95	C2	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-81	C3	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.11	0	0	0.42	0.13	1	1.1	0.41
11456D-79	C4	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-77	C5	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-75	C6	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.15	0.15	0
11456B-26	C7	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-36	C8	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-34	C9	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-18	C10	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.12	0	0.19	0.25	0.13
11456C-52	C11	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.18	0	0.23	0.24	0.11
11456D-87	D1	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.13	0	0.18	0.2	0
11456D-89	D2	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-91	D3	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-93	D4	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-71	D5	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.43	0.12	0.77	0.7	0.35
11456D-73	D6	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0.44	0.45	0.24
11456B-28	D7	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.11	0	0.16	0.16	0
11456B-38	D8	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-32	D9	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-16	D10	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.18	0.2	0.1
11456C-54	D11	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-85	E2	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-83	E3	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-64	E4	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.12	0	0.18	0.16	0.1
11456C-62	E5	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.19	0	0.32	0.3	0.17
11456C-60	E6	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-3	E7	23/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-5	E8	23/07/99	0	0	0.26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.21	0.21	0.12
11456B-30	E9	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-13	E10	23/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-56	E11	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.24	0.26	0.14
11456A-7	F8	23/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.17	0	0.41	0.51	0.27
11456A-9	F9	23/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.16	0	0	0.58	0.16	1.9	2	1
11456A-11	F10	23/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-58	F11	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.16	0	0.3	0.24	0.1

	trans-Nonachlor	p,p-DDE	Dieldrin	Endrin	o,p-DDD	o,p-DDT	b-Endosulphan	p,p-DDD	p,p-DDT	Endosulfan Sulphate	Endrin Aldehyde	Methoxychlor	Endrin Ketone	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo-a-Anthracene
average	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.66	2.07	3.83	3.11	20.33	3.70	11.18	18.21	6.09
std dev	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	71.46	14.83	28.32	22.92	148.28	26.96	79.50	130.73	43.12
t value	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
H value																						
Coeff Var	#DIV/0!	#DIV/0!	7.42	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	7.40	7.17	7.40	7.36	7.29	7.29	7.11	7.18	7.08
95% UCL	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.79	5.41	10.22	8.29	53.80	9.78	29.13	47.72	15.82
95% UCL (Log)																						
Highest Exceedance																						
Validation Criteria			20																			

Lab ID	Sample Number	Date Collected	Chrysene mg/kg	Benzo-b-Fluoranthene mg/kg	Benzo-k-fluoranthene mg/kg	Benzo-a-Pyrene mg/kg	In ,3-cd-Pyrene mg/kg	Dibenzo-ah-Anthracene mg/kg	Benzo-ghi-Perylene mg/kg	Total PAH's mg/kg	Benzene mg/kg	Toluen mg/kg	Benzene mg/kg	Xylene mg/kg	C6-C9 mg/kg	C10-C14 mg/kg	C15-C28 mg/kg	C29-C40 mg/kg
PQL			0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	1	1	1	1	20	50	100	100
11456E-127	A1	30/07/99	0.21	0.21	0	0.18	0.11	0	0.13	2.06	0	0	0	0	0	0	0	0
11456E-125	A2	30/07/99	0	0	0	0.062	0	0	0	0.06	0	0	0	0	0	0	0	0
11456E-123	A3	30/07/99	0.24	0.34	0.12	0.28	0.2	0	0.22	3.03	0	0	0	0	0	0	0	0
11456E-121	A4	30/07/99	4.8	5.8	1.1	5	37	0.75	4.4	89.64	0	0	0	0	0	0	0	0
11456E-119	A5	30/07/99	330	300	85	360	230	7.4	220	5732.4	0	0	1	2	0	2500	15000	5900
11456E-117	A6	30/07/99	1.7	1.6	0.65	1.6	0.97	0.14	1.4	17.4	0	0	0	0	0	0	0	0
11456B-40	A10	26/07/99	0	0	0	0	0	0	0	0	0	0	0	1.5	0	0	0	0
11456C-46	A11	27/07/99	0.36	0.52	0.15	0.46	0.36	0	0.11	6.4	0	0	0	0	0	0	0	0
11456D-99	B1	28/07/99	0.34	0.33	0.17	0.34	0.17	0	0.19	3.34	0	0	0	0	0	0	0	0
11456D-101	B2	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-103	B3	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-105	B4	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-113	B5	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-115	B6	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-24	B7	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-22	B8	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-20	B9	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-48	B10	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-50	B11	27/07/99	1.9	2.8	0.86	1.7	2.3	0.13	0.89	37	0	0	0	0	0	0	0	0
11456D-97	C1	28/07/99	0.58	0.73	0.35	0.82	0.79	0	0.64	7.54	0	0	0	0	0	0	0	0
11456D-95	C2	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-81	C3	28/07/99	0.48	0.57	0.36	0.65	0.42	0	0.49	6.14	0	0	0	0	0	0	0	0
11456D-79	C4	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-77	C5	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-75	C6	28/07/99	0	0	0	0.052	0	0	0	0.35	0	0	0	0	0	0	0	0
11456B-26	C7	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-36	C8	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-34	C9	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-18	C10	26/07/99	0.13	0.12	0	0.12	0	0	0	1	0	0	0	0	0	0	0	0
11456C-52	C11	27/07/99	0	0.14	0	0.1	0	0	0	1	0	0	0	0	0	0	0	0
11456D-87	D1	28/07/99	0.12	0	0	0.074	0	0	0	0.7	0	0	0	0	0	0	0	0
11456D-89	D2	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-91	D3	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-93	D4	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-71	D5	28/07/99	0.38	0.33	0.19	0.33	0.16	0	0.18	3.94	0	0	0	0	0	0	0	0
11456D-73	D6	28/07/99	0.27	0.33	0.18	0.32	0.24	0	0.27	2.94	0	0	0	0	0	0	0	0
11456B-28	D7	26/07/99	0	0	0	0.081	0	0	0	1	0	0	0	0	0	0	0	0
11456B-38	D8	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-32	D9	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456B-16	D10	26/07/99	0.11	0.12	0	0.1	0	0	0	1	0	0	0	0	0	0	0	0
11456C-54	D11	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-85	E2	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456D-83	E3	28/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-64	E4	27/07/99	0.1	0.14	0	0.07	0	0	0	0.87	0	0	0	0	0	0	0	0
11456C-62	E5	27/07/99	0.13	0.28	0	0.17	0.17	0	0	1.7	0	0	0	0	0	0	0	0
11456C-60	E6	27/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-3	E7	23/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-5	E8	23/07/99	0.13	0.13	0	0.12	0	0	0	1	0	0	0	0	0	0	0	0
11456B-30	E9	26/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456A-13	E10	23/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-56	E11	27/07/99	0.11	0.23	0	0.16	0.15	0	0	1.3	0	0	0	0	0	0	0	0
11456A-7	F8	23/07/99	0.3	0.4	0.19	0.39	0.29	0	0.26	3	0	0	0	0	0	0	0	0
11456A-9	F9	23/07/99	0.94	1.2	0.5	1.1	0.82	0	0.62	11	0	0	0	0	0	0	0	0
11456A-11	F10	23/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456C-58	F11	27/07/99	0.11	0.17	0	0.1	0.12	0	0	1.3	0	0	0	0	0	0	0	0

	Chrysene	Benzo-b-Fluoranthene	Benzo-k-fluoranthene	Benzo-a-Pyrene	Indeno-1,2,3-cd-Pyrene	Dibenzo-ah-Anthracene	Benzo-ghi-Perylene	Total PAH's	Benzene	Toluene	EthylBenzene	Xylene	C6-C9	C10-C14	C15-C28	C29-C40
average	6.24	5.75	1.63	6.81	4.99	0.15	4.18	107.95	0.00	0.00	0.02	0.06	0.00	45.45	272.73	107.27
std dev	44.47	40.42	11.45	48.51	31.30	1.00	29.65	772.56	0.00	0.00	0.13	0.33	0.00	337.10	2022.60	795.56
t value	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
H value																
Coeff Var	7.12	7.02	7.01	7.13	6.28	6.54	7.10	7.16	#DIV/0!	#DIV/0!	7.42	5.25	#DIV/0!	7.42	7.42	7.42
95% UCL	16.28	14.88	4.22	17.76	12.05	0.38	10.87	282.33	0.00	0.00	0.05	0.14	0.00	121.55	729.27	286.85
95% UCL (Log)																
Highest Exceedance				360				5732.4						2500	15000	5900
Validation Criteria				2				40	1	130	50	25	65	1000	1000	1000

Open [illegible] - Validation Results NorthWest Sector 0.0-0.2m

Lab ID	Sample Number	Date Collected	Arsenic mg/kg	Cadmium mg/kg	Chromium mg/kg	Copper mg/kg	Lead mg/kg	Me mg/kg	Manganese mg/kg	Nickel mg/kg	Zinc mg/kg	Chrome (VI) mg/kg	Chrome (III) mg/kg	Phenolics mg/kg	[illegible]le mg/kg	HCB mg/kg	a-BHC mg/kg	g-BHC (Lindane) mg/kg	Heptachlor mg/kg	Aldrin mg/kg	b- BHC mg/kg	Oxychlordane mg/kg
PQL			5	1	5	5	5	0.05	5	4	5	2.5	5	0.1	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1
11456F-139	AA1	30/07/99	0	0	13	53	14	0.08	430	37	65	0	13	0	0	0	0	0	0	0	0	0
11456F-140	AA2	30/07/99	18	0	24	20	33	0.14	270	34	260	0	24	0	0	0	0	0	0	0	0	0
11456F-141	AA3	30/07/99	0	0	7	5	14	0.05	220	4	19	0	7.2	0	0	0	0	0	0	0	0	0
11456F-142	AA4	30/07/99	21	2	23	33	67	0.12	140	18	77	0	23	0	0	0	0	0	0	0	0	0
11456F-143	AA5	30/07/99	0	0	11	4	8	0	52	7	14	0	11	0	0	0	0	0	0	0	0	0
11456E-134	BB1	30/07/99	31	0	84	31	74	0.07	260	28	140	0	84	0	0	0	0	0	0	0	0	0
11456F-147	BB2	30/07/99	0	0	6	4	0	0	180	0	13	0	6.1	0	0	0	0	0	0	0	0	0
11456F-146	BB3	30/07/99	0	0	6	3	0	0	230	0	11	0	6.2	0	0	0	0	0	0	0	0	0
11456F-145	BB4	30/07/99	0	0	6	5	0	0	230	0	13	0	6	0	0	0	0	0	0	0	0	0
11456F-144	BB5	30/07/99	5	0	51	26	28	0.08	370	35	140	0	51	0	0	0	0	0	0	0	0	0
11456E-131	CC1	30/07/99	7	0	24	24	42	0.08	220	7	88	0	24	0	0	0	0	0	0	0	0	0
11456F-148	CC2	30/07/99	0	0	9	7	17	0	210	6	43	0	90	0	0	0	0	0	0	0	0	0
11456F-149	CC3	30/07/99	0	0	7	6	7	0	230	7	15	0	7.2	0	0	0	0	0	0	0	0	0
11456F-150	CC4	30/07/99	12	2	9	46	68	0.12	230	8	78	0	9.4	0	0	0	0	0	0	0	0	0
11456F-151	CC5	30/07/99	0	3	11	10	20	0.06	260	8	33	0	11	0	0	0	0	0	0	0	0	0
11456E-132	DD1	30/07/99	6	0	86	33	53	0.09	160	10	99	0	86	0	0	0	0	0	0	0	0	0
11456E-131	DD2	30/07/99	5	0	15	27	55	0.1	140	5	110	0	15	0	0	0	0	0	0	0	0	0
11456E-130	DD3	30/07/99	0	0	12	19	46	0.1	160	5	62	0	12	0	0	0	0	0	0	0	0	0
11456E-129	DD4	30/07/99	6	0	13	20	46	0.13	110	0	55	0	13	0	0	0	0	0	0	0	0	0
11456E-128	DD5	30/07/99	0	0	17	24	85	0.19	62	0	67	0	17	0	0	0	0	0	0	0	0	0

	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Manganese	Nickel	Zinc	Chrome (VI)	Chrome (III)	Phenolics	Cyanide	HCB	a-BHC	g-BHC (Lindane)	Heptachlor	Aldrin	b- BHC	Oxychlordane
average	5.55	0.35	21.70	20.00	33.85	0.07	208.20	10.95	70.10	0.00	25.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
std dev	8.66	0.88	23.98	14.61	26.94	0.06	90.87	12.43	60.67	0.00	28.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
t value	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
H value																				
Coeff Var	1.56	2.50	1.10	0.73	0.80	0.80	0.44	1.14	0.87	#DIV/0!	1.09	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
95% UCL	8.90	0.69	30.97	25.65	44.27	0.09	243.33	15.76	93.56	0.00	36.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95% UCL (Log)																				
Highest Exceedance	31.00		86.00																	
Validation Criteria	20	40	50	2000	600	30	3000	600	14000	24%	200	17000	1000					20		

Reference Report:
Waste Service NSW (15 October 1999),
Memorandum to Frank Mohen -Wilson
Park Soil Results

Appendix 2 - Validation Results NorthWest Sector 0.0-0.2m

Lab ID	Sample Number	Date Collected	d- BHC mg/kg	Heptachlor Epoxide mg/kg	o,p-DDE mg/kg	a-Endosulf mg/kg	rans-Chlordane mg/kg	cis-Chlordane mg/kg	trans-Nonachlor mg/kg	p,p-DDE mg/kg	Dieldrin mg/kg	n mg/kg	o,p-DDD mg/kg	o,p-DDT mg/kg	b-Endosulphan mg/kg	p,p-DDD mg/kg	p,p-DDT mg/kg	Endosulfan Sulphate mg/kg
PQL			0.1	0.1	0.1	0.1	0.1	0.1	1.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
11456F-139	AA1	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-140	AA2	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-141	AA3	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-142	AA4	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-143	AA5	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-134	BB1	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-147	BB2	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-146	BB3	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-145	BB4	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-144	BB5	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-131	CC1	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-148	CC2	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-149	CC3	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-150	CC4	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-151	CC5	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-132	DD1	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-131	DD2	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-130	DD3	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-129	DD4	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-128	DD5	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	d- BHC	Heptachlor Epoxide	o,p-DDE	a-Endosulfan	trans-Chlordane	cis-Chlordane	trans-Nonachlor	p,p-DDE	Dieldrin	Endrin	o,p-DDD	o,p-DDT	b-Endosulphan	p,p-DDD	p,p-DDT	Endosulfan Sulphate
average	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
std dev	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
t value	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
H value																
Coeff Var	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
95% UCL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95% UCL (Log)																
Highest Exceedance																
Validation Criteria																

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Appendix 2 - Validation Results NorthWest Sector 0.0-0.2m

Lab ID	Sample Number	Date Collected	Endrin Aldehyde mg/kg	Methoxychlor mg/kg	Endrin Ketone mg/kg	Naphthalene mg/kg	Acenaphthylene mg/kg	Acenaphthene mg/kg	Fluorene mg/kg	Phenanthrene mg/kg	Anthracene mg/kg	Fluoranthene mg/kg	Pyrene mg/kg	Benzo-a-Anthracene mg/kg	Chrysene mg/kg	Benzo-b-Fluoranthene mg/kg
PQL			0.1	0.1	0.1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1
11456F-139	AA1	30/07/99	0	0	0	0.46	0.5	0	0.25	1.8	0.39	1.4	2.8	0.9	0.91	0.86
11456F-140	AA2	30/07/99	0	0	0	0.55	0.97	0	0.21	1.2	0.48	1.4	3	1.3	1.3	1.6
11456F-141	AA3	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-142	AA4	30/07/99	0	0	0	0.19	0.21	0	0	1.1	0.13	0.78	1.3	0.57	0.56	0.46
11456F-143	AA5	30/07/99	0	0	0	0	0	0	0	0.18	0	0.2	0.43	0.23	0.33	0.16
11456E-134	BB1	30/07/99	0	0	0	2.9	3	0.45	2.2	13	2.7	6.4	9.8	3.9	3	2.7
11456F-147	BB2	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-146	BB3	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-145	BB4	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-144	BB5	30/07/99	0	0	0	0	0.17	0	0	0.3	0	0.35	0.61	0.29	0.31	0.38
11456E-131	CC1	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-148	CC2	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-149	CC3	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-150	CC4	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-151	CC5	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-132	DD1	30/07/99	0	0	0	0	0.11	0	0	0.33	0	0.41	0.5	0.26	0.27	0.25
11456E-131	DD2	30/07/99	0	0	0	0.11	0.13	0	0	0.41	0.11	0.52	0.87	0.44	0.47	0.38
11456E-130	DD3	30/07/99	0	0	0	0	0	0	0	0.27	0	0.29	0.46	0.23	0.27	0.22
11456E-129	DD4	30/07/99	0	0	0	0	0	0	0	0.15	0	0.3	0.31	0.22	0.19	0.17
11456E-128	DD5	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Endrin Aldehyde	Methoxychlor	Endrin Ketone	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo-a-Anthracene	Chrysene	Benzo-b-Fluoranthene
average	0.00	0.00	0.00	0.21	0.25	0.02	0.13	0.94	0.19	0.60	1.00	0.42	0.38	0.36
std dev	0.00	0.00	0.00	0.65	0.69	0.10	0.49	2.88	0.61	1.43	2.25	0.89	0.71	0.68
t value	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
H value														
Coeff Var	#DIV/0!	#DIV/0!	#DIV/0!	3.10	2.70	4.47	3.70	3.08	3.18	2.38	2.24	2.13	1.86	1.88
95% UCL	0.00	0.00	0.00	0.46	0.52	0.06	0.32	2.05	0.42	1.16	1.87	0.76	0.65	0.62
95% UCL (Log)														
Highest Exceedance														
Validation Criteria														

Appendix 3 - Validation Results NorthWest Sector 0.0-0.2m

Lab ID	Sample Number	Date Collected	Benzo-k-fluoranthene mg/kg	Benzo-a-Pyrene mg/kg	Indeno-1 j-Pyrene mg/kg	Dibenzo-ah-Anthracene mg/kg	Benzo-ghi-Perylene mg/kg	Total PAH' mg/kg	Benzene mg/kg	Toluene mg/kg	EthylBenzene mg/kg	Xylene mg/kg	C6-C9 mg/kg	C10-C14 mg/kg	C15-C28 mg/kg	C29-C40 mg/kg
PQL			0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1	1	1	1	1	20	50	100	100
11456F-139	AA1	30/07/99	0.25	0.23	1.2	0.13	1.1	13.18	0	0	0	0	0	0	1700	2000
11456F-140	AA2	30/07/99	0.29	1.9	2.5	0.33	1.8	18.83	0	0	0	0	0	0	0	0
11456F-141	AA3	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-142	AA4	30/07/99	0.1	0.44	0.52	0	0.38	6.74	0	0	0	0	0	0	0	0
11456F-143	AA5	30/07/99	0	0.18	0.11	0	0	1.82	0	0	0	0	0	0	0	0
11456E-134	BB1	30/07/99	0.8	2.9	1.4	0.3	1.6	57.05	0	0	0	0	0	0	0	0
11456F-147	BB2	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-146	BB3	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-145	BB4	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-144	BB5	30/07/99	0.12	0.27	0.63	0	0.57	4	0	0	0	0	0	0	0	0
11456E-131	CC1	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-148	CC2	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-149	CC3	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-150	CC4	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456F-151	CC5	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11456E-132	DD1	30/07/99	0.1	0.23	0.12	0	0.15	2.73	0	0	0	0	0	0	0	0
11456E-131	DD2	30/07/99	0.19	0.39	0.2	0	0.27	4.49	0	0	0	0	0	0	0	0
11456E-130	DD3	30/07/99	0	0.21	0	0	0.14	2.09	0	0	0	0	0	0	0	0
11456E-129	DD4	30/07/99	0	0.14	0	0	0	1.48	0	0	0	0	0	0	0	0
11456E-128	DD5	30/07/99	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Benzo-k-fluoranthene	Benzo-a-Pyrene	Indeno-1,2,3-cd-Pyrene	Dibenzo-ah-Anthracene	Benzo-ghi-Perylene	Total PAH's	Benzene	Toluene	EthylBenzene	Xylene	C6-C9	C10-C14	C15-C28	C29-C40
average	0.09	0.34	0.33	0.04	0.30	5.62	0.00	0.00	0.00	0.00	0.00	0.00	85.00	100.00
std dev	0.19	0.74	0.66	0.10	0.55	13.08	0.00	0.00	0.00	0.00	0.00	0.00	380.13	447.21
t value	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73
H value														
Coeff Var	2.05	2.13	1.96	2.61	1.84	2.33	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	4.47	4.47
95% UCL	0.17	0.63	0.59	0.08	0.51	10.68	0.00	0.00	0.00	0.00	0.00	0.00	231.97	272.90
95% UCL (Log)														
Highest Exceedance		2.9				57.05							1700	2000
Validation Criteria		2				40	1	130	50	25	65	1000	1000	1000

Table 19. Inorganic Results (cont)

Sample Name	Arsenic (total) (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Copper (mg/kg)	Manganese (mg/kg)	Nickel (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)	Mercury (mg/kg)	Chromium III (mg/kg)	Chromium VI (mg/kg)	Total Cyanide (mg/kg)
Criteria (mg/kg)	200	40	40	2000	3000	600	600	14,000	30	240,000	200	1000
TP15 - 0.1m	6	0.8	<1	47	154	9	55	132	<0.1	12	<1	2
TP15 - 0.1m*	4	0.5	<1	19	110	9	49	126	<0.1	10	<1	1
TP15 - 0.5m	10	0.5	<1	38	108	11	132	244	<0.1	19	<1	1
TP16 - 0.1m	3	0.6	<1	25	107	5	204	254	<0.1	9	<1	1
TP16 - 0.5m	5	0.6	<1	57	110	6	172	368	<0.1	15	<1	<1
TP17 - 0.1m	9	0.5	<1	32	101	15	11	20	<0.1	5	<1	<1
TP17 - 0.5m	4	0.4	<1	18	37	3	27	28	<0.1	11	<1	<1
TP18 - 0.1m	6	0.9	<1	29	147	10	81	108	<0.1	15	<1	2
TP18 - 0.5m	6	1	<1	32	181	16	78	100	<0.1	17	<1	1
TP19 - 0.1m	3	1.1	<1	22	85	8	38	94	<0.1	8	<1	2
TP19 - 0.5m	2	0.4	<1	9	92	32	33	43	<0.1	22	<1	<1
TP20 - 0.1m	3	1	<1	15	115	5	32	59	<0.1	8	<1	3
TP20 - 0.1m*	3	1	<1	17	110	7	37	65	<0.1	10	<1	3
TP20 - 0.5m	9	0.8	<1	21	243	23	35	62	<0.1	15	<1	2
TP21 - 0.1m	4	0.4	<1	15	47	3	22	28	<0.1	7	<1	1
TP21 - 0.5m	4	0.2	<1	6	<1	<1	21	3	<0.1	7	<1	<1
TP22 - 0.1m	4	0.6	<1	20	218	7	54	374	<0.1	13	<1	3
TP22 - 0.5m	4	1	<1	18	94	9	41	75	<0.1	11	<1	<1
TP23 - 0.1m	5	0.9	<1	16	124	7	41	62	<0.1	9	<1	2
TP23 - 0.5m	9	0.3	<1	22	26	2	51	32	<0.1	15	<1	<1
TP24 - 0.1m	3	0.9	<1	18	150	6	32	62	<0.1	8	<1	3
TP24 - 0.5m	7	0.3	<1	20	24	2	37	24	<0.1	15	<1	1
TP25 - 0.1m	8	0.7	<1	28	112	11	152	122	0.1	16	<1	4
TP25 - 0.1m*	8	0.5	<1	26	120	10	139	123	0.1	17	<1	10
TP25 - 0.5m	12	0.6	<1	107	155	18	180	288	0.3	30	<1	53
TP26 - 0.1m	5	0.5	<1	27	112	8	45	85	<0.1	15	<1	3
TP26 - 0.5m	6	0.9	<1	25	143	13	37	87	<0.1	14	<1	1
TP27 - 0.1m	3	1.1	<1	18	165	8	57	80	<0.1	6	<1	2
TP27 - 0.5m	3	0.7	<1	22	156	14	324	154	<0.1	12	<1	<1
TP28 - 0.1m	8	0.5	<1	21	150	7	36	60	<0.1	12	<1	2

Table 19. Inorganic Results (cont)

Sample Name	Arsenic (total) (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Copper (mg/kg)	Manganese (mg/kg)	Nickel (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)	Mercury (mg/kg)	Chromium III (mg/kg)	Chromium VI (mg/kg)	Total Cyanide (mg/kg)
Criteria (mg/kg)	200	40	40	2000	3000	600	600	14,000	30	240,000	200	1000
TP29 - 0.1m	5	0.8	<1	21	174	12	56	87	<0.1	16	<1	2
TP29 - 0.1m*	3	0.6	<1	18	171	13	42	80	<0.1	14	<1	5
TP29 - 0.5m	3	1.2	<1	16	80	15	15	37	<0.1	8	<1	1

*= duplicate sample
shaded results exceed criteria
mg/kg = milligrams per kilogram

Reference Report:
Waste Service NSW (September 2000),
Validation Report for Wilson Park, Auburn

Table 20. Organic Results (cont)

Sample Name	Phenol (mg/kg)	PAH (total) (mg/kg)	Benzo (a) pyrene (mg/kg)	PCB (total) (mg/kg)	TPH (C6-C9) (mg/kg)	TPH (C10-C36) (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylene (mg/kg)
Criteria (mg/kg)	17,000	40	2	20	65	1000	1	130	50	25
TP15 - 0.1m	<0.5	<0.5	<0.5	<0.1	<2	<100	<0.2	<0.2	<0.2	<0.2
TP15 - 0.1m*	<0.5	<0.5	<0.5	<0.1	<2	<100	<0.2	<0.2	<0.2	<0.2
TP15 - 0.5m	<0.5	<0.5	<0.5	<0.1	<2	<100	<0.2	<0.2	<0.2	<0.2
TP16 - 0.1m	<0.5	11.5	1.1	<0.1	<2	<100	<0.2	<0.2	<0.2	<0.2
TP16 - 0.5m	<0.5	14.8	1.9	<0.1	<2	175	<0.2	<0.2	<0.2	<0.2
TP17 - 0.1m	<0.5	<0.5	<0.5	<0.1	<2	<100	<0.2	<0.2	<0.2	<0.2
TP17 - 0.5m	<0.5	<0.5	<0.5	<0.1	<2	<100	<0.2	<0.2	<0.2	<0.2
TP18 - 0.1m	<0.5	5.3	0.8	<0.1	<2	116	<0.2	<0.2	<0.2	<0.2
TP18 - 0.5m	<0.5	31.8	2.7	<0.1	<2	385	<0.2	<0.2	<0.2	<0.2
TP19 - 0.1m	<0.5	<0.5	<0.5	<0.1	<2	104	<0.2	<0.2	<0.2	<0.2
TP19 - 0.5m	<0.5	<0.5	<0.5	<0.1	<2	<100	<0.2	<0.2	<0.2	<0.2
TP20 - 0.1m	<0.5	<0.5	<0.5	<0.1	<2	156	<0.2	<0.2	<0.2	<0.2
TP20 - 0.1m*	<0.5	<0.5	<0.5	<0.1	<2	<100	<0.2	<0.2	<0.2	<0.2
TP20 - 0.5m	<0.5	<0.5	<0.5	<0.1	<2	<100	<0.2	<0.2	<0.2	<0.2
TP21 - 0.1m	<0.5	6.5	0.7	<0.1	<2	253	<0.2	<0.2	<0.2	<0.2
TP21 - 0.5m	<0.5	<0.5	<0.5	<0.1	<2	<100	<0.2	<0.2	<0.2	<0.2
TP22 - 0.1m	<0.5	5	0.9	<0.1	<2	136	<0.2	<0.2	<0.2	<0.2
TP22 - 0.5m	<0.5	<0.1	<0.5	<0.1	<2	<100	<0.2	<0.2	<0.2	<0.2
TP23 - 0.1m	<0.5	0.6	<0.5	<0.1	<2	101	<0.2	<0.2	<0.2	<0.2
TP23 - 0.5m	<0.5	<0.5	<0.5	<0.1	<2	<100	<0.2	<0.2	<0.2	<0.2
TP24 - 0.1m	<0.5	<0.5	<0.5	<0.1	<2	103	<0.2	<0.2	<0.2	<0.2
TP24 - 0.5m	<0.5	<0.5	<0.5	<0.1	<2	<100	<0.2	<0.2	<0.2	<0.2
TP25 - 0.1m	<0.5	81.2	6.9	<0.1	<2	1494	<0.2	<0.2	<0.2	<0.2
TP25 - 0.1m*	<0.5	50.6	4.6	<0.1	<2	622	<0.2	<0.2	<0.2	<0.2
TP25 - 0.5m	<0.5	268	18.8	<0.1	<2	606	<0.2	<0.2	<0.2	<0.2
TP26 - 0.1m	<0.5	6.7	0.9	<0.1	<2	286	<0.2	<0.2	<0.2	<0.2
TP26 - 0.5m	<0.5	4.9	0.8	<0.1	<2	<100	<0.2	<0.2	<0.2	<0.2
TP27 - 0.1m	<0.5	5.4	0.6	<0.1	<2	285	<0.2	<0.2	<0.2	<0.2
TP27 - 0.5m	<0.5	<0.5	<0.5	<0.1	<2	<100	<0.2	<0.2	<0.2	<0.2
TP28 - 0.1m	<0.5	<0.5	<0.5	<0.1	<2	<100	<0.2	<0.2	<0.2	<0.2

Table 20. Organic Results (cont)

Sample Name	Phenol (mg/kg)	PAH (total) (mg/kg)	Benzo (a) pyrene (mg/kg)	PCB (total) (mg/kg)	TPH (C6-C9) (mg/kg)	TPH (C10-C36) (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylene (mg/kg)
Criteria (mg/kg)	17,000	40	2	20	65	1000	1	130	50	25
TP29 - 0.1m	<0.5	39.1	29	<0.1	<2	<100	<0.2	<0.2	<0.2	<0.2
TP29 - 0.1m*	<0.5	10.6	1	<0.1	<2	403	<0.2	<0.2	<0.2	<0.2
TP29 - 0.5m	<0.5	<0.5	<0.5	<0.1	<2	<100	<0.2	<0.2	<0.2	<0.2

*= duplicate sample
shaded results exceed criteria
mg/kg = milligrams per kilogram

Table 21. OCP Results

Sample Name	Aldrin (mg/kg)	Dieldrin (mg/kg)	Chlordane (mg/kg)	DDT (mg/kg)	Heptachlor (mg/kg)
Criteria (mg/kg)	20	20	100	400	20
TP1 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP1 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP3 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP3 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP4 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP4 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP5 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP5 - 0.1m*	<0.5	<0.5	<0.5	<0.2	<0.5
TP5 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP6 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP6 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP7 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP7 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP8 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP8 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP9 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP9 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP10 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP10 - 0.1m*	<0.5	<0.5	<0.5	<0.2	<0.5
TP10 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP11 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP11 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP12 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP12 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP13 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP13 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP14 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP14 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP15 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP15 - 0.1m*	<0.5	<0.5	<0.5	<0.2	<0.5
TP15 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP16 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP16 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP17 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP17 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP18 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP18 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP19 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP19 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP20 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP20 - 0.1m*	<0.5	<0.5	<0.5	<0.2	<0.5
TP20 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP21 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP21 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP22 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP22 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP23 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5

Table 21. OCP Results (cont)

Sample Name	Aldrin (mg/kg)	Dieldrin (mg/kg)	Chlordane (mg/kg)	DDT (mg/kg)	Heptachlor (mg/kg)
Criteria (mg/kg)	20	20	100	400	20
TP24 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP24 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP25 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP25 - 0.1m*	<0.5	<0.5	<0.5	<0.2	<0.5
TP25 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP26 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP26 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP27 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP27 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP28 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP28 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5
TP29 - 0.1m	<0.5	<0.5	<0.5	<0.2	<0.5
TP29 - 0.1m*	<0.5	<0.5	<0.5	<0.2	<0.5
TP29 - 0.5m	<0.5	<0.5	<0.5	<0.2	<0.5

*= duplicate sample
mg/kg = milligrams per kilogram

Reference Report: Waste Service NSW (September 2000), Validation Report for Wilson Park, Auburn

Wilson Park

SampleCode	LocCode	Sampled_Date-Time	WellCode	Sample_Depth_From	Matrix_Type	Sampling method	Dissolved Oxygen	Electrical Conductivity	pH	Temperature	Redox	TDS	TSS	Oil and Gr	*=Ammonia Ammonium	Cyanide	Alkalinity (	BOD
		dd/mm/yyyy 00:00					ppm	mS/cm	pH_units	˚C	mV	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
PP21_00 Jan 00	PP21		PP21															
PP22_00 Jan 00	PP22		PP22															
PP23_00 Jan 00	PP23		PP23															
PP24_00 Jan 00	PP24		PP24															
Piezometer1_00 Jan 00	Piezometer1		Piezometer1															
Piezometer2_00 Jan 00	Piezometer2		Piezometer2															
Piezometer3_00 Jan 00	Piezometer3		Piezometer3															
Piezometer4_00 Jan 00	Piezometer4		Piezometer4															
Piezometer5_00 Jan 00	Piezometer5		Piezometer5															
Piezometer6A_00 Jan 00	Piezometer6A		Piezometer6A															
Piezometer6B_00 Jan 00	Piezometer6B		Piezometer6B															
Piezometer7A_00 Jan 00	Piezometer7A		Piezometer7A															
Piezometer7B_00 Jan 00	Piezometer7B		Piezometer7B															
Piezometer8_00 Jan 00	Piezometer8		Piezometer8															
Piezometer9A_00 Jan 00	Piezometer9A		Piezometer9A															
Piezometer9B_00 Jan 00	Piezometer9B		Piezometer9B															
PP21_18 Jun 12	PP21	18/06/2012	PP21		water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					4060	10	<5	0.04*	<0.004	220	3
PP22_18/06/2012 1020	PP22	18/06/2012 1020	PP22		water		6.45	2.59	7.25	14.6	-37	1250	<5	<5	0.03	<0.004	198	<2
PP23_18/06/2012 1030	PP23	18/06/2012 1030	PP23		water		4.14	8.67	6.83	17.1	-79	4490	28	<5	1.83	0.006	625	<2
PP24_18 Jun 12	PP24	18/06/2012	PP24		water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					5900	16	<5	2.45*	<0.004	633	21
Piezometer1_18/06/2012 10	Piezometer1	18/06/2012 1050	Piezometer1		water		3.50	13.72	8.58	18.6	-44	13200	2550	<5	4.14	0.062	440	<2
Piezometer2_18/06/2012 10	Piezometer2	18/06/2012 1045	Piezometer2		water		3.6	12.90	5.18	18.30	127.0	12600	550	<5	1.48	<0.004	<1	<2
Piezometer3_18/06/2012 90	Piezometer3	18/06/2012 900	Piezometer3		water		4.02	36.10	5.10	18.5	158	53600	1170	<5	<0.10	<0.004	11	<2
Piezometer4_18/06/2012 15	Piezometer4	18/06/2012 1540	Piezometer4		water		2.63	2.01	6.40	20.1	8	5570	1350	<5	<0.10	<0.004	278	<2
Piezometer5_18/06/2012 91	Piezometer5	18/06/2012 915	Piezometer5		water		9.03	28.90	6.00	16.9	94	37400	36	<5	<0.10	<0.004	186	<2
Piezometer6A_18/06/2012 1	Piezometer6A	18/06/2012 1155	Piezometer6A		water		1.90	19.96	7.69	17.8	96	19100	12	<5	<0.10	<0.004	907	4
Piezometer6B_18 Jun 12	Piezometer6B	18/06/2012	Piezometer6B		water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					9820	2210	627	4.03*	0.05	1620	97
Piezometer7A_18/06/2012 9	Piezometer7A	18/06/2012 945	Piezometer7A		water		20.80	58.60	5.68	17.7	28	67000	50	<5	4.17	<0.004	129	12
Piezometer7B_18 Jun 12	Piezometer7B	18/06/2012	Piezometer7B		water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					35900	56	<5	2.88*	<0.004	1090	20
Piezometer8_18/06/2012 14	Piezometer8	18/06/2012 1450	Piezometer8		water		0.00	15.93	6.34	18.7	-105	22000	112	<5	4.36	<0.004	701	<2
Piezometer9A_18/06/2012 1	Piezometer9A	18/06/2012 1142	Piezometer9A		water		1.36	2.32	6.98	18.3	-19	1540	66	<5	0.81	<0.004	370	4
Piezometer9B_18/06/2012 1	Piezometer9B	18/06/2012 1500	Piezometer9B		water		0.00	32.40	6.31	19.6	-81	31400	149	<5	4.46	<0.004	917	<2
PP24_10 Sep 12	PP24	10/09/2012	PP24		Water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					3000	4	<2	0.2*	0.022	415	4
PP21_05 Dec 12	PP21	5/12/2012	PP21		water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					53400	1060	277	1.61	<0.004	467	133
PP22_5/12/2012 1211	PP22	5/12/2012 1211	PP22		water		2.24	3.56	7.21	22.00	-338.00	2500	<5	<5	0.51*	<0.004	192	<2
PP23_5/12/2012 1237	PP23	5/12/2012 1237	PP23		water		1.57	16.00	7.01	20.20	-367.00	11700	34	<5	4.06	0.1	1650	<2
PP24_05 Dec 12	PP24	5/12/2012	PP24		water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					17700	37	<5	10.2*	0.013	1420	80
Piezometer1_5/12/2012 103	Piezometer1	5/12/2012 1030	Piezometer1		water		2.83	23.80	6.32	20.50	-392.00	18800	892	<5	5.88	0.044	226	11
Piezometer2_5/12/2012 104	Piezometer2	5/12/2012 1040	Piezometer2		water		2.75	18.52	4.71	19.70	-335.00	20600	5140	<5	1.22	<0.004	9	10
Piezometer3_5/12/2012 125	Piezometer3	5/12/2012 1251	Piezometer3		water		1.97	66.10	5.91	22.90	-379.00	56400	252	<5	0.49	<0.004	36	<2
Piezometer4_5/12/2012 130	Piezometer4	5/12/2012 1300	Piezometer4		water		0.78	39.60	5.89	21.20	-379.00	31400	51	<5	0.23	<0.004	198	<2
Piezometer5_5/12/2012 131	Piezometer5	5/12/2012 1315	Piezometer5		water		0.79	50.90	5.76	20.30	-389.00	41900	240	<5	1.65	<0.004	241	<2
Piezometer6A_05 Dec 12	Piezometer6A	5/12/2012	Piezometer6A		water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					18300	13	5	<0.01*	0.009	1040	<2
Piezometer6B_05 Dec 12	Piezometer6B	5/12/2012	Piezometer6B		water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					10800	70	<5	2.12*	0.05	1740	40
Piezometer7A_05 Dec 12	Piezometer7A	5/12/2012	Piezometer7A		water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					73600	70	<5	3.99*	<0.004	147	<2
Piezometer7B_05 Dec 12	Piezometer7B	5/12/2012	Piezometer7B		water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					33400	752	11	1.93*	0.005	1390	35
Piezometer8_5/12/2012 105	Piezometer8	5/12/2012 1056	Piezometer8		water		0.29	32.40	6.75	18.40	-361.00	24100	192	<5	4.11	<0.004	830	<2
Piezometer9A_5/12/2012 11	Piezometer9A	5/12/2012 1128	Piezometer9A		water		2.45	1.64	7.21	20.30	-339.00	944	80	<5	1.46	<0.004	484	<2
Piezometer9B_5/12/2012 11	Piezometer9B	5/12/2012 1120	Piezometer9B		water		0.60	41.40	6.81	19.70	-364.00	32500	116	<5	4.05	<0.004	930	<2
PP24_04 Mar 13	PP24	4/03/2013	PP24		Water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					984	9	<5	<0.01*	<0.004	314	<2
PP21_07 Jun 13	PP21	7/06/2013	PP21		water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					41900	154	2420	1.19*	<0.004	508	20
PP22_7/06/2013 1027	PP22	7/06/2013 1027	PP22		water		5.95	1.464	7.99	18.1	79	1600	14	<5	0.58	<0.004	181	6
PP23_7/06/2013 1107	PP23	7/06/2013 1107	PP23		water		4.81	15.95	6.66	20	-65	10900	25	<5	5.38	0.059	989	6
PP24_07 Jun 13	PP24	7/06/2013	PP24		water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					1330	30	<5	0.01*	<0.004	357	5
Piezometer1_7/06/2013 815	Piezometer1	7/06/2013 815	Piezometer1		water		1.61	32.12	5.2	19.6	65.9	22400	2480	<5	0.17	0.019	111	11
Piezometer2_7/06/2013 822	Piezometer2	7/06/2013 822	Piezometer2		water		4.04	22.66	4.7	19.6	165	14100	2060	<5	1.17	<0.004	29	7
Piezometer3_7/06/2013 110	Piezometer3	7/06/2013 1100	Piezometer3		water		5.5	66.15	5.73	20.2	133	58600	227	<5	0.44	<0.004	53	4
Piezometer4_7/06/2013 144	Piezometer4	7/06/2013 1445	Piezometer4		water		3.72	24.108	5.62	21.1	837	15500	2700	<5	0.11	0.005	253	<2
Piezometer5_7/06/2013 112	Piezometer5	7/06/2013 1123	Piezometer5		water		3.77	51.43	5.56	19.8	98	38900	164	<5	0.5	<0.004	251	3
Piezometer6A_07 Jun 13	Piezometer6A	7/06/2013	Piezometer6A		water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					16400	28	13	<0.01*	0.014	968	4
Piezometer6B_07 Jun 13	Piezometer6B	7/06/2013	Piezometer6B		water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					12500	120	46	1.68*	0.029	1790	38
Piezometer7A_07 Jun 13	Piezometer7A	7/06/2013	Piezometer7A		water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					71300	186	<5	1.05*	<0.004	302	13
Piezometer7B_07 Jun 13	Piezometer7B	7/06/2013	Piezometer7B		water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					34100	1710	262	2.41*	0.005	1500	129
Piezometer8_7/06/2013 845	Piezometer8	7/06/2013 845	Piezometer8		water		0	30.71	6.55	18.7	-57.8	22300	70	<5	3.68	<0.004	846	<2
Piezometer9A_7/06/2013 91	Piezometer9A	7/06/2013 910	Piezometer9A		water		1.75	37.88	6.61	19.3	22	2360	78	<5	0.52	<0.004	614	5
Piezometer9B_7/06/2013 9(	Piezometer9B	7/06/2013 901	Piezometer9B		water		0.13	41.35	6.52	19.6	-51	29400	48	<5	3.74	<0.004	953	<2
PP24_24 Sep 13	PP24	24/09/2013	PP24		Water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					16,500	<5	<5	9.89*	0.006	1330	115

PP21_4/12/2013 1335	PP21	4/12/2013 1335	PP21	water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					56500	146	<5	<0.004*	<0.004	425	8
PP22_4/12/2013 1530	PP22	4/12/2013 1530	PP22	water		5.37	3.23	7.27	21.5	-17	1460	54	<5	<0.01	<0.004	315	7
PP23_4/12/2013 1420	PP23	4/12/2013 1420	PP23	water		2.52	13.67	6.88	21.2	-75	7600	9	<5	2.52	0.066	714	<2
PP24_4/12/2013 1500	PP24	4/12/2013 1500	PP24	water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					22200	9	<5	8.58*	<0.004	1620	65
Piezometer1_4/12/2013 144	Piezometer1	4/12/2013 1445	Piezometer1	water		1.28	13.95	5.05	24.8	88	24000	3610	<5	2.55	0.024	93	5
Piezometer2_5/12/2013 145	Piezometer2	5/12/2013 1455	Piezometer2	water		2.97	28.6	6.53	22.8	18	9650	14	<5	1.51	<0.004	9	10
Piezometer3_5/12/2013 142	Piezometer3	5/12/2013 1425	Piezometer3	water		1.88	62.1	6.11	23.5	9	58400	225	<5	0.88	<0.004	38	<2
Piezometer4_4/12/2013 140	Piezometer4	4/12/2013 1400	Piezometer4	water		1.67	21.6	6.3	20.9	29	17300	3840	<5	0.15	0.005	212	<2
Piezometer5_4/12/2013 141	Piezometer5	4/12/2013 1410	Piezometer5	water		1.21	43.4	7.2	21.3	40	41100	76	<5	3.56	<0.004	272	7
Piezometer6A_4/12/2013 15	Piezometer6A	4/12/2013 1520	Piezometer6A	water		1.3	35		18.9	-241	26100	5	<5	0.35	<0.004	1480	18
Piezometer6B_4/12/2013 15	Piezometer6B	4/12/2013 1515	Piezometer6B	water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					12900	4170	39800	2.9*	0.036	1780	21
Piezometer7A_4/12/2013 13	Piezometer7A	4/12/2013 1335	Piezometer7A	water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					96000	116000	<5	1.32*	<0.004	387	274
Piezometer7B_4/12/2013 13	Piezometer7B	4/12/2013 1330	Piezometer7B	water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					43900	850	33	1.79*	0.004	1230	51
Piezometer8_4/12/2013 150	Piezometer8	4/12/2013 1500	Piezometer8	water		0.87	28.5	6.9	19	-65	23600	52	<5	4.26	<0.004	814	7
Piezometer9A_4/12/201315	Piezometer9A	4/12/20131510	Piezometer9A	water		1.77	2.4	6.82	21.1	-5	1820	307	<5	0.58	<0.004	527	8
Piezometer9B_4/12/2013 15	Piezometer9B	4/12/2013 1510	Piezometer9B	water		0.84	38.4	6.87	20.5	-54	34500	410	<5	4.02	<0.004	905	<2
PP24_Mar_14		14/03/2014 1545	PP24	water		1.96	25.52	6.75	22	-330.6	12000	140	58	13	<0.005	1000	130
PP21_10 Jun 14	PP21	10/06/2014 13:58	PP21	water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					58200	242	9	1.69*	<0.004	530	21
PP22_10 Jun 14	PP22	10/06/2014 13:00	PP22	water		8.66	3.19	7.94	17.6	-1	1980	36	<5	<0.01	0.005	428	<2
PP23_10 Jun 14	PP23	10/06/2014 13:20	PP23	water		1.86	15.3	6.61	18.5	-82	12600	61	<5	5.1	0.151	1050	<2
PP24_10 Jun 14	PP24	10/06/2014 11:40	PP24	water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					14900	32	<5	12.2*	0.029	1430	38
Piezometer1_10 Jun 14	Piezometer1	10/06/2014 7:30	Piezometer1	water		2.85	27.8	4.47	17.6	135	20000	6750	<5	4.37	0.022	94	11
Piezometer2_10 Jun 14	Piezometer2	10/06/2014 8:00	Piezometer2	water		1.84	16.64	3.52	18.1	192	12800	10	<5	1.58	<0.004	<1	12
Piezometer3_10 Jun 14	Piezometer3	10/06/2014 9:45	Piezometer3	water		1.34	52.2	4.42	17.9	149	57900	38	<5	0.64	<0.004	30	<2
Piezometer4_10 Jun 14	Piezometer4	10/06/2014 12:43	Piezometer4	water		5.31	30.4	5.97	19.9	56	28000	152	<5	0.27	0.009	255	<2
Piezometer5_10 Jun 14	Piezometer5	10/06/2014 16:10	Piezometer5	water		0.99	39.3	5.42	18.3	72	36500	1490	<5	1.77	<0.004	290	<2
Piezometer6A_10 Jun 14	Piezometer6A	10/06/2014 8:30	Piezometer6A	water		0	35.1	6.5	18	-214	34400	<5	<5	0.48	<0.004	2240	64
Piezometer6B_10 Jun 14	Piezometer6B	10/06/2014 8:45	Piezometer6B	water		1.15	15.67	7.72	18.7	-106	9030	<5		3	0.085	1850	22
Piezometer7A_10 Jun 14	Piezometer7A	10/06/2014 15:15	Piezometer7A	water		1.08	15.02	6.67	18.8	-38	82600	11	<5	0.91	<0.004	268	13
Piezometer7B_06 Jun 14	Piezometer7B	10/06/2014 15:30	Piezometer7B	water		0.91	63.4	3.5	18.1	77	10400	6	<5	<0.01	<0.004	272	5
Piezometer8_06 Jun 14	Piezometer8	6/06/2014 12:00	Piezometer8	water		0.07	26.2	7.11	18.1	-85	22700	21	<5	3.42	<0.004	882	<2
Piezometer9A_10 Jun 14	Piezometer9A	10/06/2014 8:15	Piezometer9A	water		1.07	3.88	5.93	17.9	47	1920	29	<5	2	<0.004	455	<2
Piezometer9B_06 Jun 14	Piezometer9B	6/06/2014 11:45	Piezometer9B	water		0	35.2	6.83	18.9	-80	33200	26	<5	3.38	<0.004	1040	<2
PP24_Sep_14	PP24	14/03/2014 1540	PP24	water		FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT					1260	<5	<5	0.04*	0.01	286	3
PP21_05 Dec 14	PP21	5/12/2014 12:00	PP21	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					53500	1510	<5	1.75*	<0.040	504	3870
PP22_6/12/2014 14:10:00 F	PP22	6/12/2014 14:10:00 PM	PP22	water	Bailer	2.66	2.65	5.91	25.9	55	1560	<5	<5	0.02	<0.004	62	<2
PP23_05 Dec 14	PP23	5/12/2014 12:30	PP23	water	Bailer	0.77	17.12	6.41	24.4	-101	16100	19	<5	4.7	<0.004	887	3
PP24_05 Dec 14	PP24	5/12/2014 9:30	PP24	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					33100	<5	<5	7.62*	<0.004	2460	388
Piezometer1_05 Dec 14	Piezometer1	5/12/2014 7:15	Piezometer1	water	Watera	1.2	21.21	5.9	19.8	-32	18200	2250	<5	3.94	<0.004	429	5
Piezometer2_05 Dec 14	Piezometer2	5/12/2014 7:30	Piezometer2	water	Bailer	0.74	20.79	3.55	19.7	241	16500	46	<5	0.79	<0.004	<1	8
Piezometer3_05 Dec 14	Piezometer3	5/12/2014 10:00	Piezometer3	water	Bailer	3.35	53.6	5.37	22	13	59200	2640	<5	0.7	<0.004	46	6
Piezometer4_05 Dec 14	Piezometer4	5/12/2014 10:15	Piezometer4	water	Submersible pump	0.41	31.6	5.4	19.8	-4	36900	30	<5	0.32	<0.004	198	<2
Piezometer5_08 Dec 14	Piezometer5	8/12/2014 9:00	Piezometer5	water	Submersible pump	2.05	43.3	5.49	19.6	80	43200	1690	<0.004	0.396	0.62	282	<0.004
Piezometer6A_05 Dec 14	Piezometer6A	5/12/2014 9:15	Piezometer6A	water	Submersible pump	0.54	39.5	6.52	20	-328	39400	104	<5	0.32	<0.004	1570	136
Piezometer6B_05 Dec 14	Piezometer6B	5/12/2014 8:45	Piezometer6B	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					10600	<5	<5	4.78*	<0.004	1910	83
Piezometer7A_5/12/2014 -	Piezometer7A	5/12/2014 12:45	Piezometer7A	water	Bailer	0.91	67.2	5.34	22	-20	73100	62	<5	1.27	<0.004	301	7
Piezometer7B_05 Dec 14	Piezometer7B	5/12/2014 -	Piezometer7B	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					43000	118	10	3.14*	<0.004	1710	350
Piezometer8_05 Dec 14	Piezometer8	5/12/2014 8:30	Piezometer8	water	Submersible pump	1.72	27.9	6.41	19.3	-107	21900	27	<5	4.74	<0.004	899	<2
Piezometer9A_05 Dec 14	Piezometer9A	5/12/2014 8:00	Piezometer9A	water	Submersible pump	1.3	4.27	6.45	19.4	42	3000	81	<5	2.27	<0.004	533	6
Piezometer9B_04 Dec 14	Piezometer9B	4/12/2014 12:30	Piezometer9B	water	Submersible pump	0.21	40.3	6.72	19	-135	32600	80	<5	3.94	<0.004	1040	<2
PP24_06 Mar_15	PP24	6/03/2015 14:00	PP24	water	Bailer	1.54	2.172	6.76	18.1	69	6880	17	<2	5.4	<0.001	840	89
PP21_04 Jun 15	PP21	4/06/2015 12:40	PP21	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					39800	610	150	1.8	<0.001	485	32
PP22_04 Jun 15	PP22	4/06/2015 13:47	PP22	water	Bailer	6.84	23.28	7.6	17.8	33	1680	8	<2	0.02	<0.001	435	<1
PP23_05 Jun 15	PP23	5/06/2015 8:30	PP23	water	Bailer	2.06	12.82	7.02	17.7	30	11600	120	<2	2.5	0.023	1000	3
PP24_04 Jun 15	PP24	4/06/2015 9:26	PP24	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					4630	4	82	2.5	0.007	735	24
Piezometer1_04 Jun 15	Piezometer1	4/06/2015 7:36	Piezometer1	water	Watera	1.23	8.94	6.62	15.9	-10	9850	1910	2	1.0	0.034	875	2
Piezometer2_04 Jun 15	Piezometer2	4/06/2015 8:20	Piezometer2	water	Bailer	5.48	21.49	5.58	14.3	74	20800	15300	8	1.2	<0.001	29	17
Piezometer3_05 Jun 15	Piezometer3	5/06/2015 8:13	Piezometer3	water	Bailer	2.3	39.7	5.44	16.7	69	51900	410	5	0.60	<0.001	42	<1
Piezometer4_04 Jun 15	Piezometer4	4/06/2015 11:53	Piezometer4	water	Submersible pump	4.23	23.3	5.43	20.3	62	28800	720	<2	0.28	<0.001	210	2
Piezometer5_04 Jun 15	Piezometer5	4/06/2015 12:20	Piezometer5	water	Submersible pump	2.82	28.2	5.73	18	72	40300	6930	7	1.5	<0.001	355	2
Piezometer6A_04 Jun 15	Piezometer6A	4/06/2015 10:25	Piezometer6A	water	Submersible pump	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					28500	6	14	0.11	0.001	1780	<1
Piezometer6B_05 Jun 15	Piezometer6B	4/06/2015 10:50	Piezometer6B	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					12100	30	17	3.4	0.001	1870	24
Piezometer7A_05 Jun 15	Piezometer7A	5/06/2015 9:40	Piezometer7A	water	Bailer	1.27	47.2	6	16.5	84	62700	33	52	5.4	<0.001	365	6
Piezometer7B_04 Jun 15	Piezometer7B	NO SAMPLE	Piezometer7B			UNABLE TO SAMPLE - TAR IMPACTED WELL											
Piezometer8_04 Jun 15	Piezometer8	4/06/2015 9:00	Piezometer8	water	Submersible pump	1.37	21.54	6.87	17.7	48	21000	140	2	3.2	<0.001	945	<1
Piezometer9A_04 Jun 15	Piezometer9A	4/06/2015 9:25	Piezometer9A	water	Submersible pump	4.61	2.4	7.1	16.5	0	1810	84	<2	0.89	<0.001	800	3
Piezometer9B_04 Jun 15	Piezometer9B	4/06/2015 10:00	Piezometer9B	water	Submersible pump	0.46	28.5	6.96	19	7	33200	150	3	3.4	<0.001	1070	<1
PP21_16 Dec 15	PP21	16/12/2015 14:20	PP21	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					46100	430	98	6.7	<0.001	430	74
PP22_16 Dec 15	PP22	16/12/2015 14:50	PP22	water	Bailer	4.79	2.76	7.51	20.5	-29	870	70	3	0.10	0.017	215	3
PP23_16 Dec 15	PP23	16/12/2015 15:35	PP23	water	Bailer	1.12	14.87	7.16	18.4	-95	10500	19	5	5.2	0.020	1140	30
PP24_15 Dec 15	PP24	15/12/2015 11:50	PP24			UNABLE TO SAMPLE-INACCESSABLE											
Piezometer1_16 Dec 15	Piezometer1	16/12/2015 11:25	Piezometer1	water	Waterra	0.98	16.07	5.66	18.9	13	13800	1450	3	10	0.028	160	6

Piezometer2_16 Dec 15	Piezometer2	16/12/2015 11:35	Piezometer2	water	Submersible Pump	0.79	19.29	5.19	19.2	82	13700	650	5	1.9	<0.001	<1	11
Piezometer3_16 Dec 15	Piezometer3	16/12/2015 13:45	Piezometer3	water	Submersible Pump	3.12	45.6	5.59	19.5	70	50600	210	<2	5.3	<0.001	10	<1
Piezometer4_16 Dec 15	Piezometer4	16/12/2015 13:50	Piezometer4	water	Submersible Pump	0.7	32.2	5.98	19.3	43	29700	4500	<2	3.4	0.012	255	4
Piezometer5_16 Dec 15	Piezometer5	16/12/2015 14:00	Piezometer5	water	Submersible Pump	0.45	26.7	6.54	18.9	-38	23100	76	5	3.0	<0.001	625	4
Piezometer6A_16 Dec 15	Piezometer6A	16/12/2015 13:00	Piezometer6A	water	Bailer	0.78	28.5	80.8	18.7	-99	26200	6	5	0.38	<0.001	1270	17
Piezometer6B_16 Dec 15	Piezometer6B	16/12/2015 12:40	Piezometer6B	water	Bailer	0.53	17.76	7.66	19.8	-145	10600	50	<2	2.7	0.001	1940	23
Piezometer7A_16 Dec 15	Piezometer7A	16/12/2015 14:25	Piezometer7A	water	Submersible Pump	1.11	56.1	6.03	20	10	61500	60	5	4.8	<0.001	135	<1
Piezometer7B_16 Dec 15	Piezometer7B	NO SAMPLE	Piezometer7B		UNABLE TO SAMPLE_ TAR IMPACTED WELL TO BE DECOMISSIONED												
Piezometer8_16 Dec 15	Piezometer8	16/12/2015 12:35	Piezometer8	water	Submersible Pump	0.51	22.9	6.95	18.3	-57	20500	500	4	5.3	<0.001	890	11
Piezometer9A_16 Dec 15	Piezometer9A	16/12/2015 12:15	Piezometer9A	water	Submersible Pump	0.74	2.45	7.24	19.9	-81	1450	130	5	0.43	<0.001	640	13
Piezometer9B_16 Dec 15	Piezometer9B	16/12/2015 12:10	Piezometer9B	water	Submersible Pump	0.53	30.3	6.89	19.1	-43	32600	160	5	5.0	<0.001	1030	8
PP21_24 Jun 16	PP21	24/06/2016 13:30	PP21	water	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT						34800	60	53	1.2	<0.001	1160	3
PP22_24 Jun 16	PP22	24/06/2016 14:50	PP22	water	Bailer	7.82	2.78	7.7	15.9	-7	1930	32	2	<0.01	0.006	445	<1
PP23_24 Jun 16	PP23	24/06/2016 14:30	PP23	water	Bailer	6.19	8.55	7.26	17.7	-73	4870	<2	2	0.12	0.006	675	3
PP24_NO SAMPLE	PP24	NO SAMPLE	PP24	water	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO EQUIPMENT						2180	2	2	0.22	0.001	540	2
Piezometer1_24 Jun 16	Piezometer1	24/06/2016 15:00	Piezometer1	water	Waterra	1.06	18.5	6	18.5	33	18400	1870	4	7.3	0.008	380	15
Piezometer2_NO SAMPLE	Piezometer2	NO SAMPLE	Piezometer2	water	NO PVC, CASING APPEARS TO HAVE BEEN REMOVED												
Piezometer3_24 Jun 16	Piezometer3	24/06/2016 8:20	Piezometer3	water	Submersible Pump	2.7	48.4	5.65	19.6	128	49500	29	<2	0.59	<0.001	265	1
Piezometer4_24 Jun 16	Piezometer4	24/06/2016 13:18	Piezometer4	water	Submersible Pump	4.37	29.9	6.01	20.6	30	28600	2390	4	0.22	<0.001	235	3
Piezometer5_24 Jun 16	Piezometer5	24/06/2016 13:29	Piezometer5	water	Submersible Pump	0.8	41.2	5.85	18.7	48	37400	43	2	1.6	<0.001	425	4
Piezometer6A_24 Jun 16	Piezometer6A	24/06/2016 9:53	Piezometer6A	water	Bailer	1.1	27.28	7.86	19	-115	24800	11	<2	0.13	0.001	1520	15
Piezometer6B_24 Jun 16	Piezometer6B	24/06/2016 9:42	Piezometer6B	water	Bailer	1.44	12.52	7.55	18.1	-68	12100	14	<2	3.2	0.031	2080	6
Piezometer7A_24 Jun 16	Piezometer7A	24/06/2016 13:50	Piezometer7A	water	Submersible Pump	2.69	57.6	6.23	18.2	13	61600	1270	12	4.6	<0.001	430	13
Piezometer7B_NO SAMPLE	Piezometer7B	NO SAMPLE	Piezometer7B		UNABLE TO SAMPLE_ TAR IMPACTED WELL TO BE DECOMISSIONED												
Piezometer8_24 Jun 16	Piezometer8	24/06/2016 10:45	Piezometer8	water	Submersible Pump	0.09	22.1	6.91	18.1	-97	22700	300	<2	3.8	<0.001	990	8
Piezometer9A_24 Jun 16	Piezometer9A	24/06/2016 10:30	Piezometer9A	water	Submersible Pump	2.87	1.998	6.95	18.1	-55	1920	86	<2	0.49	<0.001	525	6
Piezometer9B_24 Jun 16	Piezometer9B	24/06/2016 10:37	Piezometer9B	water	Submersible Pump	0.12	25.9	6.86	18.9	-74	32400	76	2	3.4	<0.001	1190	4
PP24_16/09/2016 14:30:00	PP24	16/09/2016 14:30:00 PM	PP24	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					5700	46	<5	4.97*	0.022	890	31
PP21_30 Nov 16	PP21	30/11/2016 13:20	PP21	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					43800	94	30	2.5	<0.001	395	24
PP22_01 Dec 16	PP22	1/12/2016 10:30	PP22	water	Bailer	5.9	2.573	6.93	20.4	132.9	1650	270	<2	<0.01	0.002	340	<1
PP23_30 Nov 16	PP23	30/11/2016 10:00	PP23	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					9140	16	3	2.3	0.028	1110	<1
PP24_30 Nov 16	PP24	30/11/2016 11:15	PP24	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					11000	10	<2	3.2	<0.001	890	81
Piezometer1_30 Nov 16	Piezometer1	30/11/2016 9:00	Piezometer1	water	Watera	6.9	18.635	5.9	20.1	81	14100	490	<2	8.1	0.021	290	8
Piezometer2_00 Jan 00	Piezometer2		Piezometer2	water	NO PVC, CASING APPEARS TO HAVE BEEN REMOVED												
Piezometer3_01 Dec 16	Piezometer3	1/12/2016 9:15	Piezometer3	water	Bailer	6.24	37.49	5.79	20.3	180.9	48600	120	<2	0.64	<0.001	40	<1
Piezometer4_01 Dec 16	Piezometer4	1/12/2016 12:50	Piezometer4	water	Submersible Pump	0.17	35.134	5.93	20.7	113.5	27400	330	<2	0.31	0.003	160	8
Piezometer5_30 Nov 16	Piezometer5	30/11/2016 12:15	Piezometer5	water	Submersible Pump	0.12	46.537	5.73	22	126.2	35100	190	<2	1.8	<0.001	235	8
Piezometer6A_30 Nov 16	Piezometer6A	30/11/2016 10:45	Piezometer6A	water	Bailer	-	21.845	7.8	18.9	-13.3	19800	11	<2	0.69	0.002	1190	10
Piezometer6B_30 Nov 16	Piezometer6B	30/11/2016 10:50	Piezometer6B	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					11400	180	10	2.8	0.020	1860	57
Piezometer7A_30 Nov 16	Piezometer7A	30/11/2016 10:40	Piezometer7A	water	Watera	4.5	64.885	5.67	21	95.3	61200	94200	12	5.5	<0.001	355	22
Piezometer7B_00 Jan 00	Piezometer7B		Piezometer7B		UNABLE TO SAMPLE_ TAR IMPACTED WELL TO BE DECOMISSIONED												
Piezometer8_30 Nov 16	Piezometer8	30/11/2016 9:59	Piezometer8	water	Submersible Pump	5.1	23.916	6.96	18.9	-3.2	20400	100	<2	3.8	<0.001	865	12
Piezometer9A_30 Nov 16	Piezometer9A	30/11/2016 10:00	Piezometer9A	water	Bailer	6.88	1.913	7.51	20.3	67.4	1200	17	6	1.9	0.005	560	17
Piezometer9B_30 Nov 16	Piezometer9B	30/11/2016 9:45	Piezometer9B	water	Bailer	4.95	29.87	6.68	19.8	11.9	27100	42	<2	3.8	0.009	990	2
PP24_2/03/2017 14:20:00	PP24	2/03/2017 14:20:00 PM	PP24	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					1320	<2	16	0.09	<0.001	305	<1
PP21_02 Jun 17	PP21	2/06/2017 15:04	PP21	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					44900	90	8	1.9	<0.001	430	5
PP22_02 Jun 17	PP22	2/06/2017 15:10	PP22	water	Bailer	7.31	2.91	7.47	14.7	79	1720	6	5	<0.01	<0.001	400	<1
PP23_02 Jun 17	PP23	2/06/2017 15:30	PP23	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					8630	7	3	2.5	0.020	1090	5
PP24_05 Jun 17	PP24	5/06/2017 10:00	PP24	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					2650	7	<2	0.34	<0.001	550	7
Piezometer1_02 Jun 17	Piezometer1	2/06/2017 12:05	Piezometer1	water	Watera	0.84	17.03	6.06	19.6	-7	15800	31	<2	10	0.015	210	10
Piezometer2	Piezometer2		Piezometer2	water	NO PVC, CASING APPEARS TO HAVE BEEN REMOVED												
Piezometer3_02 Jun 17	Piezometer3	2/06/2017 14:15	Piezometer3	water	Bailer	3.71	38.8	5.55	19.6	114	47500	70	<2	0.63	<0.001	150	<1
Piezometer4_31 May 17	Piezometer4	31/05/2017 14:50	Piezometer4	water	Submersible Pump	0.39	29.7	5.72	20.2	43	26400	920	<2	0.28	<0.001	175	6
Piezometer5_02 Jun 17	Piezometer5	2/06/2017 14:54	Piezometer5	water	Submersible Pump	1.91	38	5.97	19.3	41	35200	36	7	1.7	<0.001	275	<1
Piezometer6A_02 Jun 17	Piezometer6A	2/06/2017 12:30	Piezometer6A	water	Bailer	0.54	24.6	8.09	19.6	-42	19100	7	3	0.56	0.001	1270	4
Piezometer6B_02 Jun 17	Piezometer6B	2/06/2017 12:50	Piezometer6B	water	Bailer	0.56	13.46	7.73	20.7	-155	10800	20	<2	3.0	0.034	1930	22
Piezometer7A_05 Jun 17	Piezometer7A	5/06/2017 11:00	Piezometer7A	water	Watera	0.29	43.5	6.22	19.8	68	60600	8400	24	5.8	<0.001	430	18
Piezometer7B	Piezometer7B		Piezometer7B		UNABLE TO SAMPLE_ TAR IMPACTED WELL TO BE DECOMISSIONED												
Piezometer8_05 Jun 17	Piezometer8	5/06/2017 10:30	Piezometer8	water	Submersible Pump	0.15	20.8	7.31	18.6	-92	19500	88	<2	3.6	<0.001	890	<1
Piezometer9A_02 Jun 17	Piezometer9A	2/06/2017 13:15	Piezometer9A	water	Submersible Pump	5.33	2.18	6.9	20.1	-40	1540	38	<2	<0.01	<0.001	560	5
Piezometer9B_02 Jun 17	Piezometer9B	2/06/2017 13:55	Piezometer9B	water	Submersible Pump	0.1	30.4	6.84	19.1	-85	28100	70	<2	3.7	<0.001	1040	<1
_00 Jan 00																	
PP24_5/10/2017 14:40:00	PP24	5/10/2017 14:40:00 PM	PP24	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					2660	<2	8	0.35	<0.001	480	3
_00 Jan 00																	
PP21_07 Dec 17	PP21	7/12/2017 13:15	PP21	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					45200	120	11	2.3	<0.001	410	5
PP22_07 Dec 17	PP22	7/12/2017 12:00	PP22	water	Bailer	8.42	3.16	7.57	23.6	86	1860	8	6	0.03	<0.001	300	<1
PP23_07 Dec 17	PP23	7/12/2017 12:15	PP23	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					8970	11	3	2.4	0.076	1130	4
PP24_07 Dec 17	PP24	7/12/2017 10:00	PP24	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					5960	26	5	6.1	<0.001	870	36
Piezometer1_08 Dec 17	Piezometer1	8/12/2017 10:40	Piezometer1	water	Watera	1.23	30.3	5.71	21.2	115	19700	660	1	4.1	0.006	34	6
Piezometer2_12 Dec 17	Piezometer2	12/12/2017 14:40	Piezometer2	water	Watera	2.05	27.8	5.68	16.2	99	15500	1830	4	1.4	<0.001	<1	6
Piezometer3_12 Dec 17	Piezometer3	12/12/2017 8:00	Piezometer3	water	Bailer	1.56	69.7	5.42	20.4	125	46300	490	2	0.60	<0.001	32	1
Piezometer4_08 Dec 17	Piezometer4	8/12/2017 13:00	Piezometer4	water	Submersible Pump	1.26	36.4	6.26	23.2	150	27200	610	<1	0.32	<0.001	170	1
Piezometer5_08 Dec 17	Piezometer5	8/12/2017 13:15	Piezometer5	water	Submersible Pump	1.63	49.2	6.04	21.7	91	36100	730	5	1.8	<0.001	225	2
Piezometer6A_07 Dec 17	Piezometer6A	7/12/2017 22:30	Piezometer6A	water	Bailer	0.7	27.9	7.91	19.3	11	18700	4	2	0.57	<0.001	1140	4

Piezometer6B_07 Dec 17	Piezometer6B	7/12/2017 10:45	Piezometer6B	water	Bailer	0.64	18.5	7.24	20.1	-137	11700	490	24	2.7	0.006	1870	27
Piezometer7A_08 Dec 17	Piezometer7A	8/12/2017 13:30	Piezometer7A	water	Watera	0.85	81.2	6.09	21.5	209	58600	10900	31	7.0	<0.001	230	9
Piezometer7B_00 Jan 00	Piezometer7B		Piezometer7B		UNABLE TO SAMPLE_ TAR IMPACTED WELL TO BE DECOMISSIONED												
Piezometer8_08 Dec 17	Piezometer8	8/12/2017 12:20	Piezometer8	water	Submersible Pump	0	31.4	7.09	18.9	88	20400	110	4	3.6	<0.001	840	<1
Piezometer9A_08 Dec 17	Piezometer9A	8/12/2017 11:15	Piezometer9A	water	Submersible Pump	4.53	2.79	7.13	23.1	-51	1920	66	3	1.7	<0.001	815	6
Piezometer9B_08 Dec 17	Piezometer9B	8/12/2017 11:30	Piezometer9B	water	Submersible Pump	0.01	44.4	7.01	19.8	69	30100	44	<1	3.9	<0.001	990	<1
PP24_06 Mar 18	PP24	6/03/2018 16:07	PP24	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					9740	30	12	11	0.003	1170	94
PP21_12 Jun 18	PP21	12/06/2018 12:15	PP21	water	Bailer	0.71	23.66	6.24	18.1	-27	47200	140	7	2.5	<0.001	350	16
PP22_13 Jun 18	PP22	13/06/2018 16:15	PP22	water	Bailer	6.30	4.88	7.10	15.9	63	4050	15	4	0.13	0.005	160	<1
PP23_13 Jun 18	PP23	13/06/2018 13:32	PP23	water	Bailer	1.68	11.1	6.99	19.2	-202	12400	63	7	1.8	0.067	1040	34
PP24_12 Jun 18	PP24	12/06/2018 10:10	PP24	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					11800	33	3	13	0.007	1120	77
Piezometer1_13 Jun 18	Piezometer1	13/06/2018 8:20	MP1	water	Watera	0.99	17.61	5.15	18.7	172	22100	1060	3	3.2	0.003	<1	8
Piezometer2_13 Jun 18	Piezometer2	13/06/2018 8:45	MP2	water	Watera	3.82	11.5	4.73	19.6	166	11700	1680	9	1.9	<0.001	<1	5
Piezometer3_13 Jun 18	Piezometer3	13/06/2018 13:00	MP3	water	Bailer	3.51	24.7	5.89	20.4	15	48500	44	<1	0.66	<0.001	71	1
Piezometer4_13 Jun 18	Piezometer4	13/06/2018 13:45	MP4	water	Submersible Pump	0.33	18.52	5.86	21.4	-25	27900	390	4	0.33	0.002	165	6
Piezometer5_13 Jun 18	Piezometer5	13/06/2018 14:10	MP5	water	Submersible Pump	0.28	23.4	5.67	19.5	37	36800	790	8	1.5	<0.001	230	8
Piezometer6A_13 Jun 18	Piezometer6A	13/06/2018 12:05	MP6A	water	Bailer	0.23	23.76	7.73	19.3	-298	23500	11	4	0.70	<0.001	1430	57
Piezometer6B_13 Jun 18	Piezometer6B	13/06/2018 11:45	MP6B	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					12600	27	23	3.7	0.018	1770	55
Piezometer7A_13 Jun 18	Piezometer7A	13/06/2018 14:25	MP7A	water	Watera	2.08	40.7	5.76	19.7	14	61200	3240	14	5.4	<0.001	380	16
Piezometer7B_13 Jun 18	Piezometer7B	13/06/2018 15:00	MP7B	water	Watera	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					27900	630	260	0.92	0.004	1510	110
Piezometer8_13 Jun 18	Piezometer8	13/06/2018 9:35	MP8	water	Submersible Pump	0.02	16.31	6.95	18.5	-96	18100	150	4	3.5	<0.001	835	5
Piezometer9A_13 Jun 18	Piezometer9A	13/06/2018 11:15	MP9A	water	Submersible Pump	0.52	6.48	6.68	19.2	9	7150	72	1	2.6	0.001	400	4
Piezometer9B_13 Jun 18	Piezometer9B	13/06/2018 11:25	MP9B	water	Submersible Pump	0.04	23.26	6.76	19.5	-82	29200	42	5	3.4	0.002	990	5
PP24_04 Sep 18	PP24	4/09/2018 14:40	PP24	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					10100	28	12	13	<0.001	1160	95
PP21_05 Dec 18	PP21	5/12/2018 12:15	PP21	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					38200	110	13	1.6	<0.001	450	7
PP22_06 Dec 18	PP22	6/12/2018 10:20	PP22	water	Bailer	5.78	3.946	6.69	20.3	75	2780	29	1	<0.01	<0.001	235	<1
PP23_05 Dec 18	PP23	5/12/2018 14:10	PP23	water	Bailer	0.72	22.131	6.97	20.5	-210.8	13400	<2	<1	1.4	0.09	1170	<1
PP24_05 Dec 18	PP24	5/12/2018 10:50	PP24	water	Bailer	2.3	5.603	7.47	19.8	-98.4	8180	28	4	5.5	<0.001	835	33
Piezometer1_06 Dec 18	Piezometer1	6/12/2018 9:20	Piezometer1	water	Watera	0.52	29.874	5.55	19.4	21.9	20100	1730	5	4.1	0.015	120	8
Piezometer2_06 Dec 18	Piezometer2	6/12/2018 9:30	Piezometer2	water	Watera	1.31	20.715	4.87	19.4	127.5	12300	1370	4	1.7	0.002	6	2
Piezometer3_06 Dec 18	Piezometer3	6/12/2018 13:10	Piezometer3	water	Watera	1.36	71.043	5.86	22	61	49000	900	4	0.57	<0.001	24	1
Piezometer4_06 Dec 18	Piezometer4	6/12/2018 11:30	Piezometer4	water	Submersible Pump	0.3	20.378	6.13	20.5	63.9	15400	450	4	0.09	0.003	155	<1
Piezometer5_06 Dec 18	Piezometer5	6/12/2018 11:45	Piezometer5	water	Submersible Pump	0.21	53.429	5.84	20.3	56.4	37600	360	13	1.7	<0.001	230	3
Piezometer6A_07 Dec 18	Piezometer6A	7/12/2018 13:30	Piezometer6A	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					31500	20	6	0.68	<0.001	2160	81
Piezometer6B_06 Dec 18	Piezometer6B	6/12/2018 11:40	Piezometer6B	water	Bailer	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					12900	20	9	3.3	0.020	1830	32
Piezometer7A_06 Dec 18	Piezometer7A	6/12/2018 13:40	Piezometer7A	water	Watera	0.45	88.381	5.85	21.5	18.5	62800	7360	24	4.3	<0.001	225	7
Piezometer7B_06 Dec 18	Piezometer7B	6/12/2018 13:55	Piezometer7B	water	Watera	TAR PRESENT IN SAMPLE-FIELD PARAMETERS NOT TAKEN DUE TO LIKELY DAMAGE TO					25300	25	5	2.5	0.002	1330	9
Piezometer8_06 Dec 18	Piezometer8	6/12/2018 11:25	Piezometer8	water	Submersible Pump	0	30.658	6.85	19	-95.6	21100	72	13	3.4	0.002	860	<1
Piezometer9A_06 Dec 18	Piezometer9A	6/12/2018 10:45	Piezometer9A	water	Submersible Pump	0.11	6.647	6.63	19.8	-69.5	4770	180	3	1.7	0.001	520	<1
Piezometer9B_06 Dec 18	Piezometer9B	6/12/2018 10:55	Piezometer9B	water	Submersible Pump	0	43.812	6.69	19.8	-86.8	30700	42	3	3.7	<0.001	1030	<1
PP24_11 Mar 19	PP24	11/03/2019 14:28	PP24	water	Bailer	2.1	16.8	6.83	22.1	-212.4	11300	13	<1	6.5	0.003	1100	52
PP21_03 Jun 19	PP21	3/06/2019 13:15	PP21	water	Bailer	0.99	33.852	6	20.1	-28	44700	81	8	2.1	<0.001	410	6
PP22_03 Jun 19	PP22	3/06/2019 10:55	PP22	water	Bailer	3.3	2.071	7.52	18.2	-0.5	2670	<2	7	<0.01	0.013	270	2
PP23_03 Jun 19	PP23	3/06/2019 13:45	PP23	water	Bailer	1.85	11.742	6.67	19.8	-143	13300	4	3	1.1	0.070	1220	2
PP24_03 Jun 19	PP24	3/06/2019 10:30	PP24	water	Bailer	1.66	19.357	7.46	20.2	-75.6	13100	18	1	5.1	0.008	1300	55
Piezometer1_03 Jun 19	Piezometer1	3/06/2019 8:15	Piezometer1	water	Watera	0.7	17.745	5.68	20.1	19.4	22900	6080	9	1.3	0.003	6	5
Piezometer2_03 Jun 19	Piezometer2	3/06/2019 8:30	Piezometer2	water	Watera	2.48	11.483	5.26	20.6	98.1	12600	610	2	1.2	<0.001	<1	2
Piezometer3_03 Jun 19	Piezometer3	3/06/2019 11:20	Piezometer3	water	Watera	1.23	37.504	5.57	21.7	96.3	47700	840	<1	0.53	<0.001	<1	3
Piezometer4_03 Jun 19	Piezometer4	3/06/2019 11:30	Piezometer4	water	Submersible pump	1.4	46.448	5.98	21.9	34	23700	1190	<1	0.21	<0.001	140	<1
Piezometer5_03 Jun 19	Piezometer5	3/06/2019 12:00	Piezometer5	water	Submersible pump	0.24	51.097	5.78	20.1	57.2	36500	830	<1	1.5	<0.001	200	2
Piezometer6A_03 Jun 19	Piezometer6A	3/06/2019 10:20	Piezometer6A	water	Bailer	7.3	22.526	6.77	20.1	-183.4	29400	3	3	0.69	<0.001	2230	59
Piezometer6B_03 Jun 19	Piezometer6B	3/06/2019 10:10	Piezometer6B	water	Bailer	0.9	9.593	6.98	21.1	-30	12500	13	5	2.8	0.021	1830	32
Piezometer7A_03 Jun 19	Piezometer7A	3/06/2019 12:40	Piezometer7A	water	Watera	0.41	84.128	5.83	20.5	2.3	60700	4160	23	5.6	<0.001	160	11
Piezometer7BR_03 Jun 19	Piezometer7BR	3/06/2019 12:45	Piezometer7BR	water	Bailer	SAMPLE HEAVILY IMPACTED WITH FREE PRODUCT (LNAPL and DNAPL) NO FIELD READI					17900	1020	230	3.4	0.005	805	98
Piezometer8_03 Jun 19	Piezometer8	3/06/2019 9:45	Piezometer8	water	Submersible pump	0	30.828	6.41	19	-78.7	20400	110	7	3.0	<0.001	845	<1
Piezometer9A_03 Jun 19	Piezometer9A	3/06/2019 9:00	Piezometer9A	water	Watera	2.53	3.346	6.3	20	-4.8	3820	250	3	1.9	<0.001	585	2
Piezometer9B_03 Jun 19	Piezometer9B	3/06/2019 9:30	Piezometer9B	water	Submersible pump	0.2	43.898	6.04	19.7	-75	29900	41	3	3.3	<0.001	1040	<1

*LOR used for non-detect values

Copper mg/L	Lead mg/L	Zinc mg/L	Cesium mg/L	PAHs (Sum of total) ug/L	Benzene ug/L	Ethyl-benzene ug/L	Toluene ug/L	Xylene ug/L	Napthalene ug/L	Sodium mg/L	Potassium mg/L	Calcium mg/L	Magnesiur mg/L	Fluoride mg/L	Chloride mg/L	Bicarbonate mg/L	Carbonate mg/L	Nitrate (as mg/L	Nitrite (as mg/L	Sulphate mg/L	Nitrogen (Total) mg/L	Phosphorus mg/L
0.008	<0.001	0.055		19.1	479	47	60	64														<0.01
0.01	<0.001	0.053		<0.5	<1	<2	<2	<2														0.22
0.004	<0.001	0.032		<0.5	<1	<2	<2	<2														<0.01
0.004	<0.001	0.027		<0.5	346	30	6	13														<0.01
0.065	0.059	0.154		33.2	<1	<2	<2	<2														
0.025	0.013	0.116		6.7	<1	<2	<2	<2														
0.053	0.016	0.188		2.2	<1	<2	<2	<2														
0.105	0.039	0.609		<0.5	16	3	6	<2														
0.018	<0.010	0.165		24.2	141	13	15	12														
<0.010	<0.010	<0.050		76.7	627	17	5	35														
0.047	0.056	0.118		17500	16100	3910	7100	2060														
0.023	<0.010	0.116		196	2880	38	22	48														
<0.010	<0.010	<0.050		4000	15900	1370	719	1530														
<0.010	<0.010	<0.050		1.9	<1	<2	<2	<2														
0.003	0.002	0.19		<0.5	<1	<2	<2	<2														
0.012	<0.010	<0.050		1.4	<1	<2	<2	<2														
<0.001	<0.001	0.008		555.27	<1	<2	<2	<2														
0.012	0.014	0.562		2910	7060	509	292	584														<0.1
0.009	<0.001	0.169		<0.5	<1	<2	<2	<2														0.15
0.004	0.001	0.013		29	230	140	<2	12														<0.01
<0.001	<0.001	0.072		1300	13200	696	65	240														0.45
0.023	0.028	0.169		31.6	<1	<2	<2	<2														
0.207	0.213	0.208		<0.5	<1	<2	<2	<2														
0.039	0.014	0.087		<0.5	<1	<2	<2	<2														
0.09	<0.010	0.595		<0.5	<1	<2	<2	<2														
0.014	0.01	0.15		1.3	<1	<2	<2	<2														
<0.001	<0.001	<0.005		16.4	274	18	3	31														
0.001	0.003	0.061		8290	9430	3080	5180	1580														
0.03	0.012	0.288		21.2	353	11	5	10														
0.039	0.019	0.34		10800	10900	944	316	685														
<0.010	<0.010	<0.050		1.7	<1	<2	<2	<2														
0.003	0.003	0.304		1.6	2	<2	<2	<2														
0.014	<0.010	<0.050		1	<1	<2	<2	<2														
0.01	<0.001	0.142		<0.5	19	7	<5	<5														
<0.010	<0.010	<0.050		1280	4820	311	147	318														
0.008	<0.001	0.072		<0.5	<1	<2	<2	<2														
<0.001	<0.001	<0.005		52.1	357	231	9	51														
0.002	<0.001	0.06		<0.5	13	6	<2	15														
<0.010	<0.010	0.32		8.2	<1	<2	<2	<2														
<0.010	<0.010	<0.050		<0.5	<1	<2	<2	<2														
0.016	<0.010	<0.050		<0.5	<1	<2	<2	<2														
0.014	<0.010	0.387		1.2	<1	<2	<2	<2														
<0.010	<0.010	<0.050		<0.5	<1	<2	<2	<2														
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<0.001	<0.001	<0.005		10700	8660	2470	4290	1450														
<0.010	<0.010	<0.050		185	2100	29	13	34														
<0.010	<0.010	<0.050		86600	15500	1320	661	1640														
<0.010	<0.010	<0.050		<0.5	<1	<2	<2	<2														
<0.001	<0.001	0.04		<0.5	<1	<2	<2	<2														
<0.010	<0.010	<0.050		<0.5	<1	<2	<2	<2														
0.002	0.002	0.025		2930	18800	777	163	419														

0.024	<0.004	<0.004	728	4820	542	249	482	<0.004	<0.004	<0.004	425	<1	
0.008	<0.001	0.012	3.7	<1	<2	<2	<2				315	<1	
0.001	<0.001	0.064	8.2	3	78	<2	13				714	<1	
<0.010	<0.010	<0.050	6070	94400	3860	531	1540				1620	<1	
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<0.010	<0.010	0.083	1.2	<1	<2	<2	<2				38	<1	
0.018	<0.001	0.605	2.1	<1	<2	<2	<2				212	<1	
<0.010	<0.010	<0.050	<0.5	<1	<2	<2	<2				272	<1	
<0.010	<0.010	<0.050	1610	13500	964	88	712				1480	<1	
<0.001	<0.001	<0.005	20700	13900	2940	5330	1620				1780	<1	
<0.010	<0.010	<0.050	3440	866	38	69	33				387	<1	
<0.010	<0.010	<0.050	94100	10800	1660	447	1220				1230	<1	
<0.001	<0.001	0.032	2.5	<1	<2	<2	<2				814	<1	
0.001	<0.001	0.043	2.7	14	17	2	6				527	<1	
<0.010	<0.010	<0.050	1.8	<1	<2						905	<1	
<0.001	<0.001	<0.001	16412	110000	4200	570	1890						
<0.010	<0.010	<0.050	849	3570	263	96	257				530	<1	<0.01
0.005	<0.001	0.055	<0.5	<1	<2	<2	<2				428	<1	0.1
0.002	<0.001	0.073	14.8	<1	48	<2	4				1050	<1	<0.01
<0.001	<0.001	0.006	2720	32000	1350	166	506				1430	<1	<0.01
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0.061	<0.010	0.092	5.2	1	3	<2	<2				30	<1	
0.01	<0.001	0.293	3.2	<1	<2	<2	<2				255	<1	
<0.010	<0.010	0.098	3.8	<1	<2	<2	<2				290	<1	
<0.010	<0.010	<0.050	2160	19400	1190	487	1020				2240	<1	
<0.001	<0.001	0.014	4670	2040	1760	2020	1000				1850	<1	
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0.007	<0.001	0.033	<0.5	<1	<2	<2	<2				46	<1	
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0.003	<0.001	<0.005	3070	28000	1520	326	1350				1570	<1	
0.003	<0.001	<0.005	11400	13600	3350	5780	1820				1910	<1	
0.003	<0.001	0.014	245	2890	31	<10	29				301	<1	
0.002	<0.001	<0.005	10800	17600	1440	632	1510				1710	<1	
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0.002	<0.001	<0.005	2.7	<1	<2	<2	<2				1040	<1	
<0.001	<0.001	0.026	8447.9*	11000	730	170	248						
<0.001	<0.001	0.013	3399	9200	1200	1400	1730						
0.001	<0.001	0.019	0.3	<1	<1	<1	<2						
0.001	<0.001	0.009	87.03	750	25	490	140						
0.002	<0.001	0.013	182.4	120000	360	3400	1780						
<0.001	<0.001	0.011	2.55	<1	<1	<1	<2						
0.004	0.002	0.42	<0.1	<1	<1	<1	<2						
0.002	<0.001	0.036	0.82	<1	<1	<1	<2						
0.006	0.002	0.23	<0.1	<1	<1	<1	<2						
0.002	<0.001	0.091	0.17	<2	<2	3.6	<2						
<0.001	<0.001	0.004	23.48	11000	19	83	195						
<0.001	<0.001	0.005	239.32	16000	5200	4300	2050						
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<0.001	<0.001	0.008	<0.1	<1	<1	<1	<2						
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<0.001	<0.001	0.015	55000	5980	498	369	630						0.02
0.003	0.002	0.036	1.4	<1	<2	<2	<2						0.69
0.001	<0.001	0.037	3500	1170	1150	64	385						<0.01
<0.001	<0.001	0.072	<0.5	<1	<2	<2	<2						

0.002	0.001	0.10	<0.5	<1	<2	<2	<2			
0.004	0.002	0.52	<0.5	<1	<2	<2	<2			
0.005	0.003	0.045	<0.5	<1	<2	<2	<2			
0.001	<0.001	0.052	27.9	<1	109	<2	6			
<0.001	<0.001	0.007	169	915	74	18	94			
<0.001	<0.001	0.005	7580	12600	3310	6140	1670			
0.001	<0.001	0.025	4.4	417	6	<2	5			
<0.001	<0.001	0.032	<0.5	<1	<2	<2	<2			
<0.001	<0.001	0.014	<0.5	<1	<2	<2	<2			
<0.001	<0.001	0.007	<0.5	<1	<2	<2	<2			
<0.001	<0.001	0.044	340	3230	115	91	108	281		0.05
0.001	<0.001	0.013	1060	<1	<2	<2	<2	<5		0.26
<0.001	<0.001	0.021	5.3	195	155	6	52	288		0.03
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0.003	0.002	0.35		5	6	<2	<2	<5		
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<0.001	<0.001	0.009	475	3510	200	49	135			
<0.001	<0.001	0.005	6440	7920	2330	3660	1180			
0.003	<0.001	0.030	125	836	14	<5	11	125		
<0.001	<0.001	0.009	<0.5	<1	<2	<2	<2			
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<0.001	<0.001	0.008	2.4	<1	<2	<2	<2			
0.001	<0.001	0.006	2180	48100	2310	218	1240	7940		
<0.001	<0.001	0.026	218	5730	425	246	404	1010		
0.002	<0.001	0.032	<0.5	<1	<2	<2	<2	<5		
0.004	<0.001	0.22	14.4	66	161	<5	38	186		
<0.001	<0.001	0.051	7430	35400	1430	375	558	2880		
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<0.001	<0.001	0.010	11	1360	34	15	106	367		
<0.001	<0.001	0.004	10900	14600	3790	6460	1820	15200		
0.001	<0.001	0.023	1310	2640	20	6	24	451		
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<0.001	<0.001	0.016	<0.5	<1	<2	<2	<2	<5		
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0.003	<0.001	0.046	<0.5	125	4	3	<2	<5		
<0.001	<0.001	0.013		3810	3230	298	164	361	2170	
0.001	<0.001	0.011	<0.5	<1	<2	<2	<2	<5		
0.001	<0.001	0.028		310	378	287	10	73	266	
0.003	<0.001	0.025	<0.5		156	8	<2	2	31	
0.002	<0.001	0.079	<0.5	<1	<2	<2	<2	<5		
0.002	0.002	0.045		1.6	<1	<2	<2	<2	<5	
0.003	0.001	0.31	<0.5	<1	<2	<2	<2	<2	<5	
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0.001	<0.001	0.018		5780	11600	2970	4880	1660	11700	
0.001	<0.001	0.027		610	2610	20	8	21	210	
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0.004	<0.001	0.02		120	31	2	<1	<2	17	
<0.001	<0.001	0.012		136	3420	170	110	153	330	<0.01
0.001	<0.001	0.015	<0.09	<1	<2	<2	<2	<5		0.14
<0.001	<0.001	0.030		55	542	472	8	84	185	0.01
0.002	<0.001	0.021		730	110000	2550	1140	1320	6230	0.01
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<0.001	<0.001	0.017		16.2	240	23	4	52	93	

<0.001	<0.001	0.022	12800	13100	3520	6240	1780	11300	
0.001	<0.001	0.029	606	3770	24	<10	11	93	
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<0.001	<0.001	0.016	<0.05	38	101	4	16	62	
<0.001	<0.001	0.011	0.2	<1	<2	<2	<2	<5	
0.002	<0.001	0.018	4680	87500	5280	1390	2170	4430	
<0.001	<0.001	0.019	112	3450	239	220	256	860	<0.01
<0.001	<0.001	0.066	<0.05	<1	<2	<2	<2	<5	0.41
<0.001	<0.001	0.037	55.8	68	285	4	48	87	0.15
<0.001	<0.001	0.028	2960	25200	2380	279	809	5400	0.26
0.009	0.002	0.550	3.8	<1	<2	<2	<2	<5	
0.008	0.002	0.47	<0.05	<1	<2	<2	<2	<5	
0.003	0.001	0.18	<0.05	<1	<2	<2	<2	<5	
0.004	0.001	0.47	<0.05	<1	<2	<2	<2	<5	
0.001	<0.001	0.092	0.2	<1	<2	<2	<2	<5	
<0.001	<0.001	0.026	889	13800	848	362	1050	4170	
<0.001	<0.001	0.017	10200	14000	3300	5600	1790	16800	
0.001	<0.001	0.051	59.8	2880	14	3	11	64	
0.002	<0.001	0.027	67300	18900	1450	2270	2630	31500	
<0.001	<0.001	0.019	<0.05	<1	<2	<2	<2	<5	
<0.001	<0.001	0.018	1.3	2	<2	<2	<2	<5	
<0.001	<0.001	0.022	<0.05	<1	<2	<2	<2	<5	
0.001	<0.001	0.03	1150	55500	2320	242	1146	1000	
<0.001	<0.001	0.025	276	2150	52	83	139	298	0.09
<0.001	<0.001	0.037	<0.05	<1	<2	<2	<2	<5	0.29
0.001	<0.001	0.03	82.6	28	3	259	46	72	0.16
0.001	<0.001	0.026	739	3940	21	232	88	587	0.24
0.007	0.003	0.28	6.1	<1	<2	<2	<2	<5	
0.003	0.002	0.15	<0.05	<1	<2	<2	<2	<5	
0.002	0.002	0.14	<0.05	<1	<2	<2	<2	<5	
0.007	0.006	0.64	<0.05	<1	<2	<2	<2	<5	
<0.001	<0.001	0.11	<0.05	<1	<2	<2	<2	<5	
0.002	<0.001	0.034	2850	29300	973	1050	1470	5760	
<0.001	<0.001	0.019	8410	15200	6230	3760	2100	14300	
0.001	<0.001	0.055	54.1	1580	5	13	12	73	
0.001	<0.001	0.030	4640	14600	1110	739	1360	8650	
<0.001	<0.001	0.032	<0.05	<1	<2	<2	<2	<5	
<0.001	<0.001	0.026	1.3	<1	<2	<2	<2	<5	
<0.001	<0.001	0.030	<0.05	<1	<2	<2	<2	<5	
0.001	<0.001	0.011	3670	56600	4080	225	1247	3490	
0.006	0.001	0.18	115	1850	48	39	99	268	0.06
<0.001	<0.001	0.052	0.7	<1	<2	<2	<2	<5	0.25
<0.001	<0.001	0.031	45.1	4	<2	130	17	30	0.05
<0.001	<0.001	0.030	4930	56800	274	4710	1480	13200	0.40
0.004	0.002	0.23	1.1	<1	<2	<2	<2	<5	
0.004	0.002	0.16	0.1	<1	<2	<2	<2	<5	
0.003	0.002	0.12	0.1	<1	<2	<2	<2	<5	
0.005	0.003	0.39	2.1	8	<2	5	2	<5	
0.002	0.001	0.13	3.5	5	<2	4	<2	<5	
<0.001	<0.001	0.022	1610	20500	139	670	700	2990	
<0.001	<0.001	0.019	5470	11300	3770	1940	1080	12400	
<0.001	<0.001	0.055	67.4	1840	<5	11	<5	59	
<0.001	<0.001	0.024	17900	5630	700	728	1240	15100	
<0.001	<0.001	0.036	0.9	4	<2	2	<2	<5	
<0.001	<0.001	0.021	0.5	<1	<2	<2	<2	<5	
<0.001	<0.001	0.019	1.3	8	<2	5	2	<5	

Phenolics mg/L	Cadmium mg/L	Chromium mg/L	Iron mg/L	Manganes mg/L	Aluminium mg/L	Barium mg/L	Boron mg/L	Arsenic mg/L	Mercury mg/L	Hydroxide mg/L	Acidity mg/L

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ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

21 June 2019

Sydney Olympic Park Authority
Level 8
5 Olympic Boulevard
Sydney Olympic Park NSW 2127

Attention: **Ulrike Krause**
Environment and Remediated Land Specialist

Dear Ulrike

Remediated Lands Monitoring – June 2019 Annual Monitoring Round.

1 Introduction

Environmental Earth Sciences NSW was requested by Sydney Olympic Park Authority (SOPA) to undertake the June 2019 Annual environmental monitoring round of the remediated lands at Sydney Olympic Park ("the site"). The works form part of Contract TRSOPA17118 ("the contract"). A summary of the field work methodology and observations are presented in this letter.

2 Activates undertaken and methodology

Fieldwork was completed between 27 May to 3 June 2019 (inclusive) in accordance with Table A within SOPA document *Remediated Lands - Environmental Monitoring Volume 2 - Section 3 The Services* ("*The Services*") and included the collection of groundwater samples and static water level (SWL) measurement across the following remediated landfills:

- Sydney International Aquatic Centre (SIAQC);
- Blaxland Common (BLAX);
- Golf Driving Range (GDR);
- Kronos Hill (KROS);
- Woo-La-Ra (WOO); and
- Wilson Park (WILSON).

Landfill gas sampling of selected components and infrastructure was undertaken at Kronos Hill and Woo-La-Ra in accordance with Table 5 within *The Services*.

No additional sampling was requested as per *The Services*.

All sampling activities were undertaken in accordance with Environmental Earth Sciences (2011) - *Soil, gas and groundwater sampling manual* and procedures outlined in Environmental Earth Sciences (2017) *Quality Control and Quality Assurance Report*. All equipment used was calibrated prior to undertaking any assessment and a bump test of the water quality meter was completed at the start of each day of use. All calibration certificates can be viewed in Appendix A

2.1 Static water level measurements

The following steps were undertaken to measure the SWL from each selected well:

- prior to sampling / purging and after gas measurements, 'depth to water' was measured using an electronic gauge from the top of the monitoring point cover to the top of the water; and
- the electronic dipper was decontaminated with biodegradable surfactant between each location.

SWLs will be issued separately in the annual data update. It is acknowledged that SWL was not recorded at SIAQC LC1 through field error. A review of the existing data suggests the SWL would be within 0.1 m of LD1.

2.2 Gas monitoring

Gas monitoring of system components at WOO and KROS was undertaken on 29 and 30 May 2019 in accordance with the Remediated Land Management Plan 2009. Two different methods were used to undertake this monitoring, with methods chosen based on whether or not the location was fitted with a gas tap.

Special fitted gas taps were installed by SOPA in 2015 to allow additional gas monitoring parameters at Woo-La-Ra (locations W3, N3, EA1, W4 and W2) to be measured to assess potential risks associated with subsurface gas (gas monitoring procedure 2). Additional gas monitoring parameters such as initial, peak and stable flow rates; initial, peak and stable methane (CH_4) and carbon dioxide (CO_2) concentrations; and initial, peak and stable differential pressure were included in the gas monitoring program. Where gas taps are not installed, gas monitoring procedure 1 (as outlined below) is used and flow rate and relative pressure are not measured.

As determined in Environmental Earth Sciences (2017) report *Remediated Lands Monitoring - September 2017 Quarterly Monitoring Report*, gas taps are unable to be fitted on all KRONOS and WOO locations currently due to varied piezometer sizes and available gas tap sizes (50 mm and 100 mm).

Results for the latest subsurface gas monitoring are to be issued separately in the annual data update. Field sheets are included in Appendix B.

2.2.1 Gas monitoring procedure 1

The following procedure was undertaken at all locations, except for WOO locations W2, W3, W4, N3 and EA1:

- place GA5000 inlet hose within each component for sixty seconds to measure initial, peak and stable values of:
    - gas composition including CH_4, CO_2, oxygen (O_2), carbon monoxide (CO) and hydrogen sulfide (H_2S);
    - barometric pressure; and
    - record stabilised gas readings after sixty seconds.
- measure SWL in accordance with the procedure described in Section 2.

2.2.2 Gas monitoring procedure 2

For the remainder locations sampled during this event, measurements were undertaken in accordance with the requirements outline in *The Services* document to the following procedure:

- connect GA5000 inlet hose to gas tap for sixty seconds to measure initial, peak and stable values of the following:
    - flow;
    - relative pressure;
    - gas composition including CH_4, CO_2, O_2, CO, H_2S and barometric pressure (stable);
    - connect manometer inlet hose to gas tap for sixty seconds to measure initial, peak and stable differential pressure; and
- measure SWL in accordance with the procedure described in Section 2.1.

2.3 Groundwater water sample collection

Water samples were collected at a total of 72 locations across SIAQC, GDR, BLAX, KROS, WOO and WILSON according to the following methodology:

- calibration and / or bump test of a water quality meter at the start of each sampling day (Appendix A);
- collection of SWL measurement;
- collection of water samples:

  - piezometers were purged of three standing well volumes (or until dry). Field parameters were documented during both purging and sampling, with sampling generally occurring after stabilisation of field parameters;
  - at locations with lower volumes, samples were collected either after collecting one round of field readings or prior to collecting readings to ensure enough sample volume was obtained;
  - pump pits were sampled by lowering a plastic bailer into the pump pit and samples placed in laboratory prepared containers with field parameters documented immediately prior to sampling;
- sample containers were placed immediately into an ice-cooled esky; and
- all equipment used at multiple locations was decontaminated between each groundwater sampling location using a triple rinse system by flushing the equipment with water containing surfactant, tap water then distilled water.

Note: Locations WILSON MP6B, WILSON MP6A and WILSON MP7BR were purged by removing two bailers and then sampled due to known concentrations of free product particularly dense non-aqueous phase liquid (DNAPL) or light non-aqueous phase liquid (LNAPL).

Samples and / or field readings could not be collected at some locations due to the following reasons:

- GDR Sump 2, GDR Sump 5 and KROS MP2 – locations did not contain enough volume to sample or were dry; and
- Excessive free product (DNAPL and LNAPL) was observed at WILSON MP7BR.

In order to avoid equipment damage, field parameter readings were not collected at locations with heavy DNAPL (WILSON MP7BR) impact based upon field scientist judgement.

Field sheets containing all field readings collected while purging and sampling locations are provided as Appendix B. Laboratory certificates will be presented in Appendix C and a laboratory summary provided in the annual data up-date.

3 Quality Assurance and Quality Control

Quality control is achieved by using National Association of Testing Authorities (NATA) registered laboratories using American Standard for Testing and Materials (ASTM) methodology supported by internal duplicates, the checking of high, abnormal or otherwise anomalous results against background and other chemical results for the sample concerned.

Quality assurance is achieved by confirming that field results, or anticipated results based upon comparison with field observations, are consistent with laboratory results and that sampling methods are uniform with thorough decontamination procedures. In addition, the

laboratory undertakes additional duplicate analysis as part of their internal quality assurance program on the basis of one duplicate analysis for every 20 samples analysed.

Field observations are compared with laboratory results when they are not as expected. Confirmation, re-sampling and re-analysis of a sample are undertaken if the results are not consistent with field observations and/or measurements. In addition, field duplicate sample results have to be within the acceptable range of reproducibility (see Appendix D for details). A discussion of the quality of internal laboratory results and field duplicate relative percentage difference (RPD) calculations are presented in Appendix D.

4 Field observations

Field observations in relation to system integrity were made at each remediated landfill during fieldwork activities. Table 1 presents a summary of the field observations made during the May-June 2019 monitoring event. Field sampling sheets are provided in Appendix B.

Table 1: Summary of field observations

Landfill Location	Observation
Blaxland Common	A sheen was noted in purge water collected at BLAX4.
Golf Driving Range	No significant observations
Kronos Hill	A sheen was noted in purge and sample water at KH1.
Sydney International Aquatic Centre	Faint H_2S odour. Roots noted to be growing in MP6 and a hydrocarbon odour was note in MP7
Wilson Park	MP6A, MP6B, MP7A, MP7BR, PP21 and PP24 had DNAPL within purged and / or sample waters. MP7BR was also noted to have LNAPL
Woo-la-ra	A sheen was noted at NL2 and B35.

5 Maintenance issues

Maintenance issues presented in Table 2 were noted during May-June 2019 annual field program.

Table 2: Maintenance requirements

Item	Details
SIAQC	LD1 was not able to be opened due to seized lock and had a temporary lock installed by SOPA.
WOO N3	Monument appears to have sunk, unable to reinstall gas tap, duct tape place over well to seal.
WOO W3	Monument head is detached due to rusted hinge. Location cannot be secured
KROS KH3	**Gatic cover has been removed and could not be located.**
KROS PP2	Two of three padlocks are full of sand and inoperable
GDR Sump 1	Sump cover is missing

6 Landfill gas results

Weather conditions on the day of sampling were described as overcast, still and warm.

Landfill gas measurements were compared against threshold values provided in *The Services* document with the following exceedances measured:

- >1.25% CH_4:
    - WOO W4 (initial: 86.3%, stable: 87.2% and peak: 87.2%);
    - WOO W3 (initial and peak: 10.0% and stable: 2.1%)
    - WOO EA1 (initial and peak: 2.0%)
    - KROS KH1 (initial and peak: 1.4%)
- >25% CH_4 LEL:
    - WOO W4 (peak: >100.0% and stable: >100.0%)
    - WOO W3 (peak: 30.0%)
    - WOO EA1 (initial and peak: 40.0%)
    - KROS KH1 (initial and peak 28.0%)

- 15 ppm H_2S – no exceedance
- 30 ppm CO - no exceedance
- <19.0% O_2:
    - WOO W4 (initial and peak: 2.0%, stable: 0.1%); and,
    - WOO W3 (initial and perk: 17.2% and stable: 16.9%).

Ulrike Krause and Wendy Nguyen of SOPA was notified immediately of the results. No other measurements that exceed trigger values were noted.

Woo-la-ra locations W2, W3 and W4 (42 mm) are currently fitted with modified 50 mm gas taps in order to undertake additional gas parameter monitoring. These taps cannot always achieve a proper a seal around the casing and cap, therefore flow, relative pressure and differential pressure results at these locations may not be representative of actual conditions within the borehole.

Additional sampling of WOO W4 and WOO W3 was conducted, removing the gas tap and allowing the location to vent for 15 minutes to the atmosphere then reinstalling the gas tap and allowing gases to build for 15 minutes before sampling as per *Gas monitoring procedure 2*. The following exceedances were noted at WOO W4 during this additional sampling:

- >1.25% CH_4
    - Initial and peak (47.5%) and stable (35.3%) (note: readings were stable at 60 seconds)
- >25% CH_4 LEL
    - Initial, peak and stable: >100% (note: stable at 60 seconds)
- <19% O_2
    - Initial (9.2%), peak and stable (12.0%)

WOO W3 did not report any further exceedance during additional monitoring.

7 Additional works

No additional works were completed during the June 2019 Annual monitoring round. It is noted that WILSON MP7 was dipped along with WILSON MP7BR and SWLs for each location will be provided within the annual data update.

8 Conclusion

All works were successfully undertaken for the June Annual 2019 round in accordance with requirements in *The Services* document.

9 Limitations

This report has been prepared by Environmental Earth Sciences NSW ACN 109 404 006 in response to and subject to the following limitations:

1. The specific instructions received from Sydney Olympic Park Authority;
2. The specific scope of works set out in PO117094;
3. May not be relied upon by any third party not named in this report for any purpose except with the prior written consent of Environmental Earth Sciences NSW (which consent may or may not be given at the discretion of Environmental Earth Sciences NSW);
4. This report comprises the formal report, documentation sections, tables, figures and appendices as referred to in the index to this report and must not be released to any third party or copied in part without all the material included in this report for any reason;
5. The report only relates to the site referred to in the scope of works being located Sydney Olympic Park ("the site");
6. The report relates to the site as at the date of the report as conditions may change thereafter due to natural processes and/or site activities;
7. No warranty or guarantee is made in regard to any other use than as specified in the scope of works and only applies to the depth tested and reported in this report;
8. Fill, soil, groundwater and rock to the depth tested on the site may be fit for the use specified in this report. Unless it is expressly stated in this report, the fill, soil and/or rock may not be suitable for classification as clean fill, excavated natural material (ENM) or virgin excavated natural material (VENM) if deposited off site;
9. This report is not a geotechnical or planning report suitable for planning or zoning purposes; and
10. Our General Limitations set out at the back of the body of this report.

Should you have any queries, please do not hesitate to contact us on (02) 9922 1777.

For and on behalf of
Environmental Earth Sciences NSW

Author
Sam Goldsmith
Environmental Consultant

Internal Reviewer
James Barwood
NSW Manager

Project Manager
Elin Griffiths
Associate Environmental Scientist

117088h_Jun19 Statement_V1

10 References

Environmental Earth Sciences (2011) - *Soil, gas and groundwater sampling manual and procedures*

Environmental Earth Sciences (2017) *Quality Control and Quality Assurance Report* (ref: 117088_QA/QC).

Sydney Olympic Park Authority *Contract TRSOPA17118 Remediated Lands – Environmental Monitoring Volume 2 – Section 3 The Services*.

ENVIRONMENTAL EARTH SCIENCES GENERAL LIMITATIONS

Scope of services
The work presented in this report is Environmental Earth Sciences response to the specific scope of works requested by, planned with and approved by the client. It cannot be relied on by any other third party for any purpose except with our prior written consent. Client may distribute this report to other parties and in doing so warrants that the report is suitable for the purpose it was intended for. However, any party wishing to rely on this report should contact us to determine the suitability of this report for their specific purpose.

Data should not be separated from the report
A report is provided inclusive of all documentation sections, limitations, tables, figures and appendices and should not be provided or copied in part without all supporting documentation for any reason, because misinterpretation may occur.

Subsurface conditions change
Understanding an environmental study will reduce exposure to the risk of the presence of contaminated soil and or groundwater. However, contaminants may be present in areas that were not investigated, or may migrate to other areas. Analysis cannot cover every type of contaminant that could possibly be present. When combined with field observations, field measurements and professional judgement, this approach increases the probability of identifying contaminated soil and or groundwater. Under no circumstances can it be considered that these findings represent the actual condition of the site at all points.

Environmental studies identify actual sub-surface conditions only at those points where samples are taken, when they are taken. Actual conditions between sampling locations differ from those inferred because no professional, no matter how qualified, and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden below the ground surface. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from that predicted. Nothing can be done to prevent the unanticipated. However, steps can be taken to help minimize the impact. For this reason, site owners should retain our services.

Problems with interpretation by others
Advice and interpretation is provided on the basis that subsequent work will be undertaken by Environmental Earth Sciences NSW. This will identify variances, maintain consistency in how data is interpreted, conduct additional tests that may be necessary and recommend solutions to problems encountered on site. Other parties may misinterpret our work and we cannot be responsible for how the information in this report is used. If further data is collected or comes to light we reserve the right to alter their conclusions.

Obtain regulatory approval
The investigation and remediation of contaminated sites is a field in which legislation and interpretation of legislation is changing rapidly. Our interpretation of the investigation findings should not be taken to be that of any other party. When approval from a statutory authority is required for a project, that approval should be directly sought by the client.

Limit of liability
This study has been carried out to a particular scope of works at a specified site and should not be used for any other purpose. This report is provided on the condition that Environmental Earth Sciences NSW disclaims all liability to any person or entity other than the client in respect of anything done or omitted to be done and of the consequence of anything done or omitted to be done by any such person in reliance, whether in whole or in part, on the contents of this report. Furthermore, Environmental Earth Sciences NSW disclaims all liability in respect of anything done or omitted to be done and of the consequence of anything done or omitted to be done by the client, or any such person in reliance, whether in whole or any part of the contents of this report of all matters not stated in the brief outlined in Environmental Earth Sciences NSW's proposal number and according to Environmental Earth Sciences general terms and conditions and special terms and conditions for contaminated sites.

To the maximum extent permitted by law, we exclude all liability of whatever nature, whether in contract, tort or otherwise, for the acts, omissions or default, whether negligent or otherwise for any loss or damage whatsoever that may arise in any way in connection with the supply of services. Under circumstances where liability cannot be excluded, such liability is limited to the value of the purchased service.

APPENDIX A: CALIBRATION CERTIFICATES

23/05/2019

Gas Calibration Certificate

Instrument GA5000
Serial No. G505858
Sensors CH4, CO2, O2, CO, H2S

airmet

Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
	Recharge OK?	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
Pump	Operation	✓	
	Filter	✓	
	Flow	✓	
	Valves, Diaphragm	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	O2	✓	
	CH4	✓	
	CO2	✓	
	CO	✓	
	H2S	✓	
Alarms	Beeper	✓	
	Settings	✓	
Software	Version		
Datalogger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Diffusion mode Aspirated mode

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No	Instrument Reading
O2		20.9% Vol O2		Fresh Air	20.8% O2
CH4		60% CH4	NATA	SY244	59.9% CH4
CO2		40% CO2	NATA	SY244	39.7% CO2
CO		95ppm CO	NATA	SY174	94ppm CO
H2S		25ppm H2S	NATA	SY174	24ppm H2S

Calibrated by: **Sen Philip**

Calibration date: **23/05/2019**

Next calibration due: **19/11/2019**

Multi Parameter Water Meter

Instrument **YSI Quatro Pro Plus**
Serial No. **18G103119**

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper		
	Settings		
Software	Version		
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 10.00		pH 10.00		324189	pH 9.52
2. pH 7.00		pH 7.00		320613	pH 6.81
3. pH 4.00		pH 4.00		324985	pH 4.04
4. mV		234mV		324355/325421	237.0mV
5. EC		2.76mS		322349	2.77mS
6. D.O		0.00ppm		329994	0.01ppm
7. Temp		21.7°C		MultiTherm	21.6°C

Calibrated by: K. B **Kylie Boardman**

Calibration date: **23/05/2019**

Next calibration due: **22/06/2019**

Equipment Calibration Record – YSI Pro Plus

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

This equipment calibration record is to be stored in your job folder

Equipment Type: YSI Pro Plus with Quatro Sensor

Equipment Number: 18G103119

Date Calibrated: 28/5/19

Calibrated By: Sam Goldsmith (name)

Job Number: 177088

Details of Calibration:

Temperature: 13.1 °C

pH at 4.01 Reading: 5.3

pH at 7.01 Reading (or 6.88): 7.62

ORP in Redox solution (240 mV): 235 (mV)

Conductivity in 2.76 mS/cm: 2570 mS/cm

Conductivity in 12.88 mS/cm: _____ mS/cm

Dissolved Oxygen in 0.00 ppm in Sodium sulfate: 0 %

Dissolved Oxygen 100% Air Saturation: 100 %

Equipment Calibration Record – YSI Pro Plus

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

This equipment calibration record is to be stored in your job folder

Equipment Type: YSI Pro Plus with Quatro Sensor

Equipment Number: 18G103119

Date Calibrated: 29/5/19

Calibrated By: Sam Goldsmith. (name) / Ellen Griffiths

Job Number: 117088.

Details of Calibration:

Temperature: 16.9 °C

pH at 4.01 Reading: 4.51

pH at 7.01 Reading (or 6.88): 6.82

ORP in Redox solution (240 mV): 233. (mV)

Conductivity in 2.76 mS/cm: 2.190 mS/cm

Conductivity in 12.88 mS/cm: mS/cm

Dissolved Oxygen in 0.00 ppm in Sodium sulfate: %

Dissolved Oxygen 100% Air Saturation: %

Equipment Calibration Record – YSI Pro Plus

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

This equipment calibration record is to be stored in your job folder

Equipment Type: YSI Pro Plus with Quatro Sensor

Equipment Number: _____

Date Calibrated: 30/5/19

Calibrated By: Sam Goldsmith (name)

Job Number: 117088

Details of Calibration:

Temperature: 15.9 °C

pH at 4.01 Reading: 4.13

pH at 7.01 Reading (or 6.88): 6.99

ORP in Redox solution (240 mV): 242.9 (mV)

Conductivity in 2.~~76~~ 570 mS/cm: ~~2.69~~ mS/cm

Conductivity in 12.88 mS/cm: _____ mS/cm

Dissolved Oxygen in 0.00 ppm in Sodium sulfate: 0.00 %

Dissolved Oxygen 100% Air Saturation: _____ %

Equipment Calibration Record – YSI Pro Plus

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

This equipment calibration record is to be stored in your job folder

Equipment Type: YSI Pro Plus with Quatro Sensor

Equipment Number: _____

Date Calibrated: 31/5/19

Calibrated By: Sam Goldsmith (name)

Job Number: 117088

Details of Calibration:

Temperature: 13.5 °C

pH at 4.01 Reading: 5.46 ↓ low temp

pH at 7.01 Reading (or 6.88): 7.98 ↓ low temp

ORP in Redox solution (240 mV): 246.1 (mV)

Conductivity in ~~2.76 m~~ 2.570 mS/cm: 2.873 @ 13.5°C. mS/cm

Conductivity in 12.88 mS/cm: _____ mS/cm

Dissolved Oxygen in 0.00 ppm in Sodium sulfate: 0.01 ~~%~~ ppm

Dissolved Oxygen 100% Air Saturation: 94.7 %

Equipment Calibration Record – YSI Pro Plus

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

This equipment calibration record is to be stored in your job folder

Equipment Type: YSI Pro Plus with Quatro Sensor

Equipment Number: 184103119

Date Calibrated: 03/06/19

Calibrated By: EGr. (name)

Job Number: 117088

Details of Calibration:

Temperature: ~~16.1~~ 15.9 °C

pH at 4.01 Reading: 4.12 (Taken 15 minutes)

pH at 7.01 Reading (or 6.88): 6.54 (at 15.6°c)

ORP in Redox solution (240 mV): 245.2 (mV)

Conductivity in 2.76 mS/cm: 3.0 mS/cm

Conductivity in 12.88 mS/cm: _____ mS/cm

Dissolved Oxygen in 0.00 ppm in Sodium sulfate: 0.00 %

Dissolved Oxygen 100% Air Saturation: _____ %

APPENDIX B: FIELD SHEETS

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Field Supervisor: Sam Goldsmith -
Date:
Date purged: 29/5/19
Date sampled: 30/5/19

Woo-la-ra (WOO) - Six monthly program

Location	FF ?	Total Depth (m)	Condition	SWL Time	SWL (report)	Purged Vol (L)	Sample Time/ Date	DO (ppm)	EC	pH	Temp	Redox	Colour	Odour	Method	SWL (no report)
				Pre-purge												Pre-sample
W2	MR	6.15	Good	16:00	3.48	3	15:20 30/5/19	2.18	12931	6.98	19.3	-90			W	3.48
W3		6.74	Movement heard detected	9:00	2.935	11	09:30 30/5/19	1.36 ~~1.38~~	39769 ~~58778~~	6.46 ~~5.82~~	19.91	-51 ~~-55.2~~	light grey	H_2S	W	~~2.935~~ 2.075
N3		5.3	Movement & smell? earth to 2.4m	9:30	3.09	40	980 30/5/19	3.68	40111	6.81	19.5	-32.3	grey	None	W	~~4.49~~
NL4	FF	4.87	No gas tap good	9:50	3.88	55	10:15 30/5/19	0.14	32701 ~~33015~~	6.02	19.7	-97.1	Grey	Sweet	SP	3.88
EA1	QR	5.98	Good	12:37	2.03	20	10:40 30/5/19	0.41	27710	7.02	21.0	-41	light yellow	None	W	2.11
T1	FF	8.6	~~Movement sort~~ Good	13:00	5.66	50	11:10 30/5/19	0.11	14110 ~~14760~~	6.75 ~~6.25~~	19.4	-106.6 ~~-105.4~~	cloudy grey	H_2S	SP	5.62
PP18	FF	?	Good	13:13	1.52		1140 30/5/19	4.03	274	9.31	18.0	-46.3	amber tinge	none	B	1.47
NL1	FF	5.39	Good	13:20	3.26	55	12:10 30/5/19	0.3	33599	6.52	19.5	-79	light amber	H_2S	W	
W4	FF	15.4	Good.	12:30	7.84	30	12:30 30/5/19	0.02	16405	6.86	20.4	-96	cloudy grey	H_2S	W	7.91
200A	QR	4.63	Good	15:02	2.01	12	13:50 30/5/19	3.48	38094	~~5.29~~ 5.48	18.8	174.9	cloudy brown	none	B	2.03
350B	QR	5.8	Good	14:50	1.63	19	13:40 30/5/19	3.11	58921	5.32	20.3	255	cloudy, brown	none	~~B~~ W	1.72
NL2	FF	5.28	Good	15:05	3.11	35	13:20 30/5/19	0.08	63,048	6.32	21.0	-99	clear w HC sheen	H/C sheen	SP	3.14
* B35*	FF	4.63	Good	14:10	2.29	40	14:10 30/5/19	0.09	55902	6.28	19.7	-167 ~~-145~~	dark grey	H_2S	SP	2.29
PP19	FF	?	Good	15:27	0.68		1430 30/5/19	1.01	15189 ~~7362~~	7.55	14.7	-148	black		B	0.70
W1	MR	3	Good	15:40	2.05		1500 30/5/19	3.27	7326	7.77	19.3	-64	cloudy brown	none	B	2.47

Purge 30/5 am

Both purge

Duplicate: NL4

QA/QC samples: NL4 and NL1

* B35 dipped 30/5/19
W3 "
N3 "
NL4 "

Checked

Checked

Method Key

SP	Submersible Pump
B	Bailer
W	Waterra footvalve

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Field Supervisor: DG
Date purged: 31.05.19
Date sampled: 3/6/19

Wilson Park (WP) - annual program

Pre-purge | Pre-sample

Location	FF?	Total Depth (m)	Condition	SWL Time	SWL (report)	Purged Vol (L)	Sample Time/Date	DO (ppm)	EC	pH	Temp	Redox	Colour	Odour	Sampling Method	SWL (DO NOT report)
PP21**	FF	4.7	Good	1254	2.86		3.6.19 1345	0.99	33315	6.0	20.1	-25	~~clear~~	~~H2S~~	B	2.89
PP22	FF	3.8	Good	1210	0.820		3.6.19 1055	3.3	2071	7.52	18.2	-0.5	clear	none	B	0.84
PP23	FF	7	Good	1345	4.53	-	3.6.19 1345	1.85	11742	6.67	19.8	-143	clear	H2S	B	
PP24**	FF	7	Good	1202	3.390		3.6.19 1030	1.66	19357	7.46	20.2	-75.6	pale amber	tar	B	3.07
MP1**		6.42	Good	1110	4.19	10	3.6.19 0815	0.7	17745	5.68	20.1	19.4	cloudy brown	none	W	4.70
MP2		6.99	Good	1125	2.67	15	3.6.19 0830	2.48	11483	5.26	20.6	98.1	light brown	faint H2S	W	2.75
MP3	ME	6.82	Good	1222	2.32	15	3.6.19 1120	1.23	37504	5.57	21.7	96.3	light cloudy brown	none	W	3.03
MP4	FF	6.56	Good	1233	2.380	35	3.6.19 1130	1.4	46448	5.98	21.9	34	slighty cloudy	none	SP	2.31
MP5	QR	12.37	Good	1235	1.91	30	3.6.19 1200	0.24	51097	5.78	20.1	57.2	cloudy light brown	none	SP	1.78
MP6A**	FF	?	Good	1155	2.735	-2	3.6.19 1020	7.30	22526	6.77	20.1	-183.4	pale amber	strong H2S + tar	B	2.595
MP6B**	FF	?	Good	1149	3.195	-2	3.6.19 1010	0.9	9593	6.98	21.1	-30	pale amber	tar	B	3.235
MP7A**	QR	12.4	Good	1240	2.20	12	3.6.19 1240	0.41	84128	5.83	20.5	2.3	light brown	faint H2S	W	2.32
MP7B**	QR	5.6	Good	1245	2.11	N/A	3.6.19 1245	Not sampled.	~~Gross product~~			No	longer	useable	B	2.66
MP8**	FF	11.69	Good	1147	2.03	60	3.6.19 0945	0	30828	6.41	19.0	-78.7	light grey	sweet	SP	1.66
MP9A**	QR	6.66	Good	1139	1.96	13	3.6.19 0900	2.53	3346	6.3	20.0	-4.8	cloudy brown	none	W	1.92
MP9B	FF	11.74	Good	1146	2.36	45	3.6.19 0930	0.2	43898	6.04	19.7	-75.0	clear	none	SP	1.95

Checked JAD

** no WQM reading if there is free product - use bailer

Duplicate: MP8 (FD, SD)

QA/QC samples: MP8, MP4

Method Key

SP	Submersible Pump
B	Bailer
W	Waterra footvalve

MP7 BR 1246 2.64m – Free product observed. No field readings.
– LNAP + DNAPL, suggest interface probe.

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Field Supervisor: SG/EG
Date: 31/5/19

Golf driving Range (GDR) - annual progr Pre-purge | Pre-sample

Location	FF?	Total Depth (m)	Condition	SWL (report)	Purged Vol (L)	Sample Time	DO (ppm)	EC	pH	Temp	Redox	Colour	Odour	Method	SWL (no report)
Sump 1		?	No cap ~~Good~~	0.59	× Grab	0810	4.35	919	7.96	11.5	215.7	grey	none	Grab	
Sump 2		?	Dry	–	×	0815	–	–	–	–	–	–	–	–	–
Sump 5		1.07	Dry	Dry		0750	–	–	–	–	–	–	–	–	

Duplicate: HC_1 - FD + SD

QA/QC samples: HC-2

Method Key

SP	Submersible Pump
B	Bailer
W	Waterra footvalve

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Field Supervisor: EG
Date: 28.5.19
Date purged: 27.5.19
Date sampled: 28.5.19

Blaxland Common (BLAX) - annual program

Monitoring Location	FF?	Depth	Condition	Time	SWL (report)	Vol purged (L)	Time sampling/Date	DO (ppm)	EC	pH	Temp	Redox	Colour	Odour	Method	SWL (no report)
				Pre-purge												Pre-sample
BH3	FF	5.51	Good	935	~~2.26~~	60	0940/28.5	0	10584	7.12	19.4	-167	Pale yellow	Strong/organic	SP	2.20
BH5	MR	5.22	Good	1056	~~1.82~~	~~8~~ 8	1054/28.5	1.27	16606	7.08	21.8	-131	dark grey	H_2S	W	1.82
400A	SR	5.45	Good	1030	~~1.66~~	~~8~~ 8	1032/28.5	2.58	11579	7.2	19.4	-92	dark grey	H_2S	W	1.66
400B	SR	5.77	Good	1036	~~2.74~~	~~8~~ 8.5	1038/28.5	3.15	11204	7.03	20.0	-23	Light yellow	none	W	2.74
500B		6.67	Good	1015	~~1.75~~	~~8~~ 7	1017/28.5	1.13	7055	7.32	21.2	-52	L. brown	–	W	1.75
650B		6.8	Good	0958	~~4.22~~	~~8~~ 8	1001/28.5	2.55	19168	6.99	20.0	-81	L. brown	none	W	4.22
700A		5.85	Good	0926	~~3.915~~	~~8~~ 7	0928/28.5	1.46	7903	7.19	19.7	1.2	L. brown	none	W	3.915
BLAX4	QR	5.07	Good	0845	~~10.41~~	20	0845/28.5	0	10392	7.28	20.9	-199	grey with sheen		W	10.41

Checked. JAS

Duplicate: BLAX-BH3 BLAX-FD BLAX-SD

QA/QC samples: BLAX-BH3

Method Key

SP	Submersible Pump
B	Bailer
W	Waterra footvalve

JAS Checked

BLAX4 & BH3 purged and sampled 28.5.19

Pre purge SWLs (report)

BH3 - 2.26 mBTOC
BH5 - 1.82 mBTOC
400A - 2.15 mBTOC
400B - 1.61 mBTOC
500B - 1.71 mBTOC
650B - 2.14 mBTOC
700A - 1.94 mBTOC
BLAX4 - 10.41 mBTOC

Checked JAS

Sydney Aquatic Centre Car park (SIAQC) - annual

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Field Supervisor: EG / SG
Date: 28.5.19
Date purged: 27.5.19
Date sampled: 28.5.19 / 29.5.19

Location	FF?	Order	Depth	Condition	Time	Pre-purge SWL (m) (report)	Vol purged (L)	Time sampling/Date	DO (ppm)	EC µS cm⁻¹	pH	Temp °C	Redox mV	Colour	Odour	Method	Pre-sample SWL (no report)
LC1	FF	14	9.02	Lack Good Seized	16:43		[redacted]	16/43 27/5	2.63	17 039	9.10	21.1	-213			B	
LC2	FF	17	9.16	Good	17:20 ~~09~~00	6.35		0900/29.5	2.44	6896	7.35	21.0	179	clear	none	B	
LD1	FF	13	14.78	Lock replaced Good	11:40	5.27		11:40/29/5	1.99	1303	7.90	21.5	21	slight brown tinge	none	B	
LD2	FF	16	14.81	Good	17:30 ~~08~~40	6.75		08⁴⁰/29.5	1.8	5276	8.20	21.2	-21.5	slight amber	sweet	B	
GM1	FF	12	9.03	Good	17:15	4.78		09³⁰/29.5	5.17	556	7.91	22.8	111.3	clear	none	B	
GM2	FF	11	13.5	Good	0940	5.85		9⁴⁰/29.5	5.4	3967	7.72	22.1	145.4	clear	none	B	
MP2a	MR	8	18.89	Good	15:36	7.09	22	15⁴⁵/28.5	0.09 ~~2.62~~	7643 ~~10405~~	6.~~94~~66	~~21.7~~ 20.9	~~-106~~ -18.9	light grey	H2S	W	7.09
MP3	SL	5	10.98	Good	15:45	5.01	18	16¹⁵/28.5	4.24	9762	6.77	22.3	93.3	clear	none	W	8.70
MP4	SL	7	9.3	Good	14:45	4.79	15	14¹⁵/28.5	2.91	7971	6.55	20.8	20.7	light grey	none	W	8.29
MP6		15	6.71	Good *	15:55	5.54	5	16⁴⁰/28.5	0.48	16612 ~~[illegible]~~	8.91	20.6	-165 ~~[illegible]~~	Sweet/organic	slightly cloudy amber	W	5.58
MP7	QR	18	12.2	Good	16:15	6.25	8	16⁵⁰/28.5	0	32481	8.93	21.8	-25.5	hydrocarbon?	light brown	W	6.26
MP8		3	19.62	Good	13:14	7.43	40	12⁴¹/28.5	0.11	4985	6.89	19.2	-33	cloudy grey	faint H2S	W	8.22
MP9	SL	1	20.05	Good	12:38	7.84	32	11⁵⁰/28.5	3.56	6057	7.25	19.5	-76	grey	H2S	W	15.32
MP11	SL	6	10.69	Good	14:25	4.98	25	14⁰²/28.5	6.28	479.3	7.66	19.8	38.4	grey	organic	W	6.56
MP12	SL	10	9.8	Good	15:03	~~6.82~~ 6.54	10	14³⁰/28.5	1.10	36250	4.34	21.9	25.3	dark brown	v. faint sweet	W	6.525
MP13	MR	2	19.93	Good	13:31	7.875	35	12⁵⁴/28.5	0.25	19076	6.66	21.1	33.9	light grey	none	W	7.90
MP14	QR	4	13.54	Good	13:02	6.80	20	12²²/28.5	~~1.09~~ 0.42	6909	~~6.9~~ 6.87	~~14.5~~ 18.3	-39	light grey	faint H2S	W	6.54
MP15		9	15.85	Good	15:30	~~7.35~~ 7.35	25	14⁵⁵/28.5	0.16	3608	6.40	21.0	-78	grey	none	W	7.38
BP1		-	~~20~~	Good	10:20	3.0	47	10/20/29.5	0.55	20814	6.45	22.5	-12	clear	none	SP	
BP2		-	~~20~~	Good	11:10	13.71	50	11/10 29/5	0.17	9194	6.54	22.4	-56	slightly cloudy	none	SP	13.71

7.35

Duplicate: ~~MP9~~ BP2 (FD+SD)

QA/QC samples: MP9

MP15 - extra volume

* roots noted within MP6

Method Key

SP	Submersible Pump
B	Bailer
W	Waterra footvalve

JAB Checked

Field Supervisor:
Date Purged: Pipped - ~~30/5/19~~ 29/5/19
Date Sampled ~~31/5/19~~ 31/5/19.

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Kronos Hill (KROS) - annual program

Pre-purge 4.03m

Pre-sample

Location	Type	Total Depth (m)	Condition	SWL Time	SWL	Purged Vol (L)	Sample Time	DO (ppm)	EC	pH	Temp	Redox	Colour	Odour	Sampling Method	SWL (DO NOT report)
PP2 ✓	-	?	Locks full of sand	16:34	4.27		15:05 31/5	1.63	9661	6.88	19.8 JAB	-67	light yellow	H_2S + HC.	B	4.04
PP5 ✓	-	?	good	17:00	4.57		16:10 31/5	1.40	6675	6.79	20.0	-100	cloudy yellow	slight HC?	B	4.63
KH1 ✓	QR	6.8	good	16:38	[illegible]	19	14:55 31/5	0.13	50361	6.52	20.5	-20	cloudy brown w/ sheen	Faint H_2S + Hydrocarbon	W	4.03
KH3 ✓	SR	4.95	Cover missing	16:48	2.58	10	15:20 31/5	0.0	31426	6.60	20.0	-92	black	H_2S + HC.	W	2.50
MP1 ✓	FF	4.6	good	16:20	3.09	40	14:20 31/5/19	0.43	14050	6.73	19.4	-32	cloudy amber	H_2S/sweet	SP	3.10
MP2 ✓	-	4.28	good	16:27	DRY	—	—	—	—	—	—	—	—	—	—	DRY
MP3 ✓	FF	4.87	good	16:43	2.874	25	15:30 31/5	0.19	10920	6.95	20.4	-154	H_2S + HC (+)	dark grey	SP	2.875
MP5 ✓	FF	5.95	good	16:55	5.085	15	15:50 31/5	1.22	~~20~~ 2048	7.34	20.1	-63.9	light yellow	H_2S	B	~~2.875~~ 5.08

* KH1 SWL = 4.795m TOC ?

FF = Free Flowing at the rate pumped
QR = Quick recharge
SR = Slow recharge

JAB Checked.

Method Key

SP	Submersible Pump
B	Bailer
W	Waterra footvalve

Duplicate: — N/A

QA/QC samples: MP1

117088 Quarterly Gas Monitoring

Date: 29/5/19 Scientist: SG/EG/ZZ Weather: Cool, dry, windy.

Landfill	Location ID	Time	Flow (L/hr)			Relative pressure (mb)			CH4 (%)			CO2 (%)			O2 (%)		
			Initial	Peak	Stable	Initial	Peak	Stable	Initial	Peak	Stable	Initial	Peak	Stable	Initial	Peak	Stable
WOO	W4	13:40	0.1	0.1	0.0	~~86.3~~ 0.19	0.29	0.29	86.3	87.2	87.2	7.7	7.8	7.8	2.0	2.0	0.1
* WOO	NL~~2~~4	9:50	–	–	–	–	–	–	0.0	0.0	0.0	0.1	0.2	0.2	21.3	21.3	21.3
WOO	350B	14:05	–	–	–	–	–	–	0.0	0.0	0.0	0.4	0.4	0.1	21.0	21.0	21.0
WOO	200A	14:10	–	–	–	–	–	–	0.0	0.0	0.0	0.1	0.1	0.1	21.3	21.3	21.2
WOO	Tar Pit 2	14:00	–	–	–	–	–	–	0.0	0.0	0.0	0.1	0.1	0.1	20.9	20.9	20.9
* WOO	B35	14:10	–	–	–	–	–	–	0.0	0.0	0.0	0.4	0.5	0.5	20.7	20.7	20.0
WOO	PP19	15:27	–	–	–	–	–	–	0.0	0.0	0.0	0.1	0.1	0.1	21.5	21.5	21.5
WOO	W1	15:40	–	–	–	–	–	–	0.0	0.0	0.0	1.4	1.4	0.3	20.8	21.5	21.5
* WOO	W~~2~~3	8:50	0.0	0.0	-0.1	0.1	0.1	-0.09	10.0	10.0	2.1	8.2	8.2	5.8	17.2	17.2	16.9

Landfill	Location ID	Balance (%)	CO (ppm)			H2S (ppm)			Baro (mb)	Differential Pressure			SWL (m)	Condition
			Initial	Peak	Stable	Initial	Peak	Stable		Initial	Peak	Stable		
WOO	W4	5.0	8	8	8	3	7	7	1004	-30	-30	-836↓	7.84	Good, diff press not stable @ 60s ↓
WOO	NL~~2~~4	78.6	0	0	0	0	0	0	1018	–	–	–	3.88	Good
WOO	350B	78.7	1	1	1	0	0	0	1004	–	–	–	1.63	Good
WOO	200A	78.7	1	1	1	0	0	0	1004	–	–	–	2.01	Good
WOO	Tar Pit 2	79.0	1	1	1	0	0	0	1004	–	–	–	1.60	Good
WOO	B35	.	0	0	0	0	0	0	1017	–	–	–	2.29	Good
WOO	PP19	78.4	1	1	1	0	0	0	1005	–	–	–	0.68	Good
WOO	W1	77.5	0	1	1	0	0	0	1005	–	–	–	2.05	Good
WOO	W~~2~~3	~~78.8~~ 71.9	0	0	0	0	0	0	1018	-717	-70	-70↑	2.935	~~Good~~ gas tap doesn't fit well properly. Monument head detached.

Note: notify SOPA if the following are measured:

1.25% methane
25% LEL
15ppm H2S
30ppm CO
<19% O2
2. SWL must be measured from top of monitoring point

* Sampled 30/5/19 due to locations being within a construction site (aside from B35)

117088 **Quarterly Gas Monitoring**

Date: 29/5/19 Scientist: SG/EG/ZZ Weather: Dry & windy

Landfill	Location ID	Time	Flow (L/hr)			Relative pressure (mb)			CH4 (%)			CO2 (%)			O2 (%)		
			Initial	Peak	Stable	Initial	Peak	Stable	Initial	Peak	Stable	Initial	Peak	Stable	Initial	Peak	Stable
WOO	~~[illegible]~~ W2	1600	0.1	0.1	0.0	-0.09	-0.09	-0.07	0.0	0.0	0.0	0.1	0.1	0.1	21.8	21.8	21.8
30/5 WOO	N3	9:15	0.1	0.1	0.0	-9.81	-9.75	-9.75	0.0	0.0	0.0	1.0	1.0	1.0	20.6	20.6	20.3
WOO	~~[illegible]~~ NL1	1320	-	-	-	-	-	-	0.0	0.0	0.0	0.1	0.1	0.1	20.6	20.6	20.5
30/5 WOO	EA1 *	10:30	0.0	0.0	0.0	-0.1	-0.1	-0.14	2.0	2.0	0.5	1.8	1.8	0.9	19.7	20.7	20.7
WOO	T2	1250	—	—	—	—	—	—	0.0	0.0	0.0	0.1	0.1	0.1	20.6	20.6	20.6
WOO	T1	1300	-	-	-	-	-	-	0.0	0.0	0.0	0.1	0.1	0.1	20.6	20.7	20.7
WOO	~~[illegible]~~ NL2	1505	-	-	-				0.0	0.0	0.0	0.1	0.1	0.1	21.4	21.4	21.4
WOO	PP18 ✓	1313	-	-	-	-	-	-	0.0	0.0	0.0	0.1	0.1	0.1	20.9	20.9	20.8

Landfill	Location ID	Balance (%)	CO (ppm)			H2S (ppm)			Baro (mb)	Differential Pressure			SWL (m)	Condition
			Initial	Peak	Stable	Initial	Peak	Stable		Initial	Peak	Stable		
WOO	~~[illegible]~~ W2	78.1	0	0	0	0	0	0	1008	-4	-4	-10	3.45	Tap doesn't fit properly insert to came off
WOO	N3	78.7	0	0	0	0	0	0	1018	-8	-4	-4	3.01	- Concrete is loose, unable to fit gas tap
WOO	~~[illegible]~~ NL1	79.4	0.0	0.0	0.0	0.0	0.0	0.0	1005	-	—	-	3.26	Good.
WOO	EA1	78.0	0	0	0	0	0	0	1018	-1	-1	-2	2.11	Good
WOO	T2	79.4	0.0	0.0	0.0	0.0	0.0	0.0	1005	—	—	—	3.21	Good.
WOO	T1	79.3	0.0	0.0	0.0	0.0	0.0	0.0	1006	—	-	—	5.66	Good.
WOO NL2	~~[illegible]~~	78.8	1.0	1.0	0.0	0.0	0.0	0.0	1006	-	-	-	3.11	Good
WOO	PP18	79.1	0.0	0.0	0.0	0.0	0.0	0.0	1005	—	—	—	1.52	Good

Note: notify SOPA if the following are measured:

1.25% methane
25% LEL
15ppm H2S
30ppm CO
<19% O2
2. SWL must be measured from top of monitoring point

* EA1 - NO Gastap.

117088 Quarterly Gas Monitoring

Date: 30/5/19 Scientist: SG/ZZ/EG Weather: Dry and calm ~18°C

Landfill ID	Location ID	Time	Flow (L/hr)			Relative pressure (mb)			CH4 (%)			CO2 (%)			O2 (%)		
			Initial	Peak	Stable	Initial	Peak	Stable	Initial	Peak	Stable	Initial	Peak	Stable	Initial	Peak	Stable
KRONOS	PP2	1634	–	–	–	–	–	–	0	0.0	0.0	0.1	0.1	0.1	20.9	20.9	20.9
KRONOS	PP5	1700	–	–	–	–	–	–	0	0.0	0.0	0.1	0.1	0.1	21.4	21.4	21.4
KRONOS	MP1	1620	–	–	–	–	–	–	0.0	0.0	0.0	0	5.4	0.9	21.3	21.3	20.4
KRONOS	MP2	1627	–	–	–	–	–	–	0.0	0.0	0.0	1.1	1.1	0.7	20.7	20.7	20.5
KRONOS	MP3	1643	–	–	–	–	–	–	0.0	0.0	0.0	0.1	0.1	0.1	21.1	21.1	21.1
KRONOS	MP5	1655	–	–	–	–	–	–	0.0		0.0	0.2	0.4	0.4	21.1	21.1	21.0
KRONOS	KH1	1638	–	–	–	–	–	–	1.4	1.4	0.1	6.7	6.7	0.6	19.2	20.7	20.7
KRONOS	KH3	1648	–	–	–	–	–	–	0.0	0.0	0.0	0.1	0.1	0.1	21.1	21.1	21.1

Landfill ID	Location ID	Balance (%)	CO (ppm)			H2S (ppm)			Baro (mb)	Differential Pressure			SWL (m)	Condition
			Initial	Peak	Stable	Initial	Peak	Stable		Initial	Peak	Stable		
KRONOS	PP2	79.0	0	0	0	0	0	0	1019	–	–	–	4.27	Looks full of sand.
KRONOS	PP5	78.6	0	0	0	0	0	0	1019	–	–	–	4.57	Good.
KRONOS	MP1	78.6	0	0	0	0	0	0	1019	–	–	–	3.09	Good.
KRONOS	MP2	78.9	0	0	0	0	0	0	1019	–	–	–	Dry	Good.
KRONOS	MP3	78.9	0	0	0	0	0	0	1019	–	–	–	2.874	Good.
KRONOS	MP5	78.6	0	0	0	0	0	0	1019				5.055	Good.
KRONOS	KH1	95.7	0	0	0	0	0	0	1019	–	–	–	4.795	Good.
KRONOS	KH3	78.4	0	0	0	0	0	0	1019	–	–	–	2.50.	cover missing

Note: notify SOPA if the following are measured:

1.25% methane
25% LEL
15ppm H2S
30ppm CO
<19% O2
2. SWL must be measured from top of monitoring point

* Subsidence along access track of Kronos hill

Additional after venting.

117088 Quarterly Gas Monitoring

Date: 29/5/19 + 30/5/19 Scientist: SG/EG/ZE Weather: 29/5 - Cool, windy, dry 30/5 - Fine, dry, fairly still

	Landfill	Monitoring Location	Time	Flow (L/hr)			Relative pressure (mb)			CH4 (%)			CO2 (%)			O2 (%)		
				Initial	Peak	Stable	Initial	Peak	Stable	Initial	Peak	Stable	Initial	Peak	Stable	Initial	Peak	Stable
29/5/19	W00	L4	14:30	0.0	0.1	0.1	~~47.5~~ -8.5	~~47.5~~ -8.5	~~35.3~~ -8.5	47.5	47.5	35.3	4.7	4.7	3.6	9.2	12.0	12.0
30/5/19	W00	L3	15:50	–	–	–	–	–	–	0.0	0.1	0.0	0.0	0.3	0.2	21.2	21.2	21.0

Landfill	Monitoring Location	Balance (%)	CO (ppm)			H2S (ppm)			Baro (mb)	Differential Pressure			SWL (m)	Condition
			Initial	Peak	Stable	Initial	Peak	Stable		Initial	Peak	Stable		
W00	L4	50.0	4	4	2	0	7	0	1003	-5	-5	-10	7.84	Good. Sampled for 3 mins
W00	L3	78.8	0	0	0	0	0	0	1019	–	–	–	5.14	- Gas tap came loose ∴ no flow or press.

Note: notify SOPA if the following are measured:

1.25% methane
25% LEL
15ppm H2S
30ppm CO
<19% O2
2. SWL must be measured from top of monitoring point

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

P1 of 6

Job No: 117088 | Date: 27/6/19 | Sampled By: SG/EC/ZZ | Client: SOPA | Site: SOPA - BLAX pre - purge

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
BLAX 700A			0923	1.95										
							19.6	9.04	-37	3.86	.879			
			0925										0920 - disp.	
							19.5	7.59	-87	6.21	9079			
			0926			7L	19.6	7.61	-92	6.42	4250	-	v. light amber.	purged dry
650B			0935	2.14										
							20.1	7.14	-123.0	0.07	29709			
			0937										cloudy brown	
							20.0	7.06	-120.0	3.49	16216	-	"	
						8L	20.0	6.93	~~-89~~ -6	3.24	14214	-	cloudy brown	purged dry.
500 ~~550~~ S.G. B			0944	1.71										
							21.3	7.64	-107.9	0.05	12160	H_2S	Grey	
			0947											
							21.3	7.44	-122.3	0.04	11746	nom	Grey	
			0949			~~[illegible]~~ 7L	21.2	7.46	-121.3	0.66	11447	nom	Grey.	purged dry
400A			0956	2.15										
							20.2	7.31	-153.0	0.30	310872	H_2S	Grey.	
			0958											
							20.5	7.19	-177.6	0.65	70313	nom	Grey.	
			10:00			8L	20.4	7.17	-171.2	4.63	18219	H_2S	Grey.	purged dry.

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
PI = Polyethylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

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Job No: | Date: 27.5.18 | Sampled By: SG/EG/ZB | Client: | Site: SIAQ pre-purge

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
400B			10:01 ~~10:01~~	1.61			19.5	7.31	-173.0	0.80	11309	slight H_2S	light grey	
			10:04				19.7	7.24	-171.4	0.22	11723	slight H_2S	dark grey	
			10:06			8.5	19.6	7.23	-159.1	0.58	10526	slight H_2S	dark grey	purged dry.
			~~10:14~~											
B145			10:14	1.82			22.0	7.16	-280.8	1.57	20143	H_2S	dark grey/black	
			10:16			6	21.8	7.19	-234.9	3.16	14618	H_2S	dark grey/black	purged dry.
~~B145~~														
SIAQ1				~~7.84~~										
MP9			12:35	7.84			19.6	7.42	-131	1.74	7674	H_2S		
			12:43				19.6	7.36	-141	~~0.4~~	6194			
			12:44				19.5	7.27	-140	0.49	5593			
			12:46				19.6	7.23	-160	3.40	2425			
			12:52			~~30~~	19.5	7.31	-129	5.54	2531			
			12:56			32	18.6	7.15	-145	9.38	102		d. grey.	purged dry.
MP14			13:02			6.50								

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
PI = Polyethylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Job No: 117088 | Date: 27/5 | Sampled By: SG/EG/ZZ | Client: SCPA | Site: SCPA

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pre-purg

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
SIAC MP14			13:02	6.80			19.3	7.34	-86.2	0.39	6557	H_2S	light grey.	
			13:06				19.3	7.64	-120.2	0.90	1824	Nom	clear/grey tinge	
			13:08				19.5	7.44	-123.4	4.06	3217	nom	clear/grey tinge	
			13:10		20		19.1	6.97	-121.2	6.84	3218	nom	clear/grey.	Purged dry.
MP8			13:14	7.43			19.6	7.45	-130	0.90	1202	H_2S	clear	
			13:18				19.7	7.07	-160	0.11	1715			
			13:21				19.8	6.88	-134	0.42	3128		grey	
			13:24			40	19.8	6.76	-153	1.83	2030			Purged dry.
MP13			13:31	7.875			22.1	6.84	-84	0.6	1625	none	Light grey	
			13:35				21.3	6.56	-76	0.24	15517			
			13:39				21.1	6.52	-72	0.06	21326			
			13:41				21.1	6.58	-71	6.3	10073			
			13:43			35	21.2	6.65	-69	0.13	14930			
			~~13:48~~											Purged

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
PI = Polyethylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

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Job No: 11-088 | Date: 27/5/19 | Sampled By: EG/22/SG | Client: SOPM | Site: SIAQ. pre-purge

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
MP11			14:25	4.98	-		20.9	7.81	-128	3.92	3756	H2S	grey	
			14:28				21.1	7.46	-96.9	1.17	3310			
			14:32				21.1	7.07	-75	1.4	3220			
			14:36			25	21.1	6.80	-77	9.85	2489			purged dry.
MP4			14:45	~~[illegible]~~ 4.99		~~[illegible]~~	21.3	6.98	-66	5.42	7907	H2S	cloudy. L.amber	purged dry
			14:52				21.8	6.34	-46	1.93	5626			
			14:56			15	21.8	6.1	-53	2.63	7220			
MP12			1509	6.54										
			1505				21.7	4.38	241	1.53	33990	H2S	red brown	purged dry
			1507			1.	22	4.07	214	0.31	42730			
			1509			10	21.7	4.02	199	1.51	40559			
MP15			1530	7.350										Free flowing. dip only
MP24			1536	7.090										Free flowing. dip only

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
PI = Polyethylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Job No: 117058 | Date: 27/5/19 | Sampled By: SG/ZZ/EG | Client: SOPA | Site: SIAQ

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
MP3			1545	5.01			22.4	5.34	72.1	0.1	13099	H2S	clear	pre-purge
			1547			~~15~~	22.9	6.04	62	0.7	6577			
			1550			18	22	6.05	66.2	2.6	4141			
MP6			1555	5.54			20.3	6.51	1.3	1.22	10722			purged dry.
			1602				19.9	6.54	-154	0.8	11100	leachate		roots growing into well
			1603			~~[illegible]~~	19.2	6.63	-156	1.2	11578		cloudy	purged dry.
			1605			5	21	7.92	-169	0.7	405			
MP7			1615	6.25										
			1620				21.1	7.39	161	2.08	459	H/c		
			1622				21.6	8.76	-218	0.53	10174			
			16:23				21.8	8.86	-228	0.82	29318			
			16:25				21.8	8.85	-234	0.53	22214		light grey	
			16:27				21.1	9.20	-233	1.27	23190		light brown	
LC1	✓		16:43				21.1	9.1	-213	2.63	17039			
														sampled.
LD1			17:00											
														Lock locked nor open.

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
PI = Polyethylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

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Job No: 117088 | Date: 27/5/19 | Sampled By: SG/ZZ/EG | Client: SOPA | Site: SIAQC .. pre-purge

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
GM1			1715	4.78										
GM2			1715	4.85										dip only.
LC2			1720	6.35										dip only
LD2			1730	6.75										dip only.

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
PI = Polyethylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

p.1 of 2

Job No: 117088 Date: 28/5/19 Sampled By: SG/ZZ/EG Client: SOPA Site: BLAY. pre-sample

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
BLAY_4 ✓			0835	10.41	–		20.6	7.36	-160	0.01	10239	Leachate		
			0842				20.8	7.28	-190	0.00	10219			
			0844				20.9	7.28	-197	0.0	10378	H/C	grey w/ black sheen	Spec of S
			0845			20	20.9	7.28	-199	0	10392			
700A ✓			9:26	3.915		3	19.5	7.11	25.9	2.12	11646	none	very light amber	Sample lost. ~~Sampled.~~
			9:28				19.7	7.19	1.2	1.46	7903			Sampled.
BH3 ✓			9:35	2.26										
			0937				19.0	7.3	-149	0.05	10958	strong odour	pale yellow	
			0938				19.3	7.2	-158	0	10824			FD & SD
			0939				19.3	7.16	-161	0	10736			
			0940			60	19.4	7.13	-165	0	10650			
650B ✓			0958	4.22			19.4	7.12	-167	0	10584			
			0959				19.2	7.11	-81	1.1	9984	none	L-brown cloudy	
			1001				19.9	6.98	-90	2.81	39791			
						2	20.0	6.99	-81	2.55	19168			Sampled

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
PI = Polyethylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Job No: 170888 | Date: 28.5.19 | Sampled By: SG/ZZ/EG | Client: SOPA | Site: BLAX pre-sample.

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
500B			1015	1.75			20.2	7.53	37.3	0.52	6654		l. brown	
			1016				21.1	7.37	-30	0.33	12234			
			1017			3	21.2	7.32	-52	1.13	7055			sampled
400A			1030	1.66		5	19.2	7.48	-101	4.25	12047		d. brown	
			1031				19.4	7.28	-95	3.83	11797			
			1032				19.4	7.2	-92	2.58	11579		d. grey	sampled.
400B			1036	2.74			20.0	6.73	-13	1.66	27801	X	v. l. yellow/brown	
			1038			2	20.8	7.03	-23	3.15	11204			sampled
BH5			1050	1.82										
			1052				21.9	6.89	-171	0.08	14520	H_2S		
			1053				21.6	6.89	-150	8.38	102		Dark grey	
			1054			8	21.8	7.08	-131	1.29	16606			sampled.

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
PI = Polyethylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Job No: 117088 | Date: 28/5/19 | Sampled By: SG/ZZ/EG | Client: SOPA | Site: SIAQC

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
MP9	✓		1150	15.32			18.2	7.4	-34	7.03	685	~~Acid~~ H2S	grey	~~AD~~ Extra volume - QA/QC.
			1155				19.5	7.28	-90	0.61	9369			
			1157				19.6	7.21	-92	2.71	2364			
			1159			6	19.5	7.25	-76	3.56	6057			sampled.
MP10	✓		1215	6.54			19.3	7.08	-49	0.05	6755	H2S		
			1219				19.3	7.02	-46	0.06	3766			
			1221				18.7	6.90	-39	1.04	3642			
			1222			7	18.8	6.87	-39	0.42	6909	faint H2S (very)	Light grey	sampled.
MP8	✓		1235	8.22			19.5	6.9	-14.5	0.16	4994	faint H2S	cloudy grey	
			1238				19.8	6.88	-38	0.06	7441			
			1240				19.8	6.91	-33	0.22	3403			
			1241			16	19.2	6.89	-33	0.11	4988	none	cloudy grey	sampled.
MP13	✓		1250	7.90			21.1	6.81	34	0.10	19098	none	light grey	
			1252				21.1	6.78	34.1	0.09	19053	non	ligh grey.	
			1254			12	21.1	6.66	33.9	0.25	19076	non	~~light~~ grey.	Sampled.

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
PI = Polyethylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Job No: 117088 | Date: 26/5/19 | Sampled By: SG / ZZ / AG | Client: SOPA | Site: SIARQ

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
MP11	✓		1350	6.56			20.9	7.52	-118	7.57	52.7	"organic"	v. dark grey	sampled before readings as difficulty in obtaining water
			1400				17.7	7.59	41.3	9.13	53.8			*replace watterra.
							20.3	7.91	64.8	2.42	790			
			1402			3	19.8	7.66	38.4	6.28	479.3			
MP4	✓		1415	8.29			20.9	6.96	15.6	1.09	7796		Light grey	
						2	20.8	6.55	20.7	2.91	7971			Sampled after 2 readings. difficulty in obtaining water
MP12	✓		1430	6.525			21.0	6.09	150	2.31	15811	faint sweet odour		
							21.8	5.21	227	1.14	36212		d. brown	
							21.9	4.83	259	1.45	35582			
							22	4.6	272	1.23	36389			
							21.9	4.4	265	1.57	20198			Sampled.
							21.9	4.34	253	1.10	36250			
MP15	✓		1458	7.38		25	21.4	5.51	92.9	6.15	4949	—	Grey	purged and sampled.
							22.2	5.90	-30	7.36	1161			QA/QC volume
							21.5	6.0	-92	0.09	7104			
							21.2	6.27	-74	6.5	7771		slightly grey	
							21.1	6.36	-79	0.03	5678			
							21.0	6.40	-78	0.02	5605			

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
P = Polyethylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Job No: 170588 | Date: 28/5/19 | Sampled By: SG ZZ EG | Client: GOPA | Site: SIAOC

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
MP2a	✓		1545	7.07			21.7	6.94	-106	2.62	10405	H_2S	L. grey	
							21.1	6.78	-884	4.47	15805			
							20.9	6.71	-92	7.34	8210			
							20.9	6.66	-94	7.1	14380			
							20.9	6.65	101	7.89	9224			
						-22	20.9	6.66	-98.7	0.09	7643			Sampled
MP3	✓		1615	8.70			22.3	6.79	93.3	4.24	9762			sampled after 1 reading
														as insufficient water
MP6			1640	5.58			20.0	8.01	3.6	0.91	18531			* To be replaced + water
							21.6	8.91	-165	0.48	16612			sampled after 2 readings
														as insufficient water
MP7	✓		1650	6.26			21.2	8.62	-213	0.48	13591		L. yellow	* replace water *
							21.8	8.93	-255	0	32481			sampled after 2 reading
														insufficient water

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
PI = Polyethylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Job No: 117088 | Date: 29/5/19 | Sampled By: SE/TT/EG | Client: SOPA | Site: SIAQC

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
LD2	✓		8:40	6.75			21.2	8.20	-21.5	1.4	5276	swmr	slight amber tinge	Bailer
LC2	✓		09:00	6.38			21.0	7.35	174	2.44	6896	none	clear	organics - roots
GM1	✓		0930	4.77			22.8	7.91	111.3	5.17	556	none	clear	bailer
GM2	✓		0940	4.83			22.1	7.72	1454	5.4	3967	none	clear	bailer.
BP1	✓		10:20	3.00			24.8	6.58	1805	6.12	8044	–	clear	bailer
						20+	23.0	6.5	84.9	0.08	20376	–		
							22.5	6.44	-7.5	0.07	20978	–		
							22.3	6.41	-13.8	0.18	20549	–	brown	
							22.8	6.39	5.2	0.23	20166	–	clear.	
						35 47	23.3	6.40	7.3	0.39	20375	–	–	
BD2	FP	✓	11:10	13.71			22.5	6.45	-82	0.55	20814			sampled + QA/QC ✓d
							22.2	6.91	-52	0.03	11091	v. faint H2S	cloudy grey	purged until dry.
							22.3	6.79	-60	0.01	11077	"	"	FD + SD.
							22.3	6.71	-67	0.03	11019	"	"	readings @ 5L interval
							22.4	6.66	-70	0.14	10929	"	"	
							22.4	6.62	-71	0.1	10815	"	"	

Key

Additives
W = no additives
X = conc. HNO_3
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Z = $Na_2S_2O_3$

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±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Job No: 117088 | Date: 29/5/19 | Sampled By: SG/ZZ/EG | Client: SOPA | Site: SIAQC.

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
BP2	✓						22.4	6.6	-73	0.08	10522	none.	slightly grey	
							22.4	6.58	-69	0.07	10167	–		
							22.4	6.57	-66.8	0.07	9862	–	v. faint ~~ole~~ grey	
							22.4	6.56	-62	0.1	9422	–	–	
						50	22.4	6.55	-58	0.13	9233	–	slightly cloudy	
							22.4	6.54	-57	0.14	9219	–		
							22.4	6.54	-56	0.17	9194	–	slightly cloudy.	sampled.
LD1	✓		1140	5.27			21.5	7.90	21	1.99	1303	–	very light brown tint	Bailer. Sampled.

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±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Job No: 117088	Date: 29/5/19	Sampled By: SG/BJ/EG	Client: SOPA	Site: WOO-LA-RA

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
EA1			1237	2.03			20.9	6.85	-105.9	0.24	18788	H_2S	cloudy brown	
							21.1	6.88	-118	0.22	13591			
							21.1	6.88	-126	0.24	14085			
							21.0	6.74	-110	0.38	18056			
							21.1	6.78	-110	0.55	17843			
							21.1	6.73	-103	0.47	18006			
			1243			20	21.1	6.64	-100	0.55	17025			purged dry
350B			1450				20.3	7.19	92	0.36	6953	none	cloudy brown	
							20.5	6.91	121	0.48	79554			
							20.5	6.14	264	2.34	75083			
							20.5	5.47	227	2.92	43886			
			1456	1.63		19	20.5	5.50	160	5.65	10437			purged dry
WOA			1:02	2.01			19.0	5.83	117.7	1.48	60152	none	cloudy orange	
							18.9	5.78	121.1	3.01	61231			
							18.8	5.80	106.1	1.55	35323			purged dry

Key	Additives	Type	Sampling device	Sampling Container	Field Parameters
	W = no additives X = conc. HNO_3 Y = NaOH Z = $Na_2S_2O_3$	SW = Surface water SWC = Creek SWP = Pond SWD = Dam SWL = Puddle GW = Groundwater GWA = Artesian GWS = Sub-artesian	B = Bailer P = Piston S = Spring SP = Submersible pump GD = Gas drive GL = Gas lift SL = Suction lift PD = Positive displacement G = Grab	P = Polyethylene G = Amber glass	Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria ±10% DO when >1ppm (no criteria for<1ppm) ±10% Turbidity ±3% EC ±0.05 pH ±10mV ORP The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

1	19.3	5.68	124.1	2.91	56891
1	19.3	5.61	130.5	2.97	59916
1	19.3	5.57	131.6	3.77	36086
12	19.4	5.56	110.7	4.39	36561

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Job No: 117088 | Date: 29/5/19 | Sampled By: EG/EG/ZZ | Client: SOPA | Site: WOO-LOO-RA / KRONOS HILL

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
~~W1~~			1540	2.05			19.2	7.01	63.3	1.37	584	None	cloudy brown	
							19.5	6.58	47.1	1.24	6627			
							19.4	6.40	33.4	1.78	9627	slightly sweet		
							19.6	6.31	19.6	2.22	8765			
W2-5.6.						3	19.6	6.3	14.1	2.87	8283			purged dry B
~~W3~~			1600	3.45			20.2	6.82	-73.5	1.62	16801	mild H_2S	cloudy brown	
							20.0	6.74	-98.9	4.51	11401	"	"	
KH3-5G						3	20.0	6.73	-102.0	2.12	9735	"	"	purged dry W
~~KH1~~	W		1700	2.356			20.2	7.03	-60.5	0.02	32404	H/C	dark brown	W
							20.5	6.77	-80	0.04	28374			hydrocarbon sheen -
							20.7	6.67	-90	0.31	27348			
							20.6	6.57	-90	0.44	28242			
							20.6	6.52	-76	0.26	30314			
						19	20.5	6.51	-94	6.5	1249			purged dry

Key

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Sampling Container
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±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Job No: 117088	Date: 29/5/19	Sampled By: SG/EG/ZZ	Client: SOPA	Site: Kronos Hill

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
MB5			1723	4.86			20.1	8.04	-98	1.38	1357	H2S	cloudy grey	B
							20.3	7.78	-123	1.7	1429			
							20.3	7.66	-132	1.5	1657			
							20.4	7.61	-116	7.95	1430			
							20.4	7.58	-122	1.77	1820			
							20.4	7.55	-116	4.8	1707			
							20.3	7.49	-86	6.66	1504	H2S		
						15L	20.2	7.45	-93	2.42	1385		v. cl. grey.	not drying

Key

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±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

1 of

Job No: 117088	Date: 30/5/19	Sampled By: SG/ZZ/EG	Client: SOPA	Site: W00

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
W3	✓		~~8:50~~ 9:00	3.935			19.8	5.95	-30.5	0.03	64174	H_2S	light grey.	
PURGE			9:02				20.2	5.92	-79.9	3.43	9372	H_2S	"	
			9:06				20.1	5.83	-87.9	4.21	22570	H_2S	"	Purge water. Purged dry.
			9:28			11	19.9	~~5.82~~	-55.2	1.37	38778	1,2,4 H_2S	"	Monument? bolt disturbed.
W3	✓		9:30	3.01			20.2	6.51	-71.9	5.72	47058		grey, cloudy.	
			9:32				20.4	6.49	-68.4	1.57	44279			
			9:34				19.7	6.65	-52.7	4.21	46142		grey.	
			9:36				19.7	6.69	-46.4	4.08				
			9:40				19.5	6.76	-37.3	2.82	9400		grey cloudy	
			9:41				19.4	6.79	-32.1	3.39	17451			
			9:43			40	19.5	6.81	-32.3	3.68	40111		grey	Sampled
														monument disturbed/sunc
														unable to put gas tap on:
														associated w/ civil works
														algae

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Key	Additives	Type	Sampling device	Sampling Container	Field Parameters
	W = no additives X = conc. HNO_3 Y = NaOH Z = $Na_2S_2O_3$	SW = Surface water SWC = Creek SWP = Pond SWD = Dam SWL = Puddle GW = Groundwater GWA = Artesian GWS = Sub-artesian	B = Bailer P = Piston S = Spring SP = Submersible pump GD = Gas drive GL = Gas lift SL = Suction lift PD = Positive displacement G = Grab	PI = Polyethylene G = Amber glass	Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria ±10% DO when >1ppm (no criteria for<1ppm) ±10% Turbidity ±3% EC ±0.05 pH ±10mV ORP The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

2 of

Job No: 117088 | Date: 30/5/19 | Sampled By: SC/EG/ZC | Client: SOPA | Site: SOPA

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
NL4	✓			3.88			19.4	6.78	-84.3	0.09	35635	LD. sulphur	grey	QA / QC
							19.6	6.67	-89.1	0.10	34439	~~Poor~~	-	FD / SD.
							19.7	6.68	-90.5	0.15	33691	-	-	
							19.7	6.62	-92.9	0.13	33018	-	-	
			10:15			55	19.7	6.61	-94.1	0.14	32701	-	-	Good cond pump. some crumbling of bench.
EA1	✓		10:40	2.11			20.6	7.08	-19	0.3	39184			
							20.8	7.07	-27	0.82	31962		light yellow	
							21.0	7.02	-34	0.48	29897			
						2	21.0	7.02	-44	0.41	27710			sampled. good cond. Lateral movement lid dessorb CO2 gas tap
~~[illegible]~~			11:10	5.62			19.3	6.96	-98.0	0.02	14722	LD. Hydrocarbon	cloudy grey	
T1	✓						19.4	6.88	-101.0	0.12	14738	-	-	
							19.4	6.84	-102.5	0.14	14748	-	-	
							19.4	6.78	-105.4	0.10	14760	H2S	-	~~[illegible]~~ H2S orange odour
			11:20			50	19.4	6.75	-106.6	0.11	14810	H2S	-	
SP18	✓		11:40	1.47		2	18.0	9.31	-46.3	4.03	187.3	none	cloudy grey / Clear	- sampled pump
											274.0			- sampled ~~[illegible]~~ filter

Key

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±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

3 of

Job No: 117088	Date: 30/5/19	Sampled By: EG/SG/ZZ	Client: SOPA	Site: WOO-LA-RA

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
~~[illegible]~~	✓		12:10				19.4	6.7	-68	0.04	25045	H_2S	cloudy light amber	QA - extra volume.
✓NL							19.5	6.6	-75	0.15	24557			
							19.5	6.57	-76	0.11	24446	H_2S + sweet		
			12:12			40	19.5	6.55	-78	0.18	23322	H_2S	Light amber	sample.
							19.5	6.53	-79	0.1	24198	"	"	
			12:14			55	19.5	6.52	-79	0.3	33599	"	"	Condition - Good
✓W4	✓		12:30	7.91			21.2	7.6	-75	0.05	16132	H_2S	cloudy grey	
							20.4	7.2	-87	0.1	16421	"	"	
							20.4	7.1	-91	0.16	16415			
							20.4	7.07	-94	0.1	16393			
							20.4	6.96	-95	0.04	16402			condition - good
							20.4	6.9	-96	0.02	16415			
						30L	20.4	6.86	-96	0.02	16405	H_2S	cloudy grey	pH still decreasing sampled

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Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

p.3 of

Job No: 170688	Date: 30/5/19	Sampled By: SG/EG/ZZ	Client: SOPA	Site: WOO-LA-RA

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
NC2	✓		1320	3.14			20.2	7.35	-48	1.3	34434	H_2S	clear.	
							21.0	6.33	-91	0.02	63020	"	"	
							21.0	6.32	-96	0.13	62798		M/C sheen	
							21.0	6.32	-99	0.08	62776			
						35	21.0	6.32	-99	0.08	63048		becoming clear	sampled.
350B	✓		1340	1.72			19.5	6.3	78	2.29	7977	none	clear	
							20.1	6.19	109	3.0	48954		becoming cloudy	
							20.3	5.96	142	3.42	70489			
						8	20.3	5.32	255	3.11	58921			sampled cond = ~~9000~~.
200A	✓	135°	~~1400~~	2.03			18.6	5.29	171.7	4.06	1426	nom	cloudy brown	-EC probe not ~~reading~~ in cond.
						4	18.8	5.43	174.9	3.48	38094	nom	cloudy brown	sampled bailer.
B35			1410	2.29			16.5	8.27	-44	3.99	37041	H_2S at M/C	Black / d.grey	
							19.5	6.11	-147	0.04	49955			

Key	Additives	Type	Sampling device	Sampling Container	Field Parameters
	W = no additives X = conc. HNO_3 Y = NaOH Z = $Na_2S_2O_3$	SW = Surface water SWC = Creek SWP = Pond SWD = Dam SWL = Puddle GW = Groundwater GWA = Artesian GWS = Sub-artesian	B = Bailer P = Piston S = Spring SP = Submersible pump GD = Gas drive GL = Gas lift SL = Suction lift PD = Positive displacement G = Grab	Pl = Polyethylene G = Amber glass	Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria ±10% DO when >1ppm (no criteria for<1ppm) ±10% Turbidity ±3% EC ±0.05 pH ±10mV ORP The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EAR SCIENCES
CONTAMINATION RESOLVED

P. 4 of.

Job No: 117088 | Date: 30/5/19 | Sampled By: SG/EG/RZ | Client: SOOM | Site: WOO_LA_1a

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
BB5	✓					15	19.6	6.15	-145	0.02	54413	H2S/		
conv.							19.6	6.22	-150	0.03	55565			
							19.7	6.26	-154	0.11	55817			
						40.	19.7	6.28	-157	0.09	55902			sampled. BP
PP19			1430	0.70			14.6	7.25	-106	1.73	14853.		dark grey/black	Sampled
	✓						14.7	7.47	-136	1.72	15343			B.
							14.7	7.55	-148	1.01	15180.			
W1			1500	2.47			19.3	7.77	-64	3.27	7362		cloudy brown	sampled B
W2			1510	3.48			18.5	7.16	-54	2.46	24260			watterra to be
							19.4	7.01	-83	4.03	12942			replaced
							19.3	6.98	-90	3.18	12931			sampled. W.
W3			1550	5.15			19.0	6.79	-79	1.06	43011	faint organic	cloudy light brown	sampled. W
							19.1	6.72	-51	1.38	39769			

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
PI = Polyetnylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Job No: 117088	Date: 31/5/19	Sampled By: SE/EG/ZZ	Client: SOPA	Site: Golf driving range / ~~Wilson~~ park

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
SUMP 1			0810	0.59			11.5	7.96	215.7	4.35	916	slightly [illegible]	cloudy grey	No cap - Grab sample.
BC-U FGDR			0822	SW			9.5	7.95	187.4	2.73	1028	-	cloudy	organic matter @ surface from landscaping activities. sampled
BC-D-FGDR			840	SW			9.4	7.87	184.1	3.15	1015	-	clear	sampled - organic matter @ surface.
Sump5			7:50	dry.										
Sump2			8:15	dry.										
RB2			1050	- sample.										
HC1		SW	1325			X	14.1	6.86	125.6	6.4	50627	saline		HC-SD HC-FD sample
HC2		SW	1350				14.2	7.25	92.5	6.13	50500	Saline		QA-QC extra volume sample
HC3		SW	1445	-			14.3	6.50	21.7	5.72	15275	Saline		sample.
PURGE - WILSON PARK														
MP1			11:10	4.19			20.6	6.5	-6.1	0.19	32373	H_2S	cloudy brown	purge
							20.7	6.20	15.8	1.21	30288		w/sediment	
							20.8	5.99	11.7	0.89	16244			
						10	20.8	5.94	1.7	1.72	30171	none		

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
PI = Polyethylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

P2.

Job No: 117058 | Date: 31/5/19 | Sampled By: SG/TT/EG | Client: GOPA | Site: Wilson Park – Purgo

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
MP2			11:25	2.67			20.7	6.03	29.3	6.11	37555		cloudy brown	
							20.8	6.06	64.2	0.13	24090			
							20.8	5.88	87.7	1.10	22742			
							20.9	5.74	100.6	2.15	21543			
							20.8	5.60	96.0	1.61	28217			
						15	20.9	5.6	87.8	6.59	14616	none	cloudy brown	Purged dry
MP9A			1134	1.96			20.2	6.58	-66.4	0.68	5514	none	cloudy grey	
							20.4	6.68	-124	0.04	7289	-		
							20.5	6.74	-139	0.04	6116			
							20.3	6.86	-134	0.10	5001			
							20.1	6.89	-118	1.31	4353			
						13	20.1	6.78	-116	5.67	732			Purged dry
MP9B			1146	2.36	dip only									dip only
MP6			1147	2.03	dip only									Monument head loose & rubber seal gasket degraded
MP6B			1149	3.195	dip only							Tar		

Key	Additives	Type	Sampling device	Sampling Container	Field Parameters
	W = no additives X = conc. HNO_3 Y = NaOH Z = $Na_2S_2O_3$	SW = Surface water SWC = Creek SWP = Pond SWD = Dam SWL = Puddle GW = Groundwater GWA = Artesian GWS = Sub-artesian	B = Bailer P = Piston S = Spring SP = Submersible pump GD = Gas drive GL = Gas lift SL = Suction lift PD = Positive displacement G = Grab	PI = Polyethylene G = Amber glass	Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria ±10% DO when >1ppm (no criteria for<1ppm) ±10% Turbidity ±3% EC ±0.05 pH ±10mV ORP The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Job No: 170888	Date: 31.5.19	Sampled By: SG/EG/ZZ	Client: SOPA	Site: Wilson Park - Purge.

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
MP6A			11:55	2.735								H2S & Tar	-	dip only.
PP24			12:02	3.340										dip only
PP22			12:10	0.820										dip only.
MP3			12:22	2.32			21.7	6.47	13.8	0.12	71058	none	cloudy light brown	
							21.8	6.40	35.1	0.08	70888	-	-	
							22.0	6.23	68.8	0.06	70617	-	-	
							22.1	6.14	92.1	0.02	70335			
							22.2	6.02	96.5	0.15	66198			
							22.1	5.98	64.3	0.71	69444			
						15	21.9	5.9	65.7	1.16	58485	-	cloudy light brown	purged ~~brown~~ dry.
PP21			12:54	2.86	dip only									
MP4			12:33	2.360		dip only								
MP5			12:35	1.91		dip	only							
MP7A			12:40	2.29		dip	only							
MP7B			12:45	2.11		dip	only							
MP7BR			12:46	2.64		dip	only							

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
Pl = Polyethylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Job No: 117088	Date: 31/5/19	Sampled By: SG/ZZ/EG	Client: SOPA	Site: KROS - sample

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
KROS MP1			14:20	3.10			19.7	7.91	-56	2.50	15284	H2S /	light brown clear	QA-QC extra volume
							19.4	7.5	-50	0.14	13924	Sweet		
							19.4	7.18	-41	0.09	13507			
							19.4	7.06	-37	0.13	13441		cloudy amber	
							19.4	6.91	-36	0.29	13579			
							19.4	6.84	-32	0.42	13168			
						40	19.4	6.73	-32	0.43	14050			sampled. Pump.
KH1			14:55	4.03		20	20.3	6.73	-26	0.11	52384	Faint H2S / HC	cloudy brown	
							20.5	6.6	-22	0.01	52029			
							20.6	6.56	-22	0.03	51864		Sheen.	
						20	20.5	6.52	-20	0.13	50361 ✓			W-Sampled
KH2			15:05	4.04			19.6	6.88	-67	1.63	9661	H2S / HC	light yellow	B-sampled
KH3			15:20	2.50		2	19.2	6.63	-23.3	1.3	19759	H2S	dark brown	W-Sampled before
						10	20.0	6.60	-92	0.0	31426		black	foreign material in well sampled before field reading ∴ low vol. in well
				2.875										

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
PI = Polyethylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

KROS MP2 = DRY @ 14:30.

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

Job No: 44088	Date: 31/5/19	Sampled By: SE/EE/ZZ	Client: SOPA.	Site: KRONOS

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
MP3	✓	✓	1530	2.875			20.2	6.92	-120	0.02	14991	H_2S MC	dark grey	
							20.3	6.92	-144	0.05	14027	"	"	
							20.3	6.96	-155	0.10	13206	"	"	
						25L	20.4	6.95	-154	0.19	10920	"	"	Sampled. W
MP5	✓	✓	1550	5.08		–	20.2	7.45	-51.3	0.97	1781	H_2S	light yellow	Bailer sampled B.
							20.1	7.34	-63.9	1.22	2048	H_2S		
PP5	✓	✓	1610	4.63		–	20.0	6.77	-96.60	1.31	6385	slight MC?	cloudy yellow	Bailer sampled. Water foamy
							20.0	6.79	-100	1.40	6675	"	"	

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
PI = Polyethylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

P1

Job No: 117088	Date: 3.6.19	Sampled By: SG/EG/ZZ	Client: SOPA	Site: Wilson park

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
MP1	✓		0815	4.70			16.2	6.18	-28.6	8.41	614	None	cloudy brown	Sampled before field reading due to 16W volume - replace water, erra
							19.4	5.92	-18.6	1.63	17963	nm	"	
						2	20.1	5.68	19.4	0.70	17745	nm	"	sampled. W
MP2	✓		0830	2.75			20.2	5.41	36.2	2.21	25750	faint H_2S	light cloudy brown	
						5	20.6	5.26	98.1	2.48	11453	faint H_2S	"	sampled W
MP9A	✓		0900	1.92			20.1	6.05	38.5	3.28	3692	none.	cloudy brown	
							20.2	6.14	31.3	1.78	4801	"	"	
							20.2	6.18	30.5	1.05	3451	"	"	
							20.2	6.24	28.7	3.46	3439	"	"	
							20.1	6.30	-9.2	3.68	4691	"	"	
						8	20	6.3	-4.8	2.53	3346	"	"	Sampled. W
MP9B	✓		0930	1.95			19.7	6.47	-42	0.57	3545	none	clear	~~Sa~~ P
							20.3	6.56	-77.1	0.07	3434	"	"	
							19.9	5.36	-60.8	0.13	38720	"	"	
							19.8	5.70	-65.5	0.09	41399	"	"	
						45	19.7	5.85	-71.0	0.03	43085	"	"	S
							19.7	5.92	-73	0.04	43357			Sampled
							19.7	6.04	-75	0.2	43848			

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
PI = Polyethylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

p2.

Job No: 117086	Date: 3.6.19	Sampled By: SG / EG / RT	Client: SOPA	Site: Wilson park

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
MP8	✓		9:45	1.66			14.9	6.45	-72	0.08	32985	paint sweet.	Light grey.	
							18.9	6.49	-72	0	26931		muddy grey	
							19.0	6.39	-73	0	3647			
							19.0	6.41	-75	0	31482			
							19.0	6.40	-76	0	31253			
						40	19.0	6.41	-77.	0	31066			+ QA/QC extra vol
						60	19.0	6.41	-78.7	0	30827	"	"	SD, FD + sample SP.
MP6B			10:10	3.235		~2	21.1	6.98	-30	0.9	9593	Tar	pale amber	B - Grab sample.
MP6A	✓		10:20	2.595		~2	20.1	6.77	-183.4	7.30	22526	strong H_2S Tar	pale amber.	B - Grab sample.
PP24			10:30	3.51		~2	20.2	7.46	-75.6	1.66	19357	Tar	pale amber. photoreactive to black	B - Grab sample.
														Tar smears. Globules sampled before field readings.
PP22	✓		10:55	0.84		~2	18.2	7.52	-0.5	3.3	2071	none	clear	B - Grab sample.

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
Pl = Polyethylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

P3

Job No: 117088	Date: 3.6.18	Sampled By: SG / EG / ZC	Client: SOPA	Site: Wilson Park

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
MP3	✓		11:20	3.03			21.3	5.99	3.9	4.28	39858	none	higher cloudy brown	W. sampled
							21.7	5.57	96.3	1.23	37504			
MP4	✓		1130	2.31			20.1	6.46	37.8	3.13	21605	clear	none.	QA QC volume
							21.8	6.25	26.7	0.17	33677	cloudy		SP. sample
							21.9	6.15	22.4	0.1	29628			
							21.9	6.14	19.0	0.09	29953			
							21.8	5.98	26.7	4.3	34449			
						35	21.9	5.98	34.	1.4	46448	"	"	sampled
MP5	✓		1200	1.78			19.5	5.92	59.4	0.16	51928	-	cloudy light	FD2, SD2, SP
							20.0	5.87	55.4	0.08	51047	faint H/C ?	brown	
							20.4	5.84	55.1	0.05	50065	-	-	
							20.6	5.81	57.1	0.13	50338	-	-	
							20.2	5.80	57.6	0.2	50660	-	-	
						30	20.1	5.78	57.2	0.24	51097	-	-	sampled.

Key

Additives
W = no additives
X = conc. HNO_3
Y = NaOH
Z = $Na_2S_2O_3$

Type
SW = Surface water
SWC = Creek
SWP = Pond
SWD = Dam
SWL = Puddle
GW = Groundwater
GWA = Artesian
GWS = Sub-artesian

Sampling device
B = Bailer
P = Piston
S = Spring
SP = Submersible pump
GD = Gas drive
GL = Gas lift
SL = Suction lift
PD = Positive displacement
G = Grab

Sampling Container
PI = Polyethylene
G = Amber glass

Field Parameters
Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria
±10% DO when >1ppm (no criteria for<1ppm)
±10% Turbidity
±3% EC
±0.05 pH
±10mV ORP

The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

Field Chemical Characteristics for Water Samples

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

P4

Job No: 114088	Date: 3.6.19	Sampled By: SG/EG/ZZ	Client: SODA	Site: Wilson Park

Sample No	Type + depth	Container + additive	Time	Water level (m)	Stickup (m)	Volume purged (L)	Temp C°	pH	ORP/pE (mV)	Dissolved Oxygen (ppm)	EC µScm⁻¹	Odour	Colour	Comments
PP21	✓		12:30	2.89			20.1	6.0	-28	0.99	33852	Tar	—	Sampled. B before field reading due to free product & tar globs
MP7A	✓		12:40	2.32			18.0	6.37	53.7	9.22	179.9	H/C	light cloudy brown	- full of sediment
							20.5	6.01	-28	0.64	55961			
							20.5	5.97	-14.2	0.3	58458			
							20.5	5.89	-3.7	0.13	81737			
						12	20.5	5.83	2.3	0.41	84128			stable sample. W
MP7B2	✓		1245	2.66								tar		tar impacted.
					Not	sampled.						H/C	Black. heavily impacted with free product and tar	recommend interface probe for depth of product.
PP23			1345	4.53		~2	19.4	6.67	-67.1	1.77	10612	H_2S & faint H/C?	clear	Sampled. B. Grab sample.
							19.8	6.67	-143	1.85	11742			

Key	Additives	Type	Sampling device	Sampling Container	Field Parameters
	W = no additives X = conc. HNO_3 Y = NaOH Z = $Na_2S_2O_3$	SW = Surface water SWC = Creek SWP = Pond SWD = Dam SWL = Puddle GW = Groundwater GWA = Artesian GWS = Sub-artesian	B = Bailer P = Piston S = Spring SP = Submersible pump GD = Gas drive GL = Gas lift SL = Suction lift PD = Positive displacement G = Grab	Pl = Polyethylene G = Amber glass	Field parameters will be measured ex-situ in in-line flow cells with the following stabilisation criteria ±10% DO when >1ppm (no criteria for<1ppm) ±10% Turbidity ±3% EC ±0.05 pH ±10mV ORP The meter will be calibrated as needed (at least daily) and in accordance with the manufacturers specifications (i.e. at least 2-point calibration for pH, EC and DO)

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

APPENDIX C: LABORATORY CHAIN OF CUSTODY AND TRANSCRIPT DOCUMENTATION

CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: SAL

Project Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park **Sheet:** 1 **of** 2

No. of samples	Sample ID/ Depth (* MISSING)	Date sampled	Time sampled	Field Readings: Field pH	Field Temp	Water	TDS	TSS	Oil & Grease	NH4-N	Total CN	Alkalinity	BOD	Dissolved Cu, Pb, Zn						Sample-specific instructions/ notes (SAL 27226)
1	SIAQC GM1 *	28/5				X	X	X	X	X	X	X	X	X						
2	SIAQC GM2 *					X	X	X	X	X	X	X	X	X						
3	SIAQC MP2A					X	X	X	X	X	X	X	X	X						
4	SIAQC MP3					X	X	X	X	X	X	X	X	X						
5	SIAQC MP4					X	X	X	X	X	X	X	X	X						
6	SIAQC MP6					X	X	X	X	X	X	X	X	X						
7	SIAQC MP7					X	X	X	X	X	X	X	X	X						
8	SIAQC MP8					X	X	X	X	X	X	X	X	X						
9	SIAQC MP9					X	X	X	X	X	X	X	X	X						
10	SIAQC MP11					X	X	X	X	X	X	X	X	X						
11	SIAQC MP12					X	X	X	X	X	X	X	X	X						
12	SIAQC MP13					X	X	X	X	X	X	X	X	X						
13	SIAQC MP14					X	X	X	X	X	X	X	X	X						
14	SIAQC MP15	28/5				X	X	X	X	X	X	X	X	X						
15	SIAQC LC1 *	27/5				X	X	X	X	X	X	X	X	X						
~~16~~	~~SIAQC LD1~~					~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~						
~~17~~	~~SIAQC LC2~~					~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~						
~~18~~	~~SIAQC LD2~~					~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~						
16 ~~19~~	SIAQC FD *	28/5				X	X	X	X	X	X	X	X	X						
~~20~~	~~RB1~~					~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	X						
16	TOTAL																			

Job No.: SAL 27226
Received By: A.S
Date: 29/5/19
Temp: Warm Ambient Cool
Date Due: 12/6/19

Turn Around *(circle)*: Standard

Lab Quotation No. *(if applicable)*:

Comments/ Instructions: Please filter at lab for dissolved metals

LOR: TDS (1 mg/L), TSS (1 mg/L), Oil & Grease (1 mg/L), NH4-N (0.01 mg/L), CN (0.001 mg/L)

Alkalinity (1 mg/L), BOD (1 mg/L), dissolved metals (0.001 mg/L), phosphorus (0.01 mg/L)

Send report to *(email address)*: egriffiths@eesigroup.com

Cc: report to *(email address)*: sgoldsmith@eesigroup.com

Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	Elin Griffiths		28/5/19	17:15
Receiving Lab:				
Receiving Lab:				

Phone: (02) 9922 1777
Fax: (02) 9922 1010
PO Box 380, North Sydney, NSW 2059
Email: eesnsw@eesigroup.com

ENVIRONMENTAL EARTH SCIENCES
THE KNOW AND THE HOW

CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: SAL

Project Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park **Sheet:** 2 **of** 2

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Readings: Field Temp	Water	TDS	TSS	Oil & Grease	NH4-N	Total CN	Alkalinity	BOD	Dissolved Cu, Pb, Zn						Sample-specific instructions/ notes
1	BLAX BH3					X	X	X	X	X	X	X	X	X						
2	BLAX BH5					X	X	X	X	X	X	X	X	X						
3	BLAX 400A					X	X	X	X	X	X	X	X	X						
4	BLAX 400B					X	X	X	X	X	X	X	X	X						
5	BLAX 500B					X	X	X	X	X	X	X	X	X						
6	BLAX 650B					X	X	X	X	X	X	X	X	X						
7	BLAX 700A					X	X	X	X	X	X	X	X	X						
8	BLAX 4					X	X	X	X	X	X	X	X	X						
9	BLAX FD					X	X	X	X	X	X	X	X	X						
9	TOTAL					9								X						

Job No.: SAL27226
Received By: A.S
Date: 29/5/19
Temp: Warm Ambient Cool
Date Due: 12/6/19

Turn Around *(circle)*: Standard

Comments/ Instructions: Please filter at lab for dissolved metals

LOR: TDS (1 mg/L), TSS (1 mg/L), Oil & Grease (1 mg/L), NH4-N (0.01 mg/L), CN (0.001 mg/L)

Alkalinity (1 mg/L), BOD (1 mg/L), dissolved metals (0.001 mg/L), phosphorus (0.01 mg/L)

Lab Quotation No. *(if applicable)*:

Send report to *(email address)*: egriffiths@eesigroup.com

Cc: report to *(email address)*: sgoldsmith@eesigroup.com

Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	~~Elin Griffiths~~ Sam Goldsmith		28/5/19	17:15
Receiving Lab:				
Receiving Lab:				

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ENVIRONMENTAL EARTH SCIENCES
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CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: SAL

Project Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park **Sheet:** 1 **of** 1

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Readings: Field Temp	Water	TDS	TSS	Oil & Grease	NH4-N	Total CN	Alkalinity	BOD	Dissolved Cu, Pb, Zn						Sample-specific instructions/ notes
1	SIAQC GM1	29/05/2019				X	X	X	X	X	X	X	X	X						
2	SIAQC GM2	29/05/2019				X	X	X	X	X	X	X	X	X						
3	SIAQC LC1	28/05/2019				X	X	X	X	X	X	X	X	X						
4	SIAQC LD1	29/05/2019				X	X	X	X	X	X	X	X	X						
5	SIAQC LC2	29/05/2019				X	X	X	X	X	X	X	X	X						
6	SIAQC LD2	29/05/2019				X	X	X	X	X	X	X	X	X						
7	SIAQC BP1	29/05/2019				X	X	X	X	X	X	X	X	X						at lab extra volume
8	SIAQC BP2	29/05/2019				X	X	X	X	X	X	X	X	X						
9	SIAQC FD	29/05/2019				X	X	X	X	X	X	X	X	X						
10	RB1																			
	TOTAL																			

Job No.: SAL27226
Received By: A-S
Date: 30/5/19
Temp: Warm Ambient Cool
Date Due: 12/6/19

Turn Around *(circle)*: Standard

Comments/ Instructions: Please filter at lab for dissolved metals

LOR: TDS (1 mg/L), TSS (1 mg/L), Oil & Grease (1 mg/L), NH4-N (0.01 mg/L), CN (0.001 mg/L)

Alkalinity (1 mg/L), BOD (1 mg/L), dissolved metals (0.001 mg/L), phosphorus (0.01 mg/L)

Lab Quotation No. *(if applicable)*:

Send report to *(email address)*: egriffiths@eesigroup.com

Cc: report to *(email address)*: sgoldsmith@eesigroup.com

Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	Elin Griffiths		29-May	18:30
Receiving Lab:				
Receiving Lab:				

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CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: SAL

Project Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park **Sheet:** ____ **of** ____

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Temp	Analysis Required: Water	TDS	TSS	Oil & Grease	NH4-N	Total CN	Alkalinity	BOD	Dissolved Cu, Pb, Zn						Sample-specific instructions/ notes
1	WOO PP18	30/05/2019				X	X	X	X	X	X	X	X	X						
2	WOO PP19	30/05/2019				X	X	X	X	X	X	X	X	X						
3	WOO EA1	30/05/2019				X	X	X	X	X	X	X	X	X						
4	WOO NL1	30/05/2019				X	X	X	X	X	X	X	X	X						
5	WOO NL2	30/05/2019				X	X	X	X	X	X	X	X	X						
6	WOO NL4	30/05/2019				X	X	X	X	X	X	X	X	X						
7	WOO B35	30/05/2019				X	X	X	X	X	X	X	X	X						
8	WOO T1	30/05/2019				X	X	X	X	X	X	X	X	X						
9	WOO 200A	30/05/2019				X	X	X	X	X	X	X	X	X						
10	WOO 350B	30/05/2019				X	X	X	X	X	X	X	X	X						
11	WOO N3	30/05/2019				X	X	X	X	X	X	X	X	X						
12	WOO W1	30/05/2019				X	X	X	X	X	X	X	X	X						
13	WOO W2	30/05/2019				X	X	X	X	X	X	X	X	X						
14	WOO W3	30/05/2019				X	X	X	X	X	X	X	X	X						
15	WOO W4	30/05/2019				X	X	X	X	X	X	X	X	X						
16	WOO FD	30/05/2019				X	X	X	X	X	X	X	X	X						
16	TOTAL					16	16	16	16	16	16	16	16	16						

Job No.: SAL 27226
Received By: A.S
Date: 31/5/19
Temp: Warm Ambient Cool
Date Due: 12/6/19

Turn Around *(circle)*: Standard

Comments/ Instructions: Please filter at lab for dissolved metals

LOR: TDS (1 mg/L), TSS (1 mg/L), Oil & Grease (1 mg/L), NH4-N (0.01 mg/L), CN (0.001 mg/L)

Alkalinity (1 mg/L), BOD (1 mg/L), dissolved metals (0.001 mg/L), phosphorus (0.01 mg/L)

Lab Quotation No. *(if applicable)*:

Send report to *(email address)*: egriffiths@eesigroup.com

Cc: report to *(email address)*: sgoldsmith@eesigroup.com

Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	Elin Griffiths		30-May	17:50
Receiving Lab:				
Receiving Lab:				

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ENVIRONMENTAL EARTH SCIENCES
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CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: SAL

Project Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park **Sheet:** 1 **of** 2

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Temp	Analysis Required: Water	TDS	TSS	Oil & Grease	NH4-N	Total CN	Alkalinity	BOD	Dissolved Cu, Pb, Zn	Phosphorus	Dissolved As, Cd, Cr, Cu, Hg, Ni, Pb, Zn	BOD5	EC		Sample-specific instructions/ notes
1	HC_1	31-May				X	X	X	X	X	X	X	X	X						
2	HC_2	31-May				X	X	X	X	X	X	X	X	X						
3	HC_3	31-May				X	X	X	X	X	X	X	X	X						
4	BC_U_FGDR	31-May				X	X			X	X	X				X	X	X		
5	BC_D_FGDR	31-May				X	X			X	X	X				X	X	X		
6	GDR Sump 1	31-May				X	X	X	X	X	X	X	X	X						
7	HC_FD	31-May				X	X	X	X	X	X	X	X	X						
6	TOTAL					6	6	4	4	6	6	6	4	4		2	2	2		

Job No.: SAL27226
Received By: A.S
Date: 29/5/19
Temp: Warm Ambient Cool
Date Due: 12/6/19

Turn Around *(circle)*: Standard

Comments/ Instructions: Please filter at lab for dissolved metals

LOR: TDS (1 mg/L), TSS (1 mg/L), Oil & Grease (1 mg/L), NH4-N (0.01 mg/L), CN (0.001 mg/L)

Alkalinity (1 mg/L), BOD (1 mg/L), dissolved metals (0.001 mg/L), phosphorus (0.01 mg/L)

Lab Quotation No. *(if applicable)*:

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		Signature	Date	Time
Sent off Site/Office by:	Elin Griffiths		2-Jun	6:30
Receiving Lab:				
Receiving Lab:				

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CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: SAL

Project Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park **Sheet:** 2 **of** 2

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Readings: Field Temp	Water	TDS	TSS	Oil & Grease	NH4-N	Total CN	Alkalinity	BOD	Dissolved Cu, Pb, Zn						Sample-specific instructions/ notes
1	KROS_PP2	31/05/2019				X	X	X	X	X	X	X	X	X						
2	KROS_PP5	31/05/2019				X	X	X	X	X	X	X	X	X						
3	KROS_MP1	31/05/2019				X	X	X	X	X	X	X	X	X						
4	KROS_MP~~2~~ 5	31/05/2019				X	X	X	X	X	X	X	X	X						
5	KROS_MP3	31/05/2019				X	X	X	X	X	X	X	X	X						
6	KROS_KH1	31/05/2019				X	X	X	X	X	X	X	X	X						
7	KROS_KH3	31/05/2019				X	X	X	X	X	X	X	X	X						
8	RB2	31/05/2019				X	X	X	X	X	X	X	X	X						
9	RB3	31/05/2019				X	X	X	X	X	X	X	X	X						
	TOTAL																			

Job No.: SAL 27226
Received By: A-S
Date: 29/5/19
Temp: Warm Ambient Cool
Date Due: 12/6/19

Turn Around *(circle)*: Standard

Comments/ Instructions: Please filter at lab for dissolved metals

LOR: TDS (1 mg/L), TSS (1 mg/L), Oil & Grease (1 mg/L), NH4-N (0.01 mg/L), CN (0.001 mg/L)

Alkalinity (1 mg/L), BOD (1 mg/L), dissolved metals (0.001 mg/L), phosphorus (0.01 mg/L)

Lab Quotation No. *(if applicable)*:

Send report to *(email address)*: egriffiths@eesigroup.com

Cc: report to *(email address)*: sgoldsmith@eesigroup.com

Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	Elin Griffiths		3-Jun	6:30
Receiving Lab:				
Receiving Lab:				

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Email: eesnsw@eesigroup.com

ENVIRONMENTAL EARTH SCIENCES
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CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: SAL

Project Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park **Sheet:** 1 **of** 2

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Temp	Analysis Required: Water	TDS	TSS	Oil & Grease	NH4-N	Total CN	Alkalinity	BOD	Dissolved Cu, Pb, Zn	Phosphorus	Dissolved As, Cd, Cr, Cu, Hg, Ni, Pb, Zn	BOD5	EC		Sample-specific instructions/ notes
1	HC_1	31-May				X	X	X	X	X	X	X	X	X						
2	HC_2	31-May				X	X	X	X	X	X	X	X	X						
3	HC_3	31-May				X	X	X	X	X	X	X	X	X						
4	BC_U_FGDR	31-May				X	X			X	X	X				X	X	X		
5	BC_D_FGDR	31-May				X	X			X	X	X				X	X	X		
6	GDR Sump 1	31-May				X	X	X	X	X	X	X	X	X						
7	HC_FD	31-May				X	X	X	X	X	X	X	X	X						
6	TOTAL					6	6	4	4	6	6	6	4	4		2	2	2		

Job No.: SAL27226
Received By: A.S
Date: 29/5/19
Temp: Warm Ambient Cool
Date Due: 12/6/19

Turn Around *(circle)*: Standard

Comments/ Instructions: Please filter at lab for dissolved metals

LOR: TDS (1 mg/L), TSS (1 mg/L), Oil & Grease (1 mg/L), NH4-N (0.01 mg/L), CN (0.001 mg/L)

Alkalinity (1 mg/L), BOD (1 mg/L), dissolved metals (0.001 mg/L), phosphorus (0.01 mg/L)

Lab Quotation No. *(if applicable)*:

Send report to *(email address)*: egriffiths@eesigroup.com

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Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	Elin Griffiths		2-Jun	6:30
Receiving Lab:				
Receiving Lab:				

Phone: (02) 9922 1777
Fax: (02) 9922 1010
PO Box 380, North Sydney, NSW 2059
Email: eesnsw@eesigroup.com

ENVIRONMENTAL EARTH SCIENCES
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CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: SAL

Project Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park **Sheet:** 2 **of** 2

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Readings: Field Temp	Water	TDS	TSS	Oil & Grease	NH4-N	Total CN	Alkalinity	BOD	Dissolved Cu, Pb, Zn						Sample-specific instructions/ notes
1	KROS_PP2	31/05/2019				X	X	X	X	X	X	X	X	X						
2	KROS_PP5	31/05/2019				X	X	X	X	X	X	X	X	X						
3	KROS_MP1	31/05/2019				X	X	X	X	X	X	X	X	X						
4	KROS_MP~~2~~ 5	31/05/2019				X	X	X	X	X	X	X	X	X						
5	KROS_MP3	31/05/2019				X	X	X	X	X	X	X	X	X						
6	KROS_KH1	31/05/2019				X	X	X	X	X	X	X	X	X						
7	KROS_KH3	31/05/2019				X	X	X	X	X	X	X	X	X						
8	RB2	31/05/2019				X	X	X	X	X	X	X	X	X						
9	RB3	31/05/2019				X	X	X	X	X	X	X	X	X						
	TOTAL																			

Job No.: SAL 27226
Received By: A-S
Date: 29/5/19
Temp: Warm Ambient Cool
Date Due: 12/6/19

Turn Around *(circle)*: Standard

Comments/ Instructions: Please filter at lab for dissolved metals

LOR: TDS (1 mg/L), TSS (1 mg/L), Oil & Grease (1 mg/L), NH4-N (0.01 mg/L), CN (0.001 mg/L)

Alkalinity (1 mg/L), BOD (1 mg/L), dissolved metals (0.001 mg/L), phosphorus (0.01 mg/L)

Lab Quotation No. *(if applicable)*:

Send report to *(email address)*: egriffiths@eesigroup.com

Cc: report to *(email address)*: sgoldsmith@eesigroup.com

Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	Elin Griffiths		3-Jun	6:30
Receiving Lab:				
Receiving Lab:				

Phone: (02) 9922 1777
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Email: eesnsw@eesigroup.com

ENVIRONMENTAL EARTH SCIENCES
THE KNOW AND THE HOW

CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: SAL

Project Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park **Sheet:** 1 **of** 1

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Readings: Field Temp	Water	TDS	TSS	Oil & Grease	NH4-N	Total CN	Alkalinity	BOD	Dissolved Cu, Pb, Zn	Phosphorus	HOLD				Sample-specific instructions/ notes
1	WILSON PP21	3/06/2019				X	X	X	X	X	X	X	X	X	X					
2	WILSON PP22	3/06/2019				X	X	X	X	X	X	X	X	X	X					
3	WILSON PP23	3/06/2019				X	X	X	X	X	X	X	X	X	X					
4	WILSON PP24	3/06/2019				X	X	X	X	X	X	X	X	X	X					
5	WILSON MP1	3/06/2019				X	X	X	X	X	X	X	X	X						
6	WILSON MP2	3/06/2019				X	X	X	X	X	X	X	X	X						
7	WILSON MP3	3/06/2019				X	X	X	X	X	X	X	X	X						
8	WILSON MP4	3/06/2019				X	X	X	X	X	X	X	X	X						
9	WILSON MP5	3/06/2019				X	X	X	X	X	X	X	X	X						
10	WILSON MP6A	3/06/2019				X	X	X	X	X	X	X	X	X						
11	WILSON MP6B	3/06/2019				X	X	X	X	X	X	X	X	X						
12	WILSON MP7A	3/06/2019				X	X	X	X	X	X	X	X	X						
13	WILSON MP7B	3/06/2019				X	X	X	X	X	X	X	X	X						
14	WILSON MP8	3/06/2019				X	X	X	X	X	X	X	X	X						
15	WILSON MP9A	3/06/2019				X	X	X	X	X	X	X	X	X						
16	WILSON MP9B	3/06/2019				X	X	X	X	X	X	X	X	X						
17	WILSON FD	3/06/2019				X	X	X	X	X	X	X	X	X						
18	WILSON FD2	3/06/2019				X									X					
	RB4																			
	TOTAL																			

Job No.: SAL 27226
Received By:
Date: 29/5/19
Temp: Warm Ambient Cool
Date Due: 12/6/19

Turn Around *(circle)*: Standard

Comments/ Instructions: Please filter at lab for dissolved metals

LOR: TDS (1 mg/L), TSS (1 mg/L), Oil & Grease (1 mg/L), NH4-N (0.01 mg/L), CN (0.001 mg/L)

Alkalinity (1 mg/L), BOD (1 mg/L), dissolved metals (0.001 mg/L), phosphorus (0.01 mg/L)

Lab Quotation No. *(if applicable)*:

Send report to *(email address)*: egriffiths@eesigroup.com

Cc: report to *(email address)*: sgoldsmith@eesigroup.com

Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	Elin Griffiths		3-Jun	15:40
Receiving Lab:				
Receiving Lab:				

Phone: (02) 9922 1777
Fax: (02) 9922 1010
PO Box 380, North Sydney, NSW 2059
Email: eesnsw@eesigroup.com

ENVIRONMENTAL EARTH SCIENCES
THE KNOW AND THE HOW

SYDNEY
ANALYTICAL
LABORATORIES

Office:
PO BOX 48
ERMINGTON NSW 2115

Laboratory:
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SEVEN HILLS NSW 2147
Telephone: (02) 9838 8903
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A.C.N. 003 614 695
A.B.N. 81 829 182 852
NATA No: 1884

ANALYTICAL REPORT for:

ENVIRONMENTAL & EARTH SCIENCES

PO BOX 380
NORTH SYDNEY 2059

ATTN: E.GRIFFITHS

JOB NO: SAL27226

CLIENT ORDER: 117088

DATE RECEIVED: 29/05/19

DATE COMPLETED: 14/06/19

TYPE OF SAMPLES: WATERS

NO OF SAMPLES: 81

NATA Accredited for compliance with ISO/IEC 17025 Testing

.....
Issued on 14/06/19
Lance Smith
(Chief Chemist)

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION		29/05/19	29/05/19	28/05/19	28/05/19
SAMPLES		SIAQC GM1	SIAQC GM2	SIAQC MP2A	SIAQC MP3
Total Dissolved Solids	mg/L	650	485	6790	8060
Suspended Solids	mg/L	2	<2	330	55
Total Grease (Soxhlet)	mg/L	3	1	<1	<1
Ammonia (Total)	mg/L	<0.01	<0.01	0.12	0.11
Total Cyanide	mg/L	<0.001	<0.001	<0.001	<0.001
Total Alkalinity as CaCO3	mg/L	250	345	760	685
Biochemical Oxygen Demand	mg/L	<1	1	<1	2
Copper	mg/L	0.001	0.009	0.001	<0.001
Lead	mg/L	<0.001	0.002	<0.001	<0.001
Zinc	mg/L	0.29	1.4	0.013	0.017

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION SAMPLES		28/05/19 SIAQC MP4	28/05/19 SIAQC MP6	28/05/19 SIAQC MP7	28/05/19 SIAQC MP8
Total Dissolved Solids	mg/L	8750	21900	22500	4630
Suspended Solids	mg/L	520	280	110	580
Total Grease (Soxhlet)	mg/L	5	1	1	<1
Ammonia (Total)	mg/L	1.2	310	220	1.4
Total Cyanide	mg/L	<0.001	<0.001	0.16	0.004
Total Alkalinity as CaCO3	mg/L	33	675	530	580
Biochemical Oxygen Demand	mg/L	3	1	<1	1
Copper	mg/L	0.005	0.002	<0.001	<0.001
Lead	mg/L	0.003	<0.001	<0.001	<0.001
Zinc	mg/L	0.22	0.030	0.016	0.012

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION SAMPLES		28/05/19 SIAQC MP9	28/05/19 SIAQC MP11	28/05/19 SIAQC MP12	28/05/19 SIAQC MP13
Total Dissolved Solids	mg/L	5480	2610	26700	13100
Suspended Solids	mg/L	2820	2740	1030	380
Total Grease (Soxhlet)	mg/L	3	<1	<1	<1
Ammonia (Total)	mg/L	2.1	0.25	74	0.15
Total Cyanide	mg/L	<0.001	0.001	<0.001	<0.001
Total Alkalinity as CaCO3	mg/L	820	635	<1	685
Biochemical Oxygen Demand	mg/L	4	2	3	<1
Copper	mg/L	<0.001	<0.001	0.31	<0.001
Lead	mg/L	<0.001	<0.001	0.19	<0.001
Zinc	mg/L	0.014	0.006	3.6	0.021

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION SAMPLES		28/05/19 SIAQC MP14	28/05/19 SIAQC MP15	28/05/19 SIAQC LC1	29/05/19 SIAQC LD1
Total Dissolved Solids	mg/L	4940	4380	2430	1300
Suspended Solids	mg/L	20	140	140	<2
Total Grease (Soxhlet)	mg/L	<1	<1	3	<1
Ammonia (Total)	mg/L	15	11	10	0.01
Total Cyanide	mg/L	0.010	0.008	<0.001	0.004
Total Alkalinity as CaCO3	mg/L	445	490	235	215
Biochemical Oxygen Demand	mg/L	<1	<1	4	<1
Copper	mg/L	<0.001	<0.001	0.003	0.003
Lead	mg/L	<0.001	<0.001	0.002	0.001
Zinc	mg/L	0.020	0.026	0.47	0.19

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION SAMPLES		29/05/19 SIAQC LC2	29/05/19 SIAQC LD2	29/05/19 SIAQC BP1	29/05/19 SIAQC BP2
Total Dissolved Solids	mg/L	9170	6880	14600	6560
Suspended Solids	mg/L	7	<2	780	19
Total Grease (Soxhlet)	mg/L	<1	<1	1	3
Ammonia (Total)	mg/L	3.2	63	2.8	0.33
Total Cyanide	mg/L	0.024	0.049	<0.001	0.001
Total Alkalinity as CaCO3	mg/L	1060	120	920	470
Biochemical Oxygen Demand	mg/L	<1	<1	2	<1
Copper	mg/L	0.032	0.002	<0.001	<0.001
Lead	mg/L	0.007	0.001	<0.001	<0.001
Zinc	mg/L	9.5	0.075	0.034	0.018

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION		28/05/19	28/05/19	28/05/19	28/05/19
SAMPLES		SIAQC FD	RB1	BLAX BH3	BLAX BH5
Total Dissolved Solids	mg/L	6610	<1	6590	12100
Suspended Solids	mg/L	20	<2	25	330
Total Grease (Soxhlet)	mg/L	2	<1	2	<1
Ammonia (Total)	mg/L	0.31	<0.01	240	120
Total Cyanide	mg/L	<0.001	<0.001	<0.001	<0.001
Total Alkalinity as CaCO3	mg/L	455	<1	1200	1170
Biochemical Oxygen Demand	mg/L	<1	<1	4	8
Copper	mg/L	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	<0.001	<0.001	<0.001	<0.001
Zinc	mg/L	0.021	<0.001	0.013	0.017

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION		28/05/19	28/05/19	28/05/19	28/05/19
SAMPLES		BLAX 400A	BLAX 400B	BLAX 500B	BLAX 650B
Total Dissolved Solids	mg/L	14400	8560	8700	32300
Suspended Solids	mg/L	54	790	2130	4750
Total Grease (Soxhlet)	mg/L	<1	<1	1	2
Ammonia (Total)	mg/L	150	220	30	1.9
Total Cyanide	mg/L	0.011	0.014	0.005	<0.001
Total Alkalinity as CaCO3	mg/L	1640	1140	1610	685
Biochemical Oxygen Demand	mg/L	7	9	6	3
Copper	mg/L	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	<0.001	<0.001	<0.001	<0.001
Zinc	mg/L	0.025	0.015	0.013	0.010

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION		28/05/19	28/05/19	28/05/19	31/05/19
SAMPLES		BLAX	BLAX	BLAX	KROS
		700A	4	FD	PP2
Total Dissolved Solids	mg/L	8250	6390	6470	12300
Suspended Solids	mg/L	28	600	22	15
Total Grease (Soxhlet)	mg/L	1	7	1	3
Ammonia (Total)	mg/L	31	320	230	355
Total Cyanide	mg/L	0.007	0.004	<0.001	0.097
Total Alkalinity as CaCO3	mg/L	1320	1240	1190	1880
Biochemical Oxygen Demand	mg/L	2	21	4	16
Copper	mg/L	0.001	0.001	<0.001	<0.001
Lead	mg/L	<0.001	<0.001	<0.001	<0.001
Zinc	mg/L	0.017	0.022	0.011	0.014

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION		31/05/19	31/05/19	31/05/19	31/05/19
SAMPLES		KROS PP5	KROS MP1	KROS MP5	KROS MP3
Total Dissolved Solids	mg/L	8260	8840	2380	8550
Suspended Solids	mg/L	49	75	270	84
Total Grease (Soxhlet)	mg/L	7	<1	7	<1
Ammonia (Total)	mg/L	62	36	14	210
Total Cyanide	mg/L	0.023	0.087	0.002	0.13
Total Alkalinity as CaCO3	mg/L	940	495	580	1550
Biochemical Oxygen Demand	mg/L	8	2	3	25
Copper	mg/L	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	<0.001	<0.001	<0.001	<0.001
Zinc	mg/L	0.018	0.022	0.009	0.011

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION		31/05/19	31/05/19	31/05/19	31/05/19
SAMPLES		KROS KH1	KROS KH3	RB2	RB3
Total Dissolved Solids	mg/L	36400	24800	<1	<1
Suspended Solids	mg/L	7200	12900	<2	<2
Total Grease (Soxhlet)	mg/L	11	100	<1	<1
Ammonia (Total)	mg/L	23	93	<0.01	<0.01
Total Cyanide	mg/L	0.038	0.26	<0.001	<0.001
Total Alkalinity as CaCO3	mg/L	1530	1840	<1	<1
Biochemical Oxygen Demand	mg/L	8	31	<1	<1
Copper	mg/L	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	<0.001	<0.001	<0.001	<0.001
Zinc	mg/L	0.023	0.017	<0.001	<0.001

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION		30/05/19	30/05/19	30/05/19	30/05/19
SAMPLES		WOO	WOO	WOO	WOO
		PP18	PP19	EA1	NL1
Total Dissolved Solids	mg/L	270	20500	22100	16700
Suspended Solids	mg/L	2	1250	750	58
Total Grease (Soxhlet)	mg/L	3	21	1	<1
Ammonia (Total)	mg/L	0.12	1.0	9.2	115
Total Cyanide	mg/L	0.002	0.025	<0.001	0.55
Total Alkalinity as CaCO3	mg/L	22	795	1420	1210
Biochemical Oxygen Demand	mg/L	1	23	3	3
Copper	mg/L	0.002	<0.001	<0.001	<0.001
Lead	mg/L	0.003	<0.001	<0.001	<0.001
Zinc	mg/L	0.21	0.025	0.018	0.008

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION		30/05/19	30/05/19	30/05/19	30/05/19
SAMPLES		WOO NL2	WOO NL4	WOO B35	WOO T1
Total Dissolved Solids	mg/L	42800	22200	40200	10400
Suspended Solids	mg/L	110	40	10	67
Total Grease (Soxhlet)	mg/L	<1	1	7	1
Ammonia (Total)	mg/L	52	260	56	140
Total Cyanide	mg/L	0.14	0.53	0.088	0.38
Total Alkalinity as CaCO3	mg/L	1820	1880	2740	1540
Biochemical Oxygen Demand	mg/L	5	3	74	1
Copper	mg/L	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	<0.001	<0.001	<0.001	<0.001
Zinc	mg/L	0.016	0.007	0.005	0.011

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION		30/05/19	30/05/19	30/05/19	30/05/19
SAMPLES		WOO	WOO	WOO	WOO
		200A	350B	N3	W1
Total Dissolved Solids	mg/L	50600	56500	31300	9280
Suspended Solids	mg/L	1540	2200	2080	2020
Total Grease (Soxhlet)	mg/L	1	<1	7	8
Ammonia (Total)	mg/L	2.0	2.5	0.42	0.77
Total Cyanide	mg/L	0.067	0.002	<0.001	0.009
Total Alkalinity as CaCO3	mg/L	28	<1	180	105
Biochemical Oxygen Demand	mg/L	1	3	2	<1
Copper	mg/L	0.11	0.25	0.001	0.001
Lead	mg/L	0.012	0.013	<0.001	<0.001
Zinc	mg/L	0.39	0.92	0.030	0.031

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION		30/05/19	30/05/19	30/05/19	30/05/19
SAMPLES		WOO	WOO	WOO	WOO
		W2	W3	W4	FD
Total Dissolved Solids	mg/L	14400	50300	11500	21800
Suspended Solids	mg/L	770	340	460	41
Total Grease (Soxhlet)	mg/L	3	4	3	2
Ammonia (Total)	mg/L	13	19	32	270
Total Cyanide	mg/L	<0.001	<0.001	0.005	0.51
Total Alkalinity as CaCO3	mg/L	875	850	1130	1870
Biochemical Oxygen Demand	mg/L	3	2	2	3
Copper	mg/L	0.002	0.001	<0.001	<0.001
Lead	mg/L	<0.001	<0.001	<0.001	<0.001
Zinc	mg/L	0.047	0.035	0.027	0.007

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION SAMPLES		30/05/19 HC/1	30/05/19 HC/2	30/05/19 HC/3	30/05/19 HC/FD
Total Dissolved Solids	mg/L	34200	31800	34100	32200
Suspended Solids	mg/L	3	4	6	4
Total Grease (Soxhlet)	mg/L	<1	2	<1	3
Ammonia (Total)	mg/L	0.06	0.08	0.05	0.09
Total Cyanide	mg/L	<0.001	<0.001	<0.001	<0.001
Total Alkalinity as CaCO3	mg/L	120	125	120	120
Biochemical Oxygen Demand	mg/L	<1	<1	<1	1
Copper	mg/L	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	<0.001	<0.001	<0.001	<0.001
Zinc	mg/L	0.025	0.032	0.035	0.029

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION SAMPLES		30/05/19 GDR SUMP 1	03/06/19 WP/PP21	03/06/19 WP/PP22	03/06/19 WP/PP23
Total Dissolved Solids	mg/L	670	44700	2670	13300
Suspended Solids	mg/L	1520	81	<2	4
Total Grease (Soxhlet)	mg/L	16	8	7	3
Ammonia (Total)	mg/L	0.05	2.1	<0.01	1.1
Total Cyanide	mg/L	<0.001	<0.001	0.013	0.070
Total Alkalinity as CaCO3	mg/L	220	410	270	1220
Biochemical Oxygen Demand	mg/L	7	6	2	2
Copper	mg/L	<0.001	0.006	<0.001	<0.001
Lead	mg/L	<0.001	0.001	<0.001	<0.001
Zinc	mg/L	0.031	0.18	0.052	0.031
Total Phosphorus	mg/L		0.06	0.25	0.05

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION SAMPLES		03/06/19 WP/PP24	03/06/19 WP/MP1	03/06/19 WP/MP2	03/06/19 WP/MP3
Total Dissolved Solids	mg/L	13100	22900	12600	47700
Suspended Solids	mg/L	18	6080	610	840
Total Grease (Soxhlet)	mg/L	1	9	2	<1
Ammonia (Total)	mg/L	5.1	1.3	1.2	0.53
Total Cyanide	mg/L	0.008	0.003	<0.001	<0.001
Total Alkalinity as CaCO3	mg/L	1300	6	<1	<1
Biochemical Oxygen Demand	mg/L	55	5	2	3
Copper	mg/L	<0.001	0.004	0.004	0.003
Lead	mg/L	<0.001	0.002	0.002	0.002
Zinc	mg/L	0.030	0.23	0.16	0.12
Total Phosphorus	mg/L	0.40			

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION SAMPLES		03/06/19 WP/MP4	03/06/19 WP/MP5	03/06/19 WP/MP6A	03/06/19 WP/MP6B
Total Dissolved Solids	mg/L	23700	36500	29400	12500
Suspended Solids	mg/L	1190	830	3	13
Total Grease (Soxhlet)	mg/L	<1	<1	3	5
Ammonia (Total)	mg/L	0.21	1.5	0.69	2.8
Total Cyanide	mg/L	<0.001	<0.001	<0.001	0.021
Total Alkalinity as CaCO3	mg/L	140	200	2230	1830
Biochemical Oxygen Demand	mg/L	<1	2	59	32
Copper	mg/L	0.005	0.002	<0.001	<0.001
Lead	mg/L	0.003	0.001	<0.001	<0.001
Zinc	mg/L	0.39	0.13	0.022	0.019

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION SAMPLES		03/06/19 WP/MP7A	03/06/19 WP/MP7B	03/06/19 WP/MP8	03/06/19 WP/MP9A
Total Dissolved Solids	mg/L	60700	17900	20400	3820
Suspended Solids	mg/L	4160	1020	110	250
Total Grease (Soxhlet)	mg/L	23	230	7	3
Ammonia (Total)	mg/L	5.6	3.4	3.0	1.9
Total Cyanide	mg/L	<0.001	0.005	<0.001	<0.001
Total Alkalinity as CaCO3	mg/L	160	805	845	585
Biochemical Oxygen Demand	mg/L	11	98	<1	2
Copper	mg/L	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	<0.001	<0.001	<0.001	<0.001
Zinc	mg/L	0.055	0.024	0.036	0.021

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION SAMPLES		03/06/19 WP/MP9B	03/06/19 WP/FD	03/06/19 RB4	31/05/19 BCU_FGDR
Total Dissolved Solids	mg/L	29900	20600	<1	720
Suspended Solids	mg/L	41	100	<2	
Total Grease (Soxhlet)	mg/L	3	5	<1	
Ammonia (Total)	mg/L	3.3	3.1	<0.01	2.2
Total Cyanide	mg/L	<0.001	<0.001	<0.001	<0.001
Total Alkalinity as CaCO3	mg/L	1040	850	<1	125
Biochemical Oxygen Demand	mg/L	<1	<1	<1	1
Copper	mg/L	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	<0.001	<0.001	<0.001	<0.001
Zinc	mg/L	0.019	0.040	<0.001	0.012
Cadmium	mg/L				<0.0002
Chromium	mg/L				<0.01
Nickel	mg/L				<0.01
Arsenic	mg/L				<0.01
Mercury	mg/L				<0.001
Conductivity	uS/cm				1130

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION SAMPLES		31/05/19 BCD_FGDR	03/06/19 BLANK/1	03/06/19 BLANK/2	03/06/19 BLANK/3
Total Dissolved Solids	mg/L	610	<1	<1	<1
Suspended Solids	mg/L		<2	<2	<2
Total Grease (Soxhlet)	mg/L		<1	<1	<1
Ammonia (Total)	mg/L	2.3	<0.01	<0.01	<0.01
Total Cyanide	mg/L	<0.001	<0.001	<0.001	<0.001
Total Alkalinity as CaCO3	mg/L	130	<1	<1	<1
Biochemical Oxygen Demand	mg/L	2	<1	<1	<1
Copper	mg/L	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	<0.001	<0.001	<0.001	<0.001
Zinc	mg/L	0.010	<0.001	<0.001	<0.001
Total Phosphorus	mg/L				<0.01
Cadmium	mg/L	<0.0002			<0.0002
Chromium	mg/L	<0.01			<0.01
Nickel	mg/L	<0.01			<0.01
Arsenic	mg/L	<0.01			<0.01
Mercury	mg/L	<0.001			<0.0001
Conductivity	uS/cm	1000			1.1

SYDNEY ANALYTICAL LABORATORIES

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

DATE OF COLLECTION		29/05/19	30/05/19	03/06/19
SAMPLES		SIAQC DUP	WOO DUP	WP/PP24 DUP
Total Dissolved Solids	mg/L	6520	43500	13500
Suspended Solids	mg/L	19	120	21
Total Grease (Soxhlet)	mg/L	4	<1	2
Ammonia (Total)	mg/L	0.31	55	4.9
Total Cyanide	mg/L	0.002	0.13	0.008
Total Alkalinity as CaCO3	mg/L	470	1790	1290
Biochemical Oxygen Demand	mg/L	<1	5	54
Copper	mg/L	<0.001	<0.001	<0.001
Lead	mg/L	<0.001	<0.001	<0.001
Zinc	mg/L	0.016	0.014	0.033

SYDNEY ANALYTICAL LABORATORIES

LABORATORY DUPLICATE REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

Sample Number	Analyte	Units	MDL	Sample Result	Duplicate Result	%RPD
SIAQC/BP2	TDS	mg/L	1	6560	6520	1
WOO/NL2	TDS	mg/L	1	42800	43500	2
WP/PP24	TDS	mg/L	1	13100	13500	3
SIAQC/BP2	Suspended Sols	mg/L	2	19	19	0
WOO/NL2	Suspended Sols	mg/L	2	110	120	9
WP/PP24	Suspended Sols	mg/L	2	18	21	15
SIAQC/BP2	Total Grease	mg/L	1	3	4	25
WOO/NL2	Total Grease	mg/L	1	<1	<1	0
WP/PP24	Total Grease	mg/L	1	1	2	50
SIAQC/BP2	Ammonia	mg/L	0.01	0.33	0.31	6
WOO/NL2	Ammonia	mg/L	0.01	52	55	6
WP/PP24	Ammonia	mg/L	0.01	5.1	4.9	4
SIAQC/BP2	Total Cyanide	mg/L	0.001	0.001	0.002	50
WOO/NL2	Total Cyanide	mg/L	0.001	0.14	0.13	7
WP/PP24	Total Cyanide	mg/L	0.001	0.008	0.008	0
SIAQC/BP2	Alkalinity	mg/L	1	470	470	0
WOO/NL2	Alkalinity	mg/L	1	1820	1790	2
WP/PP24	Alkalinity	mg/L	1	1300	1290	1
SIAQC/BP2	BOD	mg/L	1	<1	<1	0
WOO/NL2	BOD	mg/L	1	5	5	0
WP/PP24	BOD	mg/L	1	55	54	2
SIAQC/BP2	Copper	mg/L	0.001	<0.001	<0.001	0
WOO/NL2	Copper	mg/L	0.001	<0.001	<0.001	0
WP/PP24	Copper	mg/L	0.001	<0.001	<0.001	0
SIAQC/BP2	Lead	mg/L	0.001	<0.001	<0.001	0
WOO/NL2	Lead	mg/L	0.001	<0.001	<0.001	0
WP/PP24	Lead	mg/L	0.001	<0.001	<0.001	0
SIAQC/BP2	Zinc	mg/L	0.001	0.018	0.016	12
WOO/NL2	Zinc	mg/L	0.001	0.016	0.014	13
WP/PP24	Zinc	mg/L	0.001	0.030	0.033	9

Acceptance criteria:

RPD <50% for low level (<10xMDL)
RPD <20% for medium level (10-50xMDL)
RPD <10% for high level (>50xMDL)
No limit applies at <2xMDL

MDL = Method Detection Limit

ANALYTICAL REPORT

JOB NO: SAL27226
CLIENT ORDER: 117088

METHODS OF PREPARATION AND ANALYSIS

The tests contained in this report have been carried out on the samples as received by the laboratory, in accordance with APHA Standard Methods of Water and Wastewater 22nd Edition, or other approved methods listed below:

2540C	Total Dissolved Solids
2540D	Suspended Solids
5520D	Total Grease (Soxhlet)
4500G	Ammonia (Total)
4500CE	Total Cyanide
2320B	Total Alkalinity as CaCO3
5210B	Biochemical Oxygen Demand
3111C	Copper
3111C	Lead
3111C	Zinc
4500BF	Total Phosphorus
3111C	Cadmium
3111B	Chromium
3111B	Nickel
3114B	Arsenic
3112B	Mercury
2510B	Conductivity

CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: ALS

Project Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park Sheet: ___ of ___

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Temp	Water	TPH - TRH C6-C40	EP132 (PAH) - Ultra Trace PAHs	Sample-specific instructions/ notes
1	BLAX BH3					X	X	X	QA/QC vol.
2	BLAX BH5					X	X	X	
3	BLAX 400A					X	X	X	
4	BLAX 400B					X	X	X	
5	BLAX 500B					X	X	X	
6	BLAX 650B					X	X	X	
7	BLAX 700A					X	X	X	
8	BLAX 4					X	X	X	
9	BLAX FD					X	X	X	
10	BLAX SP								→ HOLD to be forwarded later.
11	Trip Blank					X			
12	Trip Spike					X			
10	TOTAL					12	9	9	

Environmental Division Sydney
Work Order Reference
ES1916394

Telephone : + 61-2-8784 8555

Turn Around *(circle)*:

Comments/ Instructions: **LOR required:** TPH C6-C9 (0.5 mg/L), TPH C10-C36 (0.5 mg/L), total PAH (0.0001 mg/L)
Some additional bottles for QA/QC

Lab Quotation No. *(if applicable)*: SY-343-17 D

Send report to *(email address)*: egriffiths@eesigroup.com

Cc: report to *(email address)*: sgoldsmith@eesigroup.com

Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	Sam Goldsmith ~~Elin Griffiths~~		28/5/19	17:15
Receiving Lab:	FAS		29/5/19	11:20
Receiving Lab:				

Phone: (02) 9922 1777
Fax: (02) 9922 1010
PO Box 380, North Sydney, NSW 2059
Email: egriffiths@eesigroup.com

ENVIRONMENTAL EARTH SCIENCES
THE KNOW AND THE HOW

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1916394**	Page	: 1 of 8
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: ELIN GRIFFITHS	Contact	: Peter Ravlic
Address	: 82-84 Dickson Avenue ARTARMON NSW, AUSTRALIA 2064	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9645
Project	: 117088	Date Samples Received	: 29-May-2019 11:30
Order number	:	Date Analysis Commenced	: 30-May-2019
C-O-C number	: ----	Issue Date	: 05-Jun-2019 10:43
Sampler	: EG/SG		
Site	: SYDNEY OLYMPIC PARK		
Quote number	: SY/343/17 C		
No. of samples received	: 12		
No. of samples analysed	: 11		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEX compounds spiked at 20 ug/L.
- Total PAH reported as the sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene and Benzo(g,h,i)perylene.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	BLAX BH3	BLAX BH5	BLAX 400A	BLAX 400B	BLAX 500B
			Client sampling date / time	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916394-001	ES1916394-002	ES1916394-003	ES1916394-004	ES1916394-005
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	**20**	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	**210**	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	**210**	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	**150**	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	**150**	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	**3**	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	**3**	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	**0.1**	<0.1	<0.1	<0.1
Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	**0.1**	<0.1	<0.1	<0.1
Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	BLAX BH3	BLAX BH5	BLAX 400A	BLAX 400B	BLAX 500B
			Client sampling date / time	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916394-001	ES1916394-002	ES1916394-003	ES1916394-004	ES1916394-005
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	206-44-0	0.1	µg/L	<0.1	**0.1**	<0.1	<0.1	<0.1
Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	91-20-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	129-00-0	0.1	µg/L	<0.1	**0.2**	<0.1	<0.1	<0.1
^ Sum of PAHs	----	0.05	µg/L	<0.05	**----**	<0.05	<0.05	<0.05
^ Sum of PAHs	----	0.05	µg/L	**----**	**0.5**	**----**	**----**	**----**
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	<0.05	**0.2**	<0.05	<0.05	<0.05
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**112**	**113**	**114**	**114**	**116**
Toluene-D8	2037-26-5	2	%	**117**	**117**	**114**	**110**	**131**
4-Bromofluorobenzene	460-00-4	2	%	**112**	**111**	**104**	**103**	**119**
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	**73.7**	**84.9**	**89.4**	**80.0**	**73.8**
Anthracene-d10	1719-06-8	0.1	%	**64.2**	**79.9**	**76.4**	**63.4**	**62.0**
4-Terphenyl-d14	1718-51-0	0.1	%	**63.8**	**74.0**	**77.2**	**62.4**	**65.1**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	BLAX 650B	BLAX 700A	BLAX 4	BLAX FD	TRIP BLANK
			Client sampling date / time	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916394-006	ES1916394-007	ES1916394-008	ES1916394-009	ES1916394-011
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	**60**	**30**	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	**240**	**150**	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	**80**	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	**320**	**150**	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	**60**	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	**30**	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	**250**	**110**	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	**250**	**110**	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	**31**	**3**	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	**31**	**3**	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	**7**	<5	<5
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	<0.1	**1.2**	<0.1	----
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	**0.5**	<0.1	----
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	**0.1**	<0.1	----
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	BLAX 650B	BLAX 700A	BLAX 4	BLAX FD	TRIP BLANK
			Client sampling date / time	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916394-006	ES1916394-007	ES1916394-008	ES1916394-009	ES1916394-011
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	**0.3**	<0.1	----
Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	**0.4**	<0.1	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Naphthalene	91-20-3	0.1	µg/L	<0.1	<0.1	**4.8**	<0.1	----
Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	**0.7**	<0.1	----
Pyrene	129-00-0	0.1	µg/L	<0.1	**0.1**	**0.4**	<0.1	----
^ Sum of PAHs	----	0.05	µg/L	<0.05	----	----	<0.05	----
^ Sum of PAHs	----	0.05	µg/L	----	**0.1**	**7.2**	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**111**	**117**	**105**	**109**	**96.4**
Toluene-D8	2037-26-5	2	%	**113**	**123**	**109**	**117**	**98.4**
4-Bromofluorobenzene	460-00-4	2	%	**105**	**112**	**102**	**109**	**94.7**
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	**84.6**	**74.5**	**80.8**	**71.2**	----
Anthracene-d10	1719-06-8	0.1	%	**69.4**	**57.7**	**69.0**	**56.6**	----
4-Terphenyl-d14	1718-51-0	0.1	%	**72.1**	**55.0**	**67.9**	**57.1**	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	TRIP SPIKE	----	----	----	----
			Client sampling date / time	29-May-2019 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1916394-012	--------	--------	--------	--------
				Result	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	**15**	----	----	----	----
Toluene	108-88-3	2	µg/L	**14**	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	**14**	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	**14**	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	**15**	----	----	----	----
^ Total Xylenes	----	2	µg/L	**29**	----	----	----	----
^ Sum of BTEX	----	1	µg/L	**72**	----	----	----	----
Naphthalene	91-20-3	5	µg/L	**17**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**98.5**	----	----	----	----
Toluene-D8	2037-26-5	2	%	**106**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	**101**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	43	135
Anthracene-d10	1719-06-8	48	138
4-Terphenyl-d14	1718-51-0	48	144

QUALITY CONTROL REPORT

Work Order	: **ES1916394**	Page	: 1 of 6
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: ELIN GRIFFITHS	Contact	: Peter Ravlic
Address	: 82-84 Dickson Avenue ARTARMON NSW, AUSTRALIA 2064	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9645
Project	: 117088	Date Samples Received	: 29-May-2019
Order number	:	Date Analysis Commenced	: 30-May-2019
C-O-C number	: ----	Issue Date	: 05-Jun-2019
Sampler	: EG/SG		
Site	: SYDNEY OLYMPIC PARK		
Quote number	: SY/343/17 C		
No. of samples received	: 12		
No. of samples analysed	: 11		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2376589)									
ES1916394-001	BLAX BH3	EP071: C15 - C28 Fraction	----	100	µg/L	210	220	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2383387)									
ES1916394-001	BLAX BH3	EP080: C6 - C9 Fraction	----	20	µg/L	20	30	0.00	No Limit
ES1916394-007	BLAX 700A	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2376589)									
ES1916394-001	BLAX BH3	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	150	160	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2383387)									
ES1916394-001	BLAX BH3	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1916394-007	BLAX 700A	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 2383387)									
ES1916394-001	BLAX BH3	EP080: Benzene	71-43-2	1	µg/L	3	3	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1916394-007	BLAX 700A	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
				Laboratory Duplicate (DUP) Report					
EP080: BTEXN (QC Lot: 2383387) - continued									
ES1916394-007	BLAX 700A	EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2376588)									
ES1916394-001	BLAX BH3	EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2376589)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	81.9	70	113
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	90.2	81	111
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	75.3	67	117
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2383387)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	91.1	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2376589)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	79.9	76	112
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	75.2	65	118
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	86.2	77	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2383387)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	94.0	75	127
EP080: BTEXN (QCLot: 2383387)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	101	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	101	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	101	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	99.1	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	101	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	104	70	120
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2376588)								
EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	2 µg/L	98.8	60	120
EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	2 µg/L	66.6	59	123
EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	2 µg/L	81.6	36	144
EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	2 µg/L	69.2	64	122
EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	2 µg/L	69.9	64	126
EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	2 µg/L	78.7	65	127
EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	2 µg/L	88.1	64	130
EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	2 µg/L	96.4	64	126
EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	2 µg/L	95.3	62	126
EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	2 µg/L	97.0	62	126
EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	2 µg/L	78.0	56	126
EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	2 µg/L	105	68	130
EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	2 µg/L	84.9	66	130

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2376588) - continued								
EP132: Coronene	191-07-1	0.1	µg/L	<0.1	2 µg/L	83.0	35	133
EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	2 µg/L	82.4	58	128
EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	2 µg/L	80.6	65	127
EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	2 µg/L	73.5	64	124
EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	2 µg/L	80.4	57	127
EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	2 µg/L	60.5	54	128
EP132: Perylene	198-55-0	0.1	µg/L	<0.1	2 µg/L	98.4	66	130
EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	2 µg/L	78.6	65	129
EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	2 µg/L	80.1	66	128

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2376589)							
ES1916394-001	BLAX BH3	EP071: C10 - C14 Fraction	----	200 µg/L	109	70	130
		EP071: C15 - C28 Fraction	----	250 µg/L	119	71	130
		EP071: C29 - C36 Fraction	----	200 µg/L	101	67	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2383387)							
ES1916394-001	BLAX BH3	EP080: C6 - C9 Fraction	----	325 µg/L	127	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2376589)							
ES1916394-001	BLAX BH3	EP071: >C10 - C16 Fraction	----	250 µg/L	100	70	130
		EP071: >C16 - C34 Fraction	----	350 µg/L	98.2	75	130
		EP071: >C34 - C40 Fraction	----	150 µg/L	102	67	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2383387)							
ES1916394-001	BLAX BH3	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	125	70	130
EP080: BTEXN (QCLot: 2383387)							
ES1916394-001	BLAX BH3	EP080: Benzene	71-43-2	25 µg/L	116	70	130
		EP080: Toluene	108-88-3	25 µg/L	114	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	116	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	113	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	115	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	106	70	130

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%) Low	High
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2376588)							
ES1916394-001	BLAX BH3	EP132: 3-Methylcholanthrene	56-49-5	2 µg/L	96.2	59	115
		EP132: 2-Methylnaphthalene	91-57-6	2 µg/L	71.8	46	120
		EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	2 µg/L	77.5	21	135
		EP132: Acenaphthene	83-32-9	2 µg/L	62.1	62	114
		EP132: Acenaphthylene	208-96-8	2 µg/L	65.6	61	119
		EP132: Anthracene	120-12-7	2 µg/L	74.1	68	116
		EP132: Benz(a)anthracene	56-55-3	2 µg/L	81.9	67	122
		EP132: Benzo(a)pyrene	50-32-8	2 µg/L	87.6	72	114
		EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	2 µg/L	85.4	69	119
		EP132: Benzo(e)pyrene	192-97-2	2 µg/L	87.6	71	119
		EP132: Benzo(g.h.i)perylene	191-24-2	2 µg/L	87.4	49	133
		EP132: Benzo(k)fluoranthene	207-08-9	2 µg/L	91.6	71	124
		EP132: Chrysene	218-01-9	2 µg/L	76.7	70	118
		EP132: Coronene	191-07-1	2 µg/L	128	29	138
		EP132: Dibenz(a.h)anthracene	53-70-3	2 µg/L	82.0	60	122
		EP132: Fluoranthene	206-44-0	2 µg/L	74.0	65	121
		EP132: Fluorene	86-73-7	2 µg/L	# 57.7	63	118
		EP132: Indeno(1.2.3.cd)pyrene	193-39-5	2 µg/L	82.3	57	123
		EP132: Naphthalene	91-20-3	2 µg/L	69.7	53	115
		EP132: Perylene	198-55-0	2 µg/L	79.9	71	118
		EP132: Phenanthrene	85-01-8	2 µg/L	74.3	67	120
		EP132: Pyrene	129-00-0	2 µg/L	74.4	70	117

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1916394**	Page	: 1 of 5
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: ELIN GRIFFITHS	Telephone	: +6138549 9645
Project	: 117088	Date Samples Received	: 29-May-2019
Site	: SYDNEY OLYMPIC PARK	Issue Date	: 05-Jun-2019
Sampler	: EG/SG	No. of samples received	: 12
Order number	:	No. of samples analysed	: 11

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP132B: Polynuclear Aromatic Hydrocarbons	ES1916394--001	BLAX BH3	**Fluorene**	86-73-7	57.7 %	63-118%	**Recovery less than lower data quality objective**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
BLAX BH3,	BLAX BH5,	**29-May-2019**	**30-May-2019**	05-Jun-2019	✓	**03-Jun-2019**	09-Jul-2019	✓
BLAX 400A,	BLAX 400B,							
BLAX 500B,	BLAX 650B,							
BLAX 700A,	BLAX 4,							
BLAX FD								
Amber VOC Vial - Sulfuric Acid (EP080)								
BLAX BH3,	BLAX BH5,	**29-May-2019**	**03-Jun-2019**	12-Jun-2019	✓	**03-Jun-2019**	12-Jun-2019	✓
BLAX 400A,	BLAX 400B,							
BLAX 500B,	BLAX 650B,							
BLAX 700A,	BLAX 4,							
BLAX FD,	TRIP BLANK							

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
BLAX BH3,	BLAX BH5,	**29-May-2019**	**30-May-2019**	05-Jun-2019	✓	**03-Jun-2019**	09-Jul-2019	✓
BLAX 400A,	BLAX 400B,							
BLAX 500B,	BLAX 650B,							
BLAX 700A,	BLAX 4,							
BLAX FD								
Amber VOC Vial - Sulfuric Acid (EP080)								
BLAX BH3,	BLAX BH5,	**29-May-2019**	**03-Jun-2019**	12-Jun-2019	✓	**03-Jun-2019**	12-Jun-2019	✓
BLAX 400A,	BLAX 400B,							
BLAX 500B,	BLAX 650B,							
BLAX 700A,	BLAX 4,							
BLAX FD,	TRIP BLANK							
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
BLAX BH3,	BLAX BH5,	**29-May-2019**	**03-Jun-2019**	12-Jun-2019	✓	**03-Jun-2019**	12-Jun-2019	✓
BLAX 400A,	BLAX 400B,							
BLAX 500B,	BLAX 650B,							
BLAX 700A,	BLAX 4,							
BLAX FD,	TRIP BLANK,							
TRIP SPIKE								
EP132B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP132)								
BLAX BH3,	BLAX BH5,	**29-May-2019**	**30-May-2019**	05-Jun-2019	✓	**03-Jun-2019**	09-Jul-2019	✓
BLAX 400A,	BLAX 400B,							
BLAX 500B,	BLAX 650B,							
BLAX 700A,	BLAX 4,							
BLAX FD								

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	WATER	In house: Referenced to USEPA 3640 (GPC Cleanup), 8270D GCMS Capiliary column, SIM mode. This method is compliant with NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Sep. Funnel Extraction /Acetylation of Phenolic Compounds	ORG14-AC	WATER	In house: Referenced to USEPA 3510 (Extraction) / In-house (Acetylation): A 1L sample is extracted into dichloromethane and concentrated to 1 mL with echange into cyclohexane. Phenolic compounds are reacted with acetic anhydride to yield phenyl acetates suitable for ultra-trace analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: ALS

Project Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park **Sheet:** ____ **of** ____

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Temp	Analysis Required: Water	TPH - TRH C6-C40	EP132 (PAH) - Ultra Trace PAHs											Sample-specific instructions/ notes
1	SIAQC GM1	28/5				X	X	X											
2	SIAQC GM2					X	X	X											
3	SIAQC MP2A					X	X	X											QA/QC vol.
4	SIAQC MP3					X	X	X											
5	SIAQC MP4					X	X	X											
6	SIAQC MP6					X	X	X											
7	SIAQC MP7					X	X	X											
8	SIAQC MP8					X	X	X											
9	SIAQC MP9					X	X	X											QA/QC vol.
10	SIAQC MP11					X	X	X											
11	SIAQC MP12					X	X	X											
12	SIAQC MP13					X	X	X											
13	SIAQC MP14					X	X	X											
14	SIAQC MP15	28/5				X	X	X											
15	SIAQC LC1	27/5				X	X	X											
~~16~~	~~SIAQC LD1~~					~~X~~	~~X~~	~~X~~											
~~17~~	~~SIAQC LC2~~					~~X~~	~~X~~	~~X~~											
~~18~~	~~SIAQC LD2~~					~~X~~	~~X~~	~~X~~											
16 ~~19~~	SIAQC FD	28/5				X	X	X											
~~20~~	~~RB1~~					~~X~~	~~X~~	~~X~~											
16	TOTAL					16 ~~20~~	16 ~~20~~	16 ~~20~~											

Environmental Division Sydney
Work Order Reference
ES1916397
Telephone : + 61-2-8784 8555

Turn Around *(circle)*:

Comments/ Instructions: **LOR required:** TPH C6-C9 (0.5 mg/L), TPH C10-C36 (0.5 mg/L), total PAH (0.0001 mg/L)
Some additional bottles provided for QA/QC

Lab Quotation No. *(if applicable)*: SY-343-17 D
Send report to *(email address)*: egriffiths@eesigroup.com
Cc: report to *(email address)*: sgoldsmith@eesigroup.com
Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	Sam Goldsmith ~~Elin Griffiths~~		28/5/19	17:015
Receiving Lab:	TAS		29/5/19	11:30
Receiving Lab:				

Phone: (02) 9922 1777
Fax: (02) 9922 1010
PO Box 380, North Sydney, NSW 2059
Email: egriffiths@eesigroup.com

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CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: ALS

Project Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park Sheet: ___ of ___

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Readings: Field Temp	Water	Analysis Required: TPH - TRH C6-C40	Analysis Required: EP132 (PAH) - Ultra Trace PAHs	Sample-specific instructions/ notes
1	SIAQC GM1 SNR	28/5				X	X	X	
2	SIAQC GM2 SNR					X	X	X	
3	SIAQC MP2A					X	X	X	QA/QC vol.
4	SIAQC MP3					X	X	X	
5	SIAQC MP4					X	X	X	
6	SIAQC MP6					X	X	X	
7	SIAQC MP7					X	X	X	
8	SIAQC MP8					X	X	X	
9	SIAQC MP9					X	X	X	QA/QC vol.
10	SIAQC MP11					X	X	X	
11	SIAQC MP12					X	X	X	
12	SIAQC MP13					X	X	X	
13	SIAQC MP14					X	X	X	
14	SIAQC MP15	28/5				X	X	X	
15	SIAQC LC1 SNR	27/5				X	X	X	
~~16~~	~~SIAQC LD1~~					~~X~~	~~X~~	~~X~~	
~~17~~	~~SIAQC LC2~~					~~X~~	~~X~~	~~X~~	
~~18~~	~~SIAQC LD2~~					~~X~~	~~X~~	~~X~~	
16 ~~19~~	SIAQC FD SNR	28/5				X	X	X	
~~20~~	~~RB1~~					~~X~~	~~X~~	~~X~~	
16	TOTAL					16 ~~20~~	16 ~~20~~	16 ~~20~~	

Environmental Division Sydney
Work Order Reference
ES1916397
Telephone : + 61-2-8784 8555

Turn Around (circle):

Comments/ Instructions: **LOR required:** TPH C6-C9 (0.5 mg/L), TPH C10-C36 (0.5 mg/L), total PAH (0.0001 mg/L)
Some additional bottles provided for QA/QC

Lab Quotation No. *(if applicable)*: SY-343-17 D
Send report to *(email address)*: egriffiths@eesigroup.com
Cc: report to *(email address)*: sgoldsmith@eesigroup.com
Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	Sam Goldsmith ~~Elin Griffiths~~	[signature]	28/5/19	17:15
Receiving Lab:	Faidy	[signature]	29/5/19	11:30
Receiving Lab:				

Phone: (02) 9922 1777
Fax: (02) 9922 1010
PO Box 380, North Sydney, NSW 2059
Email: egriffiths@eesigroup.com

ENVIRONMENTAL EARTH SCIENCES
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CERTIFICATE OF ANALYSIS

Work Order	: **ES1916397**	Page	: 1 of 9
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: ELIN GRIFFITHS	Contact	: Peter Ravlic
Address	: 82-84 Dickson Avenue ARTARMON NSW, AUSTRALIA 2064	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9645
Project	: 117088	Date Samples Received	: 29-May-2019 11:30
Order number	: ----	Date Analysis Commenced	: 30-May-2019
C-O-C number	: ----	Issue Date	: 05-Jun-2019 12:10
Sampler	: EG/SG		
Site	: SYDNEY OLYMPIC PARK		
Quote number	: SY/343/17 C		
No. of samples received	: 12		
No. of samples analysed	: 12		

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Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: Positive result confirmed by re-analysis.
- Total PAH reported as the sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene and Benzo(g,h,i)perylene.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	SIAQC MP2A	SIAQC MP3	SIAQC MP4	SIAQC MP6	SIAQC MP7
			Client sampling date / time	28-May-2019 00:00	28-May-2019 00:00	28-May-2019 00:00	28-May-2019 00:00	28-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916397-003	ES1916397-004	ES1916397-005	ES1916397-006	ES1916397-007
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	**90**	**120**
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	**20**	**30**	**50**
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	**30**	**50**
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	**1**
Toluene	108-88-3	2	µg/L	<2	<2	**4**	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	**4**	<1	**1**
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	<0.1	**0.2**	<0.1	**0.4**
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	SIAQC MP2A	SIAQC MP3	SIAQC MP4	SIAQC MP6	SIAQC MP7
			Client sampling date / time	28-May-2019 00:00	28-May-2019 00:00	28-May-2019 00:00	28-May-2019 00:00	28-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916397-003	ES1916397-004	ES1916397-005	ES1916397-006	ES1916397-007
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	91-20-3	0.1	µg/L	<0.1	<0.1	**0.3**	<0.1	**1.0**
Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
^ Sum of PAHs	----	0.05	µg/L	<0.05	<0.05	----	<0.05	----
^ Sum of PAHs	----	0.05	µg/L	----	----	**0.3**	----	**1.0**
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**91.6**	**89.3**	**98.7**	**120**	**112**
Toluene-D8	2037-26-5	2	%	**109**	**115**	**122**	**128**	**116**
4-Bromofluorobenzene	460-00-4	2	%	**110**	**111**	**119**	**114**	**109**
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	**87.5**	**84.5**	**88.1**	**75.5**	**76.9**
Anthracene-d10	1719-06-8	0.1	%	**86.5**	**71.5**	**77.9**	**72.1**	**75.6**
4-Terphenyl-d14	1718-51-0	0.1	%	**93.6**	**72.9**	**77.9**	**71.8**	**77.0**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	SIAQC MP8	SIAQC MP9	SIAQC MP11	SIAQC MP12	SIAQC MP13
			Client sampling date / time	28-May-2019 00:00	28-May-2019 00:00	28-May-2019 00:00	28-May-2019 00:00	28-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916397-008	ES1916397-009	ES1916397-010	ES1916397-011	ES1916397-012
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	SIAQC MP8	SIAQC MP9	SIAQC MP11	SIAQC MP12	SIAQC MP13
			Client sampling date / time	28-May-2019 00:00	28-May-2019 00:00	28-May-2019 00:00	28-May-2019 00:00	28-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916397-008	ES1916397-009	ES1916397-010	ES1916397-011	ES1916397-012
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	91-20-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
^ Sum of PAHs	----	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**95.4**	**105**	**99.6**	**95.3**	**102**
Toluene-D8	2037-26-5	2	%	**116**	**116**	**114**	**96.5**	**109**
4-Bromofluorobenzene	460-00-4	2	%	**108**	**108**	**108**	**98.2**	**99.5**
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	**91.3**	**84.7**	**80.5**	**70.5**	**77.0**
Anthracene-d10	1719-06-8	0.1	%	**68.8**	**72.3**	**74.9**	**58.2**	**66.5**
4-Terphenyl-d14	1718-51-0	0.1	%	**70.7**	**72.5**	**76.8**	**55.7**	**67.0**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	SIAQC MP14	SIAQC MP15	----	----	----
			Client sampling date / time	28-May-2019 00:00	28-May-2019 00:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1916397-013	ES1916397-014	--------	--------	--------
				Result	Result	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	----	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	----	----	----
Toluene	108-88-3	2	µg/L	<2	<2	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	----	----	----
^ Total Xylenes	----	2	µg/L	<2	<2	----	----	----
^ Sum of BTEX	----	1	µg/L	<1	<1	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	----	----	----
2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	<0.1	----	----	----
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	----	----	----
Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	----	----	----
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	----	----	----
Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	----	----	----
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	----	----	----
Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	----	----	----
Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	SIAQC MP14	SIAQC MP15	----	----	----
			Client sampling date / time	28-May-2019 00:00	28-May-2019 00:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1916397-013	ES1916397-014	--------	--------	--------
				Result	Result	----	----	----
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	----	----	----
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	----	----	----
Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	----	----	----
Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	----	----	----
Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	----	----	----
Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	----	----	----
Naphthalene	91-20-3	0.1	µg/L	<0.1	<0.1	----	----	----
Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	----	----	----
Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	----	----	----
Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	----	----	----
^ Sum of PAHs	----	0.05	µg/L	<0.05	<0.05	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	<0.05	<0.05	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**96.5**	**96.7**	----	----	----
Toluene-D8	2037-26-5	2	%	**93.4**	**103**	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	**92.3**	**99.4**	----	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	**75.9**	**80.5**	----	----	----
Anthracene-d10	1719-06-8	0.1	%	**66.9**	**68.8**	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	**68.8**	**69.1**	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	43	135
Anthracene-d10	1719-06-8	48	138
4-Terphenyl-d14	1718-51-0	48	144

QUALITY CONTROL REPORT

Work Order	: **ES1916397**	Page	: 1 of 7
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: ELIN GRIFFITHS	Contact	: Peter Ravlic
Address	: 82-84 Dickson Avenue ARTARMON NSW, AUSTRALIA 2064	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9645
Project	: 117088	Date Samples Received	: 29-May-2019
Order number	: ----	Date Analysis Commenced	: 30-May-2019
C-O-C number	: ----	Issue Date	: 05-Jun-2019
Sampler	: EG/SG		
Site	: SYDNEY OLYMPIC PARK		
Quote number	: SY/343/17 C		
No. of samples received	: 12		
No. of samples analysed	: 12		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2376593)									
ES1916397-003	SIAQC MP2A	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
ES1916397-009	SIAQC MP9	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2382812)									
ES1916366-003	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1916397-009	SIAQC MP9	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2376593)									
ES1916397-003	SIAQC MP2A	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
ES1916397-009	SIAQC MP9	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2382812)									
ES1916366-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1916397-009	SIAQC MP9	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 2382812)									
ES1916366-003	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
				Laboratory Duplicate (DUP) Report					
EP080: BTEXN (QC Lot: 2382812) - continued									
ES1916366-003	Anonymous	EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1916397-009	SIAQC MP9	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2376592)									
ES1916397-003	SIAQC MP2A	EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
ES1916397-009	SIAQC MP9	EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
				Laboratory Duplicate (DUP) Report					
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2376592) - continued									
ES1916397-009	SIAQC MP9	EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2376593)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	79.7	70	113
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	84.3	81	111
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	71.9	67	117
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2382812)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	99.4	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2376593)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	78.6	76	112
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	72.4	65	118
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	89.0	77	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2382812)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	99.7	75	127
EP080: BTEXN (QCLot: 2382812)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	97.8	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	95.7	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	92.8	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	94.4	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	96.4	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	88.2	70	120
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2376592)								
EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	2 µg/L	102	60	120
EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	2 µg/L	95.0	59	123
EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	2 µg/L	78.4	36	144
EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	2 µg/L	83.6	64	122
EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	2 µg/L	87.7	64	126
EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	2 µg/L	83.2	65	127
EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	2 µg/L	91.8	64	130
EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	2 µg/L	98.7	64	126
EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	2 µg/L	99.8	62	126
EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	2 µg/L	104	62	126
EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	2 µg/L	94.3	56	126
EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	2 µg/L	96.8	68	130
EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	2 µg/L	89.9	66	130

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2376592) - continued								
EP132: Coronene	191-07-1	0.1	µg/L	<0.1	2 µg/L	115	35	133
EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	2 µg/L	90.4	58	128
EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	2 µg/L	83.7	65	127
EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	2 µg/L	76.4	64	124
EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	2 µg/L	90.8	57	127
EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	2 µg/L	89.7	54	128
EP132: Perylene	198-55-0	0.1	µg/L	<0.1	2 µg/L	99.5	66	130
EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	2 µg/L	84.3	65	129
EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	2 µg/L	84.7	66	128

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2376593)							
ES1916397-009	SIAQC MP9	EP071: C10 - C14 Fraction	----	200 µg/L	93.8	70	130
		EP071: C15 - C28 Fraction	----	250 µg/L	116	71	130
		EP071: C29 - C36 Fraction	----	200 µg/L	101	67	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2382812)							
ES1916366-003	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	108	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2376593)							
ES1916397-009	SIAQC MP9	EP071: >C10 - C16 Fraction	----	250 µg/L	97.0	70	130
		EP071: >C16 - C34 Fraction	----	350 µg/L	96.8	75	130
		EP071: >C34 - C40 Fraction	----	150 µg/L	106	67	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2382812)							
ES1916366-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	104	70	130
EP080: BTEXN (QCLot: 2382812)							
ES1916366-003	Anonymous	EP080: Benzene	71-43-2	25 µg/L	106	70	130
		EP080: Toluene	108-88-3	25 µg/L	104	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	107	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	102	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	106	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	98.2	70	130

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%) Low	High
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2376592)							
ES1916397-003	SIAQC MP2A	EP132: 3-Methylcholanthrene	56-49-5	2 µg/L	98.4	59	115
		EP132: 2-Methylnaphthalene	91-57-6	2 µg/L	79.4	46	120
		EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	2 µg/L	77.1	21	135
		EP132: Acenaphthene	83-32-9	2 µg/L	78.0	62	114
		EP132: Acenaphthylene	208-96-8	2 µg/L	81.2	61	119
		EP132: Anthracene	120-12-7	2 µg/L	78.4	68	116
		EP132: Benz(a)anthracene	56-55-3	2 µg/L	83.8	67	122
		EP132: Benzo(a)pyrene	50-32-8	2 µg/L	92.2	72	114
		EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	2 µg/L	87.4	69	119
		EP132: Benzo(e)pyrene	192-97-2	2 µg/L	90.6	71	119
		EP132: Benzo(g.h.i)perylene	191-24-2	2 µg/L	81.9	49	133
		EP132: Benzo(k)fluoranthene	207-08-9	2 µg/L	99.0	71	124
		EP132: Chrysene	218-01-9	2 µg/L	81.4	70	118
		EP132: Coronene	191-07-1	2 µg/L	73.4	29	138
		EP132: Dibenz(a.h)anthracene	53-70-3	2 µg/L	88.3	60	122
		EP132: Fluoranthene	206-44-0	2 µg/L	77.3	65	121
		EP132: Fluorene	86-73-7	2 µg/L	84.4	63	118
		EP132: Indeno(1.2.3.cd)pyrene	193-39-5	2 µg/L	86.1	57	123
		EP132: Naphthalene	91-20-3	2 µg/L	76.0	53	115
		EP132: Perylene	198-55-0	2 µg/L	92.6	71	118
		EP132: Phenanthrene	85-01-8	2 µg/L	78.2	67	120
		EP132: Pyrene	129-00-0	2 µg/L	77.7	70	117

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1916397**	Page	: 1 of 5
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: ELIN GRIFFITHS	Telephone	: +6138549 9645
Project	: 117088	Date Samples Received	: 29-May-2019
Site	: SYDNEY OLYMPIC PARK	Issue Date	: 05-Jun-2019
Sampler	: EG/SG	No. of samples received	: 12
Order number	: ----	No. of samples analysed	: 12

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
SIAQC MP2A,	SIAQC MP3,	**28-May-2019**	**30-May-2019**	04-Jun-2019	✓	**03-Jun-2019**	09-Jul-2019	✓
SIAQC MP4,	SIAQC MP6,							
SIAQC MP7,	SIAQC MP8,							
SIAQC MP9,	SIAQC MP11,							
SIAQC MP12,	SIAQC MP13,							
SIAQC MP14,	SIAQC MP15							
Amber VOC Vial - Sulfuric Acid (EP080)								
SIAQC MP2A,	SIAQC MP3,	**28-May-2019**	**03-Jun-2019**	11-Jun-2019	✓	**03-Jun-2019**	11-Jun-2019	✓
SIAQC MP4,	SIAQC MP6,							
SIAQC MP7,	SIAQC MP8,							
SIAQC MP9,	SIAQC MP11,							
SIAQC MP12,	SIAQC MP13,							
SIAQC MP14,	SIAQC MP15							
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
SIAQC MP2A,	SIAQC MP3,	**28-May-2019**	**30-May-2019**	04-Jun-2019	✓	**03-Jun-2019**	09-Jul-2019	✓
SIAQC MP4,	SIAQC MP6,							
SIAQC MP7,	SIAQC MP8,							
SIAQC MP9,	SIAQC MP11,							
SIAQC MP12,	SIAQC MP13,							
SIAQC MP14,	SIAQC MP15							
Amber VOC Vial - Sulfuric Acid (EP080)								
SIAQC MP2A,	SIAQC MP3,	**28-May-2019**	**03-Jun-2019**	11-Jun-2019	✓	**03-Jun-2019**	11-Jun-2019	✓
SIAQC MP4,	SIAQC MP6,							
SIAQC MP7,	SIAQC MP8,							
SIAQC MP9,	SIAQC MP11,							
SIAQC MP12,	SIAQC MP13,							
SIAQC MP14,	SIAQC MP15							

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
SIAQC MP2A,	SIAQC MP3,	**28-May-2019**	**03-Jun-2019**	11-Jun-2019	✓	**03-Jun-2019**	11-Jun-2019	✓
SIAQC MP4,	SIAQC MP6,							
SIAQC MP7,	SIAQC MP8,							
SIAQC MP9,	SIAQC MP11,							
SIAQC MP12,	SIAQC MP13,							
SIAQC MP14,	SIAQC MP15							
EP132B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP132)								
SIAQC MP2A,	SIAQC MP3,	**28-May-2019**	**30-May-2019**	04-Jun-2019	✓	**03-Jun-2019**	09-Jul-2019	✓
SIAQC MP4,	SIAQC MP6,							
SIAQC MP7,	SIAQC MP8,							
SIAQC MP9,	SIAQC MP11,							
SIAQC MP12,	SIAQC MP13,							
SIAQC MP14,	SIAQC MP15							

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	WATER	In house: Referenced to USEPA 3640 (GPC Cleanup), 8270D GCMS Capiliary column, SIM mode. This method is compliant with NEPM (2013) Schedule B(3)

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Sep. Funnel Extraction /Acetylation of Phenolic Compounds	ORG14-AC	WATER	In house: Referenced to USEPA 3510 (Extraction) / In-house (Acetylation): A 1L sample is extracted into dichloromethane and concentrated to 1 mL with echange into cyclohexane. Phenolic compounds are reacted with acetic anhydride to yield phenyl acetates suitable for ultra-trace analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: ALS

Project Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park **Sheet:** 1 **of** 1

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Readings: Field Temp	Water	TPH - TRH C6-C40	EP132 (PAH) - Ultra Trace PAHs	HOLD											Sample-specific instructions/ notes
1	SIAQC GM1	29-May-19				X	X	X												
2	SIAQC GM2	29-May-19				X	X	X												
3	SIAQC BP1	29-May-19				X	X	X												QA/QC extra volume
4	SIAQC BP2	29-May-19				X	X	X												
5	SIAQC LC1	28-May-19				X	X	X												
6	SIAQC LD1	29-May-19				X	X	X												
7	SIAQC LC2	29-May-19				X	X	X												
8	SIAQC LD2	29-May-19				X	X	X												
9	SIAQC FD	29-May-19				X	X	X												
10	SIAQC SD	29-May-19				X	X	X	X											
11	RBI																			
	TOTAL					10	9	9	1											

Environmental Division Sydney
Work Order Reference
ES1916579

Telephone : + 61-2-8784 8555

Turn Around *(circle)*:

Comments/ Instructions: **LOR required:** TPH C6-C9 (0.5 mg/L), TPH C10-C36 (0.5 mg/L), total PAH (0.0001 mg/L)

Lab Quotation No. *(if applicable)*: SY-343-17 D

Send report to *(email address)*: egriffiths@eesigroup.com

Cc: report to *(email address)*: sgoldsmith@eesigroup.com

Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	Elin Griffiths		29-May	18:30
Receiving Lab:	TAD.		30/5/19	11:45a
Receiving Lab:				

Phone: (02) 9922 1777
Fax: (02) 9922 1010
PO Box 380, North Sydney, NSW 2059

Email: egriffiths@eesigroup.com

ENVIRONMENTAL EARTH SCIENCES
THE KNOW AND THE HOW

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1916579**	Page	: 1 of 7
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: ELIN GRIFFITHS	Contact	: Peter Ravlic
Address	: 82-84 Dickson Avenue ARTARMON NSW, AUSTRALIA 2064	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9645
Project	: 117088	Date Samples Received	: 30-May-2019 11:45
Order number	:	Date Analysis Commenced	: 31-May-2019
C-O-C number	: ----	Issue Date	: 06-Jun-2019 16:58
Sampler	: EG/SG		
Site	: Sydney Olympic Park		
Quote number	: SY/343/17 C		
No. of samples received	: 11		
No. of samples analysed	: 10		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Rassem Ayoubi	Senior Organic Chemist	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Total PAH reported as the sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene and Benzo(g,h,i)perylene.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	SIAQC GM1	SIAQC GM2	SIAQC BP1	SIAQC BP2	SIAQC LC1
			Client sampling date / time	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916579-001	ES1916579-002	ES1916579-003	ES1916579-004	ES1916579-005
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	SIAQC GM1	SIAQC GM2	SIAQC BP1	SIAQC BP2	SIAQC LC1
			Client sampling date / time	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916579-001	ES1916579-002	ES1916579-003	ES1916579-004	ES1916579-005
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	91-20-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	**0.3**
Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
^ Sum of PAHs	----	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----
^ Sum of PAHs	----	0.05	µg/L	----	----	----	----	**0.3**
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**104**	**104**	**109**	**108**	**82.8**
Toluene-D8	2037-26-5	2	%	**102**	**100**	**104**	**105**	**89.1**
4-Bromofluorobenzene	460-00-4	2	%	**93.2**	**94.9**	**96.0**	**97.7**	**86.9**
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	**73.5**	**72.9**	**67.4**	**65.6**	**57.3**
Anthracene-d10	1719-06-8	0.1	%	**72.6**	**68.0**	**61.9**	**66.7**	**74.6**
4-Terphenyl-d14	1718-51-0	0.1	%	**75.9**	**69.1**	**64.5**	**73.8**	**79.5**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	SIAQC LD1	SIAQC LC2	SIAQC LD2	SIAQC FD	RB1
			Client sampling date / time	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 08:00
Compound	CAS Number	LOR	Unit	ES1916579-006	ES1916579-007	ES1916579-008	ES1916579-009	ES1916579-011
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	SIAQC LD1	SIAQC LC2	SIAQC LD2	SIAQC FD	RB1
			Client sampling date / time	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 00:00	29-May-2019 08:00
Compound	CAS Number	LOR	Unit	ES1916579-006	ES1916579-007	ES1916579-008	ES1916579-009	ES1916579-011
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	91-20-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
^ Sum of PAHs	----	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**107**	**105**	**117**	**105**	**96.8**
Toluene-D8	2037-26-5	2	%	**105**	**104**	**127**	**103**	**102**
4-Bromofluorobenzene	460-00-4	2	%	**96.2**	**93.6**	**116**	**95.6**	**97.5**
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	**61.7**	**69.7**	**72.4**	**49.6**	**85.0**
Anthracene-d10	1719-06-8	0.1	%	**62.4**	**73.3**	**72.2**	**57.8**	**73.5**
4-Terphenyl-d14	1718-51-0	0.1	%	**65.3**	**78.5**	**74.0**	**64.2**	**72.3**

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	43	135
Anthracene-d10	1719-06-8	48	138
4-Terphenyl-d14	1718-51-0	48	144

QUALITY CONTROL REPORT

Work Order	: **ES1916579**	Page	: 1 of 8
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: ELIN GRIFFITHS	Contact	: Peter Ravlic
Address	: 82-84 Dickson Avenue ARTARMON NSW, AUSTRALIA 2064	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9645
Project	: 117088	Date Samples Received	: 30-May-2019
Order number	:	Date Analysis Commenced	: 31-May-2019
C-O-C number	: ----	Issue Date	: 06-Jun-2019
Sampler	: EG/SG		
Site	: Sydney Olympic Park		
Quote number	: SY/343/17 C		
No. of samples received	: 11		
No. of samples analysed	: 10		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Rassem Ayoubi	Senior Organic Chemist	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2384159)									
ES1916579-003	SIAQC BP1	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1916665-002	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2385586)									
ES1916579-003	SIAQC BP1	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2386295)									
ES1916678-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1916874-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2384159)									
ES1916579-003	SIAQC BP1	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1916665-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2385586)									
ES1916579-003	SIAQC BP1	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2386295)									
ES1916678-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1916874-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 2384159)									
ES1916579-003	SIAQC BP1	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
				Laboratory Duplicate (DUP) Report					
EP080: BTEXN (QC Lot: 2384159) - continued									
ES1916579-003	SIAQC BP1	EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1916665-002	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP080: BTEXN (QC Lot: 2386295)									
ES1916678-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1916874-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2385584)									
ES1916579-003	SIAQC BP1	EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2385584) - continued									
ES1916579-003	SIAQC BP1	EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2384159)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	84.2	75	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2385586)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	84.5	70	113
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	96.2	81	111
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	81.0	67	117
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2386295)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	93.6	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2384159)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	83.9	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2385586)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	83.4	76	112
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	86.8	65	118
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	101	77	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2386295)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	95.8	75	127
EP080: BTEXN (QCLot: 2384159)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	78.0	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	91.4	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	91.9	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	93.8	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	90.0	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	106	70	120
EP080: BTEXN (QCLot: 2386295)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	100	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	97.3	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	95.6	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	94.7	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	96.1	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	96.6	70	120
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2385584)								
EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	2 µg/L	95.7	60	120

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2385584) - continued								
EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	2 µg/L	65.7	59	123
EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	2 µg/L	76.4	36	144
EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	2 µg/L	66.4	64	122
EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	2 µg/L	66.6	64	126
EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	2 µg/L	76.6	65	127
EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	2 µg/L	85.9	64	130
EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	2 µg/L	95.1	64	126
EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	2 µg/L	91.4	62	126
EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	2 µg/L	92.8	62	126
EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	2 µg/L	68.3	56	126
EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	2 µg/L	101	68	130
EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	2 µg/L	82.1	66	130
EP132: Coronene	191-07-1	0.1	µg/L	<0.1	2 µg/L	# 33.9	35	133
EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	2 µg/L	86.9	58	128
EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	2 µg/L	79.6	65	127
EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	2 µg/L	70.0	64	124
EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	2 µg/L	81.8	57	127
EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	2 µg/L	63.6	54	128
EP132: Perylene	198-55-0	0.1	µg/L	<0.1	2 µg/L	96.2	66	130
EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	2 µg/L	76.4	65	129
EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	2 µg/L	78.0	66	128

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2384159)							
ES1916579-003	SIAQC BP1	EP080: C6 - C9 Fraction	----	325 µg/L	94.5	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2385586)							
ES1916579-003	SIAQC BP1	EP071: C10 - C14 Fraction	----	200 µg/L	86.3	70	130
		EP071: C15 - C28 Fraction	----	250 µg/L	109	71	130
		EP071: C29 - C36 Fraction	----	200 µg/L	90.0	67	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2386295)							
ES1916678-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	97.0	70	130

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%) Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2384159)							
ES1916579-003	SIAQC BP1	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	95.8	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2385586)							
ES1916579-003	SIAQC BP1	EP071: >C10 - C16 Fraction	----	250 µg/L	96.7	70	130
		EP071: >C16 - C34 Fraction	----	350 µg/L	92.9	75	130
		EP071: >C34 - C40 Fraction	----	150 µg/L	106	67	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2386295)							
ES1916678-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	94.6	70	130
EP080: BTEXN (QCLot: 2384159)							
ES1916579-003	SIAQC BP1	EP080: Benzene	71-43-2	25 µg/L	88.2	70	130
		EP080: Toluene	108-88-3	25 µg/L	88.9	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	93.1	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	89.6	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	92.8	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	100	70	130
EP080: BTEXN (QCLot: 2386295)							
ES1916678-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	94.3	70	130
		EP080: Toluene	108-88-3	25 µg/L	92.1	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	91.8	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	88.6	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	93.7	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	95.3	70	130
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2385584)							
ES1916579-003	SIAQC BP1	EP132: 3-Methylcholanthrene	56-49-5	2 µg/L	93.1	59	115
		EP132: 2-Methylnaphthalene	91-57-6	2 µg/L	71.5	46	120
		EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	2 µg/L	78.2	21	135
		EP132: Acenaphthene	83-32-9	2 µg/L	# 60.2	62	114
		EP132: Acenaphthylene	208-96-8	2 µg/L	61.8	61	119
		EP132: Anthracene	120-12-7	2 µg/L	73.0	68	116
		EP132: Benz(a)anthracene	56-55-3	2 µg/L	81.8	67	122
		EP132: Benzo(a)pyrene	50-32-8	2 µg/L	89.2	72	114
		EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	2 µg/L	94.1	69	119
		EP132: Benzo(e)pyrene	192-97-2	2 µg/L	87.9	71	119
		EP132: Benzo(g.h.i)perylene	191-24-2	2 µg/L	75.1	49	133
		EP132: Benzo(k)fluoranthene	207-08-9	2 µg/L	84.2	71	124
		EP132: Chrysene	218-01-9	2 µg/L	78.3	70	118

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2385584) - continued							
ES1916579-003	SIAQC BP1	EP132: Coronene	191-07-1	2 µg/L	49.1	29	138
		EP132: Dibenz(a.h)anthracene	53-70-3	2 µg/L	82.7	60	122
		EP132: Fluoranthene	206-44-0	2 µg/L	75.7	65	121
		EP132: Fluorene	86-73-7	2 µg/L	# 60.7	63	118
		EP132: Indeno(1.2.3.cd)pyrene	193-39-5	2 µg/L	80.2	57	123
		EP132: Naphthalene	91-20-3	2 µg/L	65.3	53	115
		EP132: Perylene	198-55-0	2 µg/L	80.8	71	118
		EP132: Phenanthrene	85-01-8	2 µg/L	72.9	67	120
		EP132: Pyrene	129-00-0	2 µg/L	75.2	70	117

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1916579**	Page	: 1 of 5
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: ELIN GRIFFITHS	Telephone	: +6138549 9645
Project	: 117088	Date Samples Received	: 30-May-2019
Site	: Sydney Olympic Park	Issue Date	: 06-Jun-2019
Sampler	: EG/SG	No. of samples received	: 11
Order number	:	No. of samples analysed	: 10

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **Laboratory Control outliers exist - please see following pages for full details.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP132B: Polynuclear Aromatic Hydrocarbons	QC-2385584-002	----	**Coronene**	191-07-1	33.9 %	35-133%	**Recovery less than lower control limit**
Matrix Spike (MS) Recoveries							
EP132B: Polynuclear Aromatic Hydrocarbons	ES1916579--003	SIAQC BP1	**Acenaphthene**	83-32-9	60.2 %	62-114%	**Recovery less than lower data quality objective**
EP132B: Polynuclear Aromatic Hydrocarbons	ES1916579--003	SIAQC BP1	**Fluorene**	86-73-7	60.7 %	63-118%	**Recovery less than lower data quality objective**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / *Container / Client Sample ID(s)*		*Sample Date*	*Extraction / Preparation*			*Analysis*		
			Date extracted	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
RB1		**29-May-2019**	**04-Jun-2019**	05-Jun-2019	✓	**04-Jun-2019**	14-Jul-2019	✓
Amber Glass Bottle - Unpreserved (EP071)								
SIAQC GM1,	SIAQC GM2,	**29-May-2019**	**31-May-2019**	05-Jun-2019	✓	**04-Jun-2019**	10-Jul-2019	✓
SIAQC BP1,	SIAQC BP2,							
SIAQC LC1,	SIAQC LD1,							
SIAQC LC2,	SIAQC LD2,							
SIAQC FD								
Amber VOC Vial - Sulfuric Acid (EP080)								
SIAQC GM1,	SIAQC GM2,	**29-May-2019**	**04-Jun-2019**	12-Jun-2019	✓	**04-Jun-2019**	12-Jun-2019	✓
SIAQC BP1,	SIAQC BP2,							
SIAQC LC1,	SIAQC LD1,							
SIAQC LC2,	SIAQC LD2,							
SIAQC FD,	RB1							

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
RB1		**29-May-2019**	**04-Jun-2019**	05-Jun-2019	✓	**04-Jun-2019**	14-Jul-2019	✓
Amber Glass Bottle - Unpreserved (EP071)								
SIAQC GM1,	SIAQC GM2,	**29-May-2019**	**31-May-2019**	05-Jun-2019	✓	**04-Jun-2019**	10-Jul-2019	✓
SIAQC BP1,	SIAQC BP2,							
SIAQC LC1,	SIAQC LD1,							
SIAQC LC2,	SIAQC LD2,							
SIAQC FD								
Amber VOC Vial - Sulfuric Acid (EP080)								
SIAQC GM1,	SIAQC GM2,	**29-May-2019**	**04-Jun-2019**	12-Jun-2019	✓	**04-Jun-2019**	12-Jun-2019	✓
SIAQC BP1,	SIAQC BP2,							
SIAQC LC1,	SIAQC LD1,							
SIAQC LC2,	SIAQC LD2,							
SIAQC FD,	RB1							
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
SIAQC GM1,	SIAQC GM2,	**29-May-2019**	**04-Jun-2019**	12-Jun-2019	✓	**04-Jun-2019**	12-Jun-2019	✓
SIAQC BP1,	SIAQC BP2,							
SIAQC LC1,	SIAQC LD1,							
SIAQC LC2,	SIAQC LD2,							
SIAQC FD,	RB1							
EP132B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP132)								
RB1		**29-May-2019**	**04-Jun-2019**	05-Jun-2019	✓	**04-Jun-2019**	14-Jul-2019	✓
Amber Glass Bottle - Unpreserved (EP132)								
SIAQC GM1,	SIAQC GM2,	**29-May-2019**	**31-May-2019**	05-Jun-2019	✓	**04-Jun-2019**	10-Jul-2019	✓
SIAQC BP1,	SIAQC BP2,							
SIAQC LC1,	SIAQC LD1,							
SIAQC LC2,	SIAQC LD2,							
SIAQC FD								

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	4	34	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	34	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	34	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	34	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	WATER	In house: Referenced to USEPA 3640 (GPC Cleanup), 8270D GCMS Capiliary column, SIM mode. This method is compliant with NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Sep. Funnel Extraction /Acetylation of Phenolic Compounds	ORG14-AC	WATER	In house: Referenced to USEPA 3510 (Extraction) / In-house (Acetylation): A 1L sample is extracted into dichloromethane and concentrated to 1 mL with echange into cyclohexane. Phenolic compounds are reacted with acetic anhydride to yield phenyl acetates suitable for ultra-trace analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: ALS

Project Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park **Sheet:** 1 **of** 1

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Readings: Field Temp	Water	Analysis Required: EP132 (PAH) - Ultra Trace PAHs	Analysis Required: Suite W4: TRH/TPH (C6-C40) + BTEX (EP080)											Sample-specific instructions/ notes
1	WOO PP18	30/05/2019				X	X	X											
2	WOO PP19	30/05/2019				X	X	X											
3	WOO EA1	30/05/2019				X	X	X											
4	WOO NL1	30/05/2019				X	X	X											
5	WOO NL2	30/05/2019				X	X	X											
6	WOO NL4	30/05/2019				X	X	X											
7	WOO B35	30/05/2019				X	X	X											
8	WOO T1	30/05/2019				X	X	X											
9	WOO 200A	30/05/2019				X	X	X											
10	WOO 350B	30/05/2019				X	X	X											
11	WOO N3	30/05/2019				X	X	X											
12	WOO W1	30/05/2019				X	X	X											
13	WOO W2	30/05/2019				X	X	X											
14	WOO W3	30/05/2019				X	X	X											
15	WOO W4	30/05/2019				X	X	X											
16	WOO FD	30/05/2019				X	X	X											
17	TB2	30/05/2019				X													Trip Blank Sample please analyse accordingly
18	TS2	30/05/2019				X													Trip Spike Sample please analyse accordingly
19	WOO SD	30/05/19				X	X	X											

Environmental Division Sydney
Work Order Reference
ES1916823

Telephone : + 61-2-8784 8555

Turn Around *(circle)*:

Comments/ Instructions:

LOR required: benzene (0.001 mg/L), ethylbenzene (0.001 mg/L), toluene (0.001 mg/L), xylene (0.001 mg/L) total PAH (0.0001 mg/L)

Lab Quotation No. *(if applicable)*: SY-343-17 D

Send report to *(email address)*: egriffiths@eesigroup.com

Cc: report to *(email address)*: sgoldsmith@eesigroup.com

Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	Elin Griffiths		30-May	17:50
Receiving Lab:	ALS Smithfield		31/5/19	01:40PM
Receiving Lab:				

Phone: (02) 9922 1777
Fax: (02) 9922 1010
PO Box 380, North Sydney, NSW 2059
Email: egriffiths@eesigroup.com

ENVIRONMENTAL EARTH SCIENCES
THE KNOW AND THE HOW

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1916823**	Page	: 1 of 11
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: ELIN GRIFFITHS	Contact	: Peter Ravlic
Address	: 82-84 Dickson Avenue ARTARMON NSW, AUSTRALIA 2064	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9645
Project	: 117088	Date Samples Received	: 31-May-2019 13:40
Order number	:	Date Analysis Commenced	: 03-Jun-2019
C-O-C number	: ----	Issue Date	: 07-Jun-2019 17:25
Sampler	: EG / SG		
Site	: Sydney Olympic Park		
Quote number	: SY/343/17 C		
No. of samples received	: 19		
No. of samples analysed	: 18		

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Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Pabi Subba	Senior Organic Chemist	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: Positive results for sample ES1916823_8 has been confirmed by re-analysis.
- Total PAH reported as the sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene and Benzo(g,h,i)perylene.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	WOO PP18	WOO PP19	WOO EA1	WOO NL1	WOO NL2
			Client sampling date / time	30-May-2019 00:00	30-May-2019 00:00	30-May-2019 00:00	30-May-2019 00:00	30-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916823-001	ES1916823-002	ES1916823-003	ES1916823-004	ES1916823-005
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	100	<20	40	290
C10 - C14 Fraction	----	50	µg/L	<50	250	<50	210	230
C15 - C28 Fraction	----	100	µg/L	<100	3170	<100	560	430
C29 - C36 Fraction	----	50	µg/L	<50	980	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	4400	<50	770	660
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	110	<20	40	320
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	60	<20	40	210
>C10 - C16 Fraction	----	100	µg/L	<100	540	<100	410	330
>C16 - C34 Fraction	----	100	µg/L	<100	3480	<100	370	330
>C34 - C40 Fraction	----	100	µg/L	<100	500	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	4520	<100	780	660
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	480	<100	410	320
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	2	<1	<1	36
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	2
Ethylbenzene	100-41-4	2	µg/L	<2	46	<2	<2	60
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	5
ortho-Xylene	95-47-6	2	µg/L	<2	2	<2	<2	6
^ Total Xylenes	----	2	µg/L	<2	2	<2	<2	11
^ Sum of BTEX	----	1	µg/L	<1	50	<1	<1	109
Naphthalene	91-20-3	5	µg/L	<5	62	<5	<5	8
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	0.8	<0.1	<0.1	0.8
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	83-32-9	0.1	µg/L	<0.1	28.3	<0.1	<0.1	17.1
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	13.3	<0.1	0.7	7.9
Anthracene	120-12-7	0.1	µg/L	<0.1	31.1	<0.1	<0.1	2.3
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	42.4	<0.1	<0.1	2.4
Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	47.2	<0.05	<0.05	2.30
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	37.7	<0.1	<0.1	2.2
Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	32.1	<0.1	<0.1	1.9

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	WOO PP18	WOO PP19	WOO EA1	WOO NL1	WOO NL2
			Client sampling date / time	30-May-2019 00:00	30-May-2019 00:00	30-May-2019 00:00	30-May-2019 00:00	30-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916823-001	ES1916823-002	ES1916823-003	ES1916823-004	ES1916823-005
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	31.1	<0.1	<0.1	0.8
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	23.3	<0.1	<0.1	0.6
Chrysene	218-01-9	0.1	µg/L	<0.1	44.3	<0.1	<0.1	2.3
Coronene	191-07-1	0.1	µg/L	<0.1	8.5	<0.1	<0.1	0.1
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	1.6	<0.1	<0.1	0.1
Fluoranthene	206-44-0	0.1	µg/L	<0.1	78.3	<0.1	0.2	5.1
Fluorene	86-73-7	0.1	µg/L	<0.1	4.7	<0.1	<0.1	0.4
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	18.9	<0.1	<0.1	0.5
Naphthalene	91-20-3	0.1	µg/L	<0.1	10.4	<0.1	<0.1	3.7
Perylene	198-55-0	0.1	µg/L	<0.1	4.8	<0.1	<0.1	0.3
Phenanthrene	85-01-8	0.1	µg/L	<0.1	140	<0.1	<0.1	4.5
Pyrene	129-00-0	0.1	µg/L	<0.1	124	<0.1	0.3	7.8
^ Sum of PAHs	----	0.05	µg/L	<0.05	----	<0.05	----	----
^ Sum of PAHs	----	0.05	µg/L	----	677	----	1.2	60.0
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	<0.05	----	<0.05	<0.05	----
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	----	60.1	----	----	3.0
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	104	87.9	127	125	101
Toluene-D8	2037-26-5	2	%	104	85.3	129	128	96.9
4-Bromofluorobenzene	460-00-4	2	%	92.9	98.4	107	112	120
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	80.5	76.8	129	118	82.5
Anthracene-d10	1719-06-8	0.1	%	66.0	66.3	63.0	72.0	68.9
4-Terphenyl-d14	1718-51-0	0.1	%	73.0	56.4	59.9	68.7	69.7

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	WOO NL4	WOO B35	WOO T1	WOO 200A	WOO 350B
			Client sampling date / time	30-May-2019 00:00	30-May-2019 00:00	30-May-2019 00:00	30-May-2019 00:00	30-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916823-006	ES1916823-007	ES1916823-008	ES1916823-009	ES1916823-010
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	30	224000	20	<20	160
C10 - C14 Fraction	----	50	µg/L	390	2980	270	<50	<50
C15 - C28 Fraction	----	100	µg/L	670	920	910	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	1060	3900	1180	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	40	223000	30	<20	160
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	40	17700	30	<20	40
>C10 - C16 Fraction	----	100	µg/L	550	2940	470	<100	<100
>C16 - C34 Fraction	----	100	µg/L	500	660	690	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	1050	3600	1160	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	550	<100	470	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	1	191000	1	<1	125
Toluene	108-88-3	2	µg/L	<2	2510	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	7230	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	2840	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	1710	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	4550	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	1	205000	1	<1	125
Naphthalene	91-20-3	5	µg/L	<5	4440	<5	<5	<5
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	91-57-6	0.1	µg/L	0.6	116	0.5	<0.1	<0.1
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	83-32-9	0.1	µg/L	0.2	17.6	0.4	<0.1	<0.1
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	10.4	<0.1	<0.1	<0.1
Anthracene	120-12-7	0.1	µg/L	<0.1	2.7	<0.1	<0.1	<0.1
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	1.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	1.30	<0.05	<0.05	<0.05
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	1.2	<0.1	<0.1	<0.1
Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	1.0	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	WOO NL4	WOO B35	WOO T1	WOO 200A	WOO 350B
			Client sampling date / time	30-May-2019 00:00	30-May-2019 00:00	30-May-2019 00:00	30-May-2019 00:00	30-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916823-006	ES1916823-007	ES1916823-008	ES1916823-009	ES1916823-010
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	0.3	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	0.4	<0.1	<0.1	<0.1
Chrysene	218-01-9	0.1	µg/L	<0.1	1.0	<0.1	<0.1	<0.1
Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	206-44-0	0.1	µg/L	<0.1	3.1	<0.1	<0.1	<0.1
Fluorene	86-73-7	0.1	µg/L	<0.1	12.5	<0.1	<0.1	<0.1
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	0.2	<0.1	<0.1	<0.1
Naphthalene	91-20-3	0.1	µg/L	0.5	1080	0.7	<0.1	0.2
Perylene	198-55-0	0.1	µg/L	<0.1	0.2	<0.1	<0.1	<0.1
Phenanthrene	85-01-8	0.1	µg/L	<0.1	30.2	<0.1	<0.1	<0.1
Pyrene	129-00-0	0.1	µg/L	<0.1	4.5	<0.1	<0.1	<0.1
^ Sum of PAHs	----	0.05	µg/L	----	----	----	<0.05	----
^ Sum of PAHs	----	0.05	µg/L	0.7	1170	1.1	----	0.2
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	<0.05	----	<0.05	<0.05	<0.05
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	----	1.6	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	105	115	114	119	116
Toluene-D8	2037-26-5	2	%	91.8	99.9	120	92.4	129
4-Bromofluorobenzene	460-00-4	2	%	114	107	102	107	109
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	82.5	59.7	116	109	110
Anthracene-d10	1719-06-8	0.1	%	64.3	68.4	73.2	75.3	70.1
4-Terphenyl-d14	1718-51-0	0.1	%	62.6	62.7	69.1	67.0	49.8

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	WOO N3	WOO W1	WOO W2	WOO W3	WOO W4
			Client sampling date / time	30-May-2019 00:00	30-May-2019 00:00	30-May-2019 00:00	30-May-2019 00:00	30-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916823-011	ES1916823-012	ES1916823-013	ES1916823-014	ES1916823-015
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	**30**
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	**120**
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	**560**
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	**680**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	**30**
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	**30**
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	**210**
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	**450**
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	**660**
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	**210**
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	**0.2**
Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	WOO N3	WOO W1	WOO W2	WOO W3	WOO W4
			Client sampling date / time	30-May-2019 00:00	30-May-2019 00:00	30-May-2019 00:00	30-May-2019 00:00	30-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916823-011	ES1916823-012	ES1916823-013	ES1916823-014	ES1916823-015
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	**0.2**
Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	91-20-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	**0.3**
^ Sum of PAHs	----	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	**----**
^ Sum of PAHs	----	0.05	µg/L	**----**	**----**	**----**	**----**	**0.7**
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**114**	**95.6**	**107**	**112**	**103**
Toluene-D8	2037-26-5	2	%	**113**	**98.3**	**108**	**109**	**108**
4-Bromofluorobenzene	460-00-4	2	%	**96.5**	**85.5**	**90.7**	**90.2**	**91.0**
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	**93.6**	**64.4**	**75.4**	**69.9**	**64.3**
Anthracene-d10	1719-06-8	0.1	%	**80.3**	**64.5**	**71.2**	**71.7**	**69.8**
4-Terphenyl-d14	1718-51-0	0.1	%	**60.5**	**68.5**	**76.2**	**76.9**	**72.4**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	WOO FD	TB2	TS2	----	----
			Client sampling date / time	30-May-2019 00:00	28-May-2019 00:00	27-May-2019 00:00	----	----
Compound	CAS Number	LOR	Unit	ES1916823-016	ES1916823-017	ES1916823-018	--------	--------
				Result	Result	Result	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	**40**	<20	----	----	----
C10 - C14 Fraction	----	50	µg/L	**520**	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	**800**	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	**1320**	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	**50**	<20	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	**50**	<20	----	----	----
>C10 - C16 Fraction	----	100	µg/L	**720**	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	**590**	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	**1310**	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	**720**	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	**3**	<1	**17**	----	----
Toluene	108-88-3	2	µg/L	<2	<2	**15**	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	**16**	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	**17**	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	**15**	----	----
^ Total Xylenes	----	2	µg/L	<2	<2	**32**	----	----
^ Sum of BTEX	----	1	µg/L	**3**	<1	**80**	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	**16**	----	----
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	----	----	----	----
2-Methylnaphthalene	91-57-6	0.1	µg/L	**0.5**	----	----	----	----
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	----	----	----	----
Acenaphthene	83-32-9	0.1	µg/L	**0.3**	----	----	----	----
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	----	----	----	----
Anthracene	120-12-7	0.1	µg/L	<0.1	----	----	----	----
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	----	----	----	----
Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	----	----	----	----
Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	WOO FD	TB2	TS2	----	----
			Client sampling date / time	30-May-2019 00:00	28-May-2019 00:00	27-May-2019 00:00	----	----
Compound	CAS Number	LOR	Unit	ES1916823-016	ES1916823-017	ES1916823-018	--------	--------
				Result	Result	Result	----	----
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	----	----	----	----
Chrysene	218-01-9	0.1	µg/L	<0.1	----	----	----	----
Coronene	191-07-1	0.1	µg/L	<0.1	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	----	----	----	----
Fluoranthene	206-44-0	0.1	µg/L	<0.1	----	----	----	----
Fluorene	86-73-7	0.1	µg/L	<0.1	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	----	----	----	----
Naphthalene	91-20-3	0.1	µg/L	**0.5**	----	----	----	----
Perylene	198-55-0	0.1	µg/L	<0.1	----	----	----	----
Phenanthrene	85-01-8	0.1	µg/L	<0.1	----	----	----	----
Pyrene	129-00-0	0.1	µg/L	<0.1	----	----	----	----
^ Sum of PAHs	----	0.05	µg/L	**0.8**	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	<0.05	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**116**	**108**	**103**	----	----
Toluene-D8	2037-26-5	2	%	**87.0**	**94.9**	**102**	----	----
4-Bromofluorobenzene	460-00-4	2	%	**94.4**	**103**	**79.0**	----	----
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	**63.7**	----	----	----	----
Anthracene-d10	1719-06-8	0.1	%	**68.9**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	**70.0**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	43	135
Anthracene-d10	1719-06-8	48	138
4-Terphenyl-d14	1718-51-0	48	144

QUALITY CONTROL REPORT

Work Order	: **ES1916823**	Page	: 1 of 7
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: ELIN GRIFFITHS	Contact	: Peter Ravlic
Address	: 82-84 Dickson Avenue ARTARMON NSW, AUSTRALIA 2064	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9645
Project	: 117088	Date Samples Received	: 31-May-2019
Order number	:	Date Analysis Commenced	: 03-Jun-2019
C-O-C number	: ----	Issue Date	: 07-Jun-2019
Sampler	: EG / SG		
Site	: Sydney Olympic Park		
Quote number	: SY/343/17 C		
No. of samples received	: 19		
No. of samples analysed	: 18		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Pabi Subba	Senior Organic Chemist	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2382218)									
ES1916823-004	WOO NL1	EP071: C15 - C28 Fraction	----	100	µg/L	560	600	6.32	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	210	220	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
ES1916823-006	WOO NL4	EP071: C15 - C28 Fraction	----	100	µg/L	670	1000	39.7	0% - 50%
		EP071: C10 - C14 Fraction	----	50	µg/L	390	620	46.0	0% - 50%
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2386244)									
ES1916823-001	WOO PP18	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1916823-011	WOO N3	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2382218)									
ES1916823-004	WOO NL1	EP071: >C10 - C16 Fraction	----	100	µg/L	410	430	3.97	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	370	400	7.71	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
ES1916823-006	WOO NL4	EP071: >C10 - C16 Fraction	----	100	µg/L	550	860	43.7	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	500	750	40.8	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2386244)									
ES1916823-001	WOO PP18	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1916823-011	WOO N3	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 2386244)									
ES1916823-001	WOO PP18	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
				Laboratory Duplicate (DUP) Report					
EP080: BTEXN (QC Lot: 2386244) - continued									
ES1916823-001	WOO PP18	EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1916823-011	WOO N3	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2382219)									
ES1916823-004	WOO NL1	EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Acenaphthylene	208-96-8	0.1	µg/L	0.7	0.7	0.00	No Limit
		EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Fluoranthene	206-44-0	0.1	µg/L	0.2	0.3	0.00	No Limit
		EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Pyrene	129-00-0	0.1	µg/L	0.3	0.4	0.00	No Limit
ES1916823-006	WOO NL4	EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	0.6	0.6	0.00	No Limit
		EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Acenaphthene	83-32-9	0.1	µg/L	0.2	0.2	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
				Laboratory Duplicate (DUP) Report					
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2382219) - continued									
ES1916823-006	WOO NL4	EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Naphthalene	91-20-3	0.1	µg/L	0.5	0.5	0.00	No Limit
		EP132: Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2382218)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	93.6	70	113
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	86.9	81	111
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	84.1	67	117
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2386244)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	91.9	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2382218)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	77.9	76	112
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	87.4	65	118
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	78.4	77	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2386244)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	93.4	75	127
EP080: BTEXN (QCLot: 2386244)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	90.1	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	100	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	96.3	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	95.8	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	101	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	95.6	70	120
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2382219)								
EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	2 µg/L	77.4	60	120
EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	2 µg/L	60.4	59	123
EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	2 µg/L	75.2	36	144
EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	2 µg/L	# 63.6	64	122
EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	2 µg/L	# 62.7	64	126
EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	2 µg/L	68.1	65	127
EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	2 µg/L	74.6	64	130
EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	2 µg/L	74.6	64	126
EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	2 µg/L	72.9	62	126
EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	2 µg/L	73.8	62	126
EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	2 µg/L	88.0	56	126
EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	2 µg/L	71.7	68	130
EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	2 µg/L	76.4	66	130

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2382219) - continued								
EP132: Coronene	191-07-1	0.1	µg/L	<0.1	2 µg/L	110	35	133
EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	2 µg/L	83.8	58	128
EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	2 µg/L	73.4	65	127
EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	2 µg/L	73.8	64	124
EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	2 µg/L	84.9	57	127
EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	2 µg/L	61.0	54	128
EP132: Perylene	198-55-0	0.1	µg/L	<0.1	2 µg/L	76.1	66	130
EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	2 µg/L	69.5	65	129
EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	2 µg/L	74.8	66	128

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2382218)							
ES1916823-006	WOO NL4	EP071: C10 - C14 Fraction	----	200 µg/L	93.6	70	130
		EP071: C15 - C28 Fraction	----	250 µg/L	90.6	71	130
		EP071: C29 - C36 Fraction	----	200 µg/L	79.7	67	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2386244)							
ES1916823-001	WOO PP18	EP080: C6 - C9 Fraction	----	325 µg/L	108	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2382218)							
ES1916823-006	WOO NL4	EP071: >C10 - C16 Fraction	----	250 µg/L	98.8	70	130
		EP071: >C16 - C34 Fraction	----	350 µg/L	99.1	75	130
		EP071: >C34 - C40 Fraction	----	150 µg/L	103	67	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2386244)							
ES1916823-001	WOO PP18	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	110	70	130
EP080: BTEXN (QCLot: 2386244)							
ES1916823-001	WOO PP18	EP080: Benzene	71-43-2	25 µg/L	114	70	130
		EP080: Toluene	108-88-3	25 µg/L	95.2	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	95.5	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	89.2	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	94.4	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	101	70	130

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%) Low	High
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2382219)							
ES1916823-004	WOO NL1	EP132: 3-Methylcholanthrene	56-49-5	2 µg/L	93.1	59	115
		EP132: 2-Methylnaphthalene	91-57-6	2 µg/L	67.9	46	120
		EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	2 µg/L	86.6	21	135
		EP132: Acenaphthene	83-32-9	2 µg/L	74.2	62	114
		EP132: Acenaphthylene	208-96-8	2 µg/L	70.9	61	119
		EP132: Anthracene	120-12-7	2 µg/L	72.9	68	116
		EP132: Benz(a)anthracene	56-55-3	2 µg/L	79.4	67	122
		EP132: Benzo(a)pyrene	50-32-8	2 µg/L	80.1	72	114
		EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	2 µg/L	80.4	69	119
		EP132: Benzo(e)pyrene	192-97-2	2 µg/L	76.7	71	119
		EP132: Benzo(g.h.i)perylene	191-24-2	2 µg/L	76.2	49	133
		EP132: Benzo(k)fluoranthene	207-08-9	2 µg/L	73.8	71	124
		EP132: Chrysene	218-01-9	2 µg/L	79.3	70	118
		EP132: Coronene	191-07-1	2 µg/L	48.3	29	138
		EP132: Dibenz(a.h)anthracene	53-70-3	2 µg/L	92.0	60	122
		EP132: Fluoranthene	206-44-0	2 µg/L	76.0	65	121
		EP132: Fluorene	86-73-7	2 µg/L	68.7	63	118
		EP132: Indeno(1.2.3.cd)pyrene	193-39-5	2 µg/L	87.0	57	123
		EP132: Naphthalene	91-20-3	2 µg/L	66.3	53	115
		EP132: Perylene	198-55-0	2 µg/L	79.4	71	118
		EP132: Phenanthrene	85-01-8	2 µg/L	73.7	67	120
		EP132: Pyrene	129-00-0	2 µg/L	76.8	70	117

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1916823**	Page	: 1 of 6
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: ELIN GRIFFITHS	Telephone	: +6138549 9645
Project	: 117088	Date Samples Received	: 31-May-2019
Site	: Sydney Olympic Park	Issue Date	: 07-Jun-2019
Sampler	: EG / SG	No. of samples received	: 19
Order number	:	No. of samples analysed	: 18

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Matrix Spike outliers occur.**
- **Laboratory Control outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP132B: Polynuclear Aromatic Hydrocarbons	QC-2382219-002	----	**Acenaphthene**	83-32-9	63.6 %	64-122%	**Recovery less than lower control limit**
EP132B: Polynuclear Aromatic Hydrocarbons	QC-2382219-002	----	**Acenaphthylene**	208-96-8	62.7 %	64-126%	**Recovery less than lower control limit**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / *Container / Client Sample ID(s)*		*Sample Date*	*Extraction / Preparation*			*Analysis*		
			Date extracted	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
WOO PP18,	WOO PP19,	**30-May-2019**	**03-Jun-2019**	06-Jun-2019	✓	**04-Jun-2019**	13-Jul-2019	✓
WOO EA1,	WOO NL1,							
WOO NL2,	WOO NL4,							
WOO B35,	WOO T1,							
WOO 200A,	WOO 350B,							
WOO N3,	WOO W1,							
WOO W2,	WOO W3,							
WOO W4,	WOO FD							
Amber VOC Vial - Sulfuric Acid (EP080)								
TB2		**28-May-2019**	**04-Jun-2019**	11-Jun-2019	✓	**04-Jun-2019**	11-Jun-2019	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
WOO PP18,	WOO PP19,	**30-May-2019**	**04-Jun-2019**	13-Jun-2019	✓	**04-Jun-2019**	13-Jun-2019	✓
WOO EA1,	WOO NL1,							
WOO NL2,	WOO NL4,							
WOO B35,	WOO T1,							
WOO 200A,	WOO 350B,							
WOO N3,	WOO W1,							
WOO W2,	WOO W3,							
WOO W4,	WOO FD							

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
WOO PP18,	WOO PP19,	**30-May-2019**	**03-Jun-2019**	06-Jun-2019	✓	**04-Jun-2019**	13-Jul-2019	✓
WOO EA1,	WOO NL1,							
WOO NL2,	WOO NL4,							
WOO B35,	WOO T1,							
WOO 200A,	WOO 350B,							
WOO N3,	WOO W1,							
WOO W2,	WOO W3,							
WOO W4,	WOO FD							
Amber VOC Vial - Sulfuric Acid (EP080)								
TB2		**28-May-2019**	**04-Jun-2019**	11-Jun-2019	✓	**04-Jun-2019**	11-Jun-2019	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
WOO PP18,	WOO PP19,	**30-May-2019**	**04-Jun-2019**	13-Jun-2019	✓	**04-Jun-2019**	13-Jun-2019	✓
WOO EA1,	WOO NL1,							
WOO NL2,	WOO NL4,							
WOO B35,	WOO T1,							
WOO 200A,	WOO 350B,							
WOO N3,	WOO W1,							
WOO W2,	WOO W3,							
WOO W4,	WOO FD							
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
TS2		**27-May-2019**	**04-Jun-2019**	10-Jun-2019	✓	**04-Jun-2019**	10-Jun-2019	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
TB2		**28-May-2019**	**04-Jun-2019**	11-Jun-2019	✓	**04-Jun-2019**	11-Jun-2019	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
WOO PP18,	WOO PP19,	**30-May-2019**	**04-Jun-2019**	13-Jun-2019	✓	**04-Jun-2019**	13-Jun-2019	✓
WOO EA1,	WOO NL1,							
WOO NL2,	WOO NL4,							
WOO B35,	WOO T1,							
WOO 200A,	WOO 350B,							
WOO N3,	WOO W1,							
WOO W2,	WOO W3,							
WOO W4,	WOO FD							

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP132B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP132)								
WOO PP18,	WOO PP19,	**30-May-2019**	**03-Jun-2019**	06-Jun-2019	✓	**04-Jun-2019**	13-Jul-2019	✓
WOO EA1,	WOO NL1,							
WOO NL2,	WOO NL4,							
WOO B35,	WOO T1,							
WOO 200A,	WOO 350B,							
WOO N3,	WOO W1,							
WOO W2,	WOO W3,							
WOO W4,	WOO FD							

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	WATER	In house: Referenced to USEPA 3640 (GPC Cleanup), 8270D GCMS Capiliary column, SIM mode. This method is compliant with NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Sep. Funnel Extraction /Acetylation of Phenolic Compounds	ORG14-AC	WATER	In house: Referenced to USEPA 3510 (Extraction) / In-house (Acetylation): A 1L sample is extracted into dichloromethane and concentrated to 1 mL with echange into cyclohexane. Phenolic compounds are reacted with acetic anhydride to yield phenyl acetates suitable for ultra-trace analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

N OF CUSTODY - ANALYSIS REQUEST FORM

Job No: **117088** Laboratory: ALS

ject Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park **Sheet:** 1 **of** 2

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Temp	Water	TPH / TRH (C6-C40)	EP132 (PAH) - Ultra Trace PAHs												Sample-specific instructions/ notes
1	KROS_PP2	31/05/2019				X	X	X												
2	KROS_PP5	31/05/2019				X	X	X												
3	KROS_MP1	31/05/2019				X	X	X												QA/QC extra volume.
4	KROS_MP2	31/05/2019				X	X	X												
5	KROS_MP3	31/05/2019				X	X	X												
6	KROS_KH1	31/05/2019				X	X	X												
7	KROS_KH3	31/05/2019				X	X	X												
8	RB2	31/05/2019				X	X	X												
9	RB3	31/05/2019				X	X	X												
9	TOTAL					9	9	9												

Environmental Division
Sydney
Work Order Reference
ES1916930

Telephone : + 61-2-8784 8555

Turn Around *(circle)*:

Comments/ Instructions: If suite W4 uses the correct methodology please put this on the SRN

LOR required: TPH C6-C9 (0.5 mg/L), TPH C10-C36 (0.5 mg/L), benzene (0.001 mg/L), ethylbenzene (0.001 mg/L), toluene (0.001 mg/L), xylene (0.001 mg/L) total PAH (0.0001 mg/L)

Lab Quotation No. *(if applicable)* : SY-343-17 D

Send report to *(email address)* : egriffiths@eesigroup.com

Cc: report to *(email address)* : sgoldsmith@eesigroup.com

Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	Elin Griffiths		3-Jun	6:30
Receiving Lab:	Fasi		3/6/19	11:15
Receiving Lab:				

Phone: (02) 9922 1777
Fax: (02) 9922 1010
PO Box 380, North Sydney, NSW 2059
Email: egriffiths@eesigroup.com

ENVIRONMENTAL EARTH SCIENCES
THE KNOW AND THE HOW

CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: ALS

Project Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park **Sheet:** 2 **of** 2

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Readings: Field Temp	Water	TPH - TRH C6-C40	HOLD												Sample-specific instructions/ notes
10	GDR Sump 1	31-May				X	X													
11 2	HC_1	31-May				X	X													
12 3	HC_2	31-May				X	X													Extra vol for QA/QC
13 4	HC_3	31-May				X	X													
14 5	BC_U_FGDR	31-May				X	X													
15 6	BC_D_FGDR	31-May				X	X													
16 7	HC_FD	31-May				X	X													
17 8	HC_SD	31-May						X												
8	TOTAL					8	8													

Turn Around *(circle)*:

Comments/ Instructions: **LOR required:** TPH C6-C9 (0.5 mg/L), TPH C10-C36 (0.5 mg/L)

Lab Quotation No. *(if applicable)*: SY-343-17 D

Send report to *(email address)*: egriffiths@eesigroup.com

Cc: report to *(email address)*: sgoldsmith@eesigroup.com

Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	Elin Griffiths		03-Jun-19	6:30
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Receiving Lab:				

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PO Box 380, North Sydney, NSW 2059
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ENVIRONMENTAL EARTH SCIENCES
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CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: ALS

Project Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park **Sheet:** 1 **of** 2

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Temp	Analysis Required: Water	TPH / TRH (C6-C40)	EP132 (PAH) - Ultra Trace PAHs											Sample-specific instructions/ notes
1	KROS_PP2	31/05/2019				X	X	X											
2	KROS_PP5	31/05/2019				X	X	X											
3	KROS_MP1	31/05/2019				X	X	X											QA/QC extra volume.
4	KROS_MP2 MP5	31/05/2019				X	X	X											
5	KROS_MP3	31/05/2019				X	X	X											
6	KROS_KH1	31/05/2019				X	X	X											
7	KROS_KH3	31/05/2019				X	X	X											
8	RB2	31/05/2019				X	X	X											
9	RB3	31/05/2019				X	X	X											
9	TOTAL					9	9	9											

Environmental Division Sydney
Work Order Reference
ES1916930

Telephone : + 61-2-8784 8555

Turn Around *(circle)*:

Lab Quotation No. *(if applicable)* : SY-343-17 D

Comments/ Instructions: If suite W4 uses the correct methodology please put this on the SRN
LOR required: TPH C6-C9 (0.5 mg/L), TPH C10-C36 (0.5 mg/L), benzene (0.001 mg/L), ethylbenzene (0.001 mg/L), toluene (0.001 mg/L), xylene (0.001 mg/L) total PAH (0.0001 mg/L)

Send report to *(email address)* : egriffiths@eesigroup.com
Cc: report to *(email address)* : sgoldsmith@eesigroup.com
Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	Elin Griffiths		3-Jun	6:30
Receiving Lab:	FASI		3/6/19	11:15
Receiving Lab:				

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ENVIRONMENTAL EARTH SCIENCES
THE KNOW AND THE HOW

CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: ALS

Project Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park **Sheet:** 2 **of** 2

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Temp	Analysis Required: Water	TPH - TRH C6-C40	HOLD												Sample-specific Instructions/ notes
10 1	GDR Sump 1	31-May				X	X													
11 2	HC_1	31-May				X	X													
12 3	HC_2	31-May				X	X													Extra vol for QA/QC
13 4	HC_3	31-May				X	X													
14 5	BC_U_FGDR	31-May				X	X													
15 6	BC_D_FGDR	31-May				X	X													
16 7	HC_FD	31-May				X	X													
17 8	HC_SD	31-May						X												
8	TOTAL					8	8													

Turn Around *(circle)*:

Comments/ Instructions: **LOR required:** TPH C6-C9 (0.5 mg/L), TPH C10-C36 (0.5 mg/L)

Lab Quotation No. *(if applicable)*: SY-343-17 D

Send report to *(email address)*: egriffiths@eesigroup.com

Cc: report to *(email address)*: sgoldsmith@eesigroup.com

Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	Elin Griffiths		03-Jun-19	6:30
Receiving Lab:	Fmoi		3/6/19	11:52
Receiving Lab:				

Phone: (02) 9922 1777
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PO Box 380, North Sydney, NSW 2059
Email: egriffiths@eesigroup.com

ENVIRONMENTAL EARTH SCIENCES
THE KNOW AND THE HOW

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1916930**	Page	: 1 of 9
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: ELIN GRIFFITHS	Contact	: Peter Ravlic
Address	: 82-84 Dickson Avenue ARTARMON NSW, AUSTRALIA 2064	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9645
Project	: 117088	Date Samples Received	: 03-Jun-2019 11:15
Order number	: ----	Date Analysis Commenced	: 05-Jun-2019
C-O-C number	: ----	Issue Date	: 11-Jun-2019 12:23
Sampler	: EG/SG		
Site	: SYDNEY OLYMPIC PARK		
Quote number	: SY/343/17 C		
No. of samples received	: 17		
No. of samples analysed	: 16		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Total PAH reported as the sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene and Benzo(g,h,i)perylene.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	KROS_PP2	KROS_PP5	KROS_MP1	KROS_MP5	KROS_MP3
			Client sampling date / time	31-May-2019 00:00	31-May-2019 00:00	31-May-2019 00:00	31-May-2019 00:00	31-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916930-001	ES1916930-002	ES1916930-003	ES1916930-004	ES1916930-005
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	320	70	60	<20	730
C10 - C14 Fraction	----	50	µg/L	360	50	<50	<50	530
C15 - C28 Fraction	----	100	µg/L	1680	540	<100	<100	1720
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	2040	590	<50	<50	2250
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	260	60	50	<20	730
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	150	60	<20	<20	320
>C10 - C16 Fraction	----	100	µg/L	660	100	<100	<100	880
>C16 - C34 Fraction	----	100	µg/L	1350	470	<100	<100	1350
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	2010	570	<100	<100	2230
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	650	100	<100	<100	840
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	101	2	19	<1	326
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	3
Ethylbenzene	100-41-4	2	µg/L	8	<2	11	<2	54
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	2	<2	4	<2	20
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	5
^ Total Xylenes	----	2	µg/L	2	<2	4	<2	25
^ Sum of BTEX	----	1	µg/L	111	2	34	<1	408
Naphthalene	91-20-3	5	µg/L	12	<5	5	<5	37
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	91-57-6	0.1	µg/L	0.4	<0.1	0.4	<0.1	11.4
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	83-32-9	0.1	µg/L	2.4	<0.1	0.1	<0.1	5.2
Acenaphthylene	208-96-8	0.1	µg/L	0.5	<0.1	<0.1	<0.1	0.4
Anthracene	120-12-7	0.1	µg/L	0.4	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	KROS_PP2	KROS_PP5	KROS_MP1	KROS_MP5	KROS_MP3
			Client sampling date / time	31-May-2019 00:00	31-May-2019 00:00	31-May-2019 00:00	31-May-2019 00:00	31-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916930-001	ES1916930-002	ES1916930-003	ES1916930-004	ES1916930-005
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	2.3
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	91-20-3	0.1	µg/L	5.6	<0.1	3.6	<0.1	22.6
Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	85-01-8	0.1	µg/L	0.7	<0.1	<0.1	<0.1	1.0
Pyrene	129-00-0	0.1	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
^ Sum of PAHs	----	0.05	µg/L	----	<0.05	----	<0.05	----
^ Sum of PAHs	----	0.05	µg/L	9.7	----	3.7	----	31.5
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	102	110	90.2	93.4	97.0
Toluene-D8	2037-26-5	2	%	103	114	90.3	91.2	91.2
4-Bromofluorobenzene	460-00-4	2	%	105	119	85.0	83.8	92.4
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	57.2	67.5	69.4	70.0	56.6
Anthracene-d10	1719-06-8	0.1	%	63.8	58.8	65.2	59.1	61.7
4-Terphenyl-d14	1718-51-0	0.1	%	62.3	65.6	71.3	66.2	63.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	KROS_KH1	KROS_KH3	RB2	RB3	GDR SUMP1
			Client sampling date / time	31-May-2019 00:00	31-May-2019 00:00	31-May-2019 00:00	31-May-2019 00:00	31-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916930-006	ES1916930-007	ES1916930-008	ES1916930-009	ES1916930-010
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	120	100	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	80	90	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	610	960	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	90	510	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	780	1560	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	130	40	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	120	40	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	140	230	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	620	1260	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	180	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	760	1670	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	140	230	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	6	2	<1	<1	<1
Toluene	108-88-3	2	µg/L	2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	8	2	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Acenaphthene	83-32-9	0.1	µg/L	0.1	<0.1	<0.1	<0.1	----
Acenaphthylene	208-96-8	0.1	µg/L	3.4	0.4	<0.1	<0.1	----
Anthracene	120-12-7	0.1	µg/L	1.5	0.5	<0.1	<0.1	----
Benz(a)anthracene	56-55-3	0.1	µg/L	0.7	0.5	<0.1	<0.1	----
Benzo(a)pyrene	50-32-8	0.05	µg/L	0.27	0.34	<0.05	<0.05	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	0.2	0.4	<0.1	<0.1	----
Benzo(e)pyrene	192-97-2	0.1	µg/L	0.1	0.3	<0.1	<0.1	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	KROS_KH1	KROS_KH3	RB2	RB3	GDR SUMP1
			Client sampling date / time	31-May-2019 00:00	31-May-2019 00:00	31-May-2019 00:00	31-May-2019 00:00	31-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916930-006	ES1916930-007	ES1916930-008	ES1916930-009	ES1916930-010
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Chrysene	218-01-9	0.1	µg/L	0.6	0.5	<0.1	<0.1	----
Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Fluoranthene	206-44-0	0.1	µg/L	1.1	1.1	<0.1	<0.1	----
Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Naphthalene	91-20-3	0.1	µg/L	0.6	<0.1	<0.1	<0.1	----
Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----
Phenanthrene	85-01-8	0.1	µg/L	<0.1	0.4	<0.1	<0.1	----
Pyrene	129-00-0	0.1	µg/L	1.8	2.0	<0.1	<0.1	----
^ Sum of PAHs	----	0.05	µg/L	----	----	<0.05	<0.05	----
^ Sum of PAHs	----	0.05	µg/L	10.3	6.1	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	----	----	<0.05	<0.05	----
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	0.4	0.4	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	117	119	116	112	118
Toluene-D8	2037-26-5	2	%	113	116	110	106	112
4-Bromofluorobenzene	460-00-4	2	%	122	113	105	100	106
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	63.6	77.2	81.6	72.9	----
Anthracene-d10	1719-06-8	0.1	%	64.0	71.4	73.0	67.8	----
4-Terphenyl-d14	1718-51-0	0.1	%	68.0	71.2	81.9	70.6	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	HC_1	HC_2	HC_3	BC_U_FGDR	BC_D_FGDR
			Client sampling date / time	31-May-2019 00:00	31-May-2019 00:00	31-May-2019 00:00	31-May-2019 00:00	31-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916930-011	ES1916930-012	ES1916930-013	ES1916930-014	ES1916930-015
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	**20**	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**110**	**104**	**98.1**	**110**	**112**
Toluene-D8	2037-26-5	2	%	**106**	**99.1**	**97.6**	**109**	**111**
4-Bromofluorobenzene	460-00-4	2	%	**104**	**93.4**	**91.3**	**102**	**102**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	HC_FD	----	----	----	----
			Client sampling date / time	31-May-2019 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1916930-016	--------	--------	--------	--------
				Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	**109**	----	----	----	----
Toluene-D8	2037-26-5	2	%	**110**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	**112**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	43	135
Anthracene-d10	1719-06-8	48	138
4-Terphenyl-d14	1718-51-0	48	144

QUALITY CONTROL REPORT

Work Order	: **ES1916930**	Page	: 1 of 6
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: ELIN GRIFFITHS	Contact	: Peter Ravlic
Address	: 82-84 Dickson Avenue ARTARMON NSW, AUSTRALIA 2064	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9645
Project	: 117088	Date Samples Received	: 03-Jun-2019
Order number	: ----	Date Analysis Commenced	: 05-Jun-2019
C-O-C number	: ----	Issue Date	: 11-Jun-2019
Sampler	: EG/SG		
Site	: SYDNEY OLYMPIC PARK		
Quote number	: SY/343/17 C		
No. of samples received	: 17		
No. of samples analysed	: 16		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2385917)									
ES1916930-003	KROS_MP1	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
ES1916930-012	HC_2	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2388182)									
ES1916930-003	KROS_MP1	EP080: C6 - C9 Fraction	----	20	µg/L	60	70	19.2	No Limit
ES1916930-012	HC_2	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2385917)									
ES1916930-003	KROS_MP1	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
ES1916930-012	HC_2	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2388182)									
ES1916930-003	KROS_MP1	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	50	60	18.5	No Limit
ES1916930-012	HC_2	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 2388182)									
ES1916930-003	KROS_MP1	EP080: Benzene	71-43-2	1	µg/L	19	22	15.5	0% - 20%
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	11	12	14.5	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
				Laboratory Duplicate (DUP) Report					
EP080: BTEXN (QC Lot: 2388182) - continued									
ES1916930-003	KROS_MP1	EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	4	5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	5	6	0.00	No Limit
ES1916930-012	HC_2	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2385918)									
ES1916930-003	KROS_MP1	EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	0.4	0.4	0.00	No Limit
		EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Acenaphthene	83-32-9	0.1	µg/L	0.1	0.1	0.00	No Limit
		EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Naphthalene	91-20-3	0.1	µg/L	3.6	3.2	11.2	0% - 20%
		EP132: Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	0.1	0.00	No Limit
		EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2385917)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	89.2	70	113
EP071: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	88.1	81	111
EP071: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	81.9	67	117
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2388182)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	112	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2385917)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	90.1	76	112
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	79.0	65	118
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	93.7	77	119
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2388182)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	113	75	127
EP080: BTEXN (QCLot: 2388182)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	105	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	104	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	97.5	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	96.3	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	104	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	94.4	70	120
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2385918)								
EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	2 µg/L	81.1	60	120
EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	2 µg/L	66.5	59	123
EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	2 µg/L	74.3	36	144
EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	2 µg/L	70.1	64	122
EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	2 µg/L	71.2	64	126
EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	2 µg/L	67.1	65	127
EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	2 µg/L	74.4	64	130
EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	2 µg/L	71.8	64	126
EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	2 µg/L	76.1	62	126
EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	2 µg/L	71.3	62	126
EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	2 µg/L	74.3	56	126
EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	2 µg/L	68.4	68	130
EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	2 µg/L	71.7	66	130

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2385918) - continued								
EP132: Coronene	191-07-1	0.1	µg/L	<0.1	2 µg/L	84.7	35	133
EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	2 µg/L	75.3	58	128
EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	2 µg/L	67.4	65	127
EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	2 µg/L	69.3	64	124
EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	2 µg/L	71.8	57	127
EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	2 µg/L	57.1	54	128
EP132: Perylene	198-55-0	0.1	µg/L	<0.1	2 µg/L	72.6	66	130
EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	2 µg/L	68.2	65	129
EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	2 µg/L	67.6	66	128

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2385917)							
ES1916930-012	HC_2	EP071: C10 - C14 Fraction	----	200 µg/L	113	70	130
		EP071: C15 - C28 Fraction	----	250 µg/L	120	71	130
		EP071: C29 - C36 Fraction	----	200 µg/L	116	67	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2388182)							
ES1916930-003	KROS_MP1	EP080: C6 - C9 Fraction	----	325 µg/L	105	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2385917)							
ES1916930-012	HC_2	EP071: >C10 - C16 Fraction	----	250 µg/L	107	70	130
		EP071: >C16 - C34 Fraction	----	350 µg/L	115	75	130
		EP071: >C34 - C40 Fraction	----	150 µg/L	94.9	67	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2388182)							
ES1916930-003	KROS_MP1	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	99.7	70	130
EP080: BTEXN (QCLot: 2388182)							
ES1916930-003	KROS_MP1	EP080: Benzene	71-43-2	25 µg/L	106	70	130
		EP080: Toluene	108-88-3	25 µg/L	102	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	105	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	101	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	101	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	79.1	70	130

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%) Low	High
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2385918)							
ES1916930-003	KROS_MP1	EP132: 3-Methylcholanthrene	56-49-5	2 µg/L	94.1	59	115
		EP132: 2-Methylnaphthalene	91-57-6	2 µg/L	67.4	46	120
		EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	2 µg/L	78.4	21	135
		EP132: Acenaphthene	83-32-9	2 µg/L	73.0	62	114
		EP132: Acenaphthylene	208-96-8	2 µg/L	75.4	61	119
		EP132: Anthracene	120-12-7	2 µg/L	# 65.0	68	116
		EP132: Benz(a)anthracene	56-55-3	2 µg/L	78.5	67	122
		EP132: Benzo(a)pyrene	50-32-8	2 µg/L	79.8	72	114
		EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	2 µg/L	85.6	69	119
		EP132: Benzo(e)pyrene	192-97-2	2 µg/L	81.0	71	119
		EP132: Benzo(g.h.i)perylene	191-24-2	2 µg/L	62.3	49	133
		EP132: Benzo(k)fluoranthene	207-08-9	2 µg/L	80.5	71	124
		EP132: Chrysene	218-01-9	2 µg/L	76.4	70	118
		EP132: Coronene	191-07-1	2 µg/L	48.1	29	138
		EP132: Dibenz(a.h)anthracene	53-70-3	2 µg/L	67.8	60	122
		EP132: Fluoranthene	206-44-0	2 µg/L	65.7	65	121
		EP132: Fluorene	86-73-7	2 µg/L	75.2	63	118
		EP132: Indeno(1.2.3.cd)pyrene	193-39-5	2 µg/L	66.6	57	123
		EP132: Naphthalene	91-20-3	2 µg/L	# 52.3	53	115
		EP132: Perylene	198-55-0	2 µg/L	80.2	71	118
		EP132: Phenanthrene	85-01-8	2 µg/L	# 66.2	67	120
		EP132: Pyrene	129-00-0	2 µg/L	# 66.0	70	117

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1916930**	Page	: 1 of 5
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: ELIN GRIFFITHS	Telephone	: +6138549 9645
Project	: 117088	Date Samples Received	: 03-Jun-2019
Site	: SYDNEY OLYMPIC PARK	Issue Date	: 11-Jun-2019
Sampler	: EG/SG	No. of samples received	: 17
Order number	: ----	No. of samples analysed	: 16

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP132B: Polynuclear Aromatic Hydrocarbons	ES1916930--003	KROS_MP1	**Anthracene**	120-12-7	65.0 %	68-116%	**Recovery less than lower data quality objective**
EP132B: Polynuclear Aromatic Hydrocarbons	ES1916930--003	KROS_MP1	**Naphthalene**	91-20-3	52.3 %	53-115%	**Recovery less than lower data quality objective**
EP132B: Polynuclear Aromatic Hydrocarbons	ES1916930--003	KROS_MP1	**Phenanthrene**	85-01-8	66.2 %	67-120%	**Recovery less than lower data quality objective**
EP132B: Polynuclear Aromatic Hydrocarbons	ES1916930--003	KROS_MP1	**Pyrene**	129-00-0	66.0 %	70-117%	**Recovery less than lower data quality objective**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / *Container / Client Sample ID(s)*		*Sample Date*	*Extraction / Preparation*			*Analysis*		
			Date extracted	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
KROS_PP2,	KROS_PP5,	**31-May-2019**	**05-Jun-2019**	07-Jun-2019	✓	**06-Jun-2019**	15-Jul-2019	✓
KROS_MP1,	KROS_MP5,							
KROS_MP3,	KROS_KH1,							
KROS_KH3,	RB2,							
RB3,	GDR SUMP1,							
HC_1,	HC_2,							
HC_3,	BC_U_FGDR,							
BC_D_FGDR,	HC_FD							
Amber VOC Vial - Sulfuric Acid (EP080)								
KROS_PP2,	KROS_PP5,	**31-May-2019**	**06-Jun-2019**	14-Jun-2019	✓	**06-Jun-2019**	14-Jun-2019	✓
KROS_MP1,	KROS_MP5,							
KROS_MP3,	KROS_KH1,							
KROS_KH3,	RB2,							
RB3,	GDR SUMP1,							
HC_1,	HC_2,							
HC_3,	BC_U_FGDR,							
BC_D_FGDR,	HC_FD							

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
KROS_PP2,	KROS_PP5,	**31-May-2019**	**05-Jun-2019**	07-Jun-2019	✓	**06-Jun-2019**	15-Jul-2019	✓
KROS_MP1,	KROS_MP5,							
KROS_MP3,	KROS_KH1,							
KROS_KH3,	RB2,							
RB3,	GDR SUMP1,							
HC_1,	HC_2,							
HC_3,	BC_U_FGDR,							
BC_D_FGDR,	HC_FD							
Amber VOC Vial - Sulfuric Acid (EP080)								
KROS_PP2,	KROS_PP5,	**31-May-2019**	**06-Jun-2019**	14-Jun-2019	✓	**06-Jun-2019**	14-Jun-2019	✓
KROS_MP1,	KROS_MP5,							
KROS_MP3,	KROS_KH1,							
KROS_KH3,	RB2,							
RB3,	GDR SUMP1,							
HC_1,	HC_2,							
HC_3,	BC_U_FGDR,							
BC_D_FGDR,	HC_FD							
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
KROS_PP2,	KROS_PP5,	**31-May-2019**	**06-Jun-2019**	14-Jun-2019	✓	**06-Jun-2019**	14-Jun-2019	✓
KROS_MP1,	KROS_MP5,							
KROS_MP3,	KROS_KH1,							
KROS_KH3,	RB2,							
RB3,	GDR SUMP1,							
HC_1,	HC_2,							
HC_3,	BC_U_FGDR,							
BC_D_FGDR,	HC_FD							
EP132B: Polynuclear Aromatic Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP132)								
KROS_PP2,	KROS_PP5,	**31-May-2019**	**05-Jun-2019**	07-Jun-2019	✓	**06-Jun-2019**	15-Jul-2019	✓
KROS_MP1,	KROS_MP5,							
KROS_MP3,	KROS_KH1,							
KROS_KH3,	RB2,							
RB3								

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	WATER	In house: Referenced to USEPA 3640 (GPC Cleanup), 8270D GCMS Capiliary column, SIM mode. This method is compliant with NEPM (2013) Schedule B(3)

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Sep. Funnel Extraction /Acetylation of Phenolic Compounds	ORG14-AC	WATER	In house: Referenced to USEPA 3510 (Extraction) / In-house (Acetylation): A 1L sample is extracted into dichloromethane and concentrated to 1 mL with echange into cyclohexane. Phenolic compounds are reacted with acetic anhydride to yield phenyl acetates suitable for ultra-trace analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: ALS 11/6/19

Project Manager: Elin Griffiths Sampler: EG/SG Site Location: Sydney Olympic Park **Sheet:** 1 **of** 1

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Readings: Field Temp	Water	Analysis Required: EP080: BTEX	EP132 (PAH) - Ultra Trace PAHs	HOLD	Sample-specific instructions/ notes
1	WILSON PP21	3/06/2019				X	X	X		
2	WILSON PP22	3/06/2019				X	X	X		
3	WILSON PP23	3/06/2019				X	X	X		
4	WILSON PP24	3/06/2019				X	X	X		
5	WILSON MP1	3/06/2019				X	X	X		
6	WILSON MP2	3/06/2019				X	X	X		
7	WILSON MP3	3/06/2019				X	X	X		
8	WILSON MP4	3/06/2019				X	X	X		
9	WILSON MP5	3/06/2019				X	X	X		
10	WILSON MP6A	3/06/2019				X	X	X		
11	WILSON MP6B	3/06/2019				X	X	X		
12	WILSON MP7A	3/06/2019				X	X	X		
13	WILSON MP7B	3/06/2019				X	X	X		Received as "MP7BR"
14	WILSON MP8	3/06/2019				X	X	X		
15	WILSON MP9A	3/06/2019				X	X	X		
16	WILSON MP9B	3/06/2019				X	X	X		
17	WILSON FD	3/06/2019				X	X	X		
18	WILSON SD	3/06/2019				X			X	
19	WILSON SD2	3/06/2019				X			X	
20	RB4	3/06/2019				X	X	X	X	
20	TOTAL					20	18	18	2	

Environmental Division Sydney
Work Order Reference
ES1916964

Telephone : + 61-2-8784 8555

Turn Around *(circle)*:

Comments/ Instructions: 21. WILSON - FD2 on HOLD

22. TS

23. TB

LOR required: TPH C6-C9 (0.5 mg/L), TPH C10-C36 (0.5 mg/L), benzene (0.001 mg/L), ethylbenzene (0.001 mg/L), toluene (0.001 mg/L), xylene (0.001 mg/L) total PAH (0.0001 mg/L)

Lab Quotation No. *(if applicable)*: SY-343-17 D

Send report to *(email address)*: egriffiths@eesigroup.com

Cc: report to *(email address)*: sgoldsmith@eesigroup.com

Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	Elin Griffiths	[signature]	3-Jun	15:30
Receiving Lab:	[signature]	[signature]	3/6/19	1730
Receiving Lab:				

Phone: (02) 9922 1777
Fax: (02) 9922 1010
PO Box 380, North Sydney, NSW 2059
Email: egriffiths@eesigroup.com

ENVIRONMENTAL EARTH SCIENCES
THE KNOW AND THE HOW

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1916964**	Page	: 1 of 11
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: ELIN GRIFFITHS	Contact	: Peter Ravlic
Address	: 82-84 Dickson Avenue ARTARMON NSW, AUSTRALIA 2064	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9645
Project	: 117088	Date Samples Received	: 03-Jun-2019 17:30
Order number	:	Date Analysis Commenced	: 04-Jun-2019
C-O-C number	: ----	Issue Date	: 12-Jun-2019 11:27
Sampler	: EG / SG		
Site	: Sydney Oympic Park		
Quote number	: SY/343/17 C		
No. of samples received	: 23		
No. of samples analysed	: 20		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: Particular samples required dilution due to the presence of high level contaminants. LOR values have been adjusted accordingly.
- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEX compounds spiked at 20 ug/L.
- EP132: Particular samples required dilution due to sample matrix . LOR values have been adjusted accordingly. Poor surrogate recovery due to sample matrix interferences.
- Total PAH reported as the sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene and Benzo(g,h,i)perylene.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	Wilson PP21	Wilson PP22	Wilson PP23	Wilson PP24	Wilson MP1
			Client sampling date / time	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916964-001	ES1916964-002	ES1916964-003	ES1916964-004	ES1916964-005
				Result	Result	Result	Result	Result
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	1850	<1	4	56800	<1
Toluene	108-88-3	2	µg/L	48	<2	<2	274	<2
Ethylbenzene	100-41-4	2	µg/L	39	<2	130	4710	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	52	<2	3	654	<2
ortho-Xylene	95-47-6	2	µg/L	47	<2	14	827	<2
^ Total Xylenes	----	2	µg/L	99	<2	17	1480	<2
^ Sum of BTEX	----	1	µg/L	2040	<1	151	63300	<1
Naphthalene	91-20-3	5	µg/L	268	<5	30	13200	<5
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.5	<0.1
2-Methylnaphthalene	91-57-6	0.1	µg/L	3.6	<0.1	2.8	368	<0.1
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.5	<0.1
Acenaphthene	83-32-9	0.1	µg/L	6.8	<0.1	14.7	100	0.1
Acenaphthylene	208-96-8	0.1	µg/L	7.6	<0.1	3.1	28.6	<0.1
Anthracene	120-12-7	0.1	µg/L	7.8	<0.1	1.2	6.2	<0.1
Benz(a)anthracene	56-55-3	0.1	µg/L	4.0	<0.1	<0.1	<0.5	0.1
Benzo(a)pyrene	50-32-8	0.05	µg/L	3.76	<0.05	<0.05	<0.47	0.09
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	2.9	<0.1	<0.1	<0.5	<0.1
Benzo(e)pyrene	192-97-2	0.1	µg/L	2.4	<0.1	<0.1	<0.5	<0.1
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	1.5	<0.1	<0.1	<0.5	<0.1
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	0.8	<0.1	<0.1	<0.5	<0.1
Chrysene	218-01-9	0.1	µg/L	3.5	<0.1	<0.1	<0.5	<0.1
Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	<0.1	<0.5	<0.1
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	0.4	<0.1	<0.1	<0.5	<0.1
Fluoranthene	206-44-0	0.1	µg/L	8.2	0.1	0.9	3.1	0.3
Fluorene	86-73-7	0.1	µg/L	13.3	<0.1	0.7	23.3	<0.1
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	1.1	<0.1	<0.1	<0.5	<0.1
Naphthalene	91-20-3	0.1	µg/L	1.7	0.3	17.2	4720	0.2
Perylene	198-55-0	0.1	µg/L	0.4	<0.1	<0.1	<0.5	<0.1
Phenanthrene	85-01-8	0.1	µg/L	38.7	0.1	6.0	48.6	<0.1
Pyrene	129-00-0	0.1	µg/L	12.8	0.2	1.3	3.9	0.3
^ Sum of PAHs	----	0.05	µg/L	115	0.7	45.1	4930	1.1
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	----	<0.05	<0.05	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	5.0	----	----	----	0.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	Wilson PP21	Wilson PP22	Wilson PP23	Wilson PP24	Wilson MP1
			Client sampling date / time	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916964-001	ES1916964-002	ES1916964-003	ES1916964-004	ES1916964-005
				Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	120	111	111	106	117
Toluene-D8	2037-26-5	2	%	106	102	105	97.0	106
4-Bromofluorobenzene	460-00-4	2	%	97.9	93.2	97.8	92.0	94.7
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	70.3	82.9	60.9	75.4	80.6
Anthracene-d10	1719-06-8	0.1	%	72.9	78.5	72.6	99.2	79.5
4-Terphenyl-d14	1718-51-0	0.1	%	80.3	91.9	77.3	90.2	87.1

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	Wilson MP2	Wilson MP3	Wilson MP4	Wilson MP5	Wilson MP6A
			Client sampling date / time	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916964-006	ES1916964-007	ES1916964-008	ES1916964-009	ES1916964-010
				Result	Result	Result	Result	Result
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	**8**	**5**	**20500**
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	**139**
Ethylbenzene	100-41-4	2	µg/L	<2	<2	**5**	**4**	**670**
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	**2**	<2	**402**
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	**298**
^ Total Xylenes	----	2	µg/L	<2	<2	**2**	<2	**700**
^ Sum of BTEX	----	1	µg/L	<1	<1	**15**	**9**	**22000**
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	**2990**
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.5
2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	<0.1	**0.2**	**0.3**	**95.9**
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.5
Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	**5.4**
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	**23.0**
Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	**2.6**
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.5
Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.47
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.5
Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.5
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.5
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.5
Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.5
Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.5
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.5
Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	**2.0**
Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	**5.3**
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.5
Naphthalene	91-20-3	0.1	µg/L	**0.1**	**0.1**	**2.1**	**3.5**	**1560**
Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.5
Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	**12.5**
Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	**3.0**
^ Sum of PAHs	----	0.05	µg/L	**0.1**	**0.1**	**2.1**	**3.5**	**1610**
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.5
EP080S: TPH(V)/BTEX Surrogates								

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	Wilson MP2	Wilson MP3	Wilson MP4	Wilson MP5	Wilson MP6A
			Client sampling date / time	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916964-006	ES1916964-007	ES1916964-008	ES1916964-009	ES1916964-010
				Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued								
1.2-Dichloroethane-D4	17060-07-0	2	%	112	109	110	112	111
Toluene-D8	2037-26-5	2	%	104	107	104	103	100
4-Bromofluorobenzene	460-00-4	2	%	93.4	92.8	91.6	92.8	93.6
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	75.6	64.8	70.9	73.2	67.4
Anthracene-d10	1719-06-8	0.1	%	82.5	60.7	63.9	63.6	84.1
4-Terphenyl-d14	1718-51-0	0.1	%	88.9	67.6	67.6	66.0	66.6

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	Wilson MP6B	Wilson MP7A	Wilson MP7BR	Wilson MP8	Wilson MP9A
			Client sampling date / time	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916964-011	ES1916964-012	ES1916964-013	ES1916964-014	ES1916964-015
				Result	Result	Result	Result	Result
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	11300	1840	5630	4	<1
Toluene	108-88-3	2	µg/L	3770	<5	700	<2	<2
Ethylbenzene	100-41-4	2	µg/L	1940	11	728	2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	654	<5	753	<2	<2
ortho-Xylene	95-47-6	2	µg/L	430	<5	487	<2	<2
^ Total Xylenes	----	2	µg/L	1080	<5	1240	<2	<2
^ Sum of BTEX	----	1	µg/L	18100	1850	8300	6	<1
Naphthalene	91-20-3	5	µg/L	12400	59	15100	<5	<5
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.5	<0.1	<0.5	<0.1	<0.1
2-Methylnaphthalene	91-57-6	0.1	µg/L	368	10.8	1990	0.2	<0.1
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.5	<0.1	<0.5	<0.1	<0.1
Acenaphthene	83-32-9	0.1	µg/L	69.1	1.1	472	<0.1	0.4
Acenaphthylene	208-96-8	0.1	µg/L	60.1	4.0	594	<0.1	<0.1
Anthracene	120-12-7	0.1	µg/L	5.0	1.7	340	<0.1	<0.1
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.5	2.0	215	<0.1	<0.1
Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.47	2.13	188	<0.05	<0.05
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.5	1.7	174	<0.1	<0.1
Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.5	1.5	124	<0.1	<0.1
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.5	1.3	13.7	<0.1	<0.1
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.5	0.4	57.9	<0.1	<0.1
Chrysene	218-01-9	0.1	µg/L	<0.5	1.9	185	<0.1	<0.1
Coronene	191-07-1	0.1	µg/L	<0.5	0.2	7.5	<0.1	<0.1
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.5	0.3	4.4	<0.1	<0.1
Fluoranthene	206-44-0	0.1	µg/L	1.9	2.8	443	<0.1	<0.1
Fluorene	86-73-7	0.1	µg/L	20.8	0.5	368	<0.1	<0.1
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.5	0.8	12.5	<0.1	<0.1
Naphthalene	91-20-3	0.1	µg/L	5280	34.9	12500	0.9	0.1
Perylene	198-55-0	0.1	µg/L	<0.5	0.3	16.8	<0.1	<0.1
Phenanthrene	85-01-8	0.1	µg/L	33.4	7.0	1660	<0.1	<0.1
Pyrene	129-00-0	0.1	µg/L	2.8	4.9	689	<0.1	<0.1
^ Sum of PAHs	----	0.05	µg/L	5470	67.4	17900	0.9	0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	<0.5	----	----	<0.05	<0.05
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	----	2.9	239	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	Wilson MP6B	Wilson MP7A	Wilson MP7BR	Wilson MP8	Wilson MP9A
			Client sampling date / time	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916964-011	ES1916964-012	ES1916964-013	ES1916964-014	ES1916964-015
				Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	112	116	105	110	108
Toluene-D8	2037-26-5	2	%	99.8	104	101	102	104
4-Bromofluorobenzene	460-00-4	2	%	94.9	95.6	92.9	94.7	91.5
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	60.2	73.1	24.9	82.9	101
Anthracene-d10	1719-06-8	0.1	%	78.4	74.9	66.2	77.4	78.9
4-Terphenyl-d14	1718-51-0	0.1	%	66.4	74.8	60.8	83.7	85.4

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	Wilson MP9B	Wilson FD	RB4	TS	TB
			Client sampling date / time	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00	27-May-2019 00:00	28-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916964-016	ES1916964-017	ES1916964-020	ES1916964-022	ES1916964-023
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	----	----	----	----	<20
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	----	----	----	----	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	----	----	----	----	<20
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	**8**	**4**	<1	**15**	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	**14**	<2
Ethylbenzene	100-41-4	2	µg/L	**5**	**3**	<2	**14**	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	**2**	<2	<2	**14**	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	**14**	<2
^ Total Xylenes	----	2	µg/L	**2**	<2	<2	**28**	<2
^ Sum of BTEX	----	1	µg/L	**15**	**7**	<1	**71**	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	**19**	<5
EP132B: Polynuclear Aromatic Hydrocarbons								
3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	<0.1	----	----
2-Methylnaphthalene	91-57-6	0.1	µg/L	**0.2**	**0.2**	<0.1	----	----
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	<0.05	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Naphthalene	91-20-3	0.1	µg/L	**1.3**	**1.0**	<0.1	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	Wilson MP9B	Wilson FD	RB4	TS	TB
			Client sampling date / time	03-Jun-2019 00:00	03-Jun-2019 00:00	03-Jun-2019 00:00	27-May-2019 00:00	28-May-2019 00:00
Compound	CAS Number	LOR	Unit	ES1916964-016	ES1916964-017	ES1916964-020	ES1916964-022	ES1916964-023
				Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued								
Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	<0.1	----	----
Phenanthrene	85-01-8	0.1	µg/L	<0.1	0.1	<0.1	----	----
Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	<0.1	----	----
^ Sum of PAHs	----	0.05	µg/L	----	----	<0.05	----	----
^ Sum of PAHs	----	0.05	µg/L	1.3	1.1	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.05	µg/L	<0.05	<0.05	<0.05	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	2	%	112	107	114	105	113
Toluene-D8	2037-26-5	2	%	104	104	102	92.4	99.7
4-Bromofluorobenzene	460-00-4	2	%	93.2	91.7	92.9	87.4	91.1
EP132T: Base/Neutral Extractable Surrogates								
2-Fluorobiphenyl	321-60-8	0.1	%	82.8	89.2	82.6	----	----
Anthracene-d10	1719-06-8	0.1	%	72.9	78.4	68.4	----	----
4-Terphenyl-d14	1718-51-0	0.1	%	79.8	86.6	73.3	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	43	135
Anthracene-d10	1719-06-8	48	138
4-Terphenyl-d14	1718-51-0	48	144

QUALITY CONTROL REPORT

Work Order	: **ES1916964**	Page	: 1 of 7
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: ELIN GRIFFITHS	Contact	: Peter Ravlic
Address	: 82-84 Dickson Avenue ARTARMON NSW, AUSTRALIA 2064	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9645
Project	: 117088	Date Samples Received	: 03-Jun-2019
Order number	:	Date Analysis Commenced	: 04-Jun-2019
C-O-C number	: ----	Issue Date	: 12-Jun-2019
Sampler	: EG / SG		
Site	: Sydney Oympic Park		
Quote number	: SY/343/17 C		
No. of samples received	: 23		
No. of samples analysed	: 20		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2389440)									
ES1916964-002	Wilson PP22	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES1916964-012	Wilson MP7A	EP080: C6 - C9 Fraction	----	20	µg/L	2040	1910	6.40	0% - 20%
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2389440)									
ES1916964-002	Wilson PP22	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1916964-012	Wilson MP7A	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	2060	1930	6.44	0% - 20%
EP080: BTEXN (QC Lot: 2389440)									
ES1916964-002	Wilson PP22	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES1916964-012	Wilson MP7A	EP080: Benzene	71-43-2	1	µg/L	1840	1810	1.78	0% - 20%
		EP080: Toluene	108-88-3	2	µg/L	<5	<5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	11	10	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<5	<5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<5	<5	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	59	58	2.24	0% - 50%
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2385272)									
ES1916964-008	Wilson MP4	EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	0.2	0.2	0.00	No Limit

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
				Laboratory Duplicate (DUP) Report					
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2385272) - continued									
ES1916964-008	Wilson MP4	EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Naphthalene	91-20-3	0.1	µg/L	2.1	# 1.7	23.6	0% - 20%
		EP132: Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
ES1916964-014	Wilson MP8	EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	0.2	0.2	0.00	No Limit
		EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Naphthalene	91-20-3	0.1	µg/L	0.9	1.0	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2385272) - continued									
ES1916964-014	Wilson MP8	EP132: Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2389440)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	80.2	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2389440)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	79.2	75	127
EP080: BTEXN (QCLot: 2389440)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	86.3	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	87.2	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	85.7	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	85.2	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	85.0	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	99.1	70	120
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2385272)								
EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	2 µg/L	88.7	60	120
EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	2 µg/L	82.4	59	123
EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	2 µg/L	86.5	36	144
EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	2 µg/L	# 60.6	64	122
EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	2 µg/L	# 59.6	64	126
EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	2 µg/L	68.1	65	127
EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	2 µg/L	85.6	64	130
EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	2 µg/L	85.4	64	126
EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	2 µg/L	86.9	62	126
EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	2 µg/L	82.4	62	126
EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	2 µg/L	82.0	56	126
EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	2 µg/L	81.6	68	130
EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	2 µg/L	83.2	66	130
EP132: Coronene	191-07-1	0.1	µg/L	<0.1	2 µg/L	46.6	35	133
EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	2 µg/L	88.7	58	128
EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	2 µg/L	72.6	65	127
EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	2 µg/L	65.0	64	124
EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	2 µg/L	86.4	57	127
EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	2 µg/L	89.7	54	128
EP132: Perylene	198-55-0	0.1	µg/L	<0.1	2 µg/L	86.5	66	130
EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	2 µg/L	69.0	65	129

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2385272) - continued								
EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	2 µg/L	72.6	66	128

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2389440)							
ES1916964-002	Wilson PP22	EP080: C6 - C9 Fraction	----	325 µg/L	89.5	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2389440)							
ES1916964-002	Wilson PP22	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	91.0	70	130
EP080: BTEXN (QCLot: 2389440)							
ES1916964-002	Wilson PP22	EP080: Benzene	71-43-2	25 µg/L	88.1	70	130
		EP080: Toluene	108-88-3	25 µg/L	85.1	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	87.6	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	85.2	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	90.8	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	98.9	70	130
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2385272)							
ES1916964-008	Wilson MP4	EP132: 3-Methylcholanthrene	56-49-5	2 µg/L	85.2	59	115
		EP132: 2-Methylnaphthalene	91-57-6	2 µg/L	48.1	46	120
		EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	2 µg/L	80.0	21	135
		EP132: Acenaphthene	83-32-9	2 µg/L	# 57.6	62	114
		EP132: Acenaphthylene	208-96-8	2 µg/L	# 56.4	61	119
		EP132: Anthracene	120-12-7	2 µg/L	# 65.9	68	116
		EP132: Benz(a)anthracene	56-55-3	2 µg/L	79.8	67	122
		EP132: Benzo(a)pyrene	50-32-8	2 µg/L	80.1	72	114
		EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	2 µg/L	81.7	69	119
		EP132: Benzo(e)pyrene	192-97-2	2 µg/L	77.0	71	119
		EP132: Benzo(g.h.i)perylene	191-24-2	2 µg/L	78.6	49	133
		EP132: Benzo(k)fluoranthene	207-08-9	2 µg/L	76.2	71	124
		EP132: Chrysene	218-01-9	2 µg/L	76.6	70	118
		EP132: Coronene	191-07-1	2 µg/L	105	29	138
		EP132: Dibenz(a.h)anthracene	53-70-3	2 µg/L	81.3	60	122

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 2385272) - continued							
ES1916964-008	Wilson MP4	EP132: Fluoranthene	206-44-0	2 µg/L	69.0	65	121
		EP132: Fluorene	86-73-7	2 µg/L	63.1	63	118
		EP132: Indeno(1.2.3.cd)pyrene	193-39-5	2 µg/L	79.2	57	123
		EP132: Naphthalene	91-20-3	2 µg/L	# 48.3	53	115
		EP132: Perylene	198-55-0	2 µg/L	80.9	71	118
		EP132: Phenanthrene	85-01-8	2 µg/L	67.5	67	120
		EP132: Pyrene	129-00-0	2 µg/L	# 69.4	70	117

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1916964**	Page	: 1 of 5
Client	: **ENVIRONMENTAL EARTH SCIENCES**	Laboratory	: Environmental Division Sydney
Contact	: ELIN GRIFFITHS	Telephone	: +6138549 9645
Project	: 117088	Date Samples Received	: 03-Jun-2019
Site	: Sydney Oympic Park	Issue Date	: 12-Jun-2019
Sampler	: EG / SG	No. of samples received	: 23
Order number	:	No. of samples analysed	: 20

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **Duplicate outliers exist - please see following pages for full details.**
- **Laboratory Control outliers exist - please see following pages for full details.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EP132B: Polynuclear Aromatic Hydrocarbons	ES1916964--008	Wilson MP4	**Naphthalene**	91-20-3	23.6 %	0% - 20%	**RPD exceeds LOR based limits**
Laboratory Control Spike (LCS) Recoveries							
EP132B: Polynuclear Aromatic Hydrocarbons	QC-2385272-002	----	**Acenaphthene**	83-32-9	60.6 %	64-122%	**Recovery less than lower control limit**
EP132B: Polynuclear Aromatic Hydrocarbons	QC-2385272-002	----	**Acenaphthylene**	208-96-8	59.6 %	64-126%	**Recovery less than lower control limit**
Matrix Spike (MS) Recoveries							
EP132B: Polynuclear Aromatic Hydrocarbons	ES1916964--008	Wilson MP4	**Acenaphthene**	83-32-9	57.6 %	62-114%	**Recovery less than lower data quality objective**
EP132B: Polynuclear Aromatic Hydrocarbons	ES1916964--008	Wilson MP4	**Acenaphthylene**	208-96-8	56.4 %	61-119%	**Recovery less than lower data quality objective**
EP132B: Polynuclear Aromatic Hydrocarbons	ES1916964--008	Wilson MP4	**Anthracene**	120-12-7	65.9 %	68-116%	**Recovery less than lower data quality objective**
EP132B: Polynuclear Aromatic Hydrocarbons	ES1916964--008	Wilson MP4	**Naphthalene**	91-20-3	48.3 %	53-115%	**Recovery less than lower data quality objective**
EP132B: Polynuclear Aromatic Hydrocarbons	ES1916964--008	Wilson MP4	**Pyrene**	129-00-0	69.4 %	70-117%	**Recovery less than lower data quality objective**

Regular Sample Surrogates

Sub-Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Samples Submitted							
EP132T: Base/Neutral Extractable Surrogates	ES1916964-013	Wilson MP7BR	**2-Fluorobiphenyl**	321-60-8	24.9 %	43-135 %	**Recovery less than lower data quality objective**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / *Container / Client Sample ID(s)*	*Sample Date*	*Extraction / Preparation*			*Analysis*		
		Date extracted	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP080)							
TB	**28-May-2019**	**06-Jun-2019**	11-Jun-2019	✓	**06-Jun-2019**	11-Jun-2019	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber VOC Vial - Sulfuric Acid (EP080)							
TB	**28-May-2019**	**06-Jun-2019**	11-Jun-2019	✓	**06-Jun-2019**	11-Jun-2019	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
Wilson PP21, Wilson PP22, Wilson PP23, Wilson PP24, Wilson MP1, Wilson MP2, Wilson MP3, Wilson MP4, Wilson MP5, Wilson MP6A, Wilson MP6B, Wilson MP7A, Wilson MP7BR, Wilson MP8, Wilson MP9A, Wilson MP9B, Wilson FD, RB4	**03-Jun-2019**	**06-Jun-2019**	17-Jun-2019	✓	**06-Jun-2019**	17-Jun-2019	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
TS	**27-May-2019**	**06-Jun-2019**	10-Jun-2019	✓	**06-Jun-2019**	10-Jun-2019	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
TB	**28-May-2019**	**06-Jun-2019**	11-Jun-2019	✓	**06-Jun-2019**	11-Jun-2019	✓
EP132B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP132)							
Wilson PP21, Wilson PP22, Wilson PP23, Wilson PP24, Wilson MP1, Wilson MP2, Wilson MP3, Wilson MP4, Wilson MP5, Wilson MP6A, Wilson MP6B, Wilson MP7A, Wilson MP7BR, Wilson MP8, Wilson MP9A, Wilson MP9B, Wilson FD, RB4	**03-Jun-2019**	**04-Jun-2019**	10-Jun-2019	✓	**05-Jun-2019**	14-Jul-2019	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	2	18	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	18	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	WATER	In house: Referenced to USEPA 3640 (GPC Cleanup), 8270D GCMS Capiliary column, SIM mode. This method is compliant with NEPM (2013) Schedule B(3)

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Sep. Funnel Extraction /Acetylation of Phenolic Compounds	ORG14-AC	WATER	In house: Referenced to USEPA 3510 (Extraction) / In-house (Acetylation): A 1L sample is extracted into dichloromethane and concentrated to 1 mL with echange into cyclohexane. Phenolic compounds are reacted with acetic anhydride to yield phenyl acetates suitable for ultra-trace analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

CHAIN OF CUSTODY - ANALYSIS REQUEST FORM

Job No: 117088 Laboratory: Envirolab

Project Manager: Elin Griffiths Sampler: SG/ EG / ZZ Site Location: Sydney Olympic Park **Sheet:** 1 **of** 1

No. of samples	Sample ID/ Depth	Date sampled	Time sampled	Field Readings: Field pH	Field Readings: Field Temp	Water	TDS	TSS	Oil & Grease	NH4-N	Total CN	Alkalinity	BOD	Dissolved Cu, Pb, Zn	TPH - TRH C6-C40	EP132 (PAH) - Ultra Trace PAH	Benzene, Ethylbenzene, Toluene	HOLD		Sample-specific instructions/ notes
1	SIAQC_SD	29-May-19	-			X	X	X	X	X	X	X	X	X	X	X				
2	BLAX_SD	28-May-19	-			X	X	X	X	X	X	X	X	X	X	X				
3	WOO_SD	31-May-19	-			X	X	X	X	X	X	X	X	X	X	X	X			Sample may have already begun analysis please call if any queries
4	HC_SD	31-May-19	-			X	X	X	X	X	X	X	X	X	X					
5	WILSON_SD	3-Jun-19	-			X												X		HOLD
6	WILSON_SD2	3-Jun-19	-			X												X		HOLD
6	TOTAL					6	4	4	4	4	4	4	4	4	4	3	1	2		

ENVIROLAB

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 219065.

Date Received: 050619
Time Received: 1620
Received by: EMS
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Turn Around *(circle)*: Standard

Comments/ Instructions: Please filter at lab for dissolved metals
LOR: TDS (1 mg/L), TSS (1 mg/L), Oil & Grease (1 mg/L), NH4-N (0.01 mg/L), CN (0.001 mg/L)
Alkalinity (1 mg/L), BOD (1 mg/L), dissolved metals (0.001 mg/L)

Lab Quotation No. *(if applicable)*:
Send report to *(email address)*: egriffiths@eesigroup.com
Cc: report to *(email address)*: sgoldsmith@eesigroup.com
Cc: invoice to *(email address)*: egriffiths@eesigroup.com

		Signature	Date	Time
Sent off Site/Office by:	ALS		4-Jun	
Receiving Lab:	Envirolab	[signature]	050619	1620
Receiving Lab:				

Phone: (02) 9922 1777
Fax: (02) 9922 1010
PO Box 380, North Sydney, NSW 2059

SG Mob: 0488 339 097

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From: Sam Goldsmith [mailto:sgoldsmith@eesigroup.com]
Sent: Tuesday, 4 June 2019 1:18 PM
To: Shane Ellis <shane.ellis@ALSGlobal.com>; Elin Griffiths <egriffiths@eesigroup.com>
Subject: [EXTERNAL] - RE: ES1916930 - Sydney Olympic Park - Low level BTEXN

CAUTION: This email originated from outside of ALS. Do not click links or open attachments unless you recognize the sender and are sure content is relevant to you.

Hi Shane,

Thanks for the chat earlier today. I've double check all the requested analyses and also had a chat with Helen earlier this morning I believe we've covered off everything we need for this job.

With that said could I please request that the following samples are sent on to Envirolab (12 Ashley Street, Chatswood) with the attached COC as these are our triplicate samples. I understand that one sample (WOO_SD I believe) may have already started to be analysed as it was incorrectly noted on the COC although I spoke with ALS early Monday morning about halting this analysis and was informed that this had been done.

Regardless could I please request WOO_SD is sent and if Envirolab cannot analyse this due to material already having been extracted we will schedule another SD sample.

The samples that require being send to the lab are as follows:

- SIAQC_SD 29-May ES1916579 – 10 → ~~SW23~~, ~~V4448~~, ~~W2?~~, ~~P4?~~, ~~I-?~~
- BLAX_SD 28-May ES1916394 – 10 → ~~SW?-18~~, ~~V43~~, ~~W?~~, ~~P?~~, ~~I-?~~
- WOO_SD 30-May ES1916823 – 19 → ~~SW?-30~~, ~~V?-?~~, ~~W?~~, ~~P?~~, ~~I-?~~
- HC_SD 31-May ES1916930 – 17 → ~~SW?-32~~, ~~V32~~, ~~W?~~, ~~P?~~, ~~I-?~~
- WILSON_SD 3-June ES1916964 – 18 } ~~SW?-33~~, ~~V34.00~~, ~~W?~~, ~~P?~~, ~~I-?~~
- WILSON_SD2 3-JuneES1916964 – 19 } ~~SW?-33~~, ~~V34.00~~, ~~W?~~, ~~P?~~, ~~I-?~~

I believe there is an additional wide mouth amber bottle each for WILSON_SD and WILSON_SD2. Any questions please feel free to give either myself or Elin a call on 02 9922 1777

Cheers,
Sam

From: Shane Ellis <shane.ellis@ALSGlobal.com>
Sent: Monday, 3 June 2019 5:37 PM
To: Elin Griffiths <egriffiths@eesigroup.com>
Cc: Sam Goldsmith <sgoldsmith@eesigroup.com>
Subject: ES1916930 - Sydney Olympic Park - Low level BTEXN

Hi Elin,

We have noticed some of your recent batches of SOP samples have requested lower level BTEXN results. In order to achieve this LOR, we will need to run our low level VOC package of which does come at a bit of a cost increase. As it stands, our current LORs for BTEXN are sitting at between 0.001mg/L and 0.002mg/L so is marginally higher for some analytes. Can I please confirm if you would like to run the low level analysis or stick with the standard package?

COMPOUND GROUP	ALS METHOD / SUITE CODE	METHOD REFERENCE	LOR (µg/L)	PRICE ($)
Ultra Trace Monocyclic Aromatic Hydrocarbons (MAH) (8 analytes) Incl. Benzene, ethylbenzene, toluene, xylene	EP125A	In house HS/GCMS	0.05-0.5	80.00

Regards,

Shane Ellis
Client Services Officer, Environmental

T +61 2 8784 8555 F +61 2 8784 8500
D +61 2 8784 8509
shane.ellis@alsglobal.com
277-289 Woodpark Road
Smithfield NSW 2164 AUSTRALIA

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Fadi Soro

From: Shane Ellis
Sent: Tuesday, 4 June 2019 2:52 PM
To: Fadi Soro
Cc: Loren Schiavon
Subject: FW: [EXTERNAL] - RE: ES1916930 - Sydney Olympic Park - Low level BTEXN
Attachments: 117088 - June19 SD COC.pdf

Hi Fadi,

Can you please collect the samples below and forward on to envirolab with the attached COC?

Cheers,

Shane Ellis
Client Services Officer, Environmental

T +61 2 8784 8555 F +61 2 8784 8500
D +61 2 8784 8509
shane.ellis@alsglobal.com
277-289 Woodpark Road
Smithfield NSW 2164 AUSTRALIA

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www.envirolab.com.au

CERTIFICATE OF ANALYSIS 219065

Client Details

Client	Environmental & Earth Sciences
Attention	E Griffiths
Address	PO Box 380, North Sydney, NSW, 2059

Sample Details

Your Reference	**117088, Sydney Olympic Park**
Number of Samples	6 Water
Date samples received	05/06/2019
Date completed instructions received	05/06/2019

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	13/06/2019
Date of Issue	13/06/2019

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Results Approved By
Giovanni Agosti, Group Technical Manager
Nick Sarlamis, Inorganics Supervisor
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Water					
Our Reference		219065-1	219065-2	219065-3	219065-4
Your Reference	UNITS	SIAQC SD	BLAX SD	WOO-SD	HC-SD
Date Sampled		29/05/2019	28/05/2019	31/05/2019	31/05/2019
Type of sample		Water	Water	Water	Water
Date extracted	-	11/06/2019	11/06/2019	11/06/2019	11/06/2019
Date analysed	-	12/06/2019	12/06/2019	12/06/2019	12/06/2019
TRH C_6 - C_9	µg/L	<10	25	12	<10
TRH C_6 - C_{10}	µg/L	<10	36	27	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	[NA]	[NA]	26	[NA]
Benzene	µg/L	[NA]	[NA]	1	[NA]
Toluene	µg/L	[NA]	[NA]	<1	[NA]
Ethylbenzene	µg/L	[NA]	[NA]	<1	[NA]
m+p-xylene	µg/L	[NA]	[NA]	<2	[NA]
o-xylene	µg/L	[NA]	[NA]	<1	[NA]
Naphthalene	µg/L	[NA]	[NA]	<1	[NA]
Surrogate Dibromofluoromethane	%	110	103	100	100
Surrogate toluene-d8	%	115	105	102	100
Surrogate 4-BFB	%	100	96	94	94

svTRH (C10-C40) in Water					
Our Reference		219065-1	219065-2	219065-3	219065-4
Your Reference	UNITS	SIAQC SD	BLAX SD	WOO-SD	HC-SD
Date Sampled		29/05/2019	28/05/2019	31/05/2019	31/05/2019
Type of sample		Water	Water	Water	Water
Date extracted	-	12/06/2019	12/06/2019	12/06/2019	12/06/2019
Date analysed	-	13/06/2019	13/06/2019	13/06/2019	13/06/2019
TRH C_{10} - C_{14}	µg/L	<50	<50	260	<50
TRH C_{15} - C_{28}	µg/L	<100	200	380	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100	<100
TRH >C_{10} - C_{16}	µg/L	<50	83	350	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	[NA]	[NA]	350	[NA]
TRH >C_{16} - C_{34}	µg/L	<100	180	290	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100
Surrogate o-Terphenyl	%	93	116	123	91

PAHs in Water - Trace Level				
Our Reference		219065-1	219065-2	219065-3
Your Reference	UNITS	SIAQC SD	BLAX SD	WOO-SD
Date Sampled		29/05/2019	28/05/2019	31/05/2019
Type of sample		Water	Water	Water
Date extracted	-	12/06/2019	12/06/2019	12/06/2019
Date analysed	-	12/06/2019	12/06/2019	12/06/2019
Naphthalene	µg/L	<0.02	0.07	0.58
Acenaphthylene	µg/L	<0.01	<0.01	<0.01
Acenaphthene	µg/L	<0.01	<0.01	0.21
Fluorene	µg/L	<0.01	0.01	0.09
Phenanthrene	µg/L	<0.01	0.01	0.06
Anthracene	µg/L	<0.01	<0.01	<0.01
Fluoranthene	µg/L	<0.01	<0.01	<0.01
Pyrene	µg/L	<0.01	<0.01	<0.01
Benzo(a)anthracene	µg/L	<0.01	<0.01	<0.01
Chrysene	µg/L	<0.01	<0.01	<0.01
Benzo(b,j+k)fluoranthene	µg/L	<0.02	<0.02	<0.02
Benzo(a)pyrene	µg/L	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	µg/L	<0.01	<0.01	<0.01
Indeno(1,2,3-c,d)pyrene	µg/L	<0.01	<0.01	<0.01
Benzo(g,h,i)perylene	µg/L	<0.01	<0.01	<0.01
Benzo(a)pyrene TEQ	µg/L	<0.05	<0.05	<0.05
Total +ve PAH's	µg/L	NIL (+)VE	0.097	0.94
Surrogate p-Terphenyl-d14	%	109	106	119

HM in water - dissolved					
Our Reference		219065-1	219065-2	219065-3	219065-4
Your Reference	UNITS	SIAQC SD	BLAX SD	WOO-SD	HC-SD
Date Sampled		29/05/2019	28/05/2019	31/05/2019	31/05/2019
Type of sample		Water	Water	Water	Water
Date prepared	-	06/06/2019	06/06/2019	06/06/2019	06/06/2019
Date analysed	-	06/06/2019	06/06/2019	06/06/2019	06/06/2019
Copper-Dissolved	µg/L	<1	<1	<1	1
Lead-Dissolved	µg/L	<1	<1	<1	<1
Zinc-Dissolved	µg/L	130	4	4	13

Miscellaneous Inorganics					
Our Reference		219065-1	219065-2	219065-3	219065-4
Your Reference	UNITS	SIAQC SD	BLAX SD	WOO-SD	HC-SD
Date Sampled		29/05/2019	28/05/2019	31/05/2019	31/05/2019
Type of sample		Water	Water	Water	Water
Date prepared	-	05/06/2019	05/06/2019	05/06/2019	05/06/2019
Date analysed	-	05/06/2019	05/06/2019	05/06/2019	05/06/2019
Total Dissolved Solids (grav)	mg/L	5,500	5,500	22,000	38,000
Total Suspended Solids	mg/L	6	37	46	10
Oil & Grease (LLE)	mg/L	<5	<5	<5	<5
Ammonia as N in water	mg/L	0.40	170	180	0.052
Total Cyanide	mg/L	<0.004	0.005	<0.004	<0.004
Total Alkalinity as $CaCO_3$	mg/L	480	1,300	1,900	130
BOD	mg/L	<5	<5	8	<5

Method ID	Methodology Summary
Inorg-003	Oil & Grease - determine gravimetrically following extraction with Hexane, in accordance with APHA latest edition, 5520-B.
Inorg-006	Alkalinity - determined titrimetrically in accordance with APHA latest edition, 2320-B.
Inorg-014	Cyanide - free, total, weak acid dissociable by segmented flow analyser (in line dialysis with colourimetric finish). Solids/Filters and sorbents are extracted in a caustic media prior to analysis. Impingers are pH adjsuted as required prior to analysis. Cyanides amenable to Chlorination - samples are analysed untreated and treated with hyperchlorite to assess the potential for chlorination of cyanide forms. Based on APHA latest edition, 4500-CN_G,H.
Inorg-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180+/-10°C.
Inorg-019	Suspended Solids - determined gravimetricially by filtration of the sample. The samples are dried at 104+/-5°C.
Inorg-057	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Waters samples are filtered on receipt prior to analysis. Soils are analysed following a KCl extraction.
Inorg-091	BOD - Analysed in accordance with APHA latest edition 5210 D and in house INORG-091.
Metals-022	Determination of various metals by ICP-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			11/06/2019	3	11/06/2019	11/06/2019		11/06/2019	[NT]
Date analysed	-			12/06/2019	3	12/06/2019	12/06/2019		12/06/2019	[NT]
TRH C_6 - C_9	µg/L	10	Org-016	<10	3	12	14	15	107	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-016	<10	3	27	26	4	107	[NT]
Benzene	µg/L	1	Org-016	<1	3	1	1	0	108	[NT]
Toluene	µg/L	1	Org-016	<1	3	<1	<1	0	122	[NT]
Ethylbenzene	µg/L	1	Org-016	<1	3	<1	<1	0	103	[NT]
m+p-xylene	µg/L	2	Org-016	<2	3	<2	<2	0	100	[NT]
o-xylene	µg/L	1	Org-016	<1	3	<1	<1	0	104	[NT]
Naphthalene	µg/L	1	Org-013	<1	3	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-016	92	3	100	99	1	94	[NT]
Surrogate toluene-d8	%		Org-016	101	3	102	98	4	106	[NT]
Surrogate 4-BFB	%		Org-016	97	3	94	100	6	96	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			12/06/2019	[NT]	[NT]	[NT]	[NT]	12/06/2019	[NT]
Date analysed	-			13/06/2019	[NT]	[NT]	[NT]	[NT]	13/06/2019	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	83	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	83	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	89	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	83	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	83	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	89	[NT]
Surrogate o-Terphenyl	%		Org-003	69	[NT]	[NT]	[NT]	[NT]	87	[NT]

QUALITY CONTROL: PAHs in Water - Trace Level						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			12/06/2019	[NT]	[NT]	[NT]	[NT]	12/06/2019	[NT]
Date analysed	-			12/06/2019	[NT]	[NT]	[NT]	[NT]	12/06/2019	[NT]
Naphthalene	µg/L	0.02	Org-012	<0.02	[NT]	[NT]	[NT]	[NT]	70	[NT]
Acenaphthylene	µg/L	0.01	Org-012	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.01	Org-012	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	µg/L	0.01	Org-012	<0.01	[NT]	[NT]	[NT]	[NT]	94	[NT]
Phenanthrene	µg/L	0.01	Org-012	<0.01	[NT]	[NT]	[NT]	[NT]	96	[NT]
Anthracene	µg/L	0.01	Org-012	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.01	Org-012	<0.01	[NT]	[NT]	[NT]	[NT]	78	[NT]
Pyrene	µg/L	0.01	Org-012	<0.01	[NT]	[NT]	[NT]	[NT]	70	[NT]
Benzo(a)anthracene	µg/L	0.01	Org-012	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.01	Org-012	<0.01	[NT]	[NT]	[NT]	[NT]	105	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.02	Org-012	<0.02	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.01	Org-012	<0.01	[NT]	[NT]	[NT]	[NT]	91	[NT]
Dibenzo(a,h)anthracene	µg/L	0.01	Org-012	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.01	Org-012	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.01	Org-012	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	126	[NT]	[NT]	[NT]	[NT]	128	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			06/06/2019	[NT]	[NT]	[NT]	[NT]	06/06/2019	[NT]
Date analysed	-			06/06/2019	[NT]	[NT]	[NT]	[NT]	06/06/2019	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	219065-2
Date prepared	-			05/06/2019	1	05/06/2019	05/06/2019		05/06/2019	05/06/2019
Date analysed	-			05/06/2019	1	05/06/2019	05/06/2019		05/06/2019	05/06/2019
Total Dissolved Solids (grav)	mg/L	5	Inorg-018	<5	1	5500	[NT]		98	[NT]
Total Suspended Solids	mg/L	5	Inorg-019	<5	1	6	[NT]		98	[NT]
Oil & Grease (LLE)	mg/L	5	Inorg-003	<5	1	<5	[NT]		86	[NT]
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	1	0.40	[NT]		99	[NT]
Total Cyanide	mg/L	0.004	Inorg-014	<0.004	1	<0.004	<0.004	0	100	83
Total Alkalinity as $CaCO_3$	mg/L	5	Inorg-006	<5	1	480	[NT]		102	[NT]
BOD	mg/L	5	Inorg-091	<5	1	<5	[NT]		84	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Report Comments

Dissolved Metals: no filtered, preserved sample was received, therefore the unpreserved sample was filtered through 0.45µm filter at the lab. Note: there is a possibility some elements may be underestimated.

ENVIRONMENTAL EARTH SCIENCES
CONTAMINATION RESOLVED

APPENDIX D: QUALITY ASSURANCE AND QUALITY CONTROL

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Table 7: Rinsate blank laboratory results

Table 8: Laboratory duplicate outliers

Table 9: Surrogate spike recovery outliers

Table 10: Laboratory control spike outliers

Table 11: Matrix spike recovery outliers

1 DATA QUALITY OBJECTIVES

Development of data quality objectives (DQOs) for each project is a requirement of the National Environment Protection (Assessment of Site Contamination) Amendment Measure (NEPC 2013). Specific discussion in the development of the DQO's has been included in the main report.

Based on the DQOs the following measurement data quality indicators (MDQIs) are provided in Table 1.

Table 1: Measurement data quality indicators (MDQIS)

Parameter	Procedure	Minimum Frequency	Criteria	
			(5 to 10x LOR[4])	>10x LOR
Precision	Field Duplicates	1 in 20 - metals	<80 RPD	<50 RPD
		1 in 20 - semi-volatiles	<100 RPD	<80 RPD
		1 in 20 - volatiles	<150 RPD	<130 RPD
	Lab Replicate*	1 in 20	<50 RPD	<30 RPD
Accuracy*	Reference Material	1 in 10	60% to 140%R	80% to 120%R
	Matrix spikes			
	Surrogate spikes			
Representativeness*	Reagent Blanks	1 per batch	No detection	
	Holding Times*	Every sample	-	
Blanks**	Trip Blank	1 per batch	No detection	
	Rinsate Blanks			
Sensitivity	Limit of Reporting	Every sample	LOR < ½ site criteria	

Notes:

1. RPD – relative percentage difference;
2. %R – percent recovery;
3. LOR – limit of reporting;
4. [4] no limit at <5x LOR;
5. * the MDQI is usually specified in the standard method. If not, use the default values set out in this table; and
6. ** only necessary when measuring dissolved metals and volatile organic compounds in water samples.

The Standards Australia (i.e. AS4482.1) specify that typical MDQIs for precision should be ≤50% RPD, however it should be noted that low concentrations and organic compounds can be acceptable if reported outside of this range. As the standard suggests, an RPD of >50% has been used as a 'trigger' and values above this level of repeatability have also been noted and explained.

Our adopted MDQIs for precision acknowledge the potential for variations in volatile and semi volatile chemical concentrations between duplicates may be unavoidable, even when using best practice sampling methodology, especially as we seek to minimise the disturbance during monitoring and splitting of samples, which means a degree of variation is expected. As such, our adopted RPD criteria are considered to be a suitable measure for the reproducibility of results within samples chosen for quality control.

2 FIELD QA/QC PROGRAM

2.1 Sample collection, preservation, transportation and storage

Groundwater samples were collected and placed in appropriate sample containers as supplied by the nominated National Association of Testing Authorities (NATA) accredited laboratory. Samples were labelled with the corresponding field/sample identification number, site reference, date and time and field scientist initials in accordance with Environmental Earth Science sampling procedures and the requirements outlined within The Services. Samples were placed in a chilled container prior to transport to the nominated laboratory.

Groundwater samples were supplied to NATA accredited laboratories (SAL/ALS and inter [split] duplicate analysis was completed by Envirolab) under a completed chain of custody (CoC). Copies of the CoC documentation and laboratory transcripts are provided in Appendix B of the main report.

2.2 Calibration of field equipment

The calibration and/or bump testing of field equipment (YSI Professional water quality metre) was undertaken at the beginning of days of use or as required throughout the day during the groundwater sampling program. Calibration of the GA5000 was undertaken by Airmet Scientific (Airmet) immediately prior to undertaking gas measurement.

The calibration records can be found within Appendix A within the main report.

2.3 Intra (blind) and Inter (split) duplicate sampling

Five intra (blind) and four inter (split) samples were collected during collection of groundwater samples. The relative percentage differences (RPD) calculations of the collected inter and intra duplicate samples are presented in Table 2 to Table 6 below.

Calculated RPDs between the primary sample and their corresponding duplicate and triplicate samples were generally within the acceptable limits (MQDIS) except for the following:

- SIAQC BP2 and SIAQC SD:
    - Dissolved zinc – RPD of 151%; and
    - Total suspended solids – RPD of 104%
- BLAX BH3 and BLAX SD:
    - Dissolved zinc – RPD of 106%;
- HASLAMS CREEK HC1 and HC SD:
    - Dissolved zinc – RPD of 63%; and

Elevated RPD values for Inorganic Analysis (dissolved zinc) may be due to the slight differences in methods used by SAL and Envirolab. The concentrations are low therefore this discrepancy is not considered to have an adverse impact on the data set as a whole. Both methods used are NATA accredited, with primary results consistent with historical data. As such, we consider the data set to be reliable.

The elevated RPD values for TSS is not considered to have an adverse impact on the data set as the concentrations are low.

2.4 Equipment rinsate

Four equipment rinsate blank samples (IDs: RB_1-RB_4) were collected from the dipper as part of the groundwater sampling program to ensure cross contamination between samples was not occurring due to insufficient decontamination of equipment used. The results of the equipment rinsate blank samples are presented in Table 7.

The equipment rinsate blank results reported analyte concentrations below the LOR, which indicates that decontamination procedures were sufficient and appropriate.

Table 2: Duplicate pairing 1 – Relative percentage differences

Analyte grouping/ Analyte	Units	Primary LOR	SIAQC BP2	SIAQC FD	RPD	Secondary LOR	SIAQC SD	RPD
BTEXN								
Benzene	µg/L	1	<1	<1	NC	-	NA	NA
Toluene	µg/L	2	<2	<2	NC	-	NA	NA
Ethylbenzene	µg/L	2	<2	<2	NC	-	NA	NA
Meta- & para-Xylene	µg/L	2	<2	<2	NC	-	NA	NA
Ortho-Xylene	µg/L	2	<2	<2	NC	-	NA	NA
Total Xylenes	µg/L	2	<2	<2	NC	-	NA	NA
Polycyclic Aromatic Hydrocarbons (PAH)								
3-Methylcholanthrene	µg/L	<0.1	<0.1	<0.1	NC	-	NA	NA
2-Methylnaphthalene	µg/L	<0.1	<0.1	<0.1	NC	-	NA	NA
7.12-Dimethylbenz(a)anthracene	µg/L	<0.1	<0.1	<0.1	NC	-	NA	NA
Acenaphthene	µg/L	<0.1	<0.1	<0.1	NC	<0.01	<0.01	NC
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	NC	<0.01	<0.01	NC
Anthracene	µg/L	<0.1	<0.1	<0.1	NC	<0.01	<0.01	NC
Benz(a)anthracene	µg/L	<0.1	<0.1	<0.1	NC	<0.01	<0.01	NC
Benzo(a)pyrene	µg/L	<0.05	<0.05	<0.05	NC	<0.01	<0.01	NC
Benzo(b+j)fluoranthene	µg/L	<0.1	<0.1	<0.1	NC	<0.02	<0.02	NC
Benzo(e)pyrene	µg/L	<0.1	<0.1	<0.1	NC	-	NA	NA

Analyte grouping/ Analyte	Units	Primary LOR	SIAQC BP2	SIAQC FD	RPD	Secondary LOR	SIAQC SD	RPD
Benzo(g.h.i)perylene	µg/L	<0.1	<0.1	<0.1	NC	<0.01	<0.01	NC
Benzo(k)fluoranthene	µg/L	<0.1	<0.1	<0.1	NC	-*	-*	NA
Chrysene	µg/L	<0.1	<0.1	<0.1	NC	<0.01	<0.01	NC
Coronene	µg/L	<0.1	<0.1	<0.1	NC	NA	NA	NA
Dibenz(a.h)anthracene	µg/L	<0.1	<0.1	<0.1	NC	<0.01	<0.01	NC
Fluoranthene	µg/L	<0.1	<0.1	<0.1	NC	<0.01	<0.01	NC
Fluorene	µg/L	<0.1	<0.1	<0.1	NC	<0.01	<0.01	NC
Indeno(1.2.3.cd)pyrene	µg/L	<0.1	<0.1	<0.1	NC	<0.01	<0.01	NC
Naphthalene	µg/L	<0.1	<0.1	<0.1	NC	<0.02	<0.02	NC
Perylene	µg/L	<0.1	<0.1	<0.1	NC	-	NA	NA
Phenanthrene	µg/L	<0.1	<0.1	<0.1	NC	<0.01	<0.01	NC
Pyrene	µg/L	<0.1	<0.1	<0.1	NC	<0.01	<0.01	NC
Inorganic Analysis								
TDS	mg/L	1	6560	6610	0.76	5	5500	17.58
SS	mg/L	1	19	20	5.13	5	6	**104.00**
Oil and grease	mg/L	1	3	2	40	5	<5	NC
NH4-N	mg/L	0.01	0.33	0.31	6.25	0.005	0.4	19.18
Total cyanide	mg/L	0.001	0.001	<0.001	NC	0.004	<0.004	NC
Total alkalinity	mg/L	1	470	455	3.24	5	480	2.11

Analyte grouping/ Analyte	Units	Primary LOR	SIAQC BP2	SIAQC FD	RPD	Secondary LOR	SIAQC SD	RPD
BOD	mg/L	1	<1	<1	NC	5	<5	NC
Dissolved copper	mg/L	0.001	<0.001	<0.001	NC	0.001	<0.001	NC
Dissolved lead	mg/L	0.001	<0.001	<0.001	NC	0.001	<0.001	NC
Dissolved zinc	mg/L	0.001	0.018	0.021	15.38	0.001	0.13	**151.35**

Notes:

1. RPD – Relative Percentage Difference;
2. NC – RPD not calculable due to non-detect values
3. Values above the QA/QC criteria are bolded;
4. TDS – total dissolved solids
5. SS – total suspended solids
6. NA – Not analysed
7. * Benzo(k)fluoranthene is reported by Envirolab as Benzo(b+j+k)fluoranthene

Table 3: Duplicate pairing 2 – Relative percentage differences

Analyte grouping/ Analyte	Units	Primary LOR	BLAX BH3	BLAX FD	RPD	Secondary LOR	BLAX SD	RPD
BTEXN								
Benzene	µg/L	1	3	3	NC	-	NA	NA
Toluene	µg/L	2	<2	<2	NC	-	NA	NA
Ethylbenzene	µg/L	2	<2	<2	NC	-	NA	NA
Meta- & para-Xylene	µg/L	2	<2	<2	NC	-	NA	NA
Ortho-Xylene	µg/L	2	<2	<2	NC	-	NA	NA
Total Xylenes	µg/L	2	<2	<2	NC	-	NA	NA
Polycyclic Aromatic Hydrocarbons (PAH)								
3-Methylcholanthrene	µg/L	0.1	<0.1	<0.1	NC	-	NA	NA
2-Methylnaphthalene	µg/L	0.1	<0.1	<0.1	NC	-	NA	NA
7.12-Dimethylbenz(a)anthracene	µg/L	0.1	<0.1	<0.1	NC	-	NA	NA
Acenaphthene	µg/L	0.1	<0.1	<0.1	NC	0.1	<0.01	NC
Acenaphthylene	µg/L	0.1	<0.1	<0.1	NC	0.1	<0.01	NC
Anthracene	µg/L	0.1	<0.1	<0.1	NC	0.1	<0.01	NC
Benz(a)anthracene	µg/L	0.1	<0.1	<0.1	NC	0.1	<0.01	NC
Benzo(a)pyrene	µg/L	0.05	<0.05	<0.05	NC	0.01	<0.01	NC
Benzo(b+j)fluoranthene	µg/L	0.1	<0.1	<0.1	NC	-	<0.02	NC
Benzo(e)pyrene	µg/L	0.1	<0.1	<0.1	NC	-	NA	NA

Analyte grouping/ Analyte	Units	Primary LOR	BLAX BH3	BLAX FD	RPD	Secondary LOR	BLAX SD	RPD
Benzo(g.h.i)perylene	µg/L	0.1	<0.1	<0.1	NC	0.01	<0.01	NC
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	NC	-	-*	NA
Chrysene	µg/L	0.1	<0.1	<0.1	NC	0.01	<0.01	NC
Coronene	µg/L	0.1	<0.1	<0.1	NC	-	NA	NA
Dibenz(a.h)anthracene	µg/L	0.1	<0.1	<0.1	NC	0.01	<0.01	NC
Fluoranthene	µg/L	0.1	<0.1	<0.1	NC	0.01	<0.01	NC
Fluorene	µg/L	0.1	<0.1	<0.1	NC	0.01	0.01	NC
Indeno(1.2.3.cd)pyrene	µg/L	0.1	<0.1	<0.1	NC	0.01	<0.01	NC
Naphthalene	µg/L	0.1	<0.1	<0.1	NC	0.02	0.07	NC
Perylene	µg/L	0.1	<0.1	<0.1	NC	-	NA	NA
Phenanthrene	µg/L	0.1	<0.1	<0.1	NC	0.01	0.01	NC
Pyrene	µg/L	0.1	<0.1	<0.1	NC	0.01	<0.01	NC
Inorganic Analysis								
TDS	mg/L	1	6590	6470	1.84	5	5500	18.03
SS	mg/L	1	25	22	12.77	5	37	38.71
Oil and grease	mg/L	1	2	1	66.67	5	<5	NC
NH4-N	mg/L	0.01	240	230	4.26	0.005	170	34.15
Total cyanide	mg/L	0.001	<0.001	<0.001	NC	0.004	0.005	NC
Total alkalinity	mg/L	1	1200	1190	0.84	5	1300	8.00

Analyte grouping/ Analyte	Units	Primary LOR	BLAX BH3	BLAX FD	RPD	Secondary LOR	BLAX SD	RPD
BOD	mg/L	1	4	4	0.00	5	<5	NC
Dissolved copper	mg/L	0.001	<0.001	<0.001	NC	0.001	<0.001	NC
Dissolved lead	mg/L	0.001	<0.001	<0.001	NC	0.001	<0.001	NC
Dissolved zinc	mg/L	0.001	0.013	0.011	16.67	0.001	0.004	**105.88**

Notes:

1. RPD – Relative Percentage Difference;
2. NC – RPD not calculable due to non-detect values
3. Values above the QA/QC criteria are bolded;
4. TDS – total dissolved solids
5. SS – total suspended solids
6. NA – Not analysed
7. * Benzo(k)fluoranthene is reported by Envirolab as Benzo(b+j+k)fluoranthene

Table 4: Duplicate pairing 3 – Relative percentage differences

Analyte grouping/ Analyte	Units	Primary LOR	WOO NL4	WOO FD	RPD	Secondary LOR	WOO SD	RPD
BTEXN								
Benzene	µg/L	1	1	3	100.00	1	1	0.00
Toluene	µg/L	2	<2	<2	NC	1	<1	NC
Ethylbenzene	µg/L	2	<2	<2	NC	1	<1	NC
Meta- & para-Xylene	µg/L	2	<2	<2	NC	2	<2	NC
Ortho-Xylene	µg/L	2	<2	<2	NC	1	<1	NC
Total Xylenes	µg/L	2	<2	<2	NC	2	<2	NC
Polycyclic Aromatic Hydrocarbons (PAH)								
3-Methylcholanthrene	µg/L	0.1	<0.1	<0.1	NC	-	NA	NA
2-Methylnaphthalene	µg/L	0.1	0.6	0.5	18.18	-	NA	NA
7.12-Dimethylbenz(a)anthracene	µg/L	0.1	<0.1	<0.1	NC	-	NA	NA
Acenaphthene	µg/L	0.1	0.2	0.3	40.00	0.01	0.21	4.88
Acenaphthylene	µg/L	0.1	<0.1	<0.1	NC	0.01	<0.01	NC
Anthracene	µg/L	0.1	<0.1	<0.1	NC	0.01	<0.01	NC
Benz(a)anthracene	µg/L	0.1	<0.1	<0.1	NC	0.01	<0.01	NC
Benzo(a)pyrene	µg/L	0.05	<0.05	<0.05	NC	0.01	<0.01	NC
Benzo(b+j)fluoranthene	µg/L	0.1	<0.1	<0.1	NC	0.02	<0.02	NC
Benzo(e)pyrene	µg/L	0.1	<0.1	<0.1	NC	-	NA	NA

Analyte grouping/ Analyte	Units	Primary LOR	WOO NL4	WOO FD	RPD	Secondary LOR	WOO SD	RPD
Benzo(g.h.i)perylene	µg/L	0.1	<0.1	<0.1	NC	0.01	<0.01	NC
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	NC	-	-*	NA
Chrysene	µg/L	0.1	<0.1	<0.1	NC	0.01	<0.01	NC
Coronene	µg/L	0.1	<0.1	<0.1	NC	-	NA	NA
Dibenz(a.h)anthracene	µg/L	0.1	<0.1	<0.1	NC	0.01	<0.01	NC
Fluoranthene	µg/L	0.1	<0.1	<0.1	NC	0.01	<0.01	NC
Fluorene	µg/L	0.1	<0.1	<0.1	NC	0.01	0.09	NC
Indeno(1.2.3.cd)pyrene	µg/L	0.1	<0.1	<0.1	NC	0.01	<0.01	NC
Naphthalene	µg/L	0.1	0.5	0.5	0.00	0.02	0.58	14.81
Perylene	µg/L	0.1	<0.1	<0.1	NC	-	NA	NA
Phenanthrene	µg/L	0.1	<0.1	<0.1	NC	0.01	0.06	NC
Pyrene	µg/L	0.1	<0.1	<0.1	NC	0.01	<0.01	NC
Inorganic Analysis								
TDS	mg/L	1	22200	21800	1.82	5	22000	0.90
SS	mg/L	1	40	41	2.47	5	46	13.95
Oil and grease	mg/L	1	1	2	66.67	5	<5	NC
NH4-N	mg/L	0.01	260	270	3.77	0.005	180	36.36
Total cyanide	mg/L	0.001	0.53	0.51	3.85	0.004	<0.004	NC
Total alkalinity	mg/L	1	1880	1870	0.53	5	1900	1.06

Analyte grouping/ Analyte	Units	Primary LOR	WOO NL4	WOO FD	RPD	Secondary LOR	WOO SD	RPD
BOD	mg/L	1	3	3	0.00	5	8	90.91
Dissolved copper	mg/L	0.001	<0.001	<0.001	NC	0.001	<1	NC
Dissolved lead	mg/L	0.001	<0.001	<0.001	NC	0.001	<1	NC
Dissolved zinc	mg/L	0.001	0.007	0.007	0.00	0.001	0.004	54.55

Notes:

1. RPD – Relative Percentage Difference;
2. NC – RPD not calculable due to non-detect values
3. Values above the QA/QC criteria are bolded;
4. TDS – total dissolved solids
5. SS – total suspended solids
6. NA – Not analysed
7. * Benzo(k)fluoranthene is reported by Envirolab as Benzo(b+j+k)fluoranthene

Table 5: Duplicate pairing 4 – Relative percentage differences

Analyte grouping/ Analyte	Units	Primary LOR	HC 1	HC FD	RPD	Secondary LOR	HC SD	RPD
BTEXN								
Benzene	µg/L	1	<1	<1	NC	-	NA	NC
Toluene	µg/L	2	<2	<2	NC	-	NA	NC
Ethylbenzene	µg/L	2	<2	<2	NC	-	NA	NC
Meta- & para-Xylene	µg/L	2	<2	<2	NC	-	NA	NC
Ortho-Xylene	µg/L	2	<2	<2	NC	-	NA	NC
Total Xylenes	µg/L	2	<2	<2	NC	-	NA	NC
Polycyclic Aromatic Hydrocarbons (PAH)								
3-Methylcholanthrene	µg/L	0.1	NA	NA	-	-	NA	-
2-Methylnaphthalene	µg/L	0.1	NA	NA	-	-	NA	-
7.12-Dimethylbenz(a)anthracene	µg/L	0.1	NA	NA	-	-	NA	-
Acenaphthene	µg/L	0.1	NA	NA	-	0.01	NA	-
Acenaphthylene	µg/L	0.1	NA	NA	-	0.01	NA	-
Anthracene	µg/L	0.1	NA	NA	-	0.01	NA	-
Benz(a)anthracene	µg/L	0.1	NA	NA	-	0.01	NA	-
Benzo(a)pyrene	µg/L	0.05	NA	NA	-	0.01	NA	-
Benzo(b+j)fluoranthene	µg/L	0.1	NA	NA	-	0.02	NA	-
Benzo(e)pyrene	µg/L	0.1	NA	NA	-	-	NA	-

Analyte grouping/ Analyte	Units	Primary LOR	HC 1	HC FD	RPD	Secondary LOR	HC SD	RPD
Benzo(g.h.i)perylene	µg/L	0.1	NA	NA	-	0.01	NA	-
Benzo(k)fluoranthene	µg/L	0.1	NA	NA	-	0.02	NA	-
Chrysene	µg/L	0.1	NA	NA	-	0.01	NA	-
Coronene	µg/L	0.1	NA	NA	-	-	NA	-
Dibenz(a.h)anthracene	µg/L	0.1	NA	NA	-	0.01	NA	-
Fluoranthene	µg/L	0.1	NA	NA	-	0.01	NA	-
Fluorene	µg/L	0.1	NA	NA	-	0.01	NA	-
Indeno(1.2.3.cd)pyrene	µg/L	0.1	NA	NA	-	0.01	NA	-
Naphthalene	µg/L	0.1	NA	NA	-	0.02	NA	-
Perylene	µg/L	0.1	NA	NA	-	-	NA	-
Phenanthrene	µg/L	0.1	NA	NA	-	0.01	NA	-
Pyrene	µg/L	0.1	NA	NA	-	0.01	NA	-
Inorganic Analysis								
TDS	mg/L	1	34200	32200	6.02	5	38000	10.53
SS	mg/L	1	3	4	28.57	5	10	107.69
Oil and grease	mg/L	1	<1	3	NC	5	<5	NC
NH4-N	mg/L	0.01	0.06	0.09	40.00	0.005	0.052	14.29
Total cyanide	mg/L	0.001	<0.001	<0.001	NC	0.002	<0.004	NC
Total alkalinity	mg/L	1	120	120	0.00	5	130	8.00

Analyte grouping/ Analyte	Units	Primary LOR	HC 1	HC FD	RPD	Secondary LOR	HC SD	RPD
BOD	mg/L	1	<1	1	NC	5	<5	NC
Dissolved copper	mg/L	0.001	<0.001	<0.001	NC	0.001	1	NC
Dissolved lead	mg/L	0.001	<0.001	<0.001	NC	0.001	<1	NC
Dissolved zinc	mg/L	0.001	0.025	0.029	14.81	0.001	0.013	**63.16**

Notes:

1. RPD – Relative Percentage Difference;
2. NC – RPD not calculable due to non-detect values
3. Values above the QA/QC criteria are bolded;
4. TDS – total dissolved solids
5. SS – total suspended solids
6. NA – Not analysed
7. * Benzo(k)fluoranthene is reported by Envirolab as Benzo(b+j+k)fluoranthene

Table 6: Duplicate pairing 5 – Relative percentage differences

Analyte grouping/ Analyte	Units	Primary LOR	WILSON MP8	WILSON FD	RPD
BTEXN					
Benzene	µg/L	1	4	4	0.00
Toluene	µg/L	2	<2	<2	NC
Ethylbenzene	µg/L	2	2	3	40.00
Meta- & para-Xylene	µg/L	2	<2	<2	NC
Ortho-Xylene	µg/L	2	<2	<2	NC
Total Xylenes	µg/L	2	<2	<2	NC
Polycyclic Aromatic Hydrocarbons (PAH)					
3-Methylcholanthrene	µg/L	0.1	<0.1	<0.1	NC
2-Methylnaphthalene	µg/L	0.1	0.2	0.2	0.00
7.12-Dimethylbenz(a)anthracene	µg/L	0.1	<0.1	<0.1	NC
Acenaphthene	µg/L	0.1	<0.1	<0.1	NC
Acenaphthylene	µg/L	0.1	<0.1	<0.1	NC
Anthracene	µg/L	0.1	<0.1	<0.1	NC
Benz(a)anthracene	µg/L	0.1	<0.1	<0.1	NC
Benzo(a)pyrene	µg/L	0.05	<0.05	<0.05	NC
Benzo(b+j)fluoranthene	µg/L	0.1	<0.1	<0.1	NC
Benzo(e)pyrene	µg/L	0.1	<0.1	<0.1	NC
Benzo(g.h.i)perylene	µg/L	0.1	<0.1	<0.1	NC
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	NC
Chrysene	µg/L	0.1	<0.1	<0.1	NC
Coronene	µg/L	0.1	<0.1	<0.1	NC
Dibenz(a.h)anthracene	µg/L	0.1	<0.1	<0.1	NC
Fluoranthene	µg/L	0.1	<0.1	<0.1	NC
Fluorene	µg/L	0.1	<0.1	<0.1	NC
Indeno(1.2.3.cd)pyrene	µg/L	0.1	<0.1	<0.1	NC
Naphthalene	µg/L	0.1	0.9	1	10.53
Perylene	µg/L	0.1	<0.1	<0.1	NC
Phenanthrene	µg/L	0.1	<0.1	0.1	NC

Analyte grouping/ Analyte	Units	Primary LOR	WILSON MP8	WILSON FD	RPD
Pyrene	µg/L	0.1	<0.1	<0.1	NC
Inorganic Analysis					
TDS	mg/L	1	20400	20600	0.98
SS	mg/L	1	110	100	9.52
Oil and grease	mg/L	1	7	5	33.33
NH4-N	mg/L	0.01	3.0	3.1	3.28
Total cyanide	mg/L	0.001	<0.001	<0.001	NC
Total alkalinity	mg/L	1	845	850	0.59
BOD	mg/L	1	<1	<1	NC
Dissolved copper	mg/L	0.001	<0.001	<0.001	NC
Dissolved lead	mg/L	0.001	<0.001	<0.001	NC
Dissolved zinc	mg/L	0.001	0.036	0.040	10.53

Notes:

1. RPD – Relative Percentage Difference;
2. NC – RPD not calculable due to non-detect values
3. Values above the QA/QC criteria are bolded;
4. TDS – total dissolved solids
5. SS – total suspended solids
6. NA – Not analysed

Table 7: Rinsate blank laboratory results

Analyte grouping/ Analyte	Units	Primary LOR	RB1	RB2	RB3	RB4
Date	-	-	28/05/2019	31/05/2019	31/05/2019	3/06/2019
BTEXN						
Benzene	µg/L	1	<1	<1	<1	<1
Toluene	µg/L	2	<2	<2	<2	<2
Ethylbenzene	µg/L	2	<2	<2	<2	<2
Meta- & para-Xylene	µg/L	2	<2	<2	<2	<2
Ortho-Xylene	µg/L	2	<2	<2	<2	<2
Total Xylenes	µg/L	2	<2	<2	<2	<2
Polycyclic Aromatic Hydrocarbons (PAH)						
3-Methylcholanthrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
2-Methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
7.12-Dimethylbenz(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benz(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	µg/L	0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b+j)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(e)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g.h.i)perylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Coronene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(a.h)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1.2.3.cd)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Perylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1

Analyte grouping/ Analyte	Units	Primary LOR	RB1	RB2	RB3	RB4
Phenanthrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Inorganic Analysis						
TDS	mg/L	1	<1	<1	<1	<1
SS	mg/L	1	<2	<2	<2	<2
Oil and grease	mg/L	1	<1	<1	<1	<1
NH4-N	mg/L	0.01	<0.01	<0.01	<0.01	<0.01
Total cyanide	mg/L	0.001	<0.001	<0.001	<0.001	<0.001
Total alkalinity	mg/L	1	<1	<1	<1	<1
BOD	mg/L	1	<1	<1	<1	<1
Dissolved copper	mg/L	0.001	<0.001	<0.001	<0.001	<0.001
Dissolved lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001
Dissolved zinc	mg/L	0.001	<0.001	<0.001	<0.001	<0.001

Notes:

1. TDS – total dissolved solids
2. SS – total suspended solids

3 LABORATORY QA/QC PROGRAM

3.1 Holding time

Analysed samples were extracted and analysed within acceptable holding times as defined in AS4482.1-2005.

3.2 Laboratories and analytical procedures

Laboratory analysis of primary and intra (blind) duplicate samples for this project were completed by SAL/ ALS and inter (split) duplicate analysis was completed by Envirolab. Laboratories are accredited by NATA for the methods used, details of this accreditation can be viewed at http://www.nata.asn.au/, while details of the samples sent to each laboratory and the analysis requested are contained in the chain of custody documentation held in Attachment 2. The analytical methods are noted on the laboratory transcripts.

3.3 Laboratory method blanks

Reported results for laboratory method blank samples were lower than laboratory LORs.

3.4 Laboratory duplicates

Laboratory duplicate results can be found in the analytical laboratory reports. The relative percent difference (RPD) between analytical results for primary samples and their corresponding laboratory groundwater duplicates were within acceptable laboratory limits with one exception shown in Table 8.

3.5 Surrogate spike recoveries

The surrogate spike recovery results can be found in the analytical laboratory reports and generally ranged within the DQO range of 60% - 140%. All surrogate spike recoveries were within acceptable limits other than those summarised in Table 9.

The majority of surrogate spike recoveries were reported within acceptable limits. The small proportion of outlying results for surrogate spike recoveries is not expected to invalidate the data.

3.6 Laboratory control spike recoveries

The laboratory control spike recovery results can be found in the analytical laboratory reports and generally ranged within the DQO range of 60% - 140%. All laboratory control spike recoveries were within acceptable limits other than those summarised in Table 10.

The majority of laboratory control spike recoveries were reported within acceptable limits. This small proportion of outlying results for laboratory control spike recoveries is not expected to invalidate the data.

3.7 Matrix spike recoveries

The matrix spike recovery results can be found in the analytical laboratory reports. Matrix spike recoveries were generally within the DQO range of 70% - 130% or 75%-125% for heavy metals. All matrix spike recoveries were within acceptable limits other than those summarised in Table 11.

The majority of matrix spike sample recoveries were reported within acceptable limits. This small proportion of outlying results for sample matrix spike recoveries is not expected to invalidate the data.

Table 8: Laboratory duplicate outliers

Report ID	Medium	Analyte	Lab Sample ID	Client Sample ID	Result %	Control Limits %	Comment
ES1916964	Water	Naphthalene	ES1916964-008	WILSON MP4	23.6	0-20	PASS – Exceeds laboratory RPD but within MDQIS

Table 9: Surrogate spike recovery outliers

Report ID	Medium	Analyte	Lab Sample ID	Client Sample ID	Result %	Control Limits %	Comment
ES1916394	Water	Anthracene-d10	ES1916394-007	BLAX 700A	57.7	48-138	Below MDQIS but within laboratory control limits
		4-Terphenyl-d14			55.0	48-144	Below MDQIS but within laboratory control limits
		Anthracene-d10	ES1916394-009	BLAX FD	56.6	48-138	Below MDQIS but within laboratory control limits
		4-Terphenyl-d14			57.1	48-144	Below MDQIS but within laboratory control limits
ES1916397	Water	Anthracene-d10	ES1916397-011	SIAQC MP12	58.2	48-138	Below MDQIS but within laboratory control limits
		4-Terphenyl-d14			55.7	48-144	Below MDQIS but within laboratory control limits
ES1916579	Water	2-Fluorobiphenyl	ES1916579-005	SIAQC LC1	57.3	43-135	Below MDQIS but within laboratory control limits
		2-Fluorobiphenyl	ES1916579-009	SIAQC FD	49.6	43-135	Below MDQIS but within laboratory control limits
		Anthracene-d10			57.8	48-138	Below MDQIS but within laboratory control limits

Report ID	Medium	Analyte	Lab Sample ID	Client Sample ID	Result %	Control Limits %	Comment
ES1916823	Water	4-Terphenyl-d14	ES1916823-001	WOO PP18	56.4	48-144	Below MDQIS but within laboratory control limits
		4-Terphenyl-d14	ES1916823-002	WOO PP19	59.9	48-144	Below MDQIS but within laboratory control limits
		2-Fluorobiphenyl	ES1916823-007	Woo B35	59.7	43-135	Below MDQIS but within laboratory control limits
		4-Terphenyl-d14	ES1916823-010	WOO 350B	49.8	48-144	Below MDQIS but within laboratory control limits
ES1916930	Water	2-Fluorobiphenyl	ES1916930-001	KROS PP2	57.2	43-135	Below MDQIS but within laboratory control limits
		Anthracene-d10	ES1916930-002	KROS PP5	58.8	48-138	Below MDQIS but within laboratory control limits
		Anthracene-d10	ES1916930-004	KROS MP5	59.1	48-138	Below MDQIS but within laboratory control limits
		2-Fluorobiphenyl	ES1916930-005	KROS MP3	56.6	43-135	Below MDQIS but within laboratory control limits
ES1916964	Water	2-Fluorobiphenyl	ES1916964	WILSON MP7BR	24.9	43-135	Recovery less than lower data quality objective

Table 10: Laboratory control spike outliers

Report ID	Medium	Analyte	Lab Sample ID	Client Sample ID	Result %	Control Limits %	Comment
ES1916579	Water	Coronene	QCLot: 2385584	-	33.9	35 - 133	Recovery below laboratory lower control limit and MDQIS.
ES1916823	Water	Acenaphthene	QCLot: 2382219	-	63.6	64 - 122	Recovery less than laboratory lower control limit but within MDQIS.
ES1916823	Water	Acenaphthylene	QCLot: 2382219	-	62.7	64 - 126	Recovery less than laboratory lower control limit but within MDQIS.
ES1916964	Water	Acenaphthene	QCLot: 2385272	-	60.6	64-122	Recovery less than laboratory lower control limit but within MDQIS.
ES1916964	Water	Acenaphthylene	QCLot: 2385272	-	59.6	64-126	Recovery less than laboratory lower control limit and MDQIS.

Table 11: Matrix spike recovery outliers

Report ID	Medium	Analyte	Lab Sample ID	Client Sample ID	Result %	Control Limits %	Comment
ES1916394	Water	Fluorene	ES1916394-001	BLAX BH3	57.7	63 - 118	Below MDQIS and laboratory control limits
ES1916579	Water	Acenaphthene	ES1916579-003	SIAQC BP1	60.2	62 - 114	Below laboratory control limits but within MDQIS

Report ID	Medium	Analyte	Lab Sample ID	Client Sample ID	Result %	Control Limits %	Comment
ES1916579	Water	Coronene	ES1916579-003	SIAQC BP1	49.1	29-138	Below MDQIS but within laboratory controls limits
ES1916579	Water	Fluorene	ES1916579-003	SIAQC BP1	60.7	63-118	Below laboratory control limits but within MDQIS
ES1916823	Water	Coronene	ES11916823-04	WOO NL1	48.3	29-138	Below MDQIS but within laboratory control limits
ES1916930	Water	Anthracene	ES1916930-003	KROS_MP1	65.0	68-116	Below laboratory control limits but within MDQIS
ES1916930	Water	Coronene	ES1916930-003	KROS_MP1	48.1	29-138	Below MDQIS but within laboratory control limits
ES1916930	Water	Napthalene	ES1916930-003	KROS_MP1	52.3	53-115	Below MDQIS and laboratory control limits
ES1916930	Water	Phenanthrene	ES1916930-003	KROS_MP1	66.2	67-120	Below laboratory control limits but within MDQIS
ES1916930	Water	Pyrene	ES1916930-003	KROS_MP1	66.0	70-117	Below laboratory control limits but within MDQIS
ES1916964	Water	Acenaphthene	ES1916964-008	Wilson_MP4	57.6	62-114	Below MDQIS and laboratory control limits
ES1916964	Water	Acenapthlyene	ES1916964-008	Wilson_MP4	56.4	61-119	Below MDQIS and laboratory control limits
ES1916964	Water	Anthracene	ES1916964-008	Wilson_MP4	65.9	68-116	Below laboratory control limits but within MDQIS
ES1916964	Water	Napthalene	ES1916964-008	Wilson_MP4	48.3	53-115	Below MDQIS and laboratory control limits
ES1916964	Water	Anthracene	ES1916964-008	Wilson_MP4	69.4	70-117	Below MDQIS but within laboratory control limits

4 ASSESSMENT OF DATA QUALITY

The data collected and used for this investigation is considered reliable. Based on information presented above, it can be confidently stated that the MDQO's for this project have been met and the data set is considered to be reliable for interpretative use.

5 QA/QC APPENDIX REFERENCES

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Appendix C

Data Quality Assessment

DATA QUALITY ASSESSMENT

Q1. Data Quality Objectives

The Preliminary Site Investigation (PSI) was prepared with reference to the seven step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of the *National Environment Protection (Assessment of Site Contamination) Measure* 1999 as amended 2013 (NEPC, 2013). The DQO process is outlined as follows:

- Stating the Problem;
- Identifying the Decision;
- Identifying Inputs to the Decision;
- Defining the Boundary of the Assessment;
- Developing a Decision Rule;
- Specifying Acceptable Limits on Decision Errors; and
- Optimising the Design for Obtaining Data.

The DQOs have been addressed within the report as shown in Table Q1.

Table Q1: Data Quality Objectives

Data Quality Objective	Report Section where Addressed
State the Problem	S1 Introduction
Identify the Decision	S1 Introduction (objective) S12 Conclusions
Identify Inputs to the Decision	S1 Introduction S3 Site Identification, Description and Site Geology, Topography and Hydrogeology Mapping S4 Review of Previous Reports S5 Proposed Development S6 Conceptual Site Model S8 Site Assessment Criteria S9 Fieldwork Results S10 Laboratory Results
Define the Boundary of the Assessment	S3 Site Identification, Description Drawing 1 - Appendix A
Develop a Decision Rule	S8 Site Assessment Criteria
Specify Acceptable Limits on Decision Errors	S7 Fieldwork, Analysis and QA/QC S8 Site Assessment Criteria QA/QC Procedures and Results – Sections Q2, Q3
Optimise the Design for Obtaining Data	S2 Scope of Works S7 Fieldwork, Analysis and QA/QC QA/QC Procedures and Results – Sections Q2, Q3

Q2. FIELD AND LABORATORY QUALITY CONTROL

The field and laboratory quality control (QC) procedures and results are summarised in Tables Q2 and Q3. Reference should be made to the fieldwork and analysis procedures in Section 8 and the laboratory certificates in Appendix F for further details.

Table Q2: Field QC

Item	Frequency	Acceptance Criteria	Achievement
Intra-laboratory replicates	10% primary samples	RPD (<30% inorganics), <50% (organics)	yes[1]
Trip Spikes	1 per field batch	60-140% recovery	yes
Trip Blanks	1 per field batch	<PQL/LOR	yes

NOTES: 1 qualitative assessment of RPD results overall; refer Section Q2.1

Table Q3: Laboratory QC

Item	Frequency	Acceptance Criteria	Achievement
Analytical laboratories used		NATA accreditation	yes
Holding times		In accordance with NEPC (2013) which references various Australian and international standards	yes
Laboratory / Reagent Blanks	1 per lab batch	<PQL	yes
Laboratory duplicates	10% primary samples	Laboratory specific [1]	
Matrix Spikes	1 per lab batch	70-130% recovery (inorganics); 60-140% (organics); 10-140% (SVOC, speciated phenols)	yes
Surrogate Spikes	organics by GC	70-130% recovery (inorganics); 60-140% (organics); 10-140% (SVOC, speciated phenols)	yes
Control Samples	1 per lab batch	70-130% recovery (inorganics); 60-140% (organics); 10-140% (SVOC, speciated phenols)	yes

NOTES: 1 ELS: <5xPQL – any RPD; >5xPQL – 0-50%RPD

In summary, the QC data is considered to be of sufficient quality to be acceptable for the assessment.

Q2.1 Intra-Laboratory Replicates

Intra-laboratory replicates were analysed as an internal check of the reproducibility within the primary laboratory Envirolab Services (ELS) and as a measure of consistency of sampling techniques. The comparative results of analysis between original and intra-laboratory replicate samples are summarised in Table Q4.

Note that, where both samples are below LOR/PQL the difference and RPD has been given as zero. Where one sample is reported below LOR/PQL, but a concentration is reported for the other, the LOR/PQL value has been used for calculation of the RPD for the less than LOR/PQL sample.

The calculated RPD values were within the acceptable range of ± 30 for inorganic analytes and ± 50% for organics with the exception of those in shading. However, the actual differences were low.

Overall, the intra-laboratory replicate comparisons indicate that the sampling techniques were generally consistent and repeatable.

Q2.2 Inter-Laboratory Replicates

Inter-laboratory replicates were conducted as a check of the reproducibility of results between the primary laboratory ELS and the secondary ALS and as a measure of consistency of sampling techniques.

The comparative results of analysis between original and inter-laboratory replicate soil samples are summarised in Table Q5.

Note that, where both samples are below LOR/PQL the difference and RPD has been given as zero. Where one sample is reported below LOR/PQL, but a concentration is reported for the other, the LOR/PQL value has been used for calculation of the RPD for the less than LOR/PQL sample.

Groundwater or soil vapour inter-laboratory replicate sample have not been undertaken, however, it is considered that the data quality or reliability is not affected as the primary samples and intra-laboratory duplicate samples were analysed at a NATA accredited laboratory. The duplicate sample laboratory results indicated that the results are reliable.

Table Q4: Relative Percentage Difference Results – Intra-laboratory Replicates

Lab	Sample ID	Date Sampled	Media	Units	Metals										PAH				TRH				BTEX				Phenol
					As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	Fe	Mn	total	BaP TEQ	BaP	Naphthalene	C6-C10	>C10-C16	>C16-C34	>C34-C40	Benzene	Ethylbenzene	Toluene	Xylene Total	Phenol
SOIL																											
ELS	BD2/20190827	27/08/2019	filling	mg/kg	7	<0.4	9	2	12	<0.1	2	22	-	-	1.1	<0.5	0.06	<1	<25	<50	<100	<100	<0.2	<1	<0.5	<1	<5
ELS	BH7a/0.2-0.3	27/08/2019	filling	mg/kg	<4	<0.4	7	8	11	<0.1	3	23	-	-	0.06	<0.5	0.06	<1	<25	<50	<100	<100	<0.2	<1	<0.5	<1	<5
Difference				mg/kg	3	0	2	6	1	0	1	1	-	-	1.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
RPD				%	55%	0%	25%	120%	9%	0%	40%	4%	-	-	179%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GROUNDWATER																											
ELS	BD1	27/08/2019	water	ug/L	1	0.4	<1	6	<1	<0.05	59	410	-	-	-	-	<0.1	<50	<10	<50	-	-	<1	<1	0.0	<1	<0.05
ELS	MP4	27/08/2019	water	ug/L	1	0.3	<1	7	<1	<0.05	59	410	-	-	-	-	<0.1	<50	<10	<50	-	-	<1	<1	0.0	<1	<0.05
Difference				ug/L	0.0	0.1	0.0	1.0	0.0	0.0	0.0	0.0	-	-	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0
RPD				%	0.0	28.6	0.0	15.4	0.0	0.0	0.0	0.0	-	-	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0

Notes: - not applicable, not tested

Table Q5: Relative Percentage Difference Results – Inter-laboratory Replicates

Lab	Sample ID	Date Sampled	Media	Units	Metals										PAH				TRH				BTEX			
					As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	Fe	Mn	total	BaP TEQ	BaP	Naphthalene	C6-C10	>C10-C16	>C16-C34	>C34-C40	Benzene	Ethylbenzene	Toluene	Xylene Total
SOIL																										
ELS	BH6a/1.4-1.5	27/08/2019	filling	mg/kg	<4	<0.4	8	1	6	<0.1	4	4	-	-	1.4	<0.5	<0.5	1.4	<10	<50	<100	<100	<0.2	<0.5	<0.5	<2
ALS	BD1/20190827	27/08/2019	filling	mg/kg	<5	<1	8	11	18	-	3	-	-	-	-	5.6	4.0	-	<10	<50	280	<100	<0.2	<0.5	<0.5	<2
Difference				mg/kg	1.0	0.6	0.0	10.0	12.0	-	1.0	21.0	-	-	-	5.1	3.5	-	0.0	0.0	180.0	0.0	0.0	0.0	0.0	0.0
RPD				%	22.2	85.7	0.0	166.7	100.0	-	28.6	144.8	-	-	-	167.2	155.6	-	0.0	0.0	94.7	0.0	0.0	0.0	0.0	0.0

Notes: - not applicable, not tested

Table Q6: Relative Percentage Difference Results – Intra-laboratory Replicates – Soil Vapour (µg/m3)

Field Duplicates (gas)			**SDG**	ENVIROLAB 2019-09-03T00:00:00	ENVIROLAB 2019-09-03T00:00:00	
			Field ID	SV5	BD1	**RPD**
			Sampled Date/Time	2/09/2019	2/09/2019	
Chem_Group	**ChemName**	**Units**	**EQL**			
	Freon 113	µg/m3	3.8	<3.8	<3.8	0
	2-Propanol	µg/m3	12	170.0	150.0	13
	Propene	µg/m3	0.9	<0.9	<0.9	0
TO15 in Canisters ug/m3	1,2-Dichlorotetrafluoroethane	µg/m3	2.5	<2.5	<2.5	0
TO15 in Canisters/Bags	Vacuum before Analysis	Hg"		-7.0	-6.0	15
	Vacuum before Shipment	Hg"		-30.0	-30.0	0
TPH Air/ Air Phase Hydrocarbon	TPH C5 - C8 Aliphatic	µg/m3	200	<200.0	<200.0	0
	TPH C9 - C10 Aromatic	µg/m3	100	<100.0	<100.0	0
	TPH C9 - C12 Aliphatic	µg/m3	50	220.0	210.0	5
TPH	F2-NAPHTHALENE	ug/m3	40	240.0	220.0	9
	C6-C10 less BTEX (F1)	ug/m3	200	<200.0	<200.0	0
BTEX	Benzene	µg/m3	1.6	<1.6	<1.6	0
	Ethylbenzene	µg/m3	2.2	<2.2	<2.2	0
	Toluene	µg/m3	1.9	4.0	4.0	0
	Xylene (m & p)	µg/m3	4.3	5.0	5.0	0
	Xylene (o)	µg/m3	2.2	8.0	7.0	13
MAH	1,2,4-trimethylbenzene	µg/m3	2.5	3.0	3.0	0
	1,3,5-trimethylbenzene	µg/m3	2.5	<2.5	<2.5	0
	1-methyl-4 ethyl benzene	µg/m3	2.5	<2.5	<2.5	0

	Styrene	µg/m3	2.1	<2.1	<2.1	0
Chlorinated Hydrocarbons	1,1,1-trichloroethane	µg/m3	2.7	<2.7	<2.7	0
	1,1,2,2-tetrachloroethane	µg/m3	3.4	<3.4	<3.4	0
	1,1,2-trichloroethane	µg/m3	2.7	<2.7	<2.7	0
	1,1-dichloroethane	µg/m3	2	<2.0	<2.0	0
	1,1-dichloroethene	µg/m3	2	<2.0	<2.0	0
	1,2-dichloroethane	µg/m3	2	<2.0	<2.0	0
	1,2-dichloropropane	µg/m3	2.3	<2.3	<2.3	0
	Benzyl chloride	ug/m3	2.6	<2.6	<2.6	0
	Bromodichloromethane	µg/m3	3.4	<3.4	<3.4	0
	Bromoform	µg/m3	5.2	<5.2	<5.2	0
	Carbon tetrachloride	µg/m3	3.1	<3.1	<3.1	0
	Chlorodibromomethane	µg/m3	1.6	<1.6	<1.6	0
	Chloroethane	µg/m3	1.3	<1.3	<1.3	0
	Chloroform	µg/m3	2.4	2.0	2.0	0
	Chloromethane	µg/m3	1	<1.0	<1.0	0
	cis-1,2-dichloroethene	µg/m3	2	<2.0	<2.0	0
	cis-1,3-dichloropropene	µg/m3	2.3	<2.3	<2.3	0
	Dichloromethane	µg/m3	17	<17.0	<17.0	0
	Hexachlorobutadiene	µg/m3	5.3	<5.3	<5.3	0
	Trichloroethene	µg/m3	2.7	<2.7	<2.7	0
	Tetrachloroethene	µg/m3	3.4	<3.4	<3.4	0
	trans-1,2-dichloroethene	µg/m3	2	<2.0	<2.0	0
	trans-1,3-dichloropropene	µg/m3	2.3	<2.3	<2.3	0
	Vinyl chloride	µg/m3	1.3	<1.3	<1.3	0
Halogenated Hydrocarbons	1,2-dibromoethane	µg/m3	3.8	<3.8	<3.8	0
	Bromomethane	µg/m3	1.9	<1.9	<1.9	0
	Dichlorodifluoromethane	µg/m3	2.5	<2.5	<2.5	0
	Trichlorofluoromethane	µg/m3	2.8	<2.8	<2.8	0

Halogenated Benzenes	1,2,4-trichlorobenzene	µg/m3	3.7	<3.7	<3.7	0
	1,2-dichlorobenzene	µg/m3	3	<3.0	<3.0	0
	1,3-dichlorobenzene	µg/m3	3	<3.0	<3.0	0
	1,4-dichlorobenzene	µg/m3	3	3.0	4.0	29
	Chlorobenzene	µg/m3	2.3	<2.3	<2.3	0
VOCs	1,3-Butadiene	µg/m3	1.1	<1.1	<1.1	0
	Acrolein	µg/m3	11	<11.0	<11.0	0
	Methyl Methacrylate	µg/m3	2	<2.0	<2.0	0
Solvents	1,4-Dioxane	µg/m3	1.8	<1.8	<1.8	0
	Methyl Ethyl Ketone	µg/m3	15	<15.0	<15.0	0
	2-hexanone (MBK)	µg/m3	2	<2.0	<2.0	0
	4-Methyl-2-pentanone	µg/m3	20	<20.0	<20.0	0
	Acetone	ug/m3	11.9	20.0	20.0	0
	Carbon disulfide	µg/m3	16	<16.0	<16.0	0
	Cyclohexane	ug/m3	1.7	5.0	3.0	50
	Ethanol	µg/m3	9	<9.4	<9.4	0
	Ethyl acetate	µg/m3	1.8	<1.8	<1.8	0
	Heptane	µg/m3	2	<2.0	<2.0	0
	Hexane	µg/m3	1.8	2.0	2.0	0
	MTBE	ug/m3	1.8	<1.8	<1.8	0
	Tetrahydrofuran	µg/m3	1.5	<1.5	<1.5	0
	Vinyl acetate	µg/m3	1.8	<1.8	<1.8	0
PAH/Phenols	Naphthalene	µg/m3	2.6	<2.6	<2.6	0
*RPDs have only been considered where a concentration is greater than 1 times the EQL.						
**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 80 (1-10 x EQL); 50 (10-30 x EQL); 30 (> 30 x EQL))						
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory						

Q2.3 IPA Shroud and Leak Test

Isopropyl alcohol (IPA or 2-propanol) was introduced into the sub-soil vapour sampling shroud/enclosure to use as tracer gas to test the integrity of the sampling train and for leaks in the soil vapour implant/probe installation. A shroud sample was collected on each day of sampling and tested for the IPA.

ATSM D7663-12 Standard Practice for Active Gas Sampling in the vadose Zone for Vapour Intrusion Evaluations states that a concentration of the tracer gas in the samples of up to 10% of that in the shroud/enclosure is acceptable. DP adopt a more conservative acceptance level of 1% of the concentration in the shroud.

The results of the shroud sample and IPA results in the soil vapour samples is summarised in Table Q7 below.

Table Q7: Shroud Sample Results

IPA Concentration in Shroud (µg/m^3)	Sample ID	IPA Concentration in Samples (µg/m^3)	IPA in samples as % of shroud
44,000,000	SV1	98	<1
	SV2	300	<1
	SV4	120	<1
	SV5	70	<1
	SV6	50	<1
	SV7	83	<1
	SV8	50	<1
	SV9	57	<1
	SV10	40	<1
	BD1	62	<1
10,000,000	SV3	25,0000	<1

The IPA concentrations in each of the samples was well below 1% of the concentration in the shroud in each of the samples. In addition a field leak test was undertaken which involved setting up the sampling apparatus and shroud and measuring the VOC levels using a PID. The tracer compound (IPA) was then added to the shroud and the PID level re-measured to assess potential leaks. In each case the pre and post tracer application PID levels were the same indicating that the potential for leaks in the sampling train was low. This confirms that the application of IPA to the shroud did not increase the IPA levels in the sample train, but that the IPA levels detected were reflective of the sub-slab conditions.

Q2.4 Shut-in Test

A shut in test was performed to ensure that there were no leaks in the sample train. Two shut in tests were performed, one on the canister sample train and one on the pump and carbon tube sampling apparatus.

The canister shut-in test involved assembling the sample apparatus to the extent practical (i.e. connecting the summa canister to the regulator), then opening the canister valve to apply the vacuum to the sampling train, while the regulator was still capped.

The carbon back-up tube shut in test involved assembly the sample train (fittings to attach to vapour well, carbon tube, vacuum gauge, rotameter and pump plus the associated tubing connecting the sample train, then clamping the sampling tube between the vapour port and carbon tube, activating the pump until a vacuum of 15 in.Hg was achieved and then the sampling train was clamped at the pump.

ATSM D7663-12 Standard Practice for Active Gas Sampling in the vadose Zone for Vapour Intrusion Evaluations recommends that a vacuum 15 in.Hg be applied to the sampling train and that the vacuum should not drop by more than 0.5 in. Hg over a period of no less than 1 minute and preferably for 5 minutes.

The vacuum over the observation period of 1 min in the canister shut-in test did not change from a vacuum of -30 in.Hg. The vacuum over the observation period of 1 min in the carbon tube sampling train shut-in test did not change from a vacuum of -15 in.Hg. Therefore it was considered that there were no leaks in the sample train.

Records of the shut in tests are presented in the soil vapour sampling field logs in Appendix D.

Q2.5 Review of Laboratory Comments

The laboratory certificates all included the QA/QC testing and results undertaken.

Comments provided in the laboratory certificates, including any exceedances of their QA/QC, are discussed in Table Q8, below. Overall it is considered that the acceptable standards were achieved for the laboratory analysis and that the results are acceptable for use in this assessment.

Table Q8: Laboratory Comments

Lab Report ID	Lab Comment	DP Comment
ELS 225191	Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 225191-1 for Cu. Therefore a triplicate result has been issued as laboratory sample number 225191-16.	This is not considered to impact the usability of the data

Lab Report ID	Lab Comment	DP Comment
ESL 224884	AIR_TO15/AIR_TO15_UG: PQL has been raised due to the high level of analytes present in the sample #1	This is not considered to impact the usability of the data
ESL 224884-A	TPH_A_ALI_ARO: PQL has been raised due to the high level of analytes present in the sample/s. The TPH fractions are calibrated with non-halogenated and non-oxygenated hydrocarbons(aliphatics and aromatics). There are significantly different response factors for halogenated and non-halogenated hydrocarbons, and also oxygenated and non-oxygenated hydrocarbons, hence, there may be some notable differences between the TPH fraction results and the sum of the individual halogenated and oxygenated analytes within said fraction. This typically occurs where high levels of halogenated hydrocarbons and/or oxygenated hydrocarbon dominate said fraction.	This is not considered to impact the usability of the data

Q3. Data Quality Indicators

The reliability of field procedures and analytical results was assessed against the following data quality indicators (DQIs):

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

The DQIs were assessed as outlined in the following Table Q9.

Table Q9: Data Quality Indicators

Data Quality Indicator	Method(s) of Achievement
Completeness	Planned systematic and selected target locations sampled; Preparation of field logs, sample location plan and chain of custody (COC) records; Preparation of field groundwater sampling sheets; Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody; Samples analysed for contaminants of potential concern (COPC) identified in the Conceptual Site Model (CSM); Completion of COC documentation; NATA endorsed laboratory certificates provided by the laboratory; Satisfactory frequency and results for field and laboratory QC samples as discussed in Section Q2.
Comparability	Using appropriate techniques for sample recovery, storage and transportation, which were the same for the duration of the project; Works undertaken by appropriately experienced and trained DP environmental scientist / engineer; Use of NATA registered laboratories, with test methods the same or similar between laboratories; Satisfactory results for field and laboratory QC samples.
Representativeness	Target media sampled; Spatial and temporal distribution of sample locations; Sample numbers recovered and analysed are considered to be representative of the target media and complying with DQOs; Samples were extracted and analysed within holding times; Samples were analysed in accordance with the analysis request.
Precision	Acceptable RPD between original samples and replicates; Satisfactory results for all other field and laboratory QC samples.
Accuracy	Satisfactory results for all field and laboratory QC samples.

Based on the above, it is considered that the DQIs have been complied with. As such, it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

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Field Duplicates (gas)
Filter: SDG in('ENVIROLAB 2019-09-03T00:00:00','ENVIROLAB 20

SDG	VIROLAB 2019-09-03T00:00/IROLAB 2019-09-03T00:00:00		
Field ID	SV5	BD1	RPD
Sampled Date/Time	2/09/2019	2/09/2019	

Chem_Group	ChemName	Units	EQL			
	Freon 113	µg/m3	3.8	<3.8	<3.8	0
	2-Propanol	µg/m3	12	170.0	150.0	13
	Propene	µg/m3	0.9	<0.9	<0.9	0
TO15 in Canisters ug/m3	1,2-Dichlorotetrafluoroethane	µg/m3	2.5	<2.5	<2.5	0
anisters ug/m3						
TO15 in Canisters/Bags	Vacuum before Analysis	Hg"		-7.0	-6.0	15
	Vacuum before Shipment	Hg"		-30.0	-30.0	0
anisters/Bags						
TPH Air/ Air Phase Hydrocarbo	TPH C5 - C8 Aliphatic	µg/m3	200	<200.0	<200.0	0
	TPH C9 - C10 Aromatic	µg/m3	100	<100.0	<100.0	0
	TPH C9 - C12 Aliphatic	µg/m3	50	220.0	210.0	5
r Phase Hydrocarbon						
TPH	F2-NAPHTHALENE	ug/m3	40	240.0	220.0	9
	C6-C10 less BTEX (F1)	ug/m3	200	<200.0	<200.0	0
BTEX	Benzene	µg/m3	1.6	<1.6	<1.6	0
	Ethylbenzene	µg/m3	2.2	<2.2	<2.2	0
	Toluene	µg/m3	1.9	4.0	4.0	0
	Xylene (m & p)	µg/m3	4.3	5.0	5.0	0
	Xylene (o)	µg/m3	2.2	8.0	7.0	13
MAH	1,2,4-trimethylbenzene	µg/m3	2.5	3.0	3.0	0
	1,3,5-trimethylbenzene	µg/m3	2.5	<2.5	<2.5	0
	1-methyl-4 ethyl benzene	µg/m3	2.5	<2.5	<2.5	0
	Styrene	µg/m3	2.1	<2.1	<2.1	0
Chlorinated Hydrocarbons	1,1,1-trichloroethane	µg/m3	2.7	<2.7	<2.7	0
	1,1,2,2-tetrachloroethane	µg/m3	3.4	<3.4	<3.4	0
	1,1,2-trichloroethane	µg/m3	2.7	<2.7	<2.7	0
	1,1-dichloroethane	µg/m3	2	<2.0	<2.0	0
	1,1-dichloroethene	µg/m3	2	<2.0	<2.0	0
	1,2-dichloroethane	µg/m3	2	<2.0	<2.0	0
	1,2-dichloropropane	µg/m3	2.3	<2.3	<2.3	0
	Benzyl chloride	ug/m3	2.6	<2.6	<2.6	0
	Bromodichloromethane	µg/m3	3.4	<3.4	<3.4	0
	Bromoform	µg/m3	5.2	<5.2	<5.2	0
	Carbon tetrachloride	µg/m3	3.1	<3.1	<3.1	0
	Chlorodibromomethane	µg/m3	1.6	<1.6	<1.6	0
	Chloroethane	µg/m3	1.3	<1.3	<1.3	0
	Chloroform	µg/m3	2.4	2.0	2.0	0
	Chloromethane	µg/m3	1	<1.0	<1.0	0
	cis-1,2-dichloroethene	µg/m3	2	<2.0	<2.0	0
	cis-1,3-dichloropropene	µg/m3	2.3	<2.3	<2.3	0
	Dichloromethane	µg/m3	17	<17.0	<17.0	0
	Hexachlorobutadiene	µg/m3	5.3	<5.3	<5.3	0
	Trichloroethene	µg/m3	2.7	<2.7	<2.7	0
	Tetrachloroethene	µg/m3	3.4	<3.4	<3.4	0
	trans-1,2-dichloroethene	µg/m3	2	<2.0	<2.0	0
	trans-1,3-dichloropropene	µg/m3	2.3	<2.3	<2.3	0
	Vinyl chloride	µg/m3	1.3	<1.3	<1.3	0
l Hydrocarbons						
Halogenated Hydrocarbons	1,2-dibromoethane	µg/m3	3.8	<3.8	<3.8	0
	Bromomethane	µg/m3	1.9	<1.9	<1.9	0
	Dichlorodifluoromethane	µg/m3	2.5	<2.5	<2.5	0
	Trichlorofluoromethane	µg/m3	2.8	<2.8	<2.8	0
ed Hydrocarbons						
Halogenated Benzenes	1,2,4-trichlorobenzene	µg/m3	3.7	<3.7	<3.7	0
	1,2-dichlorobenzene	µg/m3	3	<3.0	<3.0	0
	1,3-dichlorobenzene	µg/m3	3	<3.0	<3.0	0
	1,4-dichlorobenzene	µg/m3	3	3.0	4.0	29
	Chlorobenzene	µg/m3	2.3	<2.3	<2.3	0
ed Benzenes						
VOCs	1,3-Butadiene	µg/m3	1.1	<1.1	<1.1	0
	Acrolein	µg/m3	11	<11.0	<11.0	0
	Methyl Methacrylate	µg/m3	2	<2.0	<2.0	0
Solvents	1,4-Dioxane	µg/m3	1.8	<1.8	<1.8	0
	Methyl Ethyl Ketone	µg/m3	15	<15.0	<15.0	0
	2-hexanone (MBK)	µg/m3	2	<2.0	<2.0	0
	4-Methyl-2-pentanone	µg/m3	20	<20.0	<20.0	0
	Acetone	ug/m3	11.9	20.0	20.0	0
	Carbon disulfide	µg/m3	16	<16.0	<16.0	0
	Cyclohexane	ug/m3	1.7	5.0	3.0	50
	Ethanol	µg/m3	9	<9.4	<9.4	0
	Ethyl acetate	µg/m3	1.8	<1.8	<1.8	0
	Heptane	µg/m3	2	<2.0	<2.0	0
	Hexane	µg/m3	1.8	2.0	2.0	0
	MTBE	ug/m3	1.8	<1.8	<1.8	0
	Tetrahydrofuran	µg/m3	1.5	<1.5	<1.5	0
	Vinyl acetate	µg/m3	1.8	<1.8	<1.8	0
PAH/Phenols	Naphthalene	µg/m3	2.6	<2.6	<2.6	0

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 80 (1-10 x EQL); 50 (10-30 x EQL); 30 (> 30 x EQL))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary l

ENVIRONMENTAL EARTH SCIENCES
THE KNOW AND THE HOW

REPORT NO. 117088

QUALITY CONTROL AND QUALITY ASSURANCE REPORT

ENVIRONMENTAL EARTH SCIENCES NSW
SYDNEY OLYMPIC PARK AUTHORITY
SEPTEMBER 2017
VERSION 1

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1 INTRODUCTION AND OBJECTIVES

Environmental Earth Sciences NSW was engaged by Sydney Olympic Park Authority (SOPA) to prepare a Quality Control and Quality Assurance (QA/QC) report for activities associated with Environmental Monitoring at Sydney Olympic Park (contract number TRSOPA17118).

The objectives of this QA/QC Report are:

- to outline Environmental Earth Sciences proposed methodology for fieldworks; and
- outline quality procedures that will be undertake.

2 FIELD METHODOLOGY

Environmental Earth Sciences' fieldwork methodologies will be in accordance with Sections 2.1.4 to 2.4.5 of *Remediated Lands – Environmental Monitoring Volume 2 – Section 3 The Services* ("The Services") document provided by Sydney Olympic Park Authority. Specifically, we will carry out the procedures outlined in the following sections.

Following attainment of relevant Work Permits, completion of safe work method statement / job safety analysis, approval of QA/QC report and completion of relevant inductions, we will mobilise one field scientist to undertake quarterly site works and two field scientists for all six-monthly, annual and two-yearly monitoring works. We will ensure that at all times we are on site at least one of our staff members has a minimum of 2 years of work experience on landfill system, has received appropriate training and is fully aware of the project requirements to ensure consistency of methodology and therefore results.

2.1 Static water level monitoring procedure

The following steps will be undertaken to measure the static water level (SWL) from each well:

- Prior to purging or sampling 'Depth to water' will be measured using an electronic guage from the top of the monitoring point cover to the top of the water; and
- The electronic dipper will be decontaminated with biodegradable surfactant between each location.

The relative level (RL) will be calculated in the office by subtracting the 'depth to water' from the RL for the top of the monitoring point.

2.2 Groundwater sample collection procedure

The following steps will be undertaken to collect samples from each well:

- measurement of the SWL with an electronic dipper;
- purging of each piezometer of three standing well volumes (or until dry). In instances where the well is purged dry the results of this procedure will be documented. As per "The Services" Section 2.4.4 we will not purge from the Pump Pits unless specifically requested by SOPA. All water purged will be deposited in a drum secured to the car and at the end of each monitoring round will be disposed of at a licensed facility

approved to accept this type of waste (unless provided written approval by SOPA to dispose of within pump pits). Environmental Earth Sciences will endeavour to limit purge water that will be disposed of by removing only the minimum volume of groundwater required to ensure a representative sample is collected.

- after purging three standing well volumes and upon stabilisation of field chemical readings or upon recovery of the piezometer (within 24 hours of purging), readings from the water quality metre will be noted. This will happen immediately prior to collection of samples;
- purging and sampling will be conducted with a combination of bailers, waterra tubing and footvalves and submersible pump for purging water from wells. This includes the use of site specific equipment at the Aquatic Centre Carpark, submersible electronic pumps at free flowing piezometers (to be triple rinsed between locations to mitigate cross contamination) and bailers in the presence of free product or where the dimensions of the piezometers prevent other methods being used.
- samples will be collected in appropriately preserved sample containers, minimising introduction of oxygen to the samples, and placing the samples immediately in an ice-cooled esky;
- all equipment used between sampling locations will be decontaminated with biodegradable surfactant;
- at the completion of each fieldwork round, all samples collected will be dispatched to a NATA accredited laboratory for analytes specified in “The Services”;
- Upon their receipt, the laboratory results will be reviewed, after which they will be released to SOPA and other nominated recipients.

Environmental Earth Sciences NSW intends to use a combination of bailers, waterra tubing and footvalves and submersible pump for purging water from wells. This includes the use of site specific equipment at the Aquatic Centre Carpark, submersible electronic pumps at free flowing piezometers (to be triple rinsed between locations to mitigate cross contamination) and bailers in the presence of free product or where the dimensions of the piezometers prevent other methods being used.

2.3 Gas measurement procedure

The following steps will be undertaken to measure gas readings from selected wells:

- Gas screening will be measured for of sixty and initial, peak and stabilised gas reading will be recorded.
- SWL measurements will be measured after gas screening is completed and using an electronic dipper.

In accordance with The Services document we will immediately notify SOPA of any gas readings recorded above the limits specified in Section 2.4.5.

3 QUALITY ASSURANCE AND QUALITY CONTROL

3.1 Measurement data quality objectives

Development of data quality objectives (DQOs) for each project is a requirement of the National Environment Protection (Assessment of Site Contamination) Amendment Measure (NEPC 2013). Specific discussion in the development of the DQO's has been included in the main report.

Based on the DQOs the following measurement data quality indicators (MDQIs) are provided in Table 1.

TABLE 1 MEASUREMENT DATA QUALITY INDICATORS (MDQIS)

Parameter	Procedure	Minimum Frequency	Criteria	
			(5 to 10x LOR[4])	>10x LOR
Precision	Field Duplicates	1 in 20 - metals	<80 RPD	<50 RPD
		1 in 20 - semi-volatiles	<100 RPD	<80 RPD
		1 in 20 - volatiles	<150 RPD	<130 RPD
	Lab Replicate*	1 in 20	<50 RPD	<30 RPD
Accuracy*	Reference Material	1 in 10	60% to 140%R	80% to 120%R
	Matrix spikes			
	Surrogate spikes			
Representativeness*	Reagent Blanks	1 per batch	No detection	
	Holding Times*	Every sample	-	
Blanks**	Trip Blank	1 per batch	No detection	
	Rinsate Blanks			
Sensitivity	Limit of Reporting	Every sample	LOR < ½ site criteria	

Notes:

1. RPD – relative percentage difference;
2. %R – percent recovery;
3. LOR – limit of reporting;
4. [4] no limit at <5x LOR;
5. * the MDQI is usually specified in the standard method. If not, use the default values set out in this table; and
6. ** only necessary when measuring dissolved metals and volatile organic compounds in water samples.

It should be noted that Standards Australia (i.e. AS4482.1) specify that typical MDQIs for precision should be ≤50% RPD; however, it should be noted that low concentrations and organic compounds can be acceptable if reported outside of this range. As the standard suggests, an RPD of >50% has been used as a 'trigger' and values above this level of repeatability have also been noted and explained.

Our adopted MDQIs for precision acknowledge the intrinsic heterogeneity of metal and semi volatile chemical concentrations in disturbed water that may potentially cause large variations in results between laboratory subsamples (although all efforts are made to homogenise non volatile duplicate samples). Similarly, large variations in volatile chemical concentrations between duplicates may be unavoidable even when using best practice sampling methodology, especially as we seek to minimise the disturbance to the sample while splitting it which means a high degree of inherent heterogeneity is expected.

As such, our adopted RPD criteria are considered to be a suitable measure for the reproducibility of results. A ≤50% RPD trigger value will be used, with any exceedance discussed and assessed for acceptability and reported in the Monitoring Round Statements.

4 FIELD QA/QC PROGRAM

4.1 Sample collection, preservation, transportation and storage

Groundwater samples will be collected and placed in appropriate sample containers as supplied by the nominated National Association of Testing Authorities (NATA) laboratory. Samples will be labelled with the corresponding field/sample identification number, site reference and date in accordance with Environmental Earth Science sample procedures. Samples will be placed in a chilled container prior to transport to the nominated laboratory.

Groundwater samples will be supplied to NATA accredited laboratories (Sydney Analytical Laboratories, Envirolab Services and Analytical Laboratory Services) under a completed chain of custody (CoC). Copies of the CoC documentation and laboratory transcripts will be provided in the Monitoring Round Statement.

4.2 Calibration of field equipment

Calibration or bump testing of the water quality metre will be undertaken daily or as required throughout the day during the groundwater sampling program. Calibration of the Gas Analyser will be undertaken once prior to each round of fieldworks. The calibration records will be provided in the Monitoring Round Statement.

4.3 Intra (blind) and Inter (split) duplicate sampling

At least 5 percent of groundwater samples (1 in 20) per day of sampling will be collected in duplicate. For comparability of data, it is important that there is little delay in the sample submission. For split samples, because of error associated with field splitting, a RPD of between 80 and 150% (depending on the substance) will be allowed as the MDQI. Consequently, samples with the most observable field homogeneity are selected.

This procedure is not considered necessary for the September and March quarterly rounds as only one sample is collected.

Any value >50% RPD will be noted and discussed, as per Standards Australia requirements, with respect to its acceptability for inclusion in the data-set.

4.4 Equipment rinsate

Equipment rinsate blanks will be collected at as part of the groundwater sampling program to ensure cross contamination between samples will not occur due to insufficient decontamination of equipment used. This will be undertaken at a rate of one sample per day in the six-monthly, yearly and 2-yearly rounds. This procedure is not considered necessary in September and March quarterly rounds as only one sample is collected.

The results of the equipment rinsate blank will be provided in the Monitoring Round Statement.

5 LABORATORY QUALITY CONTROL PROGRAM

5.1 Laboratories and analytical procedures

Laboratory analysis of primary and intra (blind) duplicate samples for this project will be completed by SAL/ Envirolab and inter (split) duplicate analysis will be completed by ALS. Laboratories are accredited by NATA for the methods used, and details of this accreditation can be viewed at http://www.nata.asn.au/. Details of the samples sent to each laboratory and the analysis requested are contained in the CoC documentation, which will be provided in the Monthly Round Statement. The analytical methods are noted on the laboratory transcripts.

5.2 Required limits of reporting

The following limits of reporting (LOR) requested by SOPA can be achieved by the designated laboratories:

TABLE 2 LABOROATORY LOR

Analyte	LOR
Base Parameters	
Total dissolved solids	1 mg/L
Total suspended solids	1 mg/L
Oil & Grease	1 mg/L
NH4-N	0.01 mg/L
CN	0.001 mg/L
Alkalinity	1 mg/L
BOD	1 mg/L
Cu	0.001 mg/L
Pb	0.001 mg/L
Zn	0.001 mg/L
TPH C6 – C9	0.5 mg/L
TPH C10-C36	0.5 mg/L
Landfill Specific Parameters	
Benzene	0.001 mg/L
PAHs Total	0.0001 mg/L each

Analyte	LOR
Ethylbenzene	0.001 mg/L
Toluene	0.001 mg/L
Xylene*	0.001 mg/L
Phosphorous	0.01mg/L
Former Gold Driving Range – Surface water Specific parameters	
Lab EC	0.1 S/cm
Total dissolved solids	1 mg/L
NH4-N	0.01 mg/L
As	0.01mg/L
Cr	0.01mg/L
Pb	0.001mg/L
Cd	0.0002 mg/L
Hg	0.0001mg/L
Ni	0.01mg/L
Cu	0.001 mg/L
Pb	0.001 mg/L
Zn	0.001 mg/L
TPH C6-9	0.02 mg/L
TPH C10-14	0.05 mg/L
TPH C15-28	0.1 mg/L
TPH C10-36	0.1 mg/L
BOD5	1 mg/L
CN	0.001 mg/L
Alkalinity	1 mg/L

Notes:

1. LOR – limit of reporting;
2. * the laboratory will report results for meta- and para- Xylene to <0.001 mg/L and ortho-Xylene to <0.002 mg/L which will be a Total Xylene LOR of <0.002 mg/L.

5.3 Laboratory method blanks, duplicates and matrix spike recoveries

Reported results for laboratory method blank samples, duplicates and matrix spike recoveries can be found in the analytical laboratory reports and will be provided in the Monitoring Round Statement.

Appendix D

Descriptive Notes

Borehole Logs

Groundwater and Soil Gas Field Sheets

Photographs

Sampling

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

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

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

Test Pits

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

Large Diameter Augers

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

Continuous Spiral Flight Augers

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

Non-core Rotary Drilling

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

Continuous Core Drilling

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

Standard Penetration Tests

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

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

The test results are reported in the following form.

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

  4,6,7
  N=13

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

  15, 30/40 mm

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

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

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

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

Soil Descriptions

Douglas Partners

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

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

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

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

Type	Particle size (mm)
Coarse gravel	19 - 63
Medium gravel	6.7 - 19
Fine gravel	2.36 – 6.7
Coarse sand	0.6 - 2.36
Medium sand	0.21 - 0.6
Fine sand	0.075 - 0.21

Definitions of grading terms used are:

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

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

Term	Proportion of sand or gravel	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	>30%	Sandy Clay
With	15 – 30%	Clay with sand
Trace	0 - 15%	Clay with trace sand

In coarse grained soils (>65% coarse)
- with clays or silts

Term	Proportion of fines	Example
And	Specify	Sand (70%) and Clay (30%)
Adjective	>12%	Clayey Sand
With	5 - 12%	Sand with clay
Trace	0 - 5%	Sand with trace clay

In coarse grained soils (>65% coarse)
- with coarser fraction

Term	Proportion of coarser fraction	Example
And	Specify	Sand (60%) and Gravel (40%)
Adjective	>30%	Gravelly Sand
With	15 - 30%	Sand with gravel
Trace	0 - 15%	Sand with trace gravel

The presence of cobbles and boulders shall be specifically noted by beginning the description with 'Mix of Soil and Cobbles/Boulders' with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

Soil Descriptions

Cohesive Soils

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

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	F	25 - 50
Stiff	St	50 - 100
Very stiff	VSt	100 - 200
Hard	H	>200
Friable	Fr	-

Cohesionless Soils

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

Relative Density	Abbreviation	Density Index (%)
Very loose	VL	<15
Loose	L	15-35
Medium dense	MD	35-65
Dense	D	65-85
Very dense	VD	>85

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;
- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.
  Soil tends to stick together.
  Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.
  Soil tends to stick together, free water forms when handling.

Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- 'Moist, dry of plastic limit' or 'w <PL' (i.e. hard and friable or powdery).
- 'Moist, near plastic limit' or 'w ≈ PL (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- 'Moist, wet of plastic limit' or 'w >PL' (i.e. soils usually weakened and free water forms on the hands when handling).
- 'Wet' or 'w ≈LL' (i.e. near the liquid limit).
- 'Wet' or 'w >LL' (i.e. wet of the liquid limit).

Rock Strength

Rock strength is defined by the Unconfined Compressive Strength and it refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects.

The Point Load Strength Index $Is_{(50)}$ is commonly used to provide an estimate of the rock strength and site specific correlations should be developed to allow UCS values to be determined. The point load strength test procedure is described by Australian Standard AS4133.4.1-2007. The terms used to describe rock strength are as follows:

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

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$. It should be noted that the UCS to $Is_{(50)}$ ratio varies significantly for different rock types and specific ratios should be determined for each site.

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Residual Soil	RS	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely weathered	XW	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible
Highly weathered	HW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately weathered	MW	The whole of the rock material is discoloured , usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly weathered	SW	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh	FR	No signs of decomposition or staining.
Note: If HW and MW cannot be differentiated use DW (see below)		
Distinctly weathered	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching or may be decreased due to deposition of weathered products in pores.

Rock Descriptions

Degree of Fracturing

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

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with occasional fragments
Fractured	Core lengths of 30-100 mm with occasional shorter and longer sections
Slightly Fractured	Core lengths of 300 mm or longer with occasional sections of 100-300 mm
Unbroken	Core contains very few fractures

Rock Quality Designation

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

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

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

Stratification Spacing

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

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

Symbols & Abbreviations

Douglas Partners

Introduction

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

Drilling or Excavation Methods

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

Water

▷	Water seep
▽	Water level

Sampling and Testing

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

Description of Defects in Rock

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

Defect Type

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

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

Symbols & Abbreviations

Graphic Symbols for Soil and Rock

General

- Asphalt
- Road base
- Concrete
- Filling

Soils

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

Sedimentary Rocks

- Boulder conglomerate
- Conglomerate
- Conglomeratic sandstone
- Sandstone
- Siltstone
- Laminite
- Mudstone, claystone, shale
- Coal
- Limestone

Metamorphic Rocks

- Slate, phyllite, schist
- Gneiss
- Quartzite

Igneous Rocks

- Granite
- Dolerite, basalt, andesite
- Dacite, epidote
- Tuff, breccia
- Porphyry

BOREHOLE LOG

CLIENT: Cox Architecture Pty Ltd
PROJECT: Western Cricket and Community Centre
LOCATION: Wilson Park, SILVERWATER

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: BH10a
PROJECT No: 86694.03
DATE: 27/8/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.1	FILL: dark brown silty clay fill, with fine to medium igneous gravel and rootlets (topsoil)							
		FILL: light brown sand fill, with crushed sandstone and fine to medium igneous gravel		U	0.3 0.4		PID<1ppm		
	0.64	FILL: light yellow crushed sandstone fill		U	0.9 1.0		PID<1ppm		
	1.5	FILL: brown sandy clay fill, with medium to coarse ironstone gravel		U	1.5 1.6		PID<1ppm		
	2.05	FILL: orange-red clay fill, with slag and tar		U	2.1 2.2		PID<1ppm		
		2.7m: becoming soft, dark brown, trace clinker, tar and crushed sandstone gravel		U	2.9 3.0		PID<1ppm		
	3.2	Bore discontinued at 3.2m - target depth reached							

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** CL **CASING:** Uncased
TYPE OF BORING: Push tube
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Location coordinates are in MGA94 Zone 56.

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cox Architecture Pty Ltd
PROJECT: Western Cricket and Community Centre
LOCATION: Wilson Park, SILVERWATER

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: BH6a
PROJECT No: 86694.03
DATE: 27/8/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.03	FILL: dark brown silty clay fill, with fine to medium igneous gravel and rootlets (topsoil)							
		FILL: light brown sand fill, with crushed sandstone and medium to coarse concrete fragments		U	0.4 0.5		PID<1ppm		
	0.7	FILL: red clay fill, with fine to coarse ironstone gravel		U	0.8 0.9		PID<1ppm		
	0.93	FILL: dark brown mottled red sandy clay fill, with slag and trace tar, hydrocarbon odour		U	1.0 1.1		PID<1ppm		
	1.28	FILL: light brown sand fill, medium to coarse grained		U*	1.4 1.5		PID<1ppm		
	1.88	CLAY: red mottled grey clay, low to medium plasticity , stiff to very stiff		U	1.9 2.0		PID<1ppm		
	2.4	Bore discontinued at 2.4m - target depth reached							

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** CL **CASING:** Uncased

TYPE OF BORING: Push tube

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 56. *BD1/20190827 taken from 1.4-1.5m

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cox Architecture Pty Ltd
PROJECT: Western Cricket and Community Centre
LOCATION: Wilson Park, SILVERWATER

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: BH7a
PROJECT No: 86694.03
DATE: 27/8/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.1	FILL: dark brown silty clay fill, with fine to medium igneous gravel and rootlets (topsoil)							
		FILL: brown and yellow sand fill, with medium to coarse sandstone gravel		U*	0.2 0.3		PID<1ppm		
	0.85	FILL: orange-brown clay fill		U U	0.85 0.95 1.0		PID<1ppm PID<1ppm		
1	1.1	0.95m: with grey concrete frgaments, trace ash/tar			1.1				1
		FILL: dark brown clayey sand fill, with crushed sandstone and slag/tar, strong hydrocarbon odour		U	1.2		PID<1ppm		
	1.3	FILL: grey mottled brown sandy clay fill, trace slag, hydrocarbon odour							
	1.6	CLAY: red mottled grey clay, low to medium plasticity , stiff to very stiff							
2									2
	2.2	Bore discontinued at 2.2m - target depth reached							
3									3
4									4

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** CL **CASING:** Uncased

TYPE OF BORING: Push tube

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 56. *BD2/20190827 taken from 0.2-0.3m

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: Cox Architecture Pty Ltd
PROJECT: Western Cricket and Community Centre
LOCATION: Wilson Park, SILVERWATER

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: SV1
PROJECT No: 86694.03
DATE: 28/8/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	VWP Construction Details	
		FILL: dark brown silty clay fill, with fine to medium igneous gravel and rootlets (topsoil)								
	0.1	FILL: yellow- brown clayey sand fill with gravel, medium to coarse grained								
	1 1.0	Bore discontinued at 1.0m - target depth reached							1	

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Push tube

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 56. Well Installation Details: Sand gravel to 0.85m, bentonite to 0.4m, grout to 0.1m and gatic cover on top

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: Cox Architecture Pty Ltd
PROJECT: Western Cricket and Community Centre
LOCATION: Wilson Park, SILVERWATER

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: SV10
PROJECT No: 86694.03
DATE: 28/8/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	VWP Construction Details
		FILL: dark brown silty clay fill, with fine to medium igneous gravel and rootlets (topsoil)							
	0.1	FILL: light brown sand fill, with crushed sandstone and fine to medium igneous gravel							
	0.64	FILL: light yellow crushed sandstone fill							
	1 1.0	Bore discontinued at 1.0m - target depth reached							1

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Push tube

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 56. Well Installation Details: Sand gravel to 0.85m, bentonite to 0.4m, grout to 0.1m and gatic cover on top

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: Cox Architecture Pty Ltd
PROJECT: Western Cricket and Community Centre
LOCATION: Wilson Park, SILVERWATER

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: SV2
PROJECT No: 86694.03
DATE: 28/8/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	VWP Construction Details	
		FILL: dark brown silty clay fill, with fine to medium igneous gravel and rootlets (topsoil)								
	0.1	FILL: yellow- brown sand fill, medium to coarse grained								
	0.35	FILL: yellow-brown sandy clay fill (possible capping layer)								
	1 1.0	Bore discontinued at 1.0m - target depth reached							1	

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Push tube

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 56. Well Installation Details: Sand gravel to 0.85m, bentonite to 0.4m, grout to 0.1m and gatic cover on top

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cox Architecture Pty Ltd
PROJECT: Western Cricket and Community Centre
LOCATION: Wilson Park, SILVERWATER

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: SV4
PROJECT No: 86694.03
DATE: 28/8/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	VWP Construction Details	
		FILL: dark brown silty clay fill, with fine to medium igneous gravel and rootlets (topsoil)								
	0.1	FILL: yellow- brown clayey sand fill with gravel, medium to coarse grained								
	1 1.0	Bore discontinued at 1.0m - target depth reached							1	

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Push tube

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 56. Well Installation Details: Sand gravel to 0.85m, bentonite to 0.4m, grout to 0.1m and gatic cover on top

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
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BOREHOLE LOG

CLIENT: Cox Architecture Pty Ltd
PROJECT: Western Cricket and Community Centre
LOCATION: Wilson Park, SILVERWATER

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: SV5
PROJECT No: 86694.03
DATE: 28/8/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	VWP Construction Details	
		FILL: dark brown silty clay fill, with fine to medium igneous gravel and rootlets (topsoil)								
	0.1	FILL: yellow- brown clayey sand fill with gravel, medium to coarse grained								
	1 1.0	Bore discontinued at 1.0m - target depth reached							1	

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Push tube

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 56. Well Installation Details: Sand gravel to 0.85m, bentonite to 0.4m, grout to 0.1m and gatic cover on top

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cox Architecture Pty Ltd
PROJECT: Western Cricket and Community Centre
LOCATION: Wilson Park, SILVERWATER

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: SV6
PROJECT No: 86694.03
DATE: 28/8/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	VWP Construction Details
	0.03	FILL: dark brown silty clay fill, with fine to medium igneous gravel and rootlets (topsoil)							
		FILL: light brown sand fill, with crushed sandstone and medium to coarse concrete fragments							
	0.7	FILL: red clay fill, with fine to coarse ironstone gravel							
	0.93	FILL: dark brown mottled red sandy clay fill, with slag and trace tar, hydrocarbon odour							
1	1.0	Bore discontinued at 1.0m - target depth reached							1

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Push tube

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 56. Well Installation Details: Sand gravel to 0.85m, bentonite to 0.4m, grout to 0.1m and gatic cover on top

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cox Architecture Pty Ltd
PROJECT: Western Cricket and Community Centre
LOCATION: Wilson Park, SILVERWATER

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: SV7
PROJECT No: 86694.03
DATE: 28/8/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	VWP Construction Details
		FILL: dark brown silty clay fill, with fine to medium igneous gravel and rootlets (topsoil)							
	0.1	FILL: brown and yellow sand fill, with medium to coarse sandstone gravel							
	0.85	FILL: orange-brown clay fill 0.95m: with grey concrete frgaments, trace ash/tar							
	1 1.0	Bore discontinued at 1.0m - target depth reached							1

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Push tube

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 56. Well Installation Details: Sand gravel to 0.85m, bentonite to 0.4m, grout to 0.1m and gatic cover on top

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cox Architecture Pty Ltd
PROJECT: Western Cricket and Community Centre
LOCATION: Wilson Park, SILVERWATER

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: SV8
PROJECT No: 86694.03
DATE: 28/8/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	VWP Construction Details	
	0.05	FILL: Wood mulch								
		FILL: dark brown silty clay fill, with fine to medium igneous gravel and rootlets (topsoil)								
	0.3	FILL: yellow-brown sandy clay/clayey sand fill								
	1 1.0	Bore discontinued at 1.0m - target depth reached							1	

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Push tube

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 56. Well Installation Details: Sand gravel to 0.85m, bentonite to 0.4m, grout to 0.1m and gatic cover on top

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Cox Architecture Pty Ltd
PROJECT: Western Cricket and Community Centre
LOCATION: Wilson Park, SILVERWATER

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: SV9
PROJECT No: 86694.03
DATE: 28/8/2019
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	VWP Construction Details	
	0.05	FILL: Wood mulch								
		FILL: dark brown silty clay fill, with fine to medium igneous gravel and rootlets (topsoil)								
	0.3	FILL: yellow-brown sandy clay/clayey sand fill								
	1 1.0	Bore discontinued at 1.0m - target depth reached							1	

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** AS **CASING:** Uncased

TYPE OF BORING: Push tube

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in MGA94 Zone 56. Well Installation Details: Sand gravel to 0.85m, bentonite to 0.4m, grout to 0.1m and gatic cover on top

SAMPLING & IN SITU TESTING LEGEND

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

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Soil Vapour Sample Field Record

Job Details

Site Name:	Wilson Park	Date:	27
Project Number:	76694.03	Sampling Media:	1L Summa Canister and Carbon Backup
Sample Location:	SV3	Weather:	overcast
Sample Depth:	0.9 m	Flow Controller:	Regulator (canister) and 0.1 L/min rotameter and low flow adapter
Installation Date:	27/8/19	Pump ID	868245
Sampled by:	KP		

Purge Details

Total Volume Purged: (L) (one volume)	500ml	Equipment Used: 5kW Pump	SKC Pump #868245
PID Reading (ppm)	0.7		

Pre-Start QA Tests

Shut In Test			
Vacuum Applied (mmHg):	-30 mmHg Canister/-15 mmHg sample train	Duration (min)	30 Seconds
Vacuum at Completion	-30 mmHg Canister/-15 mmHg sample train	Pass/Fail	PASS
Leak Test			
Tracer Compound	Isopropyl alcohol	Field Tracer Level*	In shroud: 378 ppm In Sample Line 0.9 ppm
Pass/Fail	PASS		

* Not applicable for isopropyl alcohol tracer (lab tested)

GA5000 Readings
O_2 - 21.0 %
CO_2 - 0.1 %
CO - 6 ppm
H_2S - 0 ppm
Bal - 78.6

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Soil Vapour Sample Field Record

Job Details

Site Name:	Wilson Park	Date:	2/9/19
Project Number:	86694.03	Sampling Media:	1L Summa Canister and Carbon Backup
Sample Location:	SV9	Weather:	14°C, 72% hum, Sunny
Sample Depth:	1.0	Flow Controller:	Regulator (canister) and 0.1 L/min rotameter and low flow adapter
Installation Date:	28/8/19	Pump ID	868245
Sampled by:	KP		

Purge Details

Total Volume Purged: (L) (one volume)	500ml	Equipment Used:	SKC Pump #868245
PID Reading (ppm)	<1		

Pre-Start QA Tests

Shut In Test			
Vacuum Applied (mmHg):	-30 mmHg Canister/-15mmHg sample train	Duration (min)	30 Seconds
Vacuum at Completion	-30 mmHg Canister/-15mmHg sample train	Pass/Fail	PASS
Leak Test			
Tracer Compound	Isopropyl alcohol	Field Tracer Level*	In shroud: ~~0.3~~ 306 ppm In Sample Line: ~~30~~ 0.3 ppm
Pass/Fail	PASS		

* Not applicable for isopropyl alcohol tracer (lab tested)

QA Readings
O_2 - 14.7%
CO_2 - 8.1%
CO - 0 ppm
H_2S - 0 ppm
Bal - 77.2

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Soil Vapour Sample Field Record

Job Details

Site Name:	Wilson Park	Date:	~~28~~/2/9/19
Project Number:	86694.03	Sampling Media:	1L Summa Canister and Carbon Backup
Sample Location:	SV8	Weather:	Sunny, 15°C, 69% humidity
Sample Depth:	1.0m	Flow Controller:	Regulator (canister) and 0.1 L/min rotameter and low flow adapter
Installation Date:	28/8/19	Pump ID	868245
Sampled by:	KP		

Purge Details

Total Volume Purged: (L) (one volume)	500ml	Equipment Used:	SKC Pump #868245
PID Reading (ppm)	0.2		

Pre-Start QA Tests

Shut In Test			
Vacuum Applied (mmHg):	-30 mmHg Canister/- -15 mmHg sample train	Duration (min)	30 Seconds
Vacuum at Completion	-30 mmHg Canister/- -15 mmHg sample train	Pass/Fail	PASS
Leak Test			
Tracer Compound	Isopropyl alcohol	Field Tracer Level*	In shroud: 332 ppm In Sample Line: 0 ppm
Pass/Fail	PASS		

* Not applicable for isopropyl alcohol tracer (lab tested)

GA 5000
O_2 - 18.8%
CO_2 - 2.5%
CO - 0
H_2S - 0
Bal - 78.7

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Soil Vapour Sample Field Record

Job Details

Site Name:	Wilson Park	Date:	2/9
Project Number:	86694.03	Sampling Media:	1L Summa Canister and Carbon Backup
Sample Location:	SV 70	Weather:	Sunny, 18°C, 65%
Sample Depth:	1.0	Flow Controller:	Regulator (canister) and 0.1 L/min rotameter and low flow adapter
Installation Date:	28/8	Pump ID	868245
Sampled by:	AP		

Purge Details

Total Volume Purged: (L) (one volume)	500ml	Equipment Used:	SKC Pump #868245
PID Reading (ppm)	1.2		

Pre-Start QA Tests

Shut In Test			
Vacuum Applied (mmHg):	-30 mmHg Canister/- 15 mmHg sample train	Duration (min)	30 Seconds
Vacuum at Completion	-30 mmHg Canister/- 15 mmHg sample train	Pass/Fail	PASS
Leak Test			372
Tracer Compound	Isopropyl alcohol	Field Tracer Level*	In shroud: 148 ppm In Sample Line: 1.8 ppm
Pass/Fail	PASS		

* Not applicable for isopropyl alcohol tracer (lab tested)

GA 5000
O_2 - 17.7%
CO_2 - 2.4%
CO 0 ppm
H_2S 0 ppm
Bal - 79.9

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Soil Vapour Sample Field Record

Job Details

Site Name:	Wilson Park	Date:	2/9
Project Number:	86694.03	Sampling Media:	1L Summa Canister and Carbon Backup
Sample Location:	SV6	Weather:	Sunny, 19°C, 44%
Sample Depth:	1.0	Flow Controller:	Regulator (canister) and 0.1 L/min rotameter and low flow adapter
Installation Date:	28/8	Pump ID	868245
Sampled by:	KP		

Purge Details

Total Volume Purged: (L) (one volume)	500ml	Equipment Used:	SKC Pump #868245
PID Reading (ppm)	2.1		PASS

Pre-Start QA Tests

Shut In Test			
Vacuum Applied (mmHg):	30 mmHg Canister/-15 mmHg sample train	Duration (min)	30 Seconds
Vacuum at Completion	30 mmHg Canister/-15 mmHg sample train	Pass/Fail	PASS
Leak Test			
Tracer Compound	Isopropyl alcohol	Field Tracer Level*	In shroud: 2.1 ppm In Sample Line: 372 ppm
Pass/Fail	PASS		

* Not applicable for isopropyl alcohol tracer (lab tested)

GA 5000
CO_2 - 5.6%
O_2 - 11.8%
CO - 0
H_2S - 0
Bal - 82.6

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Soil Vapour Sample Field Record

Job Details

Site Name:	Wilson Park	Date:	2/9
Project Number:	86894.03	Sampling Media:	1L Summa Canister and Carbon Backup
Sample Location:	SV7	Weather:	Sunny. 20°c 44%
Sample Depth:	1.0	Flow Controller:	Regulator (canister) and 0.1 L/min rotameter and low flow adapter
Installation Date:	28/8	Pump ID	868245
Sampled by:	KP		

Purge Details

Total Volume Purged: (L) (one volume)	500ml 0.5	Equipment Used:	SKC Pump #868245
PID Reading (ppm)	0.6		

Pre-Start QA Tests

Shut In Test			
Vacuum Applied (mmHg):	-30 mmHg Canister/-15 mmHg sample train	Duration (min)	30 Seconds
Vacuum at Completion	-30 mmHg Canister/-15 mmHg sample train	Pass/Fail	PASS
Leak Test			
Tracer Compound	Isopropyl alcohol	Field Tracer Level*	In shroud: 374 ppm In Sample Line: 1.4 ppm
Pass/Fail	PASS		

* Not applicable for isopropyl alcohol tracer (lab tested)

GA5000
O_2 12.0%
CO_2 6.5%
CO 0 ppm
H_2S 0 ppm
Bal 81.6

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Soil Vapour Sample Field Record

Job Details

Site Name:	Wilson Park	Date:	2/9
Project Number:	86694.03	Sampling Media:	1L Summa Canister and Carbon Backup
Sample Location:	SV5 / BD1 / 020919	Weather:	21°C, 40%
Sample Depth:	1.0	Flow Controller:	Regulator (canister) and 0.1 L/min rotameter and low flow adapter
Installation Date:	28/8	Pump ID	868245
Sampled by:	KP		

Purge Details

Total Volume Purged: (L) (one volume)	500ml	Equipment Used:	SKC Pump #868245
PID Reading (ppm)	0.1.		

Pre-Start QA Tests

Shut In Test			
Vacuum Applied (mmHg):	-30 mmHg Canister/- 15 mmHg sample train	Duration (min)	30 Seconds
Vacuum at Completion	-30 mmHg Canister/- 15 mmHg sample train	Pass/Fail	PASS
Leak Test			
Tracer Compound	Isopropyl alcohol	Field Tracer Level*	In shroud: ~~3~~ 42 ppm In Sample Line: 0 ppm
Pass/Fail	PASS		

* Not applicable for isopropyl alcohol tracer (lab tested)

GA5000
CH_4 - 0
CO_2 - 3.9%
O_2 - 15.6%
CO - 0
H_2S - 0
Bu - 80.5

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Soil Vapour Sample Field Record

Job Details

Site Name:	SV1	Date:	2/9/19
Project Number:	86694.03	Sampling Media:	1L Summa Canister and Carbon Backup
Sample Location:	Wilson Park	Weather:	Sunny 21°C 42%
Sample Depth:	1.0	Flow Controller:	Regulator (canister) and 0.1 L/min rotameter and low flow adapter
Installation Date:	28/8	Pump ID	868245
Sampled by:	KD		

Purge Details

Total Volume Purged: (L) (one volume)	500	Equipment Used:	SKC Pump #868245
PID Reading (ppm)	0.6		

Pre-Start QA Tests

Shut In Test			
Vacuum Applied (mmHg):	-30 mmHg Canister/-15mmHg sample train	Duration (min)	30 Seconds
Vacuum at Completion	-30 mmHg Canister/-15mmHg sample train	Pass/Fail	PASS
Leak Test			
Tracer Compound	Isopropyl alcohol	Field Tracer Level*	In shroud: 412 ppm In Sample Line: 0.6 ppm
Pass/Fail	PASS		

* Not applicable for isopropyl alcohol tracer (lab tested)

CH_4 - 0
CO_2 - 2.0%
O_2 - 19.6
CO - 0
H_2S - 0
Bal - 78%

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Soil Vapour Sample Field Record

Job Details

Site Name:	Wilson Park	Date:	2/9
Project Number:	86694.03	Sampling Media:	1L Summa Canister and Carbon Backup
Sample Location:	SV4	Weather:	Sunny 21° 43%
Sample Depth:	1.0	Flow Controller:	Regulator (canister) and 0.1 L/min rotameter and low flow adapter
Installation Date:	28/8	Pump ID	868245
Sampled by:	KP		

Purge Details

Total Volume Purged: (L) (one volume)	500	Equipment Used:	SKC Pump #868245
PID Reading (ppm)	0.6		

Pre-Start QA Tests

Shut In Test			
Vacuum Applied (mmHg):	-30 mmHg Canister/-15 mmHg sample train	Duration (min)	30 Seconds
Vacuum at Completion	-30 mmHg Canister/-15 mmHg sample train	Pass/Fail	PASS
Leak Test			
Tracer Compound	Isopropyl alcohol	Field Tracer Level*	In shroud: 384 ppm In Sample Line: 0.8 ppm
Pass/Fail	PASS		

* Not applicable for isopropyl alcohol tracer (lab tested)

GA5000
CH_4 0
CO_2 - 11.2%
CO - 1 ppm
H_2S - 0 ppm
Bal 86.9

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Soil Vapour Sample Field Record

Job Details

Site Name:	SV42	Date:	2/9
Project Number:	86694.03	Sampling Media:	1L Summa Canister and Carbon Backup
Sample Location:	Wilson Park	Weather:	Sunny, 21°c, 43%
Sample Depth:	1.0	Flow Controller:	Regulator (canister) and 0.1 L/min rotameter and low flow adapter
Installation Date:	38/8	Pump ID	868245
Sampled by:	KP		

Purge Details

Total Volume Purged: (L) (one volume)	500 ml	Equipment Used:	SKC Pump #868245
PID Reading (ppm)	0.3		

Pre-Start QA Tests

Shut In Test			
Vacuum Applied (mmHg):	-30 mmHg Canister/-15 mmHg sample train	Duration (min)	30 Seconds
Vacuum at Completion	-30 mmHg Canister/-15 mmHg sample train	Pass/Fail	PASS
Leak Test			
Tracer Compound	Isopropyl alcohol	Field Tracer Level*	In shroud: 406 ppm In Sample Line: 0.3 ppm
Pass/Fail	PASS		

* Not applicable for isopropyl alcohol tracer (lab tested)

GA5000
CH_4 0%
CO_2 7.9%
CO 0ppm
O_2 10.7%
H_2S 0ppm
Bal 81.4

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Sample Record (Carbon and Thermal Desorption Tubes)

Sample ID	Tube ID	Sample Time (min)	Flow (L/min)	Volume (L)	Vacuum (in.Hg)	Analysis Required	Comments
SV3	7221406606	5 min	113		2	HOLD	
Shroud	7221407356	30 sec	"		0	IPA	
SV9	7221406854	5m	113		0	HOLD	
SV8	7221406214	5 min	113		0	HOLD	
SV10	7221406847	5 min	113		0	HOLD	
SV6	7221406853	5 min	113		0	HOLD	
SV7	7221406848	5m	113		0	HOLD	
SV5	7221406858	5m	113		0	HOLD	
BD102024G	7221406952	5m	113		0	HOLD	
Shroud2	7221406849	30sec	113		0	HOLD	
SV1	7221406850	5m	113		0	HOLD	
SV4	7221406215	5min	113		0	HOLD	
SV2	7221406854	5m	113		0	HOLD	

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Sample Record – Summa Canister

Sample ID	Canister ID	Regulator ID	Regulator Flow Rate (ml/min)	Start Pressure (mmHg)	Final Pressure (mmHg)	Sampling Duration (min)	Analysis Required	Comments
SV3	2259	2075	100	-30	-6	9 Min	TO15/F1/F2	
SV9	3496	1748	100	-30	-6	9 min	TO15/F1 F2	
SV8	2282	1983	100	-30	-6	9	"	
SV10	2246	614	100	-30	-6	9	"	
SV6	2273	831	100	-30	-6	9	"	
SV7	3521	1875	100	-30	-6	9	"	
SV5	2292	1749	100	-30	-6	9	"	
BD1/020919	2268	1751	100	-30	-6	9	"	
SV1	2283	1779	100	-30	-6	9	"	
SV4	1627	1754	100	-30	-6	9	"	
SV2	2291	1752	100	-30	-6	9	"	

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CALIBRATION RECORD

Calibrated Equipment

SKC pump with 100 ml/min flow meter, low flow adapter, carbon tube, vacuum gauge. Flow rate recorded on

Calibrated Against: Soap Bubble Flow Meter

Calibration

Date(s): 27 May 2019

Operator(s): Kurt Plambeck

Bubble	Time to 100 ml (sec)	Flow rate*	Comment
1	47	n/a	Wetting – do not use value
2	53	113.2	
3	53	113.2	
4	53	113.2	
5	53	113.2	
6	54	111.1	
7	52.5	114.3	
Average	53.08	113.0	

$$\text{Flow rate (ml/min)} = \frac{60 \times (\text{volume travelled, 100 ml})}{\text{Time (secs)}}$$

At 100 ml/min on rotameter (with above set up) actual flow rate =

113 ml/min

Approved:

Date: 27/5/19

Gas Calibration Certificate

Instrument GA5000
Serial No. G505859
Sensors CH4, CO2, O2, CO, H2S

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
	Recharge OK?	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
Pump	Operation	✓	
	Filter	✓	
	Flow	✓	
	Valves, Diaphragm	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	O2	✓	
	CH4	✓	
	CO2	✓	
	CO	✓	
	H2S	✓	
Alarms	Beeper	✓	
	Settings	✓	
Software	Version		
Datalogger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Diffusion mode Aspirated mode

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No	Instrument Reading
O2		20.9% Vol O2		Fresh Air	20.8% O2
CH4		60% CH4	NATA	SY244	59.8% CH4
CO2		40% CO2	NATA	SY244	39.8% CO2
CO		100ppm CO	NATA	SY277	99ppm CO
H2S		25ppm H2S	NATA	SY277	24ppm H2S

Calibrated by: **Sen Philip**

Calibration date: **23/08/2019**

Next calibration due: **19/02/2020**

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Groundwater Field Sheet

Project and Bore Installation Details			
Bore / Standpipe ID:	MP1		
Project Name:	Wilson Park		
Project Number:	86694.03		
Site Location:			
Bore Easting:		Northing:	
Installation Date:			
GW Level (during drilling):	m bgl		
Well Depth:	m bgl		
Screened Interval:	m bgl		
Contaminants/Comments:			
Bore Development Details			
Date/Time:			
Purged By:			
GW Level (pre-purge):	m bgl		
GW Level (post-purge):	m bgl		
PSH observed:	Yes / No (interface/visual). ? mm thick		
Observed Well Depth:	m bgl		
Estimated Bore Volume:	L		
Total Volume Purged:	L		
Equipment:			
Micropurge and Sampling Details			
Date/Time:	27/8/19		
Sampled By:	CLN		
Weather Conditions:	fine		
GW Level (pre-purge):	3.99 m bgl		
GW Level (post sample):	5.17 m bgl		
PSH observed:	Yes / No (interface/visual). ? mm thick		
Observed Well Depth:	5.97 m bgl		
Estimated Bore Volume:	L		
Total Volume Purged:	L		
Equipment:	Peripump, WQM, interface probe		

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Redox (mV)
Stabilisation Criteria (3 readings)	***0.1°C***	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10 mV**
	19.3	5.66	16.71	4.33	223
1L	19.5	2.11	23.5	4.63	184
2L	19.6	1.91	32.5	5.20	129
3L	19.6	1.69	31.6	5.29	112
~~4L~~ 3.5L	19.5	1.42	31.3	5.28	110
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS		

Sample Details

Sampling Depth (rationale):	4.5 to 5 m bgl, Middle of column
Sample Appearance (e.g. colour, siltiness, odour):	light yellow, then went brown, then back to light yellow
Sample ID:	~~tigl~~ MP1
QA/QC Samples:	N/A
Sampling Containers and filtration:	1 x amber, 1 x metals (filtered), 2x vials, 1x purple, 1 x green
Comments / Observations:	

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Groundwater Field Sheet

Project and Bore Installation Details			
Bore / Standpipe ID:	MP2		
Project Name:	Wilson Park		
Project Number:	86694.03		
Site Location:			
Bore Easting:		Northing:	
Installation Date:			
GW Level (during drilling):	m bgl		
Well Depth:	m bgl		
Screened Interval:	m bgl		
Contaminants/Comments:			
Bore Development Details			
Date/Time:			
Purged By:			
GW Level (pre-purge):	m bgl		
GW Level (post-purge):	m bgl		
PSH observed:	Yes / No (interface/visual). ? mm thick		
Observed Well Depth:	m bgl		
Estimated Bore Volume:	L		
Total Volume Purged:	L		
Equipment:			
Micropurge and Sampling Details			
Date/Time:	27/8/19		
Sampled By:	CLN		
Weather Conditions:	fine		
GW Level (pre-purge):	2.49 m bgl		
GW Level (post sample):	3.74 m bgl		
PSH observed:	Yes / No (interface/visual). ? mm thick		
Observed Well Depth:	5.72 m bgl		
Estimated Bore Volume:	L		
Total Volume Purged:	L		
Equipment:	Peripump, WQM, interface probe		

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Redox (mV)
Stabilisation Criteria (3 readings)	***0.1°C***	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10 mV**
	18.9	65.99%S	16.59 mS	2.66	459
1L	18.8	74.5%S	16.81	2.64	465
2L	18.9	74.74ppm	16.88	2.64	472
3L	19.2	7.31	16.83	2.63	472
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS		

Sample Details

Sampling Depth (rationale):	3.5 to 4 m bgl, middle of column
Sample Appearance (e.g. colour, siltiness, odour):	light brown
Sample ID:	MP2
QA/QC Samples:	N/A
Sampling Containers and filtration:	1x amber, 1x metals (filtered), 2x vials, 1x purple bottle 1x green bottle
Comments / Observations:	

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Groundwater Field Sheet

Project and Bore Installation Details			
Bore / Standpipe ID:	MP3		
Project Name:	Wilson Park		
Project Number:	86694.03		
Site Location:			
Bore Easting:		Northing:	
Installation Date:			
GW Level (during drilling):	m bgl		
Well Depth:	m bgl		
Screened Interval:	m bgl		
Contaminants/Comments:			
Bore Development Details			
Date/Time:			
Purged By:			
GW Level (pre-purge):	m bgl		
GW Level (post-purge):	m bgl		
PSH observed:	Yes / No (interface/visual). ? mm thick		
Observed Well Depth:	m bgl		
Estimated Bore Volume:	L		
Total Volume Purged:	L		
Equipment:			
Micropurge and Sampling Details			
Date/Time:	27/8/19		
Sampled By:	CLW		
Weather Conditions:	fine		
GW Level (pre-purge):	2.07 m bgl		
GW Level (post sample):	4.26 m bgl		
PSH observed:	Yes / No (interface/visual). ? mm thick		
Observed Well Depth:	5.96 m bgl		
Estimated Bore Volume:	L		
Total Volume Purged:	L		
Equipment:	Peripump, WQM, interface probe		

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Redox (mV)
Stabilisation Criteria (3 readings)	***0.1° C***	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10 mV**
	20.5	1.89	68.1	4.91	113
1L	20.1	0.72	69.6	4.87	120
2L	20.0	0.54	69.6	4.86	125
3L	19.9	0.34	69.7	4.87	127
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS		

Sample Details

Sampling Depth (rationale):	4m ~~3 to 3.5~~ m bgl, middle of column
Sample Appearance (e.g. colour, siltiness, odour):	Clear
Sample ID:	~~MW~~ MP3
QA/QC Samples:	N/A
Sampling Containers and filtration:	1 x amber, 1x metals (filtered), 2x vials, 1x purple, 1x green
Comments / Observations:	

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Groundwater Field Sheet

Project and Bore Installation Details		
Bore / Standpipe ID:	MP4	
Project Name:		
Project Number:		
Site Location:		
Bore Easting:		Northing:
Installation Date:		
GW Level (during drilling):	m bgl	
Well Depth:	m bgl	
Screened Interval:	m bgl	
Contaminants/Comments:		
Bore Development Details		
Date/Time:		
Purged By:		
GW Level (pre-purge):	m bgl	
GW Level (post-purge):	m bgl	
PSH observed:	Yes / No (interface/visual). ? mm thick	
Observed Well Depth:	m bgl	
Estimated Bore Volume:	L	
Total Volume Purged:	L	
Equipment:		
Micropurge and Sampling Details		
Date/Time:	27/8/19	
Sampled By:	CLN	
Weather Conditions:	fine	
GW Level (pre-purge):	1.6 m bgl	
GW Level (post sample):	1.74 m bgl	
PSH observed:	Yes / No (interface/visual). ? mm thick	
Observed Well Depth:	5.8 m bgl	
Estimated Bore Volume:	L	
Total Volume Purged:	L	
Equipment:	Perimpump, WQM, interface probe	

Water Quality Parameters

Time / Volume	Temp (°C)	DO (mg/L)	EC (µS or mS/cm)	pH	Redox (mV)
Stabilisation Criteria (3 readings)	***0.1° C***	**+/- 0.3 mg/L**	**+/- 3%**	**+/- 0.1**	**+/- 10 mV**
	19.3	3.84	19.7	6.36	106
1L	19.0	1.08	11.36	6.54	81
2L	19.0	0.67	12.21	6.46	83
3L	19.2	0.46	13.91	6.39	82
3.5L	19.2	0.39	13.89	6.35	82
Additional Readings Following stabilisation:	DO % Sat	SPC	TDS		

Sample Details

Sampling Depth (rationale):	4m m bgl,
Sample Appearance (e.g. colour, siltiness, odour):	Clear
Sample ID:	MP4
QA/QC Samples:	BD1
Sampling Containers and filtration:	1x amber, 1x metals (filtered), 2x vials 1x purple, 1x green
Comments / Observations:	

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

KIT SUMMARY

Client Details

Kit ID	AK000735	**Contact**	Kurt Plambeck
Name	Douglas Partners Pty Ltd	**Phone**	-
		Address	96 Hermitage Rd, West Ryde, NSW 2114

Comments

Silverwater

* Canisters should have some residual vacuum after sampling - aim to fill the canisters approximately 75% full. (-7.5 "Hg)

N/A if canisters are to be positively pressurised.

Kit Summary

Security No.	Serial No.	Item	Quantity	Case No.	Date Certified	FR Before shipment mL/min	Vacuum before shipment inch Hg
831R	A0187902-6	Passive sampler Restek + orifice	1	s15	-	99.40	
2282	2282	1L Canister	1	L27	22/08/2019		-29.70
2273	2273	1L Canister	1	L27	21/08/2019		-29.70
2246	2246	1L Canister	1	L27	22/08/2019		-29.70
3521	3521	1L Canister	1	L27	20/08/2019		-29.70
2291	2291	1L Canister	1	L27	21/08/2019		-29.70
2292	2292	1L Canister	1	L34	22/08/2019		-29.70
2268	2268	1L Canister	1	L34	21/08/2019		-29.70
2274	2274	1L Canister	1	L34	21/08/2019		-29.70
2283	2283	1L Canister	1	L34	20/08/2019		-29.7
-	-	Pressure Gauge with connection	1	QF	-		
614R	A0113258-8	Passive sampler Restek + orifice	1	s15	-	99.80	
-	-	Charcoal tube-SKC Anasorb 226-09	1	x12	-		
2259	2259	1L Canister	1	sX	22/08/2019		-29.80
2075	A0334387-5	Passive sampler Restek + orifice	1	sX	-	99.80	
1875R	A0305763-5	Passive sampler Restek + orifice	1	s15	-	100.20	
1983R	A0309007-1	Passive sampler Restek + orifice	1	s15	-	100.80	
1752R	3841	Passive sampler Entech 50cc-160cc min	1	s12	-	100.70	
1754R	3843	Passive sampler Entech 50cc-160cc min	1	s12	-	99.50	

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Kit Summary

Security No.	Serial No.	Item	Quantity	Case No.	Date Certified	FR Before shipment mL/min	Vacuum before shipment inch Hg
1779R	3856	Passive sampler Entech 2cc-5cc min	1		-	99.90	
1751R	3840	Passive sampler Entech 50cc-160cc min	1	s12	-	99.20	
1749R	3838	Passive sampler Entech 50cc-160cc min	1	s12	-	100.90	

Please direct any queries to:

Airtox Sydney

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KIT SUMMARY

Client Details

Kit ID	AK000735	**Contact**	Kurt Plambeck
Name	Douglas Partners Pty Ltd	**Phone**	-
		Address	96 Hermitage Rd, West Ryde, NSW 2114

Comments

Nil

* Canisters should have some residual vacuum after sampling - aim to fill the canisters approximately 75% full. (-7.5 "Hg)

N/A if canisters are to be positively pressurised.

Kit Summary

Security No.	Serial No.	Item	Quantity	Case No.	Date Certified	FR Before shipment mL/min	Vacuum before shipment inch Hg
831R	A0187902-6	Passive sampler Restek + orifice	1	s15	-	99.40	
2282	2282	1L Canister	1	L27	22/08/2019		-29.70
2273	2273	1L Canister	1	L27	21/08/2019		-29.70
2246	2246	1L Canister	1	L27	22/08/2019		-29.70
3521	3521	1L Canister	1	L27	20/08/2019		-29.70
2291	2291	1L Canister	1	L27	21/08/2019		-29.70
2292	2292	1L Canister	1	L34	22/08/2019		-29.70
2268	2268	1L Canister	1	L34	21/08/2019		-29.70
2274	2274	1L Canister	1	L34	21/08/2019		-29.70
2283	2283	1L Canister	1	L34	20/08/2019		-29.7
-	-	Pressure Gauge with connection	1	QF	-		
614R	A0113258-8	Passive sampler Restek + orifice	1	s15	-	99.80	
-	-	Charcoal tube-SKC Anasorb 226-09	1	x11	-		
1875R	A0305763-5	Passive sampler Restek + orifice	1	s15	-	100.20	
1983R	A0309007-1	Passive sampler Restek + orifice	1	s15	-	100.80	
1752R	3841	Passive sampler Entech 50cc-160cc min	1	s12	-	100.70	
1754R	3843	Passive sampler Entech 50cc-160cc min	1	s12	-	99.50	
1779R	3856	Passive sampler Entech 2cc-5cc min	1		-	99.90	
1751R	3840	Passive sampler Entech 50cc-160cc min	1	s12	-	99.20	

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Kit Summary

Security No.	Serial No.	Item	Quantity	Case No.	Date Certified	FR Before shipment mL/min	Vacuum before shipment inch Hg
1749R	3838	Passive sampler Entech 50cc-160cc min	1	s12	-	100.90	

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KIT SUMMARY

Client Details

Kit ID	AK000735	**Contact**	Kurt Plambeck
Name	Douglas Partners Pty Ltd	**Phone**	-
		Address	96 Hermitage Rd, West Ryde, NSW 2114

Comments

Silverwater

* Canisters should have some residual vacuum after sampling - aim to fill the canisters approximately 75% full. (-7.5 "Hg)

N/A if canisters are to be positively pressurised.

Kit Summary

Security No.	Serial No.	Item	Quantity	Case No.	Date Certified	FR Before shipment mL/min	Vacuum before shipment inch Hg
831R	A0187902-6	Passive sampler Restek + orifice	1	s15	-	99.40	[NA]
2282	2282	1L Canister	1	L27	22/08/2019	[NA]	-29.70
2273	2273	1L Canister	1	L27	21/08/2019	[NA]	-29.70
2246	2246	1L Canister	1	L27	22/08/2019	[NA]	-29.70
3521	3521	1L Canister	1	L27	20/08/2019	[NA]	-29.70
2291	2291	1L Canister	1	L27	21/08/2019	[NA]	-29.70
2292	2292	1L Canister	1	L34	22/08/2019	[NA]	-29.70
2268	2268	1L Canister	1	L34	21/08/2019	[NA]	-29.70
2274	2274	1L Canister	1	L34	21/08/2019	[NA]	-29.70
2283	2283	1L Canister	1	L34	20/08/2019	[NA]	-29.7
-	-	Pressure Gauge with connection	1	QF	-	[NA]	[NA]
614R	A0113258-8	Passive sampler Restek + orifice	1	s15	-	99.80	[NA]
-	-	Charcoal tube-SKC Anasorb 226-09	1	x13	-	[NA]	[NA]
2259	2259	1L Canister	1	sX	22/08/2019	[NA]	-29.80
2075	A0334387-5	Passive sampler Restek + orifice	1	sX	-	99.80	[NA]
3496	3496	1L Canister	1	-	23/08/2019	[NA]	-30.00
1748R	3837	Passive sampler Entech 50cc-160cc min	1	-	-	100.10	[NA]
1875R	A0305763-5	Passive sampler Restek + orifice	1	s15	-	100.20	[NA]
1983R	A0309007-1	Passive sampler Restek + orifice	1	s15	-	100.80	[NA]

Added on 28/08/19. tlm

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Kit Summary

Security No.	Serial No.	Item	Quantity	Case No.	Date Certified	FR Before shipment mL/min	Vacuum before shipment inch Hg
1752R	3841	Passive sampler Entech 50cc-160cc min	1	s12	-	100.70	
1754R	3843	Passive sampler Entech 50cc-160cc min	1	s12	-	99.50	
1779R	3856	Passive sampler Entech 2cc-5cc min	1		-	99.90	
1751R	3840	Passive sampler Entech 50cc-160cc min	1	s12	-	99.20	
1749R	3838	Passive sampler Entech 50cc-160cc min	1	s12	-	100.90	

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CALIBRATION RECORD

Project: Wilson Park, Silverwater

Project Number: 86694.03

Calibrated Equipment

Model: MiniRAE Lite

Serial No.:

DP Reference: DP-PID3

Other: 10.6eV Lamp

Calibration

Date(s): 26/8/2019

Operator(s): CL

Zero Gas: ambient air

Span Gas: isobutylene

Span Gas Concentration: 100

Response Factor: 1.0

Pre-calibration Reading 105

Post-calibration Reading 100

Approved: CL

Date: 26/8/2019

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TPS FLT90 CALIBRATION RECORD

Serial Number: 428561

DP Identification No. DP595

Project: Wilson Park, Silverwater

Project Number: 86694.03

PARAMETER	STANDARD	PRE CALIBRATION READING		POST CALIBRATION READING	
Temperature	* 23.0	23.1	degrees C	23.0	degrees C
pH	10	9.85	pH units	10.0	pH units
	7	7.1	pH units	7.0	pH units
	4	3.9	pH units	4.01	pH units
Conductivity	~~0.0** uS/cm~~	—	µS/cm	—	µS/cm
	2.76 mS/cm	2.53	mS/cm	2.75	mS/cm
TDS	0.0** ppm	—	ppm	—	ppm
	36.0 ppk	—	ppk	—	ppk
Dissolved Oxygen	0.0% sat	—	ppm		
		0	%	—	%
	100.0**% sat		ppm		
		99.8	%	100	%
Turbidity	0*** NTU	—	NTU	—	NTU
	90 NTU	91.4	NTU	90.0	NTU
ORP #	240 mV	223	mV	-	mV

Calibrated by: CL

Date: 27/8/2019

* use NATA certified reference thermometer from soils clean lab
** air
*** distilled water
# factory calibrated – do a bump test

NOTES:

Form Updated 21Mar2011

Douglas Partners
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CALIBRATION RECORD

Project:	Wilson Park
Project Number:	86694.03

<u>Calibrated Equipment</u>

Model:	Minirae Lite
Serial No.:	
DP Reference:	DP415
Other:	10.6eV Lamp

<u>Calibration</u>

Date(s):	30/8/19
Operator(s):	KP
Zero Gas:	ambient air
Span Gas:	isobutylene
Span Gas Concentration:	100
Response Factor:	1.0
Pre-calibration Reading	101
Post-calibration Reading	100

Approved:	KP
Date:	30/8/19

Appendix E

Summary of Laboratory Results for Soil, Groundwater and Soil Gas

Table E1: Summary of Laboratory Results – Metals, TRH, BTEX, PAH

			Metals								TRH						BTEX				PAH					
			Arsenic	Cadmium	Chromium (VI)	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene[b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs	Phenol	VOCs
		PQL	4	0.4	1	1	1	0.1	1	1	25	50	25	50	100	100	0.2	0.5	1	1	1	0.05	0.5	0.05	5	various
Sample ID[a]	Depth	Sampled Date	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	mg/kg	mg/kg	mg/kg	mg/kg
BH6a/0.4-0.5	0.4-0.5m	27/08/2019	<4	<0.4	**8**	**15**	**13**	<0.1	**5**	**25**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05	<5	<PQL
			300 100	90 NC	300 410	17000 120	600 1100	80 NC	1200 45	30000 330	NC NC	NC NC	260 180	NL 120	NC 300	NC 2800	3 50	NL 85	NL 70	230 105	NL 170	NC 0.7	3 NC	300 NC	120 NC	
BH7a/0.2-0.3	0.2-0.3m	27/08/2019	<4	<0.4	**7**	**8**	**11**	<0.1	**3**		<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.06**	<0.5	**0.06**	<5	<PQL
			300 100	90 NC	300 410	17000 120	600 1100	80 NC	1200 45	30000 330	NC NC	NC NC	260 180	NL 120	NC 300	NC 2800	3 50	NL 85	NL 70	230 105	NL 170	NC 0.7	3 NC	300 NC	120 NC	
BD2/20170827	-	27/08/2019	**7**	<0.4	**9**	**2**	**12**	<0.1	**2**	**22**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.06**	<0.5	**1.1**	<5	<PQL
			300 100	90 NC	300 410	17000 120	600 1100	80 NC	1200 45	30000 330	NC NC	NC NC	260 180	NL 120	NC 300	NC 2800	3 50	NL 85	NL 70	230 105	NL 170	NC 0.7	3 NC	300 NC	120 NC	
BH7a/0.85-0.95	0.85-0.95m	27/08/2019	<4	<0.4	**7**	**8**	**11**	<0.1	**2**	**12**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05	<5	<PQL
			300 100	90 NC	300 410	17000 120	600 1100	80 NC	1200 45	30000 330	NC NC	NC NC	260 180	NL 120	NC 300	NC 2800	3 50	NL 85	NL 70	230 105	NL 170	NC 0.7	3 NC	300 NC	120 NC	
BH7a/0.95-1.0	0.95-1.0m	27/08/2019	**4**	<0.4	**8**	**15**	**22**	<0.1	**4**	**14**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**0.97**	**1.3**	**6.9**	<5	<PQL
			300 100	90 NC	300 410	17000 120	600 1100	80 NC	1200 45	30000 330	NC NC	NC NC	260 180	NL 120	NC 300	NC 2800	3 50	NL 85	NL 70	230 105	NL 170	NC 0.7	3 NC	300 NC	120 NC	
BH7a/1.4-1.5	1.4-1.5m	27/08/2019	**10**	<0.4	**9**	**3**	**5**	<0.1	**1**	**2**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**3**	<0.05	<0.5	**5.1**	<5	<PQL
			300 100	90 NC	300 410	17000 120	600 1100	80 NC	1200 45	30000 330	NC NC	NC NC	260 180	NL 120	NC 300	NC 2800	3 50	NL 85	NL 70	230 105	NL 170	NC 0.7	3 NC	300 NC	120 NC	
BH10a/0.3-04	0.3-0.4m	27/08/2019	<4	<0.4	**6**	**6**	**12**	<0.1	**3**	**21**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05	<5	<PQL
			300 100	90 NC	300 410	17000 120	600 1100	80 NC	1200 45	30000 330	NC NC	NC NC	260 180	NL 120	NC 300	NC 2800	3 50	NL 85	NL 70	230 105	NL 170	NC 0.7	3 NC	300 NC	120 NC	
BH10a/0.9-1.0	0.9-1.0m	27/08/2019	<4	<0.4	**9**	**7**	**16**	<0.1	**13**	**45**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	**1.5**	**2.1**	**13**	<5	<PQL
			300 100	90 NC	300 410	17000 120	600 1100	80 NC	1200 45	30000 330	NC NC	NC NC	260 180	NL 120	NC 300	NC 2800	3 50	NL 85	NL 70	230 105	NL 170	NC 0.7	3 NC	300 NC	120 NC	
BH10a/1.5-1.6	1.5-1.6m	27/08/2019	**5**	**1**	**16**	**15**	**50**	<0.1	**14**	**43**	<25	<50	<25	<50	**380**	<100	<0.2	<0.5	<1	<1	<1	**12**	**17**	**110**	<5	<PQL
			300 100	90 NC	300 410	17000 120	600 1100	80 NC	1200 45	30000 330	NC NC	NC NC	260 180	NL 120	NC 300	NC 2800	3 50	NL 85	NL 70	230 105	NL 170	NC 0.7	3 NC	300 NC	120 NC	
BH10a/2.1-2.2	2.1-2.2m	27/08/2019	**11**	**1**	**16**	**16**	**39**	<0.1	**12**	**86**	<25	<50	<25	<50	**200**	<100	<0.2	<0.5	<1	<1	<1	**6.4**	**8.6**	**59**	<5	<PQL
			300 100	90 NC	300 410	17000 120	600 1100	80 NC	1200 45	30000 330	NC NC	NC NC	260 180	NL 120	NC 300	NC 2800	3 50	NL 85	NL 70	230 105	NL 170	NC 0.7	3 NC	300 NC	120 NC	
BH10a/2.9-3.0	2.9-3.0m	27/08/2019	**10**	<0.4	**15**	**20**	**31**	**0.1**	**17**	**45**	<25	<50	<25	<50	**340**	<100	<0.2	<0.5	<1	<1	<1	**10**	**14**	**90**	<5	<PQL
			300 100	90 NC	300 410	17000 120	600 1100	80 NC	1200 45	30000 330	NC NC	NC NC	260 180	NL 120	NC 300	NC 2800	3 50	NL 85	NL 70	230 105	NL 170	NC 0.7	3 NC	300 NC	120 NC	
BH6a/0.4-0.5 - [TRIPLICATE]	0.4-0.5m	27/08/2019	<4	<0.4	**7**	**16**	**14**	<0.1	**4**	**25**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	
			300 100	90 NC	300 410	17000 120	600 1100	80 NC	1200 45	30000 330	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC	120 NC	
BH6a/1.0-1.1	1.0-1.1m	27/08/2019	**4**	<0.4	**32**	**55**	**180**	**0.3**	**150**	**190**	<25	**470**	<25	**470**	[illegible]	**2300**	<0.2	<0.5	<1	<1	**1**	**99**	**140**	**1300**	<5	<PQL
			300 100	90 NC	300 410	17000 120	600 1100	80 NC	1200 35	30000 150	NC NC	NC NC	260 180	NL 120	NC 300	NC 2800	3 50	NL 85	NL 70	230 105	NL 170	NC 0.7	3 NC	300 NC	120 NC	
BH6a/1.4-1.5	1.4-1.5m	27/08/2019	<4	<0.4	**8**	**1**	**6**	<0.1	**4**	**4**	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	**1**	<0.05	<0.5	1.4	<5	<PQL
			300 100	90 NC	300 410	17000 120	600 1100	80 NC	1200 35	30000 150	NC NC	NC NC	260 180	NL 120	NC 300	NC 2800	3 50	NL 85	NL 70	230 105	NL 170	NC 0.7	3 NC	300 NC	120 NC	

Lab result	
HIL/HSL value	EIL/ESL value

HIL/HSL exceedance · EIL/ESL exceedance · HIL/HSL and EIL/ESL exceedance · ML exceedance · ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab below the PQL, refer to the lab report **Blue** = DC exceedance

Bold = Lab detections NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable NAD = No asbestos detected

Notes:

HIL/HSL/DC	NEPC, Schedule B1 - HIL C (Recreational / Open Space), HSL C (Recreational / Open Space)
EIL/ESL	NEPC, Schedule B1 - EIL UR/POS (Urban Residential and Public Open Space), ESL UR/POS (Urban Residential and Public Open Space)
ML	NEPC, Schedule B1 - ML R/P/POS (Residential, Parkland and Public Open Space)
a	QA/QC replicate of sample listed directly below the primary sample
b	reported naphthalene laboratory result obtained from BTEXN suite
c	criteria applies to DDT only

Table E2 - Summary of Analytical Results - Groundwater (All results in µg/L unless otherwise stated)

Monitoring Well ID	Date Sampled	Metals								TRH			BTEX					PAH			Phenols	VOC	
		Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Lead (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)	C6-C10 less BTEX (F1)	F2-NAPHTHALENE	Total TRH >C10-C40	Benzene	Toluene	Ethylbenzene	Xylene (m&p)	Xylene (o)	Benzo(a) pyrene	Naphthalene	Total PAH	Phenol (mg/L)	Chloroform	All other VOC
PQL		1	0.1	1	1	1	0.05	1	1	10	50	PQL	1	1	1	2	1	0.1	0.2	1	0.05	1	PQL
Site Assessment Criteria (SAC)																							
DGV[2] for slightly to moderately disturbed marine waters		13[a]	0.7[b]	27.4 (Cr III) 4.4 (Cr VI)	1.3	4.4	0.1[b]	7[b]	15	-	-	-	500[b]	180[c]	80	75[c] (m xylene) 200[c] (p xylene)	350[c]	0.1[c]	50[b]	-	0.4	370	-
Inerim marine water guideline [3], 95% species protection		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HSL C (Recreational) 2m to <4m		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HSL D (Commercial/Industrial) 2m to <4m		-	-	-	-	-	-	-	-	6	-	-	5	-	-	-	-	-	-	-	-	-	-
MP1	27/08/2019	**4**	<0.1	<1	<1	1	<0.05	64	250	<10	<50	<PQL	<1	<1	<1	<2	<1	<0.1	<0.2	0.33	<0.05	<1	<PQL
MP2	27/08/2019	1	0.1	<1	14	**2**	<0.05	23	150	<10	<50	<PQL	<1	<1	<1	<2	<1	<0.1	<0.2	-	<0.05	<1	<PQL
MP3	27/08/2019	<1	<0.1	<1	2	<1	<0.05	9	29	<10	<50	<PQL	<1	<1	<1	<2	<1	<0.1	<0.2	-	<0.05	<1	<PQL
MP4	27/08/2019	1	**0.4**	<1	6	<1	<0.05	59	410	<10	<50	<PQL	<1	<1	<1	<2	<1	<0.1	<0.2	-	<0.05	<1	<PQL
BD1	27/08/2019	1	**0.3**	<1	7	<1	<0.05	59	410	<10	<50	<PQL	<1	<1	<1	<2	<1	<0.1	<0.2	-	<0.05	<1	<PQL
Previous SOPA monitoring data (average values, presumed filtered)																							
MP1	2012-2019	-	-	-	13	16	-	-	207	-	-	-	<1	<2	<2	<2	-	-	-	12.3	-	-	-
MP2	2012-2019	-	-	-	26	26	-	-	282	-	-	-	<1	<2	<2	<2	-	-	-	2.9	-	-	-
MP3	2012-2019	-	-	-	14	4.4	-	-	137	-	-	-	<1	<2	<2	<2	-	-	-	1.8	-	-	-
MP4	2012-2019	-	-	-	18	5.6	-	-	362	-	-	-	<1	<2	<2	<2	-	-	-	4.7	-	-	-

Notes

2	Groundwater Default Guideline Values obtained from (ANZG 2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality
a	Freshwater DGV applied
b	Based on 99 % level of species protection
c	Unknown level of protection
BOLD	Values over the PQL
PQL	Practical Quantitation Limit
HSLs C	Groundwater Health Screening levels for Vapour Intrusion (Recreational)
HSLs D	Groundwater Health Screening levels for Vapour Intrusion (Commercial/Industrial)
-	Indicates no value presented in the data from SOPA

Table E3: Soil Vapour Laboratory Results

							Field_ID	SV1	SV2	SV3	SV4	BD1	SV5	SV6	SV8	SV7	SV9	SV10
							LocCode	SV1	SV2	SV3	SV4	SV5	SV5	SV6	SV7	SV8	SV9	SV10
							WellCode											
							Sampled_Date-Time	02-Sep-19	02-Sep-19	27-Aug-19	02-Sep-19	02-Sep-19	02-Sep-19	02-Sep-19	02-Sep-19	02-Sep-19	02-Sep-19	02-Sep-19
				NEPC 2013 Table 1A(5) Comm/Ind D Soil Vapour HSL for Vapour Intrusion, Sand	NEPC 2013 Table 1A(2) Comm/Ind D Soil Vap VOCC HILs	NEPC 2013 Table 1A(2) Rec C Soil Vap VOCC HILs	NEPC 2013 Table 1A(5) Rec C Soil Vapour HSL for Vapour Intrusion, Sand											
Chem_Group	**ChemName**	**Units**	**EQL**	**0-1m**			**0-1m**											
	Freon 113	µg/m3	**3.8**					<3.8	<3.8	<38	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8
	2-Propanol	µg/m3	**12**					**240**	**750**	**25,000**	**310**	**150**	**170**	**120**	**100**	**200**	**140**	**100**
	Propene	µg/m3	**0.9**					**3**	**5**	**21**	**13**	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
TO15 in Canisters ug/m3	1,2-Dichlorotetrafluoroethane	µg/m3	**2.5**					<2.5	<2.5	<25	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
TPH Air/ Air Phase Hydrocarbon	TPH C5 - C8 Aliphatic	µg/m3	**200**					**210**	**410**	**7200**	**210**	<200	<200	<200	<200	<200	<200	<200
	TPH C9 - C10 Aromatic	µg/m3	**100**					<100	<100	<1000	<100	<100	<100	<100	<100	<100	<100	<100
	TPH C9 - C12 Aliphatic	µg/m3	**50**					**230**	**900**	<500	**260**	**210**	**220**	**430**	**200**	**390**	**250**	**210**
TPH	F2-NAPHTHALENE	ug/m3	**40**	500000			NL	**330**	**1300**	<400	**360**	**220**	**240**	**450**	**230**	**420**	**290**	**240**
	C6-C10 less BTEX (F1)	ug/m3	**200**	680000			86000000	<200	<200	<2000	<200	<200	<200	<200	<200	<200	<200	<200
BTEX	Benzene	µg/m3	**1.6**	4000			360000	**35**	**6**	<16	**2**	<1.6	<1.6	**10**	<1.6	**3**	<1.6	<1.6
	Ethylbenzene	µg/m3	**2.2**	1300000			NL	**3**	**6**	<22	**7**	<2.2	<2.2	**7**	<2.2	2	**6**	<2.2
	Toluene	µg/m3	**1.9**	4800000			NL	**28**	**20**	<19	**6**	**4**	**4**	**10**	**4**	**4**	**4**	**3**
	Xylene (m & p)	µg/m3	**4.3**					**10**	**30**	<43	**40**	**5**	**5**	**10**	<4.3	**6**	**20**	<4.3
	Xylene (o)	µg/m3	**2.2**					**6**	**26**	<22	**51**	**7**	**8**	**10**	<2.2	**4**	**120**	<2.2
MAH	1,2,4-trimethylbenzene	µg/m3	**2.5**					**6**	**7**	<25	**5**	**3**	**3**	**10**	2	**4**	<2.5	<2.5
	1,3,5-trimethylbenzene	µg/m3	**2.5**					2	<2.5	<25	<2.5	<2.5	<2.5	**8**	<2.5	<2.5	<2.5	<2.5
	1-methyl-4 ethyl benzene	µg/m3	**2.5**					<2.5	<2.5	<25	<2.5	<2.5	<2.5	**3**	<2.5	<2.5	<2.5	<2.5
	Styrene	µg/m3	**2.1**					**3**	**3**	<21	<2.1	<2.1	<2.1	**5**	<2.1	<2.1	<2.1	<2.1
Chlorinated Hydrocarbons	1,1,1-trichloroethane	µg/m3	**2.7**		230000	1200000		<2.7	<2.7	<27	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7
	1,1,2,2-tetrachloroethane	µg/m3	**3.4**					<3.4	<3.4	<34	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4
	1,1,2-trichloroethane	µg/m3	**2.7**					<2.7	<2.7	<27	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7
	1,1-dichloroethane	µg/m3	**2**					<2	<2	<20	<2	<2	<2	<2	<2	<2	<2	<2
	1,1-dichloroethene	µg/m3	**2**					<2	<2	<20	<2	<2	<2	<2	<2	<2	<2	<2
	1,2-dichloroethane	µg/m3	**2**					<2	<2	<20	<2	<2	<2	<2	<2	<2	<2	<2
	1,2-dichloropropane	µg/m3	**2.3**					<2.3	<2.3	<23	<2.3	<2.3	<2.3	<2.3	<2.3	<2.3	<2.3	<2.3
	Benzyl chloride	ug/m3	**2.6**					<2.6	<2.6	<26	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6
	Bromodichloromethane	µg/m3	**3.4**					<3.4	<3.4	<34	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4
	Bromoform	µg/m3	**5.2**					<5.2	<5.2	<52	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2	<5.2
	Carbon tetrachloride	µg/m3	**3.1**					<3.1	<3.1	<31	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1	<3.1
	Chlorodibromomethane	µg/m3	**1.6**					<1.6	<1.6	<16	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
	Chloroethane	µg/m3	**1.3**					<1.3	<1.3	<13	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
	Chloroform	µg/m3	**2.4**					**9**	<2.4	<24	<2.4	2	2	<2.4	<2.4	**3**	**4**	<2.4
	Chloromethane	µg/m3	**1**					<1	<1	<10	<1	<1	<1	<1	<1	<1	<1	<1
	cis-1,2-dichloroethene	µg/m3	**2**		300	2000		<2	<2	<20	<2	<2	<2	<2	<2	<2	<2	<2
	cis-1,3-dichloropropene	µg/m3	**2.3**					<2.3	<2.3	<23	<2.3	<2.3	<2.3	<2.3	<2.3	<2.3	<2.3	<2.3
	Dichloromethane	µg/m3	**17**					<17	<17	<172	<17	<17	<17	<17	<17	<17	<17	<17
	Hexachlorobutadiene	µg/m3	**5.3**					<5.3	<5.3	<53	<5.3	<5.3	<5.3	<5.3	<5.3	<5.3	<5.3	<5.3
	Trichloroethene	µg/m3	**2.7**		80	400		<2.7	<2.7	<27	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7	<2.7
	Tetrachloroethene	µg/m3	**3.4**		8000	40000		<3.4	<3.4	<34	<3.4	<3.4	<3.4	<3.4	**73**	<3.4	**4**	<3.4
	trans-1,2-dichloroethene	µg/m3	**2**					<2	<2	<20	<2	<2	<2	<2	<2	<2	<2	<2
	trans-1,3-dichloropropene	µg/m3	**2.3**					<2.3	<2.3	<23	<2.3	<2.3	<2.3	<2.3	<2.3	<2.3	<2.3	<2.3
	Vinyl chloride	µg/m3	**1.3**		100	500		<1.3	<1.3	<13	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
Halogenated Hydrocarbons	1,2-dibromoethane	µg/m3	**3.8**					<3.8	<3.8	<38	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8
	Bromomethane	µg/m3	**1.9**					<1.9	<1.9	<19	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9
	Dichlorodifluoromethane	µg/m3	**2.5**					<2.5	**46**	<25	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
	Trichlorofluoromethane	µg/m3	**2.8**					<2.8	<2.8	<28	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8	<2.8
Halogenated Benzenes	1,2,4-trichlorobenzene	µg/m3	**3.7**					<3.7	<3.7	<37	<3.7	<3.7	<3.7	<3.7	<3.7	<3.7	<3.7	<3.7
	1,2-dichlorobenzene	µg/m3	**3**					<3	<3	<30	<3	<3	<3	<3	<3	<3	<3	<3
	1,3-dichlorobenzene	µg/m3	**3**					<3	<3	<30	<3	<3	<3	<3	<3	<3	<3	<3
	1,4-dichlorobenzene	µg/m3	**3**					**4**	**6**	<30	**4**	**4**	3	<3	**3**	**5**	<3	<3
	Chlorobenzene	µg/m3	**2.3**					<2.3	<2.3	<23	<2.3	<2.3	<2.3	<2.3	<2.3	<2.3	<2.3	<2.3
VOCs	1,3-Butadiene	µg/m3	**1.1**					<1.1	<1.1	<11	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
	Acrolein	µg/m3	**11**					<11	<11	<115	<11	<11	<11	<11	<11	<11	<11	<11
	Methyl Methacrylate	µg/m3	**2**					<2	<2	<20	<2	<2	<2	<2	<2	<2	<2	<2
Solvents	1,4-Dioxane	µg/m3	**1.8**					<1.8	<1.8	<18	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
	Methyl Ethyl Ketone	µg/m3	**15**					<15	<15	<147	<15	<15	<15	<15	<15	<15	**94**	<15
	2-hexanone (MBK)	µg/m3	**2**					<2	<2	<20	<2	<2	<2	<2	<2	<2	**5**	<2
	4-Methyl-2-pentanone	µg/m3	**20**					<20	<20	<205	<20	<20	<20	<20	<20	<20	<20	<20
	Acetone	ug/m3	**11.9**					<12	10	<119	**20**	**20**	**20**	<12	<12	<12	**70**	<12
	Carbon disulfide	µg/m3	**16**					<16	<16	<156	<16	<16	<16	<16	<16	<16	**30**	<16
	Cyclohexane	ug/m3	**1.7**					<1.7	<1.7	<17	<1.7	**3**	**5**	**5**	<1.7	<1.7	<1.7	<1.7
	Ethanol	µg/m3	**9**					<9.4	**10**	<94	<9.4	<9.4	<9.4	<9.4	<9.4	<9.4	<9.4	<9.4
	Ethyl acetate	µg/m3	**1.8**					<1.8	<1.8	<18	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
	Heptane	µg/m3	**2**					<2	<2	<20	<2	<2	<2	**3**	<2	<2	<2	<2
	Hexane	µg/m3	**1.8**					**4**	<1.8	<18	**4**	**2**	**2**	**3**	<1.8	<1.8	**10**	**7**
	MTBE	ug/m3	**1.8**					<1.8	<1.8	<18	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
	Tetrahydrofuran	µg/m3	**1.5**					<1.5	<1.5	<15	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
	Vinyl acetate	µg/m3	**1.8**					<1.8	<1.8	<18	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
PAH/Phenols	Naphthalene	µg/m3	**2.6**	3000			NL	**10**	<2.6	<26	**3**	<2.6	<2.6	**20**	<2.6	<2.6	<2.6	<2.6

Appendix F

Laboratory Certificates of Analysis

Sample Receipt Advice

Chain of Custody Documentation

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1927963**	Page	: 1 of 6
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR PAUL GORMAN	Contact	: Shirley LeCornu
Address	: UNIT 5 50 TOPHAN ROAD NSW 2567	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 07 32378900	Telephone	: +6138549 9630
Project	: 868694.03 Wilson Park	Date Samples Received	: 02-Sep-2019 14:45
Order number	:	Date Analysis Commenced	: 03-Sep-2019
C-O-C number	: ----	Issue Date	: 04-Sep-2019 17:39
Sampler	: ----		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Evie Sidarta	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BD1/20190827	----	----	----	----
			Client sampling date / time	27-Aug-2019 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1927963-001	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	7.6	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	8	----	----	----	----
Copper	7440-50-8	5	mg/kg	11	----	----	----	----
Lead	7439-92-1	5	mg/kg	18	----	----	----	----
Nickel	7440-02-0	2	mg/kg	3	----	----	----	----
Zinc	7440-66-6	5	mg/kg	25	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EP035SF: Total Phenol by Segmented Flow Analyser								
Phenols (Total)	----	1	mg/kg	<1	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	0.6	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	1.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg	0.7	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	6.9	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	1.2	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	7.2	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	9.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	3.6	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	3.6	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	4.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	1.2	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	4.0	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	2.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	3.2	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	49.7	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	5.6	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	5.6	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	5.6	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BD1/20190827	----	----	----	----
			Client sampling date / time	27-Aug-2019 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1927963-001	--------	--------	--------	--------
				Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg	<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg	**210**	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg	**130**	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	**340**	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	**280**	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	**280**	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	----	----	----	----
^ Total Xylenes	----	0.5	mg/kg	<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg	<1	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**91.6**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	**103**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	**81.9**	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**105**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%	**97.0**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	**110**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**108**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BD1/20190827	----	----	----	----
			Client sampling date / time	27-Aug-2019 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1927963-001	--------	--------	--------	--------
				Result	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued								
Toluene-D8	2037-26-5	0.2	%	**112**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	**105**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	868694.03	**Suburb:**	Silverwater	**To:**	Envirolab Services
Project Name:	Wilson Park	**Order Number**			12 Ashley Street, Chatswood
Project Manager:	Paul Gorman	**Sampler:**	CL	**Attn:**	Aileen
Emails:	paul.gorman/celine.li@douglaspartners.com.au			**Phone:**	612 9910 6200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☑ 72 hours ☐ Standard ☐			**Email:**	ahie@envirolab.com.au
Prior Storage:	☐ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	VOC	Combo4	pH &CEC	TRH & BTEX					Notes/preservation
BH6a/0.4-0.5	1	27/08/19	SOIL	G	X	X	X						
BH6a/1.0-1.1	2	27/08/19	SOIL	G									
BH6a/1.4-1.5	3	27/08/19	SOIL	G									
BD2/20170827	4	27/08/19	SOIL	G		X							intra lab
BH7a/0.2-0.3	5	27/08/19	SOIL	G	X	X							
BH7a/0.85-0.95	6	27/08/19	SOIL	G	X	X	X						
BH7a/0.95-1.0	7	27/08/19	SOIL	G	X	X							
BH7a/1.4-1.5	8	27/08/19	SOIL	G	X	X							
(1) BD1/20190827		27/08/19	SOIL	G		X							inter lab
BH8/0.3-0.4	9	27/08/19	SOIL	G	X	X	X						
BH8/0.9-1.0	10	27/08/19	SOIL	G	X	X							
BH8/1.5-1.6	11	27/08/19	SOIL	G	X	X							
BH8/2.1-2.2	12	27/08/19	SOIL	G	X	X							
BH8/2.9-3.0	13	27/08/19	SOIL	G	X	X							
TS1 TB	14,15	22/8/19	Soil	G				X					
PQL (S) mg/kg													

Analytes

Environmental Division Sydney
Work Order Reference
ES1927963
Telephone : +61-2-8784 8555

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 225191
Date Received: 02/09/19
Time Received: 1204
Received by: KH 129
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

TAT

ANZECC PQLs req'd for all water analytes ☐

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: **Relinquished by:** **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd **Address** **Phone:** **Fax:**

Signed: **Received by:** K. Gore ECS **Date & Time:** 02/9/19. 12:04

2/9/19 Relinished: ECS Syd. S. Bolton 02/09/19 12:55

KC: Fadi 2/9/19 2:48p

QUALITY CONTROL REPORT

Work Order	: **ES1927963**	Page	: 1 of 7
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR PAUL GORMAN	Contact	: Shirley LeCornu
Address	: UNIT 5 50 TOPHAN ROAD NSW 2567	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 07 32378900	Telephone	: +6138549 9630
Project	: 868694.03 Wilson Park	Date Samples Received	: 02-Sep-2019
Order number	:	Date Analysis Commenced	: 03-Sep-2019
C-O-C number	: ----	Issue Date	: 04-Sep-2019
Sampler	: ----		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Evie Sidarta	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 2562064)									
ES1927930-004	Anonymous	EG005T: Chromium	7440-47-3	2	mg/kg	33	34	0.00	0% - 50%
		EG005T: Copper	7440-50-8	5	mg/kg	157	179	12.6	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	542	547	0.846	0% - 20%
ES1927930-004	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	2	87.7	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	34	36	4.85	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	5	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	55	64	14.8	0% - 50%
EP035SF: Total Phenol by Segmented Flow Analyser (QC Lot: 2561612)									
ES1927963-001	BD1/20190827	EP035SF: Phenols (Total)	----	1	mg/kg	<1	<1	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 2562065)									
ES1927930-004	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.2	0.2	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2559551)									
ES1927924-021	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
				Laboratory Duplicate (DUP) Report					
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 2559551) - continued									
ES1927924-021	Anonymous	EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1927924-032	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	1.1	1.2	8.75	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	1.7	2.0	16.1	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	2.8	3.7	27.7	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2559550)									
ES1927924-021	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1927924-032	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	6390	7400	14.6	0% - 20%
		EP071: C29 - C36 Fraction	----	100	mg/kg	160	180	12.6	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	1130	1170	2.92	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2560346)									
ES1927920-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EW1903795-006	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2559550)									
ES1927924-021	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
				Laboratory Duplicate (DUP) Report					
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2559550) - continued									
ES1927924-021	Anonymous	EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1927924-032	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	5030	5940	16.6	0% - 20%
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	2530	2430	3.96	0% - 20%
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2560346)									
ES1927920-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EW1903795-006	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080: BTEXN (QC Lot: 2560346)									
ES1927920-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EW1903795-006	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2562064)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	96.6	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	94.2	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	95.5	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	93.5	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	104	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	98.8	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	100	80	122
EP035SF: Total Phenol by Segmented Flow Analyser (QCLot: 2561612)								
EP035SF: Phenols (Total)	----	1	mg/kg	<1	20 mg/kg	94.1	60	102
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2562065)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	81.1	70	105
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2559551)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	122	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	120	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	119	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	117	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	120	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	102	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	126	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	126	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	117	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	112	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	112	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	117	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	124	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	117	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	112	62	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	121	63	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2559550)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	103	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	95.9	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	96.4	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2560346)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2560346) - continued								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	113	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2559550)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	100	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	94.6	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	97.6	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2560346)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	110	68	128
EP080: BTEXN (QCLot: 2560346)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	105	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	108	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	111	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	108	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	107	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	105	63	119

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 2562064)							
ES1927930-004	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	97.9	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	95.8	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	111	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	99.4	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	96.5	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	101	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	77.6	70	130
EP035SF: Total Phenol by Segmented Flow Analyser (QCLot: 2561612)							
ES1927963-001	BD1/20190827	EP035SF: Phenols (Total)	----	20 mg/kg	104	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 2562065)							
ES1927930-004	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	101	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2559551)							
ES1927924-021	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	108	70	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 2559551) - continued							
ES1927924-021	Anonymous	EP075(SIM): Pyrene	129-00-0	10 mg/kg	121	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2559550)							
ES1927924-021	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	94.2	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	114	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	121	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2560346)							
ES1927920-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	84.6	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2559550)							
ES1927924-021	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	96.4	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	117	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	110	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2560346)							
ES1927920-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	82.5	70	130
EP080: BTEXN (QCLot: 2560346)							
ES1927920-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	83.4	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	87.3	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	89.3	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	87.2	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	88.4	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	81.8	70	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1927963**	Page	: 1 of 4
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR PAUL GORMAN	Telephone	: +6138549 9630
Project	: 868694.03 Wilson Park	Date Samples Received	: 02-Sep-2019
Site	: ----	Issue Date	: 04-Sep-2019
Sampler	: ----	No. of samples received	: 1
Order number	:	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / *Container / Client Sample ID(s)*	*Sample Date*	*Extraction / Preparation*			*Analysis*		
		Date extracted	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
BD1/20190827	**27-Aug-2019**	**----**	----	----	**03-Sep-2019**	10-Sep-2019	✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
BD1/20190827	**27-Aug-2019**	**03-Sep-2019**	23-Feb-2020	✓	**04-Sep-2019**	23-Feb-2020	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
BD1/20190827	**27-Aug-2019**	**03-Sep-2019**	24-Sep-2019	✓	**04-Sep-2019**	24-Sep-2019	✓
EP035SF: Total Phenol by Segmented Flow Analyser							
Soil Glass Jar - Unpreserved (EP035SF)							
BD1/20190827	**27-Aug-2019**	**03-Sep-2019**	10-Sep-2019	✓	**04-Sep-2019**	10-Sep-2019	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
BD1/20190827	**27-Aug-2019**	**03-Sep-2019**	10-Sep-2019	✓	**03-Sep-2019**	13-Oct-2019	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
BD1/20190827	**27-Aug-2019**	**03-Sep-2019**	10-Sep-2019	✓	**03-Sep-2019**	10-Sep-2019	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
BD1/20190827	**27-Aug-2019**	**03-Sep-2019**	10-Sep-2019	✓	**03-Sep-2019**	10-Sep-2019	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
BD1/20190827	**27-Aug-2019**	**03-Sep-2019**	10-Sep-2019	✓	**03-Sep-2019**	10-Sep-2019	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
PAH/Phenols (SIM)	EP075(SIM)	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	2	50.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	2	100.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phenol By Discrete Analyser	EP035SF	1	1	100.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phenol By Discrete Analyser	EP035SF	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phenol By Discrete Analyser	EP035SF	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phenol By Discrete Analyser	EP035SF	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Phenol By Discrete Analyser	EP035SF	SOIL	In house: Referenced to ISO 14402. Phenols are extracted in 1M NaOH. The extract is diluted by 10 and then in-line-distilled at pH 1- 4. The distillate, containing steam-volatile phenolic compounds is then oxidised by hexacyanoferrate(III). The resulting quinones react with 4-aminoantipyrine forming red condensation products, which are measured spectrometrically in a flow spectrometer at 505 nm.. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM amended 2013.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM amended 2013.

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Extraction for Total Phenols in soil	EP035-PR	SOIL	In house: Soil sub-sample is extracted in 1M NaOH by tumbling for between 6 and 16 hours. The resulting extract is diluted 10 times with reagent grade water prior to analysis.
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES1927963**

Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR PAUL GORMAN	Contact	: Shirley LeCornu
Address	: UNIT 5 50 TOPHAN ROAD NSW 2567	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: paul.gorman@douglaspartners.com.au	E-mail	: shirley.lecornu@Alsglobal.com
Telephone	: +61 07 32378900	Telephone	: +6138549 9630
Facsimile	: +61 07 32378999	Facsimile	: +61-2-8784 8500
Project	: 868694.03 Wilson Park	Page	: 1 of 3
Order number	:	Quote number	: EM2017DOUPAR0002 (EN/222)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	:		

Dates

Date Samples Received	: 02-Sep-2019 14:45	Issue Date	: 02-Sep-2019
Client Requested Due Date	: 04-Sep-2019	Scheduled Reporting Date	: **04-Sep-2019**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not Available
No. of coolers/boxes	: ----	Temperature	: 7.8'C - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA055-103 Moisture Content	SOIL - EP035SF (solids) Total Phenol by Segmented Flow Analyser	SOIL - S-26 8 metals/TRH/BTEXN/PAH
ES1927963-001	27-Aug-2019 00:00	BD1/20190827	✓	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ACCOUNTS BRISBANE		
- A4 - AU Tax Invoice (INV)	Email	brisbane@douglaspartners.com.au
ACCOUNTS PAYABLE		
- A4 - AU Tax Invoice (INV)	Email	accounts@douglaspartners.com.au
CELINE LI		
- *AU Certificate of Analysis - NATA (COA)	Email	celine.li@douglaspartners.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	celine.li@douglaspartners.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	celine.li@douglaspartners.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	celine.li@douglaspartners.com.au
- A4 - AU Tax Invoice (INV)	Email	celine.li@douglaspartners.com.au
- Chain of Custody (CoC) (COC)	Email	celine.li@douglaspartners.com.au
- EDI Format - ENMRG (ENMRG)	Email	celine.li@douglaspartners.com.au
- EDI Format - ESDAT (ESDAT)	Email	celine.li@douglaspartners.com.au
- EDI Format - XTab (XTAB)	Email	celine.li@douglaspartners.com.au
PAUL GORMAN		
- *AU Certificate of Analysis - NATA (COA)	Email	paul.gorman@douglaspartners.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	paul.gorman@douglaspartners.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	paul.gorman@douglaspartners.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	paul.gorman@douglaspartners.com.au
- A4 - AU Tax Invoice (INV)	Email	paul.gorman@douglaspartners.com.au
- Chain of Custody (CoC) (COC)	Email	paul.gorman@douglaspartners.com.au
- EDI Format - ENMRG (ENMRG)	Email	paul.gorman@douglaspartners.com.au
- EDI Format - ESDAT (ESDAT)	Email	paul.gorman@douglaspartners.com.au
- EDI Format - XTab (XTAB)	Email	paul.gorman@douglaspartners.com.au

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CERTIFICATE OF ANALYSIS 224951

Client Details

Client	Douglas Partners Pty Ltd
Attention	Chamali Nagodavithane
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**86694.03, Silverwater**
Number of Samples	7 WATER
Date samples received	28/08/2019
Date completed instructions received	28/08/2019

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	02/09/2019
Date of Issue	02/09/2019

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Results Approved By
Diego Bigolin, Team Leader, Inorganics
Josh Williams, Chemist
Loren Bardwell, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

VOCs in water					
Our Reference		224951-1	224951-2	224951-3	224951-4
Your Reference	UNITS	MP1	MP2	MP3	MP4
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		WATER	WATER	WATER	WATER
Date extracted	-	30/08/2019	30/08/2019	30/08/2019	30/08/2019
Date analysed	-	31/08/2019	31/08/2019	31/08/2019	31/08/2019
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1
Chloroform	µg/L	<1	<1	<1	<1
2,2-dichloropropane	µg/L	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1	<1
Cyclohexane	µg/L	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1
Benzene	µg/L	<1	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1
Bromodichloromethane	µg/L	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1	<1
Dibromochloromethane	µg/L	<1	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1

VOCs in water					
Our Reference		224951-1	224951-2	224951-3	224951-4
Your Reference	UNITS	MP1	MP2	MP3	MP4
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		WATER	WATER	WATER	WATER
Bromoform	µg/L	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2
Styrene	µg/L	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1	<1
o-xylene	µg/L	<1	<1	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1	<1	<1
Isopropylbenzene	µg/L	<1	<1	<1	<1
Bromobenzene	µg/L	<1	<1	<1	<1
n-propyl benzene	µg/L	<1	<1	<1	<1
2-chlorotoluene	µg/L	<1	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1	<1	<1
Tert-butyl benzene	µg/L	<1	<1	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1	<1
Sec-butyl benzene	µg/L	<1	<1	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1	<1	<1
4-isopropyl toluene	µg/L	<1	<1	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1	<1
n-butyl benzene	µg/L	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	111	92	93	100
Surrogate toluene-d8	%	106	100	94	101
Surrogate 4-BFB	%	102	99	100	104

vTRH(C6-C10)/BTEXN in Water						
Our Reference		224951-1	224951-2	224951-3	224951-4	224951-5
Your Reference	UNITS	MP1	MP2	MP3	MP4	BD1
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		WATER	WATER	WATER	WATER	WATER
Date extracted	-	30/08/2019	30/08/2019	30/08/2019	30/08/2019	30/08/2019
Date analysed	-	31/08/2019	31/08/2019	31/08/2019	31/08/2019	31/08/2019
TRH C_6 - C_9	µg/L	<10	<10	<10	<10	<10
TRH C_6 - C_{10}	µg/L	<10	<10	<10	<10	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	<10	<10	<10	<10
Benzene	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
o-xylene	µg/L	<1	<1	<1	<1	<1
Naphthalene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	111	92	93	100	103
Surrogate toluene-d8	%	106	100	94	101	102
Surrogate 4-BFB	%	102	99	100	104	94

vTRH(C6-C10)/BTEXN in Water			
Our Reference		224951-6	224951-7
Your Reference	UNITS	TB	TS
Date Sampled		27/08/2019	27/08/2019
Type of sample		WATER	WATER
Date extracted	-	30/08/2019	30/08/2019
Date analysed	-	31/08/2019	31/08/2019
TRH C_6 - C_9	µg/L	<10	[NA]
TRH C_6 - C_{10}	µg/L	<10	[NA]
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	[NA]
Benzene	µg/L	<1	107%
Toluene	µg/L	<1	105%
Ethylbenzene	µg/L	<1	10%
m+p-xylene	µg/L	<2	97%
o-xylene	µg/L	<1	102%
Naphthalene	µg/L	<1	[NA]
Surrogate Dibromofluoromethane	%	99	103
Surrogate toluene-d8	%	100	101
Surrogate 4-BFB	%	100	98

svTRH (C10-C40) in Water						
Our Reference		224951-1	224951-2	224951-3	224951-4	224951-5
Your Reference	UNITS	MP1	MP2	MP3	MP4	BD1
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		WATER	WATER	WATER	WATER	WATER
Date extracted	-	29/08/2019	29/08/2019	29/08/2019	29/08/2019	29/08/2019
Date analysed	-	30/08/2019	30/08/2019	30/08/2019	30/08/2019	30/08/2019
TRH C_{10} - C_{14}	µg/L	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100	<100	<100
TRH >C_{10} - C_{16}	µg/L	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	<50	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	70	93	70	87	93

PAHs in Water - Low Level						
Our Reference		224951-1	224951-2	224951-3	224951-4	224951-5
Your Reference	UNITS	MP1	MP2	MP3	MP4	BD1
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		WATER	WATER	WATER	WATER	WATER
Date extracted	-	29/08/2019	29/08/2019	29/08/2019	29/08/2019	29/08/2019
Date analysed	-	29/08/2019	29/08/2019	29/08/2019	29/08/2019	29/08/2019
Naphthalene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.2	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	0.33	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	80	88	71	88	91

Total Phenolics in Water					
Our Reference		224951-1	224951-2	224951-3	224951-4
Your Reference	UNITS	MP1	MP2	MP3	MP4
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		WATER	WATER	WATER	WATER
Date extracted	-	29/08/2019	29/08/2019	29/08/2019	29/08/2019
Date analysed	-	29/08/2019	29/08/2019	29/08/2019	29/08/2019
Total Phenolics (as Phenol)	mg/L	<0.05	<0.05	<0.05	<0.05

HM in water - dissolved						
Our Reference		224951-1	224951-2	224951-3	224951-4	224951-5
Your Reference	UNITS	MP1	MP2	MP3	MP4	BD1
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		WATER	WATER	WATER	WATER	WATER
Date prepared	-	29/08/2019	29/08/2019	29/08/2019	29/08/2019	29/08/2019
Date analysed	-	29/08/2019	29/08/2019	29/08/2019	29/08/2019	29/08/2019
Arsenic-Dissolved	µg/L	4	1	<1	1	1
Cadmium-Dissolved	µg/L	<0.1	0.1	<0.1	0.4	0.3
Chromium-Dissolved	µg/L	<1	<1	<1	<1	<1
Copper-Dissolved	µg/L	<1	14	2	6	7
Lead-Dissolved	µg/L	1	2	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	64	23	9	59	59
Zinc-Dissolved	µg/L	250	150	29	410	410

Method ID	Methodology Summary
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			30/08/2019	1	30/08/2019	02/09/2019		30/08/2019	[NT]
Date analysed	-			31/08/2019	1	31/08/2019	02/09/2019		31/08/2019	[NT]
Dichlorodifluoromethane	µg/L	10	Org-013	<10	1	<10	<10	0	[NT]	[NT]
Chloromethane	µg/L	10	Org-013	<10	1	<10	<10	0	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-013	<10	1	<10	<10	0	[NT]	[NT]
Bromomethane	µg/L	10	Org-013	<10	1	<10	<10	0	[NT]	[NT]
Chloroethane	µg/L	10	Org-013	<10	1	<10	<10	0	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-013	<10	1	<10	<10	0	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-013	<1	1	<1	<1	0	101	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Chloroform	µg/L	1	Org-013	<1	1	<1	<1	0	102	[NT]
2,2-dichloropropane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-013	<1	1	<1	<1	0	96	[NT]
1,1,1-trichloroethane	µg/L	1	Org-013	<1	1	<1	<1	0	99	[NT]
1,1-dichloropropene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Cyclohexane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Dibromomethane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Trichloroethene	µg/L	1	Org-013	<1	1	<1	<1	0	102	[NT]
Bromodichloromethane	µg/L	1	Org-013	<1	1	<1	<1	0	99	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Toluene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichloropropane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-013	<1	1	<1	<1	0	98	[NT]
1,2-dibromoethane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-013	<1	1	<1	<1	0	100	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Bromoform	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
m+p-xylene	µg/L	2	Org-013	<2	1	<2	<2	0	[NT]	[NT]
Styrene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]

QUALITY CONTROL: VOCs in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
o-xylene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichloropropane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Bromobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-013	103	1	111	99	11	100	[NT]
Surrogate toluene-d8	%		Org-013	100	1	106	99	7	102	[NT]
Surrogate 4-BFB	%		Org-013	94	1	102	98	4	93	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			30/08/2019	1	30/08/2019	02/09/2019		30/08/2019	[NT]
Date analysed	-			31/08/2019	1	31/08/2019	02/09/2019		31/08/2019	[NT]
TRH C_6 - C_9	µg/L	10	Org-016	<10	1	<10	<10	0	97	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-016	<10	1	<10	<10	0	97	[NT]
Benzene	µg/L	1	Org-016	<1	1	<1	<1	0	101	[NT]
Toluene	µg/L	1	Org-016	<1	1	<1	<1	0	102	[NT]
Ethylbenzene	µg/L	1	Org-016	<1	1	<1	<1	0	93	[NT]
m+p-xylene	µg/L	2	Org-016	<2	1	<2	<2	0	94	[NT]
o-xylene	µg/L	1	Org-016	<1	1	<1	<1	0	93	[NT]
Naphthalene	µg/L	1	Org-013	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-016	103	1	111	99	11	100	[NT]
Surrogate toluene-d8	%		Org-016	100	1	106	99	7	102	[NT]
Surrogate 4-BFB	%		Org-016	94	1	102	98	4	93	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			29/08/2019	[NT]	[NT]	[NT]	[NT]	29/08/2019	[NT]
Date analysed	-			29/08/2019	[NT]	[NT]	[NT]	[NT]	29/08/2019	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	104	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	101	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	130	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	104	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	101	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	130	[NT]
Surrogate o-Terphenyl	%		Org-003	93	[NT]	[NT]	[NT]	[NT]	123	[NT]

QUALITY CONTROL: PAHs in Water - Low Level						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			29/08/2019	[NT]	[NT]	[NT]	[NT]	29/08/2019	[NT]
Date analysed	-			29/08/2019	[NT]	[NT]	[NT]	[NT]	29/08/2019	[NT]
Naphthalene	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	118	[NT]
Acenaphthylene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Phenanthrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	104	[NT]	[NT]	[NT]	[NT]	96	[NT]

QUALITY CONTROL: Total Phenolics in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			29/08/2019	[NT]	[NT]	[NT]	[NT]	29/08/2019	[NT]
Date analysed	-			29/08/2019	[NT]	[NT]	[NT]	[NT]	29/08/2019	[NT]
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			29/08/2019	1	29/08/2019	29/08/2019		29/08/2019	[NT]
Date analysed	-			29/08/2019	1	29/08/2019	29/08/2019		29/08/2019	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	4	4	0	101	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	<0.1	<0.1	0	103	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	97	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	110	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	1	1	1	0	101	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	<0.05	<0.05	0	105	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	1	64	64	0	102	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	250	250	0	102	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd
Attention	Chamali Nagodavithane

Sample Login Details

Your reference	86694.03, Silverwater
Envirolab Reference	224951
Date Sample Received	28/08/2019
Date Instructions Received	28/08/2019
Date Results Expected to be Reported	02/09/2019

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	7 WATER
Turnaround Time Requested	3 days
Temperature on Receipt (°C)	17.5
Cooling Method	None
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	VOCs in water	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHs in Water - Low Level	Total Phenolicsin Water	HM in water - dissolved
MP1	✓	✓	✓	✓	✓	✓
MP2	✓	✓	✓	✓	✓	✓
MP3	✓	✓	✓	✓	✓	✓
MP4	✓	✓	✓	✓	✓	✓
BD1		✓	✓	✓		✓
TB		✓				
TS		✓				

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86694.03	**Suburb:**	Silverwater	**To:**	EnviroLab
Project Name:	Wilson Park	**Order Number**			12 Ashley Street, Chatswood 2067
Project Manager:	Paul Gorman	**Sampler:**	CLN	**Attn:**	Aileen Hie
Emails:	chamali.nagodavithane@douglaspartners.com.au; Celine Li			**Phone:**	(02) 9910 6200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☑ Standard ☐			**Email:**	Ahie@envirolab.com.au
Prior Storage:	☑ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)		

	Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Combo 4L	VOC	Combo 3L	BTEX	TRH/BTEX					Notes/preservation
1	MP1		27/08/19	W	G	x	x								
2	MP2		27/08/19	W	G	x	x								
3	MP3		27/08/19	W	G	x	x								
4	MP4		27/08/19	W	G	x	x								
6 ~~[illegible]~~	TB		27/08/19	W	G					x					
5	BD1		27/08/19	W	G			x							
7 ~~[illegible]~~ lks	TS								x						
PQL (S) mg/kg															

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 224951
Date Received: 28/08/19
Time Received: 12:55
Received by: KS
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: **Relinquished by:** **Transported to laboratory by:** Courier

Send Results to: Douglas Partners Pty Ltd **Address** **Phone:** **Fax:**

Signed: [signature] **Received by:** ECS Syd K Springer **Date & Time:** 28/08/19 12:55

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 225191

Client Details

Client	Douglas Partners Pty Ltd
Attention	Paul Gorman
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**868694.03, Silverwater**
Number of Samples	15 SOIL
Date samples received	02/09/2019
Date completed instructions received	02/09/2019

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	04/09/2019
Date of Issue	04/09/2019

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Josh Williams, Chemist
Loren Bardwell, Senior Chemist
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

VOCs in soil						
Our Reference		225191-1	225191-5	225191-6	225191-7	225191-8
Your Reference	UNITS	BH6a/0.4-0.5	BH7a/0.2-0.3	BH7a/0.85-0.95	BH7a/0.95-1.0	BH7a/1.4-1.5
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Date analysed	-	04/09/2019	04/09/2019	04/09/2019	04/09/2019	04/09/2019
Dichlorodifluoromethane	mg/kg	<1	<1	<1	<1	<1
Chloromethane	mg/kg	<1	<1	<1	<1	<1
Vinyl Chloride	mg/kg	<1	<1	<1	<1	<1
Bromomethane	mg/kg	<1	<1	<1	<1	<1
Chloroethane	mg/kg	<1	<1	<1	<1	<1
Trichlorofluoromethane	mg/kg	<1	<1	<1	<1	<1
1,1-Dichloroethene	mg/kg	<1	<1	<1	<1	<1
trans-1,2-dichloroethene	mg/kg	<1	<1	<1	<1	<1
1,1-dichloroethane	mg/kg	<1	<1	<1	<1	<1
cis-1,2-dichloroethene	mg/kg	<1	<1	<1	<1	<1
bromochloromethane	mg/kg	<1	<1	<1	<1	<1
chloroform	mg/kg	<1	<1	<1	<1	<1
2,2-dichloropropane	mg/kg	<1	<1	<1	<1	<1
1,2-dichloroethane	mg/kg	<1	<1	<1	<1	<1
1,1,1-trichloroethane	mg/kg	<1	<1	<1	<1	<1
1,1-dichloropropene	mg/kg	<1	<1	<1	<1	<1
Cyclohexane	mg/kg	<1	<1	<1	<1	<1
carbon tetrachloride	mg/kg	<1	<1	<1	<1	<1
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
dibromomethane	mg/kg	<1	<1	<1	<1	<1
1,2-dichloropropane	mg/kg	<1	<1	<1	<1	<1
trichloroethene	mg/kg	<1	<1	<1	<1	<1
bromodichloromethane	mg/kg	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	mg/kg	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	mg/kg	<1	<1	<1	<1	<1
1,1,2-trichloroethane	mg/kg	<1	<1	<1	<1	<1
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-dichloropropane	mg/kg	<1	<1	<1	<1	<1
dibromochloromethane	mg/kg	<1	<1	<1	<1	<1
1,2-dibromoethane	mg/kg	<1	<1	<1	<1	<1
tetrachloroethene	mg/kg	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	mg/kg	<1	<1	<1	<1	<1
chlorobenzene	mg/kg	<1	<1	<1	<1	<1
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1

VOCs in soil						
Our Reference		225191-1	225191-5	225191-6	225191-7	225191-8
Your Reference	UNITS	BH6a/0.4-0.5	BH7a/0.2-0.3	BH7a/0.85-0.95	BH7a/0.95-1.0	BH7a/1.4-1.5
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
bromoform	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
styrene	mg/kg	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	mg/kg	<1	<1	<1	<1	<1
o-Xylene	mg/kg	<1	<1	<1	<1	<1
1,2,3-trichloropropane	mg/kg	<1	<1	<1	<1	<1
isopropylbenzene	mg/kg	<1	<1	<1	<1	<1
bromobenzene	mg/kg	<1	<1	<1	<1	<1
n-propyl benzene	mg/kg	<1	<1	<1	<1	<1
2-chlorotoluene	mg/kg	<1	<1	<1	<1	<1
4-chlorotoluene	mg/kg	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	mg/kg	<1	<1	<1	<1	<1
tert-butyl benzene	mg/kg	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	mg/kg	<1	<1	<1	<1	<1
1,3-dichlorobenzene	mg/kg	<1	<1	<1	<1	<1
sec-butyl benzene	mg/kg	<1	<1	<1	<1	<1
1,4-dichlorobenzene	mg/kg	<1	<1	<1	<1	<1
4-isopropyl toluene	mg/kg	<1	<1	<1	<1	<1
1,2-dichlorobenzene	mg/kg	<1	<1	<1	<1	<1
n-butyl benzene	mg/kg	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	mg/kg	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	mg/kg	<1	<1	<1	<1	<1
hexachlorobutadiene	mg/kg	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	mg/kg	<1	<1	<1	<1	<1
Surrogate Dibromofluorometha	%	100	102	102	100	102
Surrogate aaa-Trifluorotoluene	%	98	95	99	97	96
Surrogate Toluene-d_8	%	97	97	98	97	102
Surrogate 4-Bromofluorobenzene	%	97	102	103	113	106

VOCs in soil						
Our Reference		225191-9	225191-10	225191-11	225191-12	225191-13
Your Reference	UNITS	BH10a/0.3-04	BH10a/0.9-1.0	BH10a/1.5-1.6	BH10a/2.1-2.2	BH10a/2.9-3.0
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Date analysed	-	04/09/2019	04/09/2019	04/09/2019	04/09/2019	04/09/2019
Dichlorodifluoromethane	mg/kg	<1	<1	<1	<1	<1
Chloromethane	mg/kg	<1	<1	<1	<1	<1
Vinyl Chloride	mg/kg	<1	<1	<1	<1	<1
Bromomethane	mg/kg	<1	<1	<1	<1	<1
Chloroethane	mg/kg	<1	<1	<1	<1	<1
Trichlorofluoromethane	mg/kg	<1	<1	<1	<1	<1
1,1-Dichloroethene	mg/kg	<1	<1	<1	<1	<1
trans-1,2-dichloroethene	mg/kg	<1	<1	<1	<1	<1
1,1-dichloroethane	mg/kg	<1	<1	<1	<1	<1
cis-1,2-dichloroethene	mg/kg	<1	<1	<1	<1	<1
bromochloromethane	mg/kg	<1	<1	<1	<1	<1
chloroform	mg/kg	<1	<1	<1	<1	<1
2,2-dichloropropane	mg/kg	<1	<1	<1	<1	<1
1,2-dichloroethane	mg/kg	<1	<1	<1	<1	<1
1,1,1-trichloroethane	mg/kg	<1	<1	<1	<1	<1
1,1-dichloropropene	mg/kg	<1	<1	<1	<1	<1
Cyclohexane	mg/kg	<1	<1	<1	<1	<1
carbon tetrachloride	mg/kg	<1	<1	<1	<1	<1
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
dibromomethane	mg/kg	<1	<1	<1	<1	<1
1,2-dichloropropane	mg/kg	<1	<1	<1	<1	<1
trichloroethene	mg/kg	<1	<1	<1	<1	<1
bromodichloromethane	mg/kg	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	mg/kg	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	mg/kg	<1	<1	<1	<1	<1
1,1,2-trichloroethane	mg/kg	<1	<1	<1	<1	<1
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-dichloropropane	mg/kg	<1	<1	<1	<1	<1
dibromochloromethane	mg/kg	<1	<1	<1	<1	<1
1,2-dibromoethane	mg/kg	<1	<1	<1	<1	<1
tetrachloroethene	mg/kg	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	mg/kg	<1	<1	<1	<1	<1
chlorobenzene	mg/kg	<1	<1	<1	<1	<1
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1

VOCs in soil						
Our Reference		225191-9	225191-10	225191-11	225191-12	225191-13
Your Reference	UNITS	BH10a/0.3-04	BH10a/0.9-1.0	BH10a/1.5-1.6	BH10a/2.1-2.2	BH10a/2.9-3.0
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
bromoform	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
styrene	mg/kg	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	mg/kg	<1	<1	<1	<1	<1
o-Xylene	mg/kg	<1	<1	<1	<1	<1
1,2,3-trichloropropane	mg/kg	<1	<1	<1	<1	<1
isopropylbenzene	mg/kg	<1	<1	<1	<1	<1
bromobenzene	mg/kg	<1	<1	<1	<1	<1
n-propyl benzene	mg/kg	<1	<1	<1	<1	<1
2-chlorotoluene	mg/kg	<1	<1	<1	<1	<1
4-chlorotoluene	mg/kg	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	mg/kg	<1	<1	<1	<1	<1
tert-butyl benzene	mg/kg	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	mg/kg	<1	<1	<1	<1	<1
1,3-dichlorobenzene	mg/kg	<1	<1	<1	<1	<1
sec-butyl benzene	mg/kg	<1	<1	<1	<1	<1
1,4-dichlorobenzene	mg/kg	<1	<1	<1	<1	<1
4-isopropyl toluene	mg/kg	<1	<1	<1	<1	<1
1,2-dichlorobenzene	mg/kg	<1	<1	<1	<1	<1
n-butyl benzene	mg/kg	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	mg/kg	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	mg/kg	<1	<1	<1	<1	<1
hexachlorobutadiene	mg/kg	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	mg/kg	<1	<1	<1	<1	<1
Surrogate Dibromofluorometha	%	101	97	99	107	100
Surrogate aaa-Trifluorotoluene	%	100	85	99	102	101
Surrogate Toluene-d_8	%	98	95	100	100	98
Surrogate 4-Bromofluorobenzene	%	102	95	100	105	104

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		225191-1	225191-4	225191-5	225191-6	225191-7
Your Reference	UNITS	BH6a/0.4-0.5	BD2/20170827	BH7a/0.2-0.3	BH7a/0.85-0.95	BH7a/0.95-1.0
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Date analysed	-	04/09/2019	04/09/2019	04/09/2019	04/09/2019	04/09/2019
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	98	96	95	99	97

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		225191-8	225191-9	225191-10	225191-11	225191-12
Your Reference	UNITS	BH7a/1.4-1.5	BH10a/0.3-04	BH10a/0.9-1.0	BH10a/1.5-1.6	BH10a/2.1-2.2
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Date analysed	-	04/09/2019	04/09/2019	04/09/2019	04/09/2019	04/09/2019
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	3	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	96	100	85	99	102

vTRH(C6-C10)/BTEXN in Soil				
Our Reference		225191-13	225191-14	225191-15
Your Reference	UNITS	BH10a/2.9-3.0	TS	TB
Date Sampled		27/08/2019	22/08/2019	22/08/2019
Type of sample		SOIL	SOIL	SOIL
Date extracted	-	02/09/2019	02/09/2019	02/09/2019
Date analysed	-	04/09/2019	04/09/2019	04/09/2019
TRH C_6 - C_9	mg/kg	<25	[NA]	<25
TRH C_6 - C_{10}	mg/kg	<25	[NA]	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	[NA]	<25
Benzene	mg/kg	<0.2	100%	<0.2
Toluene	mg/kg	<0.5	99%	<0.5
Ethylbenzene	mg/kg	<1	96%	<1
m+p-xylene	mg/kg	<2	104%	<2
o-Xylene	mg/kg	<1	103%	<1
naphthalene	mg/kg	<1	[NA]	<1
Total +ve Xylenes	mg/kg	<3	[NA]	<3
Surrogate aaa-Trifluorotoluene	%	101	97	97

svTRH (C10-C40) in Soil						
Our Reference		225191-1	225191-4	225191-5	225191-6	225191-7
Your Reference	UNITS	BH6a/0.4-0.5	BD2/20170827	BH7a/0.2-0.3	BH7a/0.85-0.95	BH7a/0.95-1.0
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Date analysed	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	82	87	80	82	86

svTRH (C10-C40) in Soil						
Our Reference		225191-8	225191-9	225191-10	225191-11	225191-12
Your Reference	UNITS	BH7a/1.4-1.5	BH10a/0.3-04	BH10a/0.9-1.0	BH10a/1.5-1.6	BH10a/2.1-2.2
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Date analysed	-	02/09/2019	02/09/2019	02/09/2019	03/09/2019	03/09/2019
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	250	130
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	180	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	380	200
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	380	200
Surrogate o-Terphenyl	%	79	91	88	89	90

svTRH (C10-C40) in Soil		
Our Reference		225191-13
Your Reference	UNITS	BH10a/2.9-3.0
Date Sampled		27/08/2019
Type of sample		SOIL
Date extracted	-	02/09/2019
Date analysed	-	03/09/2019
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	220
TRH C_{29} - C_{36}	mg/kg	160
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	340
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	340
Surrogate o-Terphenyl	%	93

PAHs in Soil						
Our Reference		225191-1	225191-4	225191-5	225191-6	225191-7
Your Reference	UNITS	BH6a/0.4-0.5	BD2/20170827	BH7a/0.2-0.3	BH7a/0.85-0.95	BH7a/0.95-1.0
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Date analysed	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Naphthalene	mg/kg	<0.1	0.9	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.6
Pyrene	mg/kg	<0.1	0.1	<0.1	<0.1	1.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.7
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.9
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	1
Benzo(a)pyrene	mg/kg	<0.05	0.06	0.06	<0.05	0.97
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.4
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.8
Total +ve PAH's	mg/kg	<0.05	1.1	0.06	<0.05	6.9
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	1.3
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	1.3
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	1.3
Surrogate p-Terphenyl-d14	%	115	113	115	112	119

PAHs in Soil						
Our Reference		225191-8	225191-9	225191-10	225191-11	225191-12
Your Reference	UNITS	BH7a/1.4-1.5	BH10a/0.3-04	BH10a/0.9-1.0	BH10a/1.5-1.6	BH10a/2.1-2.2
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Date analysed	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Naphthalene	mg/kg	3.5	<0.1	<0.1	0.9	0.4
Acenaphthylene	mg/kg	0.4	<0.1	<0.1	0.6	0.3
Acenaphthene	mg/kg	0.1	<0.1	<0.1	1.2	0.5
Fluorene	mg/kg	0.2	<0.1	<0.1	0.5	0.3
Phenanthrene	mg/kg	0.7	<0.1	1.0	10	5.5
Anthracene	mg/kg	<0.1	<0.1	0.1	1.6	0.8
Fluoranthene	mg/kg	<0.1	<0.1	1.4	12	6.9
Pyrene	mg/kg	0.1	<0.1	2.8	23	13
Benzo(a)anthracene	mg/kg	<0.1	<0.1	1.1	8.5	4.6
Chrysene	mg/kg	<0.1	<0.1	1.6	11	5.8
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	2	12	6.8
Benzo(a)pyrene	mg/kg	<0.05	<0.05	1.5	12	6.4
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.6	5.1	2.6
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	0.2	1.6	0.8
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	1.2	8.6	4.4
Total +ve PAH's	mg/kg	5.1	<0.05	13	110	59
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	2.1	17	8.6
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	2.1	17	8.6
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	2.1	17	8.6
Surrogate p-Terphenyl-d14	%	115	118	118	121	115

PAHs in Soil		
Our Reference		225191-13
Your Reference	UNITS	BH10a/2.9-3.0
Date Sampled		27/08/2019
Type of sample		SOIL
Date extracted	-	02/09/2019
Date analysed	-	02/09/2019
Naphthalene	mg/kg	0.8
Acenaphthylene	mg/kg	0.5
Acenaphthene	mg/kg	0.6
Fluorene	mg/kg	0.4
Phenanthrene	mg/kg	6.5
Anthracene	mg/kg	1
Fluoranthene	mg/kg	10
Pyrene	mg/kg	19
Benzo(a)anthracene	mg/kg	7.4
Chrysene	mg/kg	9.3
Benzo(b,j+k)fluoranthene	mg/kg	11
Benzo(a)pyrene	mg/kg	10
Indeno(1,2,3-c,d)pyrene	mg/kg	4.3
Dibenzo(a,h)anthracene	mg/kg	1.4
Benzo(g,h,i)perylene	mg/kg	7.1
Total +ve PAH's	mg/kg	90
Benzo(a)pyrene TEQ calc (zero)	mg/kg	14
Benzo(a)pyrene TEQ calc(half)	mg/kg	14
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	14
Surrogate p-Terphenyl-d14	%	118

Misc Soil - Inorg						
Our Reference		225191-1	225191-4	225191-5	225191-6	225191-7
Your Reference	UNITS	BH6a/0.4-0.5	BD2/20170827	BH7a/0.2-0.3	BH7a/0.85-0.95	BH7a/0.95-1.0
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Date analysed	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg						
Our Reference		225191-8	225191-9	225191-10	225191-11	225191-12
Your Reference	UNITS	BH7a/1.4-1.5	BH10a/0.3-04	BH10a/0.9-1.0	BH10a/1.5-1.6	BH10a/2.1-2.2
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Date analysed	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg		
Our Reference		225191-13
Your Reference	UNITS	BH10a/2.9-3.0
Date Sampled		27/08/2019
Type of sample		SOIL
Date prepared	-	02/09/2019
Date analysed	-	02/09/2019
Total Phenolics (as Phenol)	mg/kg	<5

Acid Extractable metals in soil						
Our Reference		225191-1	225191-4	225191-5	225191-6	225191-7
Your Reference	UNITS	BH6a/0.4-0.5	BD2/20170827	BH7a/0.2-0.3	BH7a/0.85-0.95	BH7a/0.95-1.0
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Date analysed	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Arsenic	mg/kg	<4	7	<4	<4	4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	8	9	7	7	8
Copper	mg/kg	15	2	8	8	15
Lead	mg/kg	13	12	11	11	22
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	2	3	2	4
Zinc	mg/kg	25	22	23	12	14

Acid Extractable metals in soil						
Our Reference		225191-8	225191-9	225191-10	225191-11	225191-12
Your Reference	UNITS	BH7a/1.4-1.5	BH10a/0.3-04	BH10a/0.9-1.0	BH10a/1.5-1.6	BH10a/2.1-2.2
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Date analysed	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Arsenic	mg/kg	10	<4	<4	5	11
Cadmium	mg/kg	<0.4	<0.4	<0.4	1	1
Chromium	mg/kg	9	6	9	16	16
Copper	mg/kg	3	6	7	15	16
Lead	mg/kg	5	12	16	50	39
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	3	13	14	12
Zinc	mg/kg	2	21	45	43	86

Acid Extractable metals in soil			
Our Reference		225191-13	225191-16
Your Reference	UNITS	BH10a/2.9-3.0	BH6a/0.4-0.5 - [TRIPLICATE]
Date Sampled		27/08/2019	27/08/2019
Type of sample		SOIL	SOIL
Date prepared	-	02/09/2019	02/09/2019
Date analysed	-	02/09/2019	02/09/2019
Arsenic	mg/kg	10	<4
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	15	7
Copper	mg/kg	20	16
Lead	mg/kg	31	14
Mercury	mg/kg	0.1	<0.1
Nickel	mg/kg	17	4
Zinc	mg/kg	45	25

Moisture						
Our Reference		225191-1	225191-4	225191-5	225191-6	225191-7
Your Reference	UNITS	BH6a/0.4-0.5	BD2/20170827	BH7a/0.2-0.3	BH7a/0.85-0.95	BH7a/0.95-1.0
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Date analysed	-	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019
Moisture	%	3.8	12	7.0	17	17

Moisture						
Our Reference		225191-8	225191-9	225191-10	225191-11	225191-12
Your Reference	UNITS	BH7a/1.4-1.5	BH10a/0.3-04	BH10a/0.9-1.0	BH10a/1.5-1.6	BH10a/2.1-2.2
Date Sampled		27/08/2019	27/08/2019	27/08/2019	27/08/2019	27/08/2019
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Date analysed	-	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019
Moisture	%	11	4.6	8.8	15	16

Moisture		
Our Reference		225191-13
Your Reference	UNITS	BH10a/2.9-3.0
Date Sampled		27/08/2019
Type of sample		SOIL
Date prepared	-	02/09/2019
Date analysed	-	03/09/2019
Moisture	%	16

Misc Inorg - Soil				
Our Reference		225191-1	225191-6	225191-9
Your Reference	UNITS	BH6a/0.4-0.5	BH7a/0.85-0.95	BH10a/0.3-04
Date Sampled		27/08/2019	27/08/2019	27/08/2019
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	04/09/2019	04/09/2019	04/09/2019
Date analysed	-	04/09/2019	04/09/2019	04/09/2019
pH 1:5 soil:water	pH Units	8.8	8.9	7.6

CEC				
Our Reference		225191-1	225191-6	225191-9
Your Reference	UNITS	BH6a/0.4-0.5	BH7a/0.85-0.95	BH10a/0.3-04
Date Sampled		27/08/2019	27/08/2019	27/08/2019
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	04/09/2019	04/09/2019	04/09/2019
Date analysed	-	04/09/2019	04/09/2019	04/09/2019
Exchangeable Ca	meq/100g	6.4	2.4	2.2
Exchangeable K	meq/100g	<0.1	0.2	0.1
Exchangeable Mg	meq/100g	1.4	1.5	1.6
Exchangeable Na	meq/100g	<0.1	0.62	<0.1
Cation Exchange Capacity	meq/100g	8.0	4.7	3.8

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-009	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: VOCs in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	225191-5
Date extracted	-			02/09/2019	1	02/09/2019	02/09/2019		02/09/2019	02/09/2019
Date analysed	-			04/09/2019	1	04/09/2019	04/09/2019		04/09/2019	04/09/2019
Dichlorodifluoromethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Chloromethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Vinyl Chloride	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Bromomethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Chloroethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Trichlorofluoromethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,1-Dichloroethene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
trans-1,2-dichloroethene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,1-dichloroethane	mg/kg	1	Org-014	<1	1	<1	<1	0	103	110
cis-1,2-dichloroethene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
bromochloromethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
chloroform	mg/kg	1	Org-014	<1	1	<1	<1	0	100	98
2,2-dichloropropane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloroethane	mg/kg	1	Org-014	<1	1	<1	<1	0	91	93
1,1,1-trichloroethane	mg/kg	1	Org-014	<1	1	<1	<1	0	106	107
1,1-dichloropropene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Cyclohexane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
carbon tetrachloride	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-014	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
dibromomethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichloropropane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
trichloroethene	mg/kg	1	Org-014	<1	1	<1	<1	0	112	113
bromodichloromethane	mg/kg	1	Org-014	<1	1	<1	<1	0	110	112
trans-1,3-dichloropropene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
cis-1,3-dichloropropene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,1,2-trichloroethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-014	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,3-dichloropropane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
dibromochloromethane	mg/kg	1	Org-014	<1	1	<1	<1	0	102	100
1,2-dibromoethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
tetrachloroethene	mg/kg	1	Org-014	<1	1	<1	<1	0	103	100
1,1,1,2-tetrachloroethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
chlorobenzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
bromoform	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-014	<2	1	<2	<2	0	[NT]	[NT]
styrene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,1,2,2-tetrachloroethane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]

QUALITY CONTROL: VOCs in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	225191-5
o-Xylene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichloropropane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
isopropylbenzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
bromobenzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
n-propyl benzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
2-chlorotoluene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
4-chlorotoluene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,3,5-trimethyl benzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
tert-butyl benzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trimethyl benzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,3-dichlorobenzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
sec-butyl benzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,4-dichlorobenzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
4-isopropyl toluene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,2-dichlorobenzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
n-butyl benzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,2-dibromo-3-chloropropane	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,2,4-trichlorobenzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
hexachlorobutadiene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
1,2,3-trichlorobenzene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluorometha	%		Org-014	102	1	100	103	3	98	103
Surrogate aaa-Trifluorotoluene	%		Org-014	104	1	98	100	2	109	105
Surrogate Toluene-d_8	%		Org-014	97	1	97	97	0	101	101
Surrogate 4-Bromofluorobenzene	%		Org-014	104	1	97	100	3	99	101

QUALITY CONTROL: VOCs in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	12	02/09/2019	02/09/2019		[NT]	[NT]
Date analysed	-			[NT]	12	04/09/2019	04/09/2019		[NT]	[NT]
Dichlorodifluoromethane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
Chloromethane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
Vinyl Chloride	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
Bromomethane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
Chloroethane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
Trichlorofluoromethane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,1-Dichloroethene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
trans-1,2-dichloroethene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,1-dichloroethane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
cis-1,2-dichloroethene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
bromochloromethane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
chloroform	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
2,2-dichloropropane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,2-dichloroethane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,1,1-trichloroethane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,1-dichloropropene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
Cyclohexane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
carbon tetrachloride	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-014	[NT]	12	<0.2	<0.2	0	[NT]	[NT]
dibromomethane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,2-dichloropropane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
trichloroethene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
bromodichloromethane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
trans-1,3-dichloropropene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
cis-1,3-dichloropropene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,1,2-trichloroethane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-014	[NT]	12	<0.5	<0.5	0	[NT]	[NT]
1,3-dichloropropane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
dibromochloromethane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,2-dibromoethane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
tetrachloroethene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,1,1,2-tetrachloroethane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
chlorobenzene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
bromoform	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-014	[NT]	12	<2	<2	0	[NT]	[NT]
styrene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,1,2,2-tetrachloroethane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]

QUALITY CONTROL: VOCs in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
o-Xylene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,2,3-trichloropropane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
isopropylbenzene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
bromobenzene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
n-propyl benzene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
2-chlorotoluene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
4-chlorotoluene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,3,5-trimethyl benzene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
tert-butyl benzene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,2,4-trimethyl benzene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,3-dichlorobenzene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
sec-butyl benzene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,4-dichlorobenzene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
4-isopropyl toluene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,2-dichlorobenzene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
n-butyl benzene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,2-dibromo-3-chloropropane	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,2,4-trichlorobenzene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
hexachlorobutadiene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
1,2,3-trichlorobenzene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluorometha	%		Org-014	[NT]	12	107	108	1	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-014	[NT]	12	102	100	2	[NT]	[NT]
Surrogate Toluene-d_8	%		Org-014	[NT]	12	100	98	2	[NT]	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-014	[NT]	12	105	99	6	[NT]	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	225191-5
Date extracted	-			02/09/2019	1	02/09/2019	02/09/2019		02/09/2019	02/09/2019
Date analysed	-			04/09/2019	1	04/09/2019	04/09/2019		04/09/2019	04/09/2019
TRH C_6 - C_9	mg/kg	25	Org-016	<25	1	<25	<25	0	103	104
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	1	<25	<25	0	103	104
Benzene	mg/kg	0.2	Org-016	<0.2	1	<0.2	<0.2	0	108	108
Toluene	mg/kg	0.5	Org-016	<0.5	1	<0.5	<0.5	0	108	106
Ethylbenzene	mg/kg	1	Org-016	<1	1	<1	<1	0	103	105
m+p-xylene	mg/kg	2	Org-016	<2	1	<2	<2	0	98	100
o-Xylene	mg/kg	1	Org-016	<1	1	<1	<1	0	98	101
naphthalene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	104	1	98	100	2	109	105

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	12	02/09/2019	02/09/2019		[NT]	[NT]
Date analysed	-			[NT]	12	04/09/2019	04/09/2019		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	[NT]	12	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	[NT]	12	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-016	[NT]	12	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-016	[NT]	12	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-016	[NT]	12	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-016	[NT]	12	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-016	[NT]	12	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	12	102	100	2	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	225191-5
Date extracted	-			02/09/2019	1	02/09/2019	02/09/2019		02/09/2019	02/09/2019
Date analysed	-			02/09/2019	1	02/09/2019	02/09/2019		02/09/2019	02/09/2019
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	1	<50	<50	0	89	89
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	1	<100	<100	0	89	85
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	1	<100	<100	0	77	87
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	1	<50	<50	0	89	89
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	1	<100	<100	0	89	85
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	1	<100	<100	0	77	87
Surrogate o-Terphenyl	%		Org-003	84	1	82	81	1	96	95

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	12	02/09/2019	02/09/2019		[NT]	[NT]
Date analysed	-			[NT]	12	03/09/2019	03/09/2019		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	[NT]	12	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	[NT]	12	130	160	21	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	[NT]	12	<100	120	18	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	[NT]	12	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	[NT]	12	200	250	22	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	[NT]	12	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-003	[NT]	12	90	89	1	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	225191-5
Date extracted	-			02/09/2019	1	02/09/2019	02/09/2019		02/09/2019	02/09/2019
Date analysed	-			02/09/2019	1	02/09/2019	02/09/2019		02/09/2019	02/09/2019
Naphthalene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	114	112
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	118	120
Phenanthrene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	118	116
Anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	120	116
Pyrene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	120	114
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	126	120
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	1	<0.05	<0.05	0	128	116
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	120	1	115	115	0	117	115

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	12	02/09/2019	02/09/2019		[NT]	[NT]
Date analysed	-			[NT]	12	02/09/2019	02/09/2019		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012	[NT]	12	0.4	0.6	40	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	[NT]	12	0.3	0.3	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	[NT]	12	0.5	0.6	18	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	[NT]	12	0.3	0.4	29	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012	[NT]	12	5.5	7.2	27	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012	[NT]	12	0.8	1	22	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	[NT]	12	6.9	8.1	16	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012	[NT]	12	13	16	21	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	[NT]	12	4.6	5.8	23	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	[NT]	12	5.8	7.4	24	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	[NT]	12	6.8	8.6	23	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	[NT]	12	6.4	8.2	25	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	[NT]	12	2.6	3.4	27	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	[NT]	12	0.8	1.1	32	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	[NT]	12	4.4	5.7	26	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	[NT]	12	115	117	2	[NT]	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	225191-5
Date prepared	-			02/09/2019	1	02/09/2019	02/09/2019		02/09/2019	02/09/2019
Date analysed	-			02/09/2019	1	02/09/2019	02/09/2019		02/09/2019	02/09/2019
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	1	<5	<5	0	104	105

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	12	02/09/2019	02/09/2019		[NT]	[NT]
Date analysed	-			[NT]	12	02/09/2019	02/09/2019		[NT]	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	[NT]	12	<5	<5	0	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	225191-5
Date prepared	-			02/09/2019	1	02/09/2019	02/09/2019		02/09/2019	02/09/2019
Date analysed	-			02/09/2019	1	02/09/2019	02/09/2019		02/09/2019	02/09/2019
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	104	94
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	102	91
Chromium	mg/kg	1	Metals-020	<1	1	8	6	29	110	93
Copper	mg/kg	1	Metals-020	<1	1	15	9	50	103	101
Lead	mg/kg	1	Metals-020	<1	1	13	11	17	110	95
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	88	95
Nickel	mg/kg	1	Metals-020	<1	1	5	3	50	103	94
Zinc	mg/kg	1	Metals-020	<1	1	25	17	38	106	97

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	12	02/09/2019	02/09/2019		[NT]	[NT]
Date analysed	-			[NT]	12	02/09/2019	02/09/2019		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	12	11	10	10	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	12	1	2	67	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	12	16	15	6	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	12	16	21	27	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	12	39	40	3	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	12	12	12	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	12	86	90	5	[NT]	[NT]

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	[NT]
Date prepared	-			04/09/2019	[NT]	[NT]	[NT]	[NT]	04/09/2019	[NT]
Date analysed	-			04/09/2019	[NT]	[NT]	[NT]	[NT]	04/09/2019	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-9	[NT]
Date prepared	-			04/09/2019	1	04/09/2019	04/09/2019		04/09/2019	[NT]
Date analysed	-			04/09/2019	1	04/09/2019	04/09/2019		04/09/2019	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-009	<0.1	1	6.4	7.4	14	108	[NT]
Exchangeable K	meq/100g	0.1	Metals-009	<0.1	1	<0.1	<0.1	0	105	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-009	<0.1	1	1.4	1.4	0	107	[NT]
Exchangeable Na	meq/100g	0.1	Metals-009	<0.1	1	<0.1	<0.1	0	102	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Report Comments

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 225191-1 for Cu. Therefore a triplicate result has been issued as laboratory sample number 225191-16.

Douglas Partners
Geotechnics I Environment I Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	868694.03	**Suburb:**	Silverwater	**To:**	Envirolab Services
Project Name:	Wilson Park	**Order Number**			12 Ashley Street, Chatswood
Project Manager:	Paul Gorman	**Sampler:**	CL	**Attn:**	Aileen
Emails:	paul.gorman/celine.li@douglaspartners.com.au			**Phone:**	612 9910 6200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☑ 72 hours ☐ Standard ☐			**Email:**	ahie@envirolab.com.au
Prior Storage:	☐ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: VOC	Combo4	pH &CEC	TRH & BTEX						Notes/preservation
BH6a/0.4-0.5	1	27/08/19	SOIL	G	X	X	X							
BH6a/1.0-1.1	2	27/08/19	SOIL	G										
BH6a/1.4-1.5	3	27/08/19	SOIL	G										
BD2/20170827	4	27/08/19	SOIL	G		X								intra lab
BH7a/0.2-0.3	5	27/08/19	SOIL	G	X	X								
BH7a/0.85-0.95	6	27/08/19	SOIL	G	X	X	X							
BH7a/0.95-1.0	7	27/08/19	SOIL	G	X	X								
BH7a/1.4-1.5	8	27/08/19	SOIL	G	X	X								
BD1/20190827		27/08/19	SOIL	G		X								inter lab
BH8/0.3-0.4	9	27/08/19	SOIL	G	X	X	X							
BH8/0.9-1.0	10	27/08/19	SOIL	G	X	X								
BH8/1.5-1.6	11	27/08/19	SOIL	G	X	X								
BH8/2.1-2.2	12	27/08/19	SOIL	G	X	X								
BH8/2.9-3.0	13	27/08/19	SOIL	G	X	X								
TS1 TB	14,15	22/8/19	Soil	G				X						
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐

ENVIROLAB — Envirolab Services, 12 Ashley St, Chatswood NSW 2067, Ph: (02) 9910 6200
Job No: 225191
Date Received: 02/09/19
Time Received: 1204
Received by: KG 12.9
Temp: (Cool/Ambient)
Cooling: (Ice/Icepack)
Security: (Intact/Broken/None)

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: **Relinquished by:** **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd **Address** **Phone:** **Fax:**

Signed: 2/9/19 **Received by:** K. Gore ERS **Date & Time:** 02/9/19. 12:04

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd
Attention	Paul Gorman

Sample Login Details

Your reference	868694.03, Silverwater
Envirolab Reference	225191
Date Sample Received	02/09/2019
Date Instructions Received	02/09/2019
Date Results Expected to be Reported	04/09/2019

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	15 SOIL
Turnaround Time Requested	2 days
Temperature on Receipt (°C)	12.9
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	VOCs in soil	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Misc Soil - Inorg	Acid Extractable metalsin soil	Misc Inorg - Soil	CEC	On Hold
BH6a/0.4-0.5	✓	✓	✓	✓	✓	✓	✓	✓	
BH6a/1.0-1.1									✓
BH6a/1.4-1.5									✓
BD2/20170827		✓	✓	✓	✓	✓			
BH7a/0.2-0.3	✓	✓	✓	✓	✓	✓			
BH7a/0.85-0.95	✓	✓	✓	✓	✓	✓	✓	✓	
BH7a/0.95-1.0	✓	✓	✓	✓	✓	✓			
BH7a/1.4-1.5	✓	✓	✓	✓	✓	✓			
BH8/0.3-04	✓	✓	✓	✓	✓	✓	✓	✓	
BH8/0.9-1.0	✓	✓	✓	✓	✓	✓			
BH8/1.5-1.6	✓	✓	✓	✓	✓	✓			
BH8/2.1-2.2	✓	✓	✓	✓	✓	✓			
BH8/2.9-3.0	✓	✓	✓	✓	✓	✓			
TS		✓							
TB		✓							

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 225191-A

Client Details

Client	Douglas Partners Pty Ltd
Attention	Celine Li
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**868694.03, Silverwater**
Number of Samples	15 SOIL
Date samples received	02/09/2019
Date completed instructions received	05/09/2019

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	06/09/2019
Date of Issue	06/09/2019

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Josh Williams, Chemist
Loren Bardwell, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

VOCs in soil			
Our Reference		225191-A-2	225191-A-3
Your Reference	UNITS	BH6a/1.0-1.1	BH6a/1.4-1.5
Date Sampled		27/08/2019	27/08/2019
Type of sample		SOIL	SOIL
Date extracted	-	05/09/2019	05/09/2019
Date analysed	-	06/09/2019	06/09/2019
Dichlorodifluoromethane	mg/kg	<1	<1
Chloromethane	mg/kg	<1	<1
Vinyl Chloride	mg/kg	<1	<1
Bromomethane	mg/kg	<1	<1
Chloroethane	mg/kg	<1	<1
Trichlorofluoromethane	mg/kg	<1	<1
1,1-Dichloroethene	mg/kg	<1	<1
trans-1,2-dichloroethene	mg/kg	<1	<1
1,1-dichloroethane	mg/kg	<1	<1
cis-1,2-dichloroethene	mg/kg	<1	<1
bromochloromethane	mg/kg	<1	<1
chloroform	mg/kg	<1	<1
2,2-dichloropropane	mg/kg	<1	<1
1,2-dichloroethane	mg/kg	<1	<1
1,1,1-trichloroethane	mg/kg	<1	<1
1,1-dichloropropene	mg/kg	<1	<1
Cyclohexane	mg/kg	<1	<1
carbon tetrachloride	mg/kg	<1	<1
Benzene	mg/kg	<0.2	<0.2
dibromomethane	mg/kg	<1	<1
1,2-dichloropropane	mg/kg	<1	<1
trichloroethene	mg/kg	<1	<1
bromodichloromethane	mg/kg	<1	<1
trans-1,3-dichloropropene	mg/kg	<1	<1
cis-1,3-dichloropropene	mg/kg	<1	<1
1,1,2-trichloroethane	mg/kg	<1	<1
Toluene	mg/kg	<0.5	<0.5
1,3-dichloropropane	mg/kg	<1	<1
dibromochloromethane	mg/kg	<1	<1
1,2-dibromoethane	mg/kg	<1	<1
tetrachloroethene	mg/kg	<1	<1
1,1,1,2-tetrachloroethane	mg/kg	<1	<1
chlorobenzene	mg/kg	<1	<1
Ethylbenzene	mg/kg	<1	<1

VOCs in soil			
Our Reference		225191-A-2	225191-A-3
Your Reference	UNITS	BH6a/1.0-1.1	BH6a/1.4-1.5
Date Sampled		27/08/2019	27/08/2019
Type of sample		SOIL	SOIL
bromoform	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
styrene	mg/kg	<1	<1
1,1,2,2-tetrachloroethane	mg/kg	<1	<1
o-Xylene	mg/kg	<1	<1
1,2,3-trichloropropane	mg/kg	<1	<1
isopropylbenzene	mg/kg	<1	<1
bromobenzene	mg/kg	<1	<1
n-propyl benzene	mg/kg	<1	<1
2-chlorotoluene	mg/kg	<1	<1
4-chlorotoluene	mg/kg	<1	<1
1,3,5-trimethyl benzene	mg/kg	<1	<1
tert-butyl benzene	mg/kg	<1	<1
1,2,4-trimethyl benzene	mg/kg	<1	<1
1,3-dichlorobenzene	mg/kg	<1	<1
sec-butyl benzene	mg/kg	<1	<1
1,4-dichlorobenzene	mg/kg	<1	<1
4-isopropyl toluene	mg/kg	<1	<1
1,2-dichlorobenzene	mg/kg	<1	<1
n-butyl benzene	mg/kg	<1	<1
1,2-dibromo-3-chloropropane	mg/kg	<1	<1
1,2,4-trichlorobenzene	mg/kg	<1	<1
hexachlorobutadiene	mg/kg	<1	<1
1,2,3-trichlorobenzene	mg/kg	<1	<1
Surrogate Dibromofluorometha	%	97	99
Surrogate aaa-Trifluorotoluene	%	79	84
Surrogate Toluene-d_8	%	98	107
Surrogate 4-Bromofluorobenzene	%	103	103

vTRH(C6-C10)/BTEXN in Soil			
Our Reference		225191-A-2	225191-A-3
Your Reference	UNITS	BH6a/1.0-1.1	BH6a/1.4-1.5
Date Sampled		27/08/2019	27/08/2019
Type of sample		SOIL	SOIL
Date extracted	-	05/09/2019	05/09/2019
Date analysed	-	06/09/2019	06/09/2019
TRH C_6 - C_9	mg/kg	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
naphthalene	mg/kg	1	1
Total +ve Xylenes	mg/kg	<3	<3
Surrogate aaa-Trifluorotoluene	%	79	84

svTRH (C10-C40) in Soil			
Our Reference		225191-A-2	225191-A-3
Your Reference	UNITS	BH6a/1.0-1.1	BH6a/1.4-1.5
Date Sampled		27/08/2019	27/08/2019
Type of sample		SOIL	SOIL
Date extracted	-	05/09/2019	05/09/2019
Date analysed	-	06/09/2019	06/09/2019
TRH C_{10} - C_{14}	mg/kg	180	<50
TRH C_{15} - C_{28}	mg/kg	6,100	<100
TRH C_{29} - C_{36}	mg/kg	4,300	<100
TRH >C_{10} -C_{16}	mg/kg	470	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	470	<50
TRH >C_{16} -C_{34}	mg/kg	8,900	<100
TRH >C_{34} -C_{40}	mg/kg	2,300	<100
Total +ve TRH (>C10-C40)	mg/kg	12,000	<50
Surrogate o-Terphenyl	%	#	83

PAHs in Soil			
Our Reference		225191-A-2	225191-A-3
Your Reference	UNITS	BH6a/1.0-1.1	BH6a/1.4-1.5
Date Sampled		27/08/2019	27/08/2019
Type of sample		SOIL	SOIL
Date extracted	-	05/09/2019	05/09/2019
Date analysed	-	05/09/2019	05/09/2019
Naphthalene	mg/kg	12	1.4
Acenaphthylene	mg/kg	21	<0.1
Acenaphthene	mg/kg	6.4	<0.1
Fluorene	mg/kg	9.5	<0.1
Phenanthrene	mg/kg	120	<0.1
Anthracene	mg/kg	19	<0.1
Fluoranthene	mg/kg	150	<0.1
Pyrene	mg/kg	410	<0.1
Benzo(a)anthracene	mg/kg	77	<0.1
Chrysene	mg/kg	120	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	120	<0.2
Benzo(a)pyrene	mg/kg	99	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	53	<0.1
Dibenzo(a,h)anthracene	mg/kg	12	<0.1
Benzo(g,h,i)perylene	mg/kg	86	<0.1
Total +ve PAH's	mg/kg	1,300	1.4
Benzo(a)pyrene TEQ calc (zero)	mg/kg	140	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	140	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	140	<0.5
Surrogate p-Terphenyl-d14	%	98	101

Acid Extractable metals in soil			
Our Reference		225191-A-2	225191-A-3
Your Reference	UNITS	BH6a/1.0-1.1	BH6a/1.4-1.5
Date Sampled		27/08/2019	27/08/2019
Type of sample		SOIL	SOIL
Date prepared	-	06/09/2019	06/09/2019
Date analysed	-	06/09/2019	06/09/2019
Arsenic	mg/kg	4	<4
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	32	8
Copper	mg/kg	55	1
Lead	mg/kg	180	6
Mercury	mg/kg	0.3	<0.1
Nickel	mg/kg	150	4
Zinc	mg/kg	190	4

Misc Soil - Inorg			
Our Reference		225191-A-2	225191-A-3
Your Reference	UNITS	BH6a/1.0-1.1	BH6a/1.4-1.5
Date Sampled		27/08/2019	27/08/2019
Type of sample		SOIL	SOIL
Date prepared	-	06/09/2019	06/09/2019
Date analysed	-	06/09/2019	06/09/2019
Total Phenolics (as Phenol)	mg/kg	<5	<5

Moisture			
Our Reference		225191-A-2	225191-A-3
Your Reference	UNITS	BH6a/1.0-1.1	BH6a/1.4-1.5
Date Sampled		27/08/2019	27/08/2019
Type of sample		SOIL	SOIL
Date prepared	-	05/09/2019	05/09/2019
Date analysed	-	06/09/2019	06/09/2019
Moisture	%	14	8.4

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: VOCs in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	[NT]
Date extracted	-			05/09/2019	2	05/09/2019	06/09/2019		05/09/2019	[NT]
Date analysed	-			06/09/2019	2	06/09/2019	06/09/2019		06/09/2019	[NT]
Dichlorodifluoromethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Chloromethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Vinyl Chloride	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Bromomethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Chloroethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Trichlorofluoromethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,1-Dichloroethene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
trans-1,2-dichloroethene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,1-dichloroethane	mg/kg	1	Org-014	<1	2	<1	<1	0	99	[NT]
cis-1,2-dichloroethene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
bromochloromethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
chloroform	mg/kg	1	Org-014	<1	2	<1	<1	0	96	[NT]
2,2-dichloropropane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,2-dichloroethane	mg/kg	1	Org-014	<1	2	<1	<1	0	92	[NT]
1,1,1-trichloroethane	mg/kg	1	Org-014	<1	2	<1	<1	0	100	[NT]
1,1-dichloropropene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Cyclohexane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
carbon tetrachloride	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-014	<0.2	2	<0.2	<0.2	0	[NT]	[NT]
dibromomethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,2-dichloropropane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
trichloroethene	mg/kg	1	Org-014	<1	2	<1	<1	0	101	[NT]
bromodichloromethane	mg/kg	1	Org-014	<1	2	<1	<1	0	99	[NT]
trans-1,3-dichloropropene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
cis-1,3-dichloropropene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,1,2-trichloroethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-014	<0.5	2	<0.5	<0.5	0	[NT]	[NT]
1,3-dichloropropane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
dibromochloromethane	mg/kg	1	Org-014	<1	2	<1	<1	0	97	[NT]
1,2-dibromoethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
tetrachloroethene	mg/kg	1	Org-014	<1	2	<1	<1	0	97	[NT]
1,1,1,2-tetrachloroethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
chlorobenzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
bromoform	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-014	<2	2	<2	<2	0	[NT]	[NT]
styrene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,1,2,2-tetrachloroethane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]

QUALITY CONTROL: VOCs in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	[NT]
o-Xylene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,2,3-trichloropropane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
isopropylbenzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
bromobenzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
n-propyl benzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
2-chlorotoluene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
4-chlorotoluene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,3,5-trimethyl benzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
tert-butyl benzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,2,4-trimethyl benzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,3-dichlorobenzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
sec-butyl benzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,4-dichlorobenzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
4-isopropyl toluene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,2-dichlorobenzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
n-butyl benzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,2-dibromo-3-chloropropane	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,2,4-trichlorobenzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
hexachlorobutadiene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
1,2,3-trichlorobenzene	mg/kg	1	Org-014	<1	2	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluorometha	%		Org-014	102	2	97	97	0	103	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-014	97	2	79	87	10	97	[NT]
Surrogate Toluene-d_8	%		Org-014	98	2	98	99	1	100	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-014	101	2	103	104	1	109	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	[NT]
Date extracted	-			05/09/2019	2	05/09/2019	05/09/2019		05/09/2019	[NT]
Date analysed	-			06/09/2019	2	06/09/2019	06/09/2019		06/09/2019	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	<25	2	<25	<25	0	105	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	2	<25	<25	0	105	[NT]
Benzene	mg/kg	0.2	Org-016	<0.2	2	<0.2	<0.2	0	102	[NT]
Toluene	mg/kg	0.5	Org-016	<0.5	2	<0.5	<0.5	0	102	[NT]
Ethylbenzene	mg/kg	1	Org-016	<1	2	<1	<1	0	109	[NT]
m+p-xylene	mg/kg	2	Org-016	<2	2	<2	<2	0	105	[NT]
o-Xylene	mg/kg	1	Org-016	<1	2	<1	<1	0	105	[NT]
naphthalene	mg/kg	1	Org-014	<1	2	1	1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	95	2	79	87	10	97	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	[NT]
Date extracted	-			05/09/2019	[NT]	[NT]	[NT]	[NT]	05/09/2019	[NT]
Date analysed	-			05/09/2019	[NT]	[NT]	[NT]	[NT]	05/09/2019	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	96	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	88	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	108	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	96	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	88	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	108	[NT]
Surrogate o-Terphenyl	%		Org-003	85	[NT]	[NT]	[NT]	[NT]	94	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	[NT]
Date extracted	-			05/09/2019	[NT]	[NT]	[NT]	[NT]	05/09/2019	[NT]
Date analysed	-			05/09/2019	[NT]	[NT]	[NT]	[NT]	05/09/2019	[NT]
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]	[NT]	[NT]	[NT]	94	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	102	[NT]	[NT]	[NT]	[NT]	99	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	[NT]
Date prepared	-			06/09/2019	[NT]	[NT]	[NT]	[NT]	06/09/2019	[NT]
Date analysed	-			06/09/2019	[NT]	[NT]	[NT]	[NT]	06/09/2019	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	102	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	98	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: Misc Soil - Inorg						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-13	[NT]
Date prepared	-			06/09/2019	[NT]	[NT]	[NT]	[NT]	06/09/2019	[NT]
Date analysed	-			06/09/2019	[NT]	[NT]	[NT]	[NT]	06/09/2019	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	[NT]	[NT]	[NT]	[NT]	104	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Report Comments

PAHs in Soil - The PQL for sample/s 225191-a-2 has been raised due to the high concentration of analytes in the sample/s, resulting in the sample/s requiring a dilution.
TRH Soil C10-C40 NEPM - # Percent recovery for the surrogate/matrix spike is not possible to report as the high concentration of analytes in sample 225191-A-2 have caused interference.

Jessica Hie

From: Celine Li <Celine.Li@douglaspartners.com.au>
Sent: Thursday, 5 September 2019 12:02 PM
To: Nancy Zhang
Cc: Samplereceipt
Subject: RE: Results for Registration 225191 868694.03, Silverwater

225191-A
Due: 6/9/19
1 day TAT

Hi Nancy,

Could we please schedule two additional testing on samples BH6a/1.0-1.1 (2) and BH6a/1.4-1.5 (3) for Combo4 and VOC on fastest turnaround time please?

Regards,

Celine Li | Environmental Engineer/Scientist
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685
P: 02 9809 0666 | F: 02 9809 4095 | M: 0428 199 646 | E: Celine.Li@douglaspartners.com.au

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This email is confidential. If you are not the intended recipient, please notify us immediately and be aware that any disclosure, copying, distribution or use of the contents of this information is prohibited. Please note that this company does not make any commitment if used email, not confirmed by fax or letter.

From: Nancy Zhang [mailto:NZhang@envirolab.com.au]
Sent: Wednesday, 4 September 2019 3:33 PM
To: Paul Gorman; Celine Li
Subject: Results for Registration 225191 868694.03, Silverwater

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the COC/paperwork received from you
ESDAT Extracts
an Excel or .csv file containing the results
Please note that a hard copy will not be posted.

Enquiries should be made directly to:
customerservice@envirolab.com.au

Regards,

Nancy Zhang | Laboratory Manager, Sydney | Envirolab Services Pty Ltd

Great Science, Great Service.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 224884

Client Details

Client	Douglas Partners Pty Ltd
Attention	Kurt Plambeck
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**86694.03 Wilson Park, Silverwater**
Number of Samples	1xCanister, 2xCT
Date samples received	28/08/2019
Date completed instructions received	28/08/2019

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	04/09/2019
Date of Issue	02/09/2019
Reissue Details	This report replaces R00 created on 30/08/2019 due to: revised report with additional results - ug/m3 for IPA
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***	

Results Approved By
Chris Guo, Senior Chemist, Air
Jeremy Faircloth, Operations Manager, Sydney

Authorised By

Nancy Zhang, Laboratory Manager

TO15 in Canisters/Bags		
Our Reference		224884-1
Your Reference	UNITS	SV3
Type of sample		Air, canister
Air Kit Security No.		2259
Date Sampled		27/08/2019
Vacuum before Shipment	Hg"	-30
Vacuum before Analysis	Hg"	-5
Date prepared	-	28/08/2019
Date analysed	-	30/08/2019
Propylene	ppbv	12
Dichlorodifluoromethane	ppbv	<5
Chloromethane	ppbv	<5
1,2-Dichlorotetrafluoroethane	ppbv	<5
Vinyl chloride	ppbv	<5
1,3-Butadiene	ppbv	<5
Bromomethane	ppbv	<5
Chloroethane	ppbv	<5
Ethanol	ppbv	<50
Acrolein	ppbv	<50
Trichlorofluoromethane (Freon 11)	ppbv	<5
Acetone	ppbv	<50
Isopropyl Alcohol	ppbv	10,000
1,1-Dichloroethene	ppbv	<5
1,1,2-Trichlorotrifluoroethane	ppbv	<5
Methylene chloride (Dichloromethane)	ppbv	<50
Carbon Disulfide	ppbv	<50
trans-1,2-dichloroethene	ppbv	<5
MTBE	ppbv	<5
1,1- Dichloroethane	ppbv	<5
Vinyl Acetate	ppbv	<5
MEK	ppbv	<50
Hexane	ppbv	<5
cis-1,2-Dichloroethene	ppbv	<5
Ethyl Acetate	ppbv	<5
Chloroform	ppbv	<5
Tetrahydrofuran	ppbv	<5
1,1,1-Trichloroethane	ppbv	<5
1,2-Dichloroethane	ppbv	<5
Benzene	ppbv	<5
Carbon tetrachloride	ppbv	<5

TO15 in Canisters/Bags		
Our Reference		224884-1
Your Reference	UNITS	SV3
Type of sample		Air, canister
Air Kit Security No.		2259
Date Sampled		27/08/2019
Cyclohexane	ppbv	<5
Heptane	ppbv	<5
Trichloroethene	ppbv	<5
1,2-Dichloropropane	ppbv	<5
1,4-Dioxane	ppbv	<5
Bromodichloromethane	ppbv	<5
Methyl Methacrylate	ppbv	<5
MIBK	ppbv	<50
cis-1,3-Dichloropropene	ppbv	<5
trans-1,3-Dichloropropene	ppbv	<5
Toluene	ppbv	<5
1,1,2-Trichloroethane	ppbv	<5
Methyl Butyl Ketone	ppbv	<5
Dibromochloromethane	ppbv	<5
Tetrachloroethene	ppbv	<5
1,2-Dibromoethane	ppbv	<5
Chlorobenzene	ppbv	<5
Ethylbenzene	ppbv	<5
m-& p-Xylene	ppbv	<10
Styrene	ppbv	<5
o-Xylene	ppbv	<5
Bromoform	ppbv	<5
1,1,2,2-Tetrachloroethane	ppbv	<5
4-ethyl toluene	ppbv	<5
1,3,5-Trimethylbenzene	ppbv	<5
1,2,4-Trimethylbenzene	ppbv	<5
1,3-Dichlorobenzene	ppbv	<5
Benzyl chloride	ppbv	<5
1,4-Dichlorobenzene	ppbv	<5
1,2-Dichlorobenzene	ppbv	<5
1,2,4-Trichlorobenzene	ppbv	<5
Naphthalene	ppbv	<5
Hexachloro- 1,3-butadiene	ppbv	<5
Surrogate-Bromochloromethane	% rec	95
Surrogate -1,4-Difluorobenzene	% rec	90
Surrogate-Chlorobenzene-D5	% rec	92

TO15 in Canisters ug/m3		
Our Reference		224884-1
Your Reference	UNITS	SV3
Type of sample		Air, canister
Air Kit Security No.		2259
Date Sampled		27/08/2019
Vacuum before Shipment	Hg"	-30
Vacuum before Analysis	Hg"	-5
Date prepared	-	28/08/2019
Date analysed	-	30/08/2019
Propylene	µg/m³	21
Dichlorodifluoromethane	µg/m³	<25
Chloromethane	µg/m³	<10
1,2-Dichlorotetrafluoroethane	µg/m³	<25
Vinyl chloride	µg/m³	<13
1,3-Butadiene	µg/m³	<11
Bromomethane	µg/m³	<19
Chloroethane	µg/m³	<13
Ethanol	µg/m³	<94
Acrolein	µg/m³	<115
Trichlorofluoromethane (Freon 11)	µg/m³	<28
Acetone	µg/m³	<119
Isopropyl Alcohol	µg/m³	25,000
1,1-Dichloroethene	µg/m³	<20
1,1,2-Trichlorotrifluoroethane	µg/m³	<38
Methylene chloride (Dichloromethane)	µg/m³	<172
Carbon Disulfide	µg/m³	<156
trans-1,2-dichloroethene	µg/m³	<20
MTBE	µg/m³	<18
1,1- Dichloroethane	µg/m³	<20
Vinyl Acetate	µg/m³	<18
MEK	µg/m³	<147
Hexane	µg/m³	<18
cis-1,2-Dichloroethene	µg/m³	<20
Ethyl Acetate	µg/m³	<18
Chloroform	µg/m³	<24
Tetrahydrofuran	µg/m³	<15
1,1,1-Trichloroethane	µg/m³	<27
1,2-Dichloroethane	µg/m³	<20
Benzene	µg/m³	<16
Carbon tetrachloride	µg/m³	<31

TO15 in Canisters ug/m3		
Our Reference		224884-1
Your Reference	UNITS	SV3
Type of sample		Air, canister
Air Kit Security No.		2259
Date Sampled		27/08/2019
Cyclohexane	µg/m³	<17
Heptane	µg/m³	<20
Trichloroethene	µg/m³	<27
1,2-Dichloropropane	µg/m³	<23
1,4-Dioxane	µg/m³	<18
Bromodichloromethane	µg/m³	<34
Methyl Methacrylate	µg/m³	<20
MIBK	µg/m³	<205
cis-1,3-Dichloropropene	µg/m³	<23
trans-1,3-Dichloropropene	µg/m³	<23
Toluene	µg/m³	<19
1,1,2-Trichloroethane	µg/m³	<27
Methyl Butyl Ketone	µg/m³	<20
Dibromochloromethane	µg/m³	<16
Tetrachloroethene	µg/m³	<34
1,2-Dibromoethane	µg/m³	<38
Chlorobenzene	µg/m³	<23
Ethylbenzene	µg/m³	<22
m-& p-Xylene	µg/m³	<43
Styrene	µg/m³	<21
o-Xylene	µg/m³	<22
Bromoform	µg/m³	<52
1,1,2,2-Tetrachloroethane	µg/m³	<34
4-ethyl toluene	µg/m³	<25
1,3,5-Trimethylbenzene	µg/m³	<25
1,2,4-Trimethylbenzene	µg/m³	<25
1,3-Dichlorobenzene	µg/m³	<30
Benzyl chloride	µg/m³	<26
1,4-Dichlorobenzene	µg/m³	<30
1,2-Dichlorobenzene	µg/m³	<30
1,2,4-Trichlorobenzene	µg/m³	<37
Naphthalene	µg/m³	<26
Hexachloro- 1,3-butadiene	µg/m³	<53
Surrogate-Bromochloromethane	% rec	95
Surrogate -1,4-Difluorobenzene	% rec	90
Surrogate-Chlorobenzene-D5	% rec	92

VOC in Carbon tubes		
Our Reference		224884-3
Your Reference	UNITS	Shroud 1
Type of sample		Air, CT
Air Kit Security No.		7221407356
Date Sampled		27/08/2019
Date extracted	-	28/08/2019
Date analysed	-	28/08/2019
Isopropyl Alcohol*	µg/tube	590
Surrogate Toluene-d8	%	88
Surrogate 4-Bromofluorobenzene	%	87

VOC in Carbon tubes		
Our Reference		224884-3
Your Reference	UNITS	Shroud 1
Type of sample		Air, CT
Air Kit Security No.		7221407356
Date Sampled		27/08/2019
Date prepared	-	28/08/2019
Date analysed	-	28/08/2019
Tube Sampling rate	mL/min	113
Tube Sampling Time	mins	0.5
Volume sampled	m^3	0.00005650
Isopropyl Alcohol	$\mu g/m^3$	10,000,000

Method ID	Methodology Summary
AT-008	Determination of volatile organic compounds in charcoal tubes/badges/sorbents using CS2 extraction, based on NIOSH methods. Desorption efficiencies are not applied to results in ug/tube. Note where µg/m^3 results are supplied for SKC badges, the factors used are for 575-001, if 575-001 data is unavailable for an analyte then use 575-002 then 575-003 (exposure time must be supplied).
TO15	USEPA TO15 - Analysis of VOC's in air following USEPA TO15 protocols
USEPA 18	Measurement of Gaseous Organic Compound Emissions by Gas Chromatography using USEPA m18.

QUALITY CONTROL: TO15 in Canisters/Bags						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Vacuum before Shipment	Hg"			[NT]	1	-30	-30	0	[NT]	[NT]
Vacuum before Analysis	Hg"			[NT]	1	-5	-5	0	[NT]	[NT]
Date prepared	-			28/08/2019	1	28/08/2019	28/08/2019		28/08/2019	[NT]
Date analysed	-			30/08/2019	1	30/08/2019	30/08/2019		30/08/2019	[NT]
Propylene	ppbv	0.5	TO15	<0.5	1	12	11	9	113	[NT]
Dichlorodifluoromethane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Chloromethane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
1,2-Dichlorotetrafluoroethane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Vinyl chloride	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
1,3-Butadiene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Bromomethane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Chloroethane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Ethanol	ppbv	5	TO15	<5	1	<50	<50	0	[NT]	[NT]
Acrolein	ppbv	5	TO15	<5	1	<50	<50	0	[NT]	[NT]
Trichlorofluoromethane (Freon 11)	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Acetone	ppbv	5	TO15	<5	1	<50	<50	0	[NT]	[NT]
Isopropyl Alcohol	ppbv	5	TO15	<5	1	10000	10000	0	[NT]	[NT]
1,1-Dichloroethene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
1,1,2-Trichlorotrifluoroethane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Methylene chloride (Dichloromethane)	ppbv	5	TO15	<5	1	<50	<50	0	[NT]	[NT]
Carbon Disulfide	ppbv	5	TO15	<5	1	<50	<50	0	[NT]	[NT]
trans-1,2-dichloroethene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
MTBE	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
1,1- Dichloroethane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Vinyl Acetate	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
MEK	ppbv	5	TO15	<5	1	<50	<50	0	[NT]	[NT]
Hexane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	113	[NT]
cis-1,2-Dichloroethene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Ethyl Acetate	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Chloroform	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Tetrahydrofuran	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
1,1,1-Trichloroethane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
1,2-Dichloroethane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Benzene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	103	[NT]
Carbon tetrachloride	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Cyclohexane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	101	[NT]
Heptane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	116	[NT]

QUALITY CONTROL: TO15 in Canisters/Bags						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Trichloroethene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
1,2-Dichloropropane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
1,4-Dioxane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Bromodichloromethane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Methyl Methacrylate	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
MIBK	ppbv	5	TO15	<5	1	<50	<50	0	[NT]	[NT]
cis-1,3-Dichloropropene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
trans-1,3-Dichloropropene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Toluene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	117	[NT]
1,1,2-Trichloroethane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Methyl Butyl Ketone	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Dibromochloromethane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Tetrachloroethene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
1,2-Dibromoethane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Chlorobenzene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Ethylbenzene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	117	[NT]
m-& p-Xylene	ppbv	1	TO15	<1	1	<10	<10	0	119	[NT]
Styrene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	94	[NT]
o-Xylene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	98	[NT]
Bromoform	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
1,1,2,2-Tetrachloroethane	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
4-ethyl toluene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	117	[NT]
1,3,5-Trimethylbenzene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	117	[NT]
1,2,4-Trimethylbenzene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	115	[NT]
1,3-Dichlorobenzene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Benzyl chloride	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
1,4-Dichlorobenzene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
1,2-Dichlorobenzene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
1,2,4-Trichlorobenzene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Naphthalene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Hexachloro- 1,3-butadiene	ppbv	0.5	TO15	<0.5	1	<5	<5	0	[NT]	[NT]
Surrogate-Bromochloromethane	% rec		TO15	104	1	95	97	2	106	[NT]
Surrogate -1,4-Difluorobenzene	% rec		TO15	101	1	90	91	1	102	[NT]
Surrogate-Chlorobenzene-D5	% rec		TO15	101	1	92	92	0	100	[NT]

QUALITY CONTROL: TO15 in Canisters ug/m3						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Vacuum before Shipment	Hg"			[NT]	1	-30	-30	0	[NT]	[NT]
Vacuum before Analysis	Hg"			[NT]	1	-5	-5	0	[NT]	[NT]
Date prepared	-			28/08/2019	1	28/08/2019	28/08/2019		[NT]	[NT]
Date analysed	-			30/08/2019	1	30/08/2019	30/08/2019		[NT]	[NT]
Propylene	µg/m³	0.9	TO15	<0.9	1	21	18	15	[NT]	[NT]
Dichlorodifluoromethane	µg/m³	2.5	TO15	<2.5	1	<25	<25	0	[NT]	[NT]
Chloromethane	µg/m³	1.0	TO15	<1.0	1	<10	<10	0	[NT]	[NT]
1,2-Dichlorotetrafluoroethane	µg/m³	2.5	TO15	<2.5	1	<25	<25	0	[NT]	[NT]
Vinyl chloride	µg/m³	1.3	TO15	<1.3	1	<13	<13	0	[NT]	[NT]
1,3-Butadiene	µg/m³	1.1	TO15	<1.1	1	<11	<11	0	[NT]	[NT]
Bromomethane	µg/m³	1.9	TO15	<1.9	1	<19	<19	0	[NT]	[NT]
Chloroethane	µg/m³	1.3	TO15	<1.3	1	<13	<13	0	[NT]	[NT]
Ethanol	µg/m³	9	TO15	<9	1	<94	<94	0	[NT]	[NT]
Acrolein	µg/m³	11	TO15	<11	1	<115	<115	0	[NT]	[NT]
Trichlorofluoromethane (Freon 11)	µg/m³	2.8	TO15	<2.8	1	<28	<28	0	[NT]	[NT]
Acetone	µg/m³	11.9	TO15	<11.9	1	<119	<119	0	[NT]	[NT]
Isopropyl Alcohol	µg/m³	12	TO15	<12	1	25000	26000	4	[NT]	[NT]
1,1-Dichloroethene	µg/m³	2.0	TO15	<2.0	1	<20	<20	0	[NT]	[NT]
1,1,2-Trichlorotrifluoroethane	µg/m³	3.8	TO15	<3.8	1	<38	<38	0	[NT]	[NT]
Methylene chloride (Dichloromethane)	µg/m³	17	USEPA 18	<17	1	<172	<172	0	[NT]	[NT]
Carbon Disulfide	µg/m³	16	TO15	<16	1	<156	<156	0	[NT]	[NT]
trans-1,2-dichloroethene	µg/m³	2.0	TO15	<2.0	1	<20	<20	0	[NT]	[NT]
MTBE	µg/m³	1.8	TO15	<1.8	1	<18	<18	0	[NT]	[NT]
1,1- Dichloroethane	µg/m³	2.0	TO15	<2.0	1	<20	<20	0	[NT]	[NT]
Vinyl Acetate	µg/m³	1.8	TO15	<1.8	1	<18	<18	0	[NT]	[NT]
MEK	µg/m³	15	TO15	<15	1	<147	<147	0	[NT]	[NT]
Hexane	µg/m³	1.8	TO15	<1.8	1	<18	<18	0	[NT]	[NT]
cis-1,2-Dichloroethene	µg/m³	2.0	TO15	<2.0	1	<20	<20	0	[NT]	[NT]
Ethyl Acetate	µg/m³	1.8	TO15	<1.8	1	<18	<18	0	[NT]	[NT]
Chloroform	µg/m³	2.4	TO15	<2.4	1	<24	<24	0	[NT]	[NT]
Tetrahydrofuran	µg/m³	1.5	TO15	<1.5	1	<15	<15	0	[NT]	[NT]
1,1,1-Trichloroethane	µg/m³	2.7	TO15	<2.7	1	<27	<27	0	[NT]	[NT]
1,2-Dichloroethane	µg/m³	2.0	TO15	<2.0	1	<20	<20	0	[NT]	[NT]
Benzene	µg/m³	1.6	TO15	<1.6	1	<16	<16	0	[NT]	[NT]
Carbon tetrachloride	µg/m³	3.1	TO15	<3.1	1	<31	<31	0	[NT]	[NT]
Cyclohexane	µg/m³	1.7	TO15	<1.7	1	<17	<17	0	[NT]	[NT]
Heptane	µg/m³	2.0	TO15	<2.0	1	<20	<20	0	[NT]	[NT]

QUALITY CONTROL: TO15 in Canisters ug/m3						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Trichloroethene	µg/m³	2.7	TO15	<2.7	1	<27	<27	0	[NT]	[NT]
1,2-Dichloropropane	µg/m³	2.3	TO15	<2.3	1	<23	<23	0	[NT]	[NT]
1,4-Dioxane	µg/m³	1.8	TO15	<1.8	1	<18	<18	0	[NT]	[NT]
Bromodichloromethane	µg/m³	3.4	TO15	<3.4	1	<34	<34	0	[NT]	[NT]
Methyl Methacrylate	µg/m³	2.0	TO15	<2.0	1	<20	<20	0	[NT]	[NT]
MIBK	µg/m³	20	TO15	<20	1	<205	<205	0	[NT]	[NT]
cis-1,3-Dichloropropene	µg/m³	2.3	TO15	<2.3	1	<23	<23	0	[NT]	[NT]
trans-1,3-Dichloropropene	µg/m³	2.3	TO15	<2.3	1	<23	<23	0	[NT]	[NT]
Toluene	µg/m³	1.9	TO15	<1.9	1	<19	<19	0	[NT]	[NT]
1,1,2-Trichloroethane	µg/m³	2.7	TO15	<2.7	1	<27	<27	0	[NT]	[NT]
Methyl Butyl Ketone	µg/m³	2.0	TO15	<2.0	1	<20	<20	0	[NT]	[NT]
Dibromochloromethane	µg/m³	1.6	TO15	<1.6	1	<16	<16	0	[NT]	[NT]
Tetrachloroethene	µg/m³	3.4	TO15	<3.4	1	<34	<34	0	[NT]	[NT]
1,2-Dibromoethane	µg/m³	3.8	TO15	<3.8	1	<38	<38	0	[NT]	[NT]
Chlorobenzene	µg/m³	2.3	TO15	<2.3	1	<23	<23	0	[NT]	[NT]
Ethylbenzene	µg/m³	2.2	TO15	<2.2	1	<22	<22	0	[NT]	[NT]
m-& p-Xylene	µg/m³	4.3	TO15	<4.3	1	<43	<43	0	[NT]	[NT]
Styrene	µg/m³	2.1	TO15	<2.1	1	<21	<21	0	[NT]	[NT]
o-Xylene	µg/m³	2.2	TO15	<2.2	1	<22	<22	0	[NT]	[NT]
Bromoform	µg/m³	5.2	TO15	<5.2	1	<52	<52	0	[NT]	[NT]
1,1,2,2-Tetrachloroethane	µg/m³	3.4	TO15	<3.4	1	<34	<34	0	[NT]	[NT]
4-ethyl toluene	µg/m³	2.5	TO15	<2.5	1	<25	<25	0	[NT]	[NT]
1,3,5-Trimethylbenzene	µg/m³	2.5	TO15	<2.5	1	<25	<25	0	[NT]	[NT]
1,2,4-Trimethylbenzene	µg/m³	2.5	TO15	<2.5	1	<25	<25	0	[NT]	[NT]
1,3-Dichlorobenzene	µg/m³	3.0	TO15	<3.0	1	<30	<30	0	[NT]	[NT]
Benzyl chloride	µg/m³	2.6	TO15	<2.6	1	<26	<26	0	[NT]	[NT]
1,4-Dichlorobenzene	µg/m³	3.0	TO15	<3.0	1	<30	<30	0	[NT]	[NT]
1,2-Dichlorobenzene	µg/m³	3.0	TO15	<3.0	1	<30	<30	0	[NT]	[NT]
1,2,4-Trichlorobenzene	µg/m³	3.7	TO15	<3.7	1	<37	<37	0	[NT]	[NT]
Naphthalene	µg/m³	2.6	TO15	<2.6	1	<26	<26	0	[NT]	[NT]
Hexachloro- 1,3-butadiene	µg/m³	5.3	TO15	<5.3	1	<53	<53	0	[NT]	[NT]
Surrogate-Bromochloromethane	% rec		TO15	104	1	95	97	2	[NT]	[NT]
Surrogate -1,4-Difluorobenzene	% rec		TO15	101	1	90	91	1	[NT]	[NT]
Surrogate-Chlorobenzene-D5	% rec		TO15	101	1	92	92	0	[NT]	[NT]

QUALITY CONTROL: VOC in Carbon tubes						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			28/08/2019	[NT]	[NT]	[NT]	[NT]	28/08/2019	[NT]
Date analysed	-			28/08/2019	[NT]	[NT]	[NT]	[NT]	28/08/2019	[NT]
Isopropyl Alcohol*	µg/tube	5	AT-008	<5	[NT]	[NT]	[NT]	[NT]	92	[NT]
Surrogate Toluene-d8	%		AT-008	95	[NT]	[NT]	[NT]	[NT]	118	[NT]
Surrogate 4-Bromofluorobenzene	%		AT-008	96	[NT]	[NT]	[NT]	[NT]	114	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Report Comments

AIR_TO15/AIR_TO15_UG:

PQL has been raised due to the high level of analytes present in the sample #1.

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86694.03	**Suburb:**	Silverwater	**To:**	Envirolab Services
Project Name:	Wilson Park	**Order Number**			12 Ashley Street, Chatswood
Project Manager:	Paul Gorman	**Sampler:**	Kurt / Celine	**Attn:**	Aileen
Emails:	paul.gorman / kurt.plambeck celine.li @douglaspartners.com.au			**Phone:**	612 9910 6200
Date Required:	Standard			**Email:**	ahie@envirolab.com.au

Prior Storage: ☐ Esky ☐ Fridge ☐ Shelved Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Lab ID	Date Sampled	Sample Type	Serial No.s		Analytes				Sample Details					Weather
				Canister / Carbon Tube	Restrictor	TO15	HOLD	TPH (F1/F2)	IPA	Start Time	Stop Time	Flow Rate	sample duration (mon)	PID	
SV3		27/08/19	S	2259 / 2075		X		X					9	0.9	
SV3		27/08/19	C	7221406606			X					113 ml/m	5	0.9	
Shroud 1		27/08/19		7221407356					X				0.5	378	
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐		

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
ENVIROLAB
Job No: 224884
Date Received: 28/08/2019
Time Received: 13:00
Received by: CG
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: **Relinquished by:** **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Signed: 28/8/19 **Received by:** **Date & Time:**

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd
Attention	Kurt Plambeck

Sample Login Details

Your reference	86694.03 Wilson Park, Silverwater
Envirolab Reference	224884
Date Sample Received	28/08/2019
Date Instructions Received	28/08/2019
Date Results Expected to be Reported	04/09/2019

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1xCanister, 2xCT
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	n/a
Cooling Method	Not applicable
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
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www.envirolab.com.au

Sample ID	TO15 in Canisters/Bags	TO15 in Canisters ug/m3	VOC in Carbon tubes	On Hold
SV3	✓	✓		
SV3				✓
Shroud 1			✓	

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info
Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

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customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 224884-A

Client Details

Client	Douglas Partners Pty Ltd
Attention	Kurt Plambeck
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**86694.03 Wilson Park, Silverwater**
Number of Samples	1xCanister, 2xCT
Date samples received	28/08/2019
Date completed instructions received	30/08/2019

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	09/09/2019
Date of Issue	02/09/2019

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Chris Guo, Senior Chemist, Air

Authorised By

Nancy Zhang, Laboratory Manager

TPH Air/ Air Phase Hydrocarbon		
Our Reference		224884-A-1
Your Reference	UNITS	SV3
Type of sample		Air, canister
Air Kit Security No.		2259
Date Sampled		27/08/2019
Date prepared	-	29/08/2019
Date analysed	-	02/09/2019
TPH C_5 - C_8 Aliphatic	µg/m^3	7,200
TPH C_9 - C_{12} Aliphatic	µg/m^3	<500
TPH C_9 - C_{10} Aromatic	µg/m^3	<1000
TPH C_6 - C_{10} - BTEX (F1)	µg/m^3	<2000
TPH >C_{10} - C_{12} - Naphthalene (F2)	µg/m^3	<400

Method ID	Methodology Summary
AT-005	Measurement of Air-Phase Petroleum Hydrocarbons and Ozone Precursors by GC/MS
TO15	USEPA TO15 - Analysis of VOC's in air following USEPA TO15 protocols

QUALITY CONTROL: TPH Air/ Air Phase Hydrocarbon						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			29/08/2019	1	29/08/2019	29/08/2019		29/08/2019	[NT]
Date analysed	-			02/09/2019	1	02/09/2019	02/09/2019		02/09/2019	[NT]
TPH C_5 - C_8 Aliphatic	µg/m^3	200	AT-005	<200	1	7200	6900	4	93	[NT]
TPH C_9 - C_{12} Aliphatic	µg/m^3	50	AT-005	<50	1	<500	<500	0	[NT]	[NT]
TPH C_9 - C_{10} Aromatic	µg/m^3	100	AT-005	<100	1	<1000	<1000	0	82	[NT]
TPH C_6 - C_{10} - BTEX (F1)	µg/m^3	200	TO15	<200	1	<2000	<2000	0	89	[NT]
TPH >C_{10} - C_{12} - Naphthalene (F2)	µg/m^3	40	TO15	<40	1	<400	<400	0	95	[NT]

Result Definitions

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NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
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>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
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NEPM	National Environmental Protection Measure
NR	Not Reported

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Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
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For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

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Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

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Report Comments

TPH_A_ALI_ARO :

PQL has been raised due to the high level of analytes present in the sample/s.

The TPH fractions are calibrated with non-halogenated and non-oxygenated hydrocarbons (aliphatics and aromatics). There are significantly different response factors for halogenated and non-halogenated hydrocarbons, and also oxygenated and non-oxygenated hydrocarbons, hence, there may be some notable differences between the TPH fraction result(s) and the sum of the individual halogenated and oxygenated analytes within said fraction. This typically occurs where high levels of halogenated hydrocarbon(s) and/or oxygenated hydrocarbon(s) dominate said fraction.

224884-A

From: Kurt Plambeck <kurt.plambeck@douglaspartners.com.au>
Sent: Friday, 30 August 2019 6:59 PM
To: Ken Nguyen <KNguyen@envirolab.com.au>
Subject: Re: Results for Registration 224884 86694.03 Wilson Park, Silverwater

Ken,

Was that sample tested for tph, if not can U please schedule it.

On 30 Aug. 2019 18:33, Ken Nguyen <KNguyen@envirolab.com.au> wrote:

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the COC/paperwork received from you
ESDAT Extracts
an Excel or .csv file containing the results
Please note that a hard copy will not be posted.

Enquiries should be made directly to:
customerservice@envirolab.com.au

Regards,

Ken Nguyen | Customer Service / Chemist | Envirolab Services Pty Ltd
(Monday to Friday 1pm to 9pm)

Great Science, Great Service.

12 Ashley Street Chatswood NSW 2067
T 612 9910 6200 **F** 612 9910 6201
E knguyen@envirolab.com.au | **W** www.envirolab.com.au

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CERTIFICATE OF ANALYSIS 225266

Client Details

Client	Douglas Partners Pty Ltd
Attention	Paul Gorman
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	**86694.03, Wilson Park**
Number of Samples	10xAir canisters, 11xCarbon Tubes
Date samples received	03/09/2019
Date completed instructions received	03/09/2019

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	05/09/2019
Date of Issue	05/09/2019

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Results Approved By
Chris Guo, Senior Chemist, Air
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

VOC in Carbon tubes		
Our Reference		225266-21
Your Reference	UNITS	Shroud 2
Date Sampled		02/09/2019
Type of sample		CT
Air Kit Security No.		7221406849
Date extracted	-	04/09/2019
Date analysed	-	04/09/2019
Isopropyl Alcohol*	µg/tube	2,500
Surrogate Toluene-d8	%	115
Surrogate 4-Bromofluorobenzene	%	110

VOC in Carbon tubes		
Our Reference		225266-21
Your Reference	UNITS	Shroud 2
Date Sampled		02/09/2019
Type of sample		CT
Air Kit Security No.		7221406849
Date prepared	-	04/09/2019
Date analysed	-	04/09/2019
Tube Sampling rate	mL/min	113
Tube Sampling Time	mins	0.5
Volume sampled	m^3	0.00005650
Isopropyl Alcohol	$\mu g/m^3$	44,000,000

TO15 in Canisters/Bags						
Our Reference		225266-1	225266-3	225266-5	225266-7	225266-9
Your Reference	UNITS	SV1	SV2	SV4	SV5	SV6
Date Sampled		02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Type of sample		Air, canister	Air, canister	Air, canister	Air, canister	Air, canister
Air Kit Security No.		2283	2291	2274	2292	2273
Vacuum before Shipment	Hg"	-30	-30	-30	-30	-30
Vacuum before Analysis	Hg"	-6	-5	-7	-7	-7
Date prepared	-	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019
Date analysed	-	04/09/2019	04/09/2019	04/09/2019	04/09/2019	04/09/2019
Propylene	ppbv	2	3	7.7	<0.5	<0.5
Dichlorodifluoromethane	ppbv	<0.5	9.4	<0.5	<0.5	<0.5
Chloromethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorotetrafluoroethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl chloride	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Butadiene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Ethanol	ppbv	<5	7	<5	<5	<5
Acrolein	ppbv	<5	<5	<5	<5	<5
Trichlorofluoromethane (Freon 11)	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Acetone	ppbv	<5	5	9	6	<5
Isopropyl Alcohol	ppbv	98	300	120	70	50
1,1-Dichloroethene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorotrifluoroethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride (Dichloromethane)	ppbv	<5	<5	<5	<5	<5
Carbon Disulfide	ppbv	<5	<5	<5	<5	<5
trans-1,2-dichloroethene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
MTBE	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,1- Dichloroethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl Acetate	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
MEK	ppbv	<5	<5	<5	<5	<5
Hexane	ppbv	1	<0.5	1	0.7	0.8
cis-1,2-Dichloroethene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Acetate	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroform	ppbv	2	<0.5	<0.5	0.5	<0.5
Tetrahydrofuran	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	ppbv	11	2	0.7	<0.5	3
Carbon tetrachloride	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5

TO15 in Canisters/Bags						
Our Reference		225266-1	225266-3	225266-5	225266-7	225266-9
Your Reference	UNITS	SV1	SV2	SV4	SV5	SV6
Date Sampled		02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Type of sample		Air, canister	Air, canister	Air, canister	Air, canister	Air, canister
Air Kit Security No.		2283	2291	2274	2292	2273
Cyclohexane	ppbv	<0.5	<0.5	<0.5	1	2
Heptane	ppbv	<0.5	<0.5	<0.5	<0.5	0.6
Trichloroethene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dioxane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Methyl Methacrylate	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
MIBK	ppbv	<5	<5	<5	<5	<5
cis-1,3-Dichloropropene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	ppbv	7.3	5	2	1	3
1,1,2-Trichloroethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Methyl Butyl Ketone	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dibromoethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	ppbv	0.7	2	2	<0.5	2
m-& p-Xylene	ppbv	3	8	9	1	3
Styrene	ppbv	0.8	0.8	<0.5	<0.5	1
o-Xylene	ppbv	1	6.1	12	2	2
Bromoform	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
4-ethyl toluene	ppbv	<0.5	<0.5	<0.5	<0.5	0.6
1,3,5-Trimethylbenzene	ppbv	0.5	<0.5	<0.5	<0.5	2
1,2,4-Trimethylbenzene	ppbv	1	2	1	0.6	3
1,3-Dichlorobenzene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Benzyl chloride	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ppbv	0.7	1	0.7	0.5	<0.5
1,2-Dichlorobenzene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,4-Trichlorobenzene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	ppbv	2	<0.5	0.5	<0.5	4
Hexachloro- 1,3-butadiene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate-Bromochloromethane	% rec	105	105	107	104	104
Surrogate -1,4-Difluorobenzene	% rec	95	94	95	94	92
Surrogate-Chlorobenzene-D5	% rec	92	91	92	91	90

TO15 in Canisters/Bags						
Our Reference		225266-11	225266-13	225266-15	225266-17	225266-19
Your Reference	UNITS	SV7	SV7	SV9	SV10	BD1
Date Sampled		02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Type of sample		Air, canister	Air, canister	Air, canister	Air, canister	Air, canister
Air Kit Security No.		3521	2282	3496	2246	2268
Vacuum before Shipment	Hg"	-30	-30	-30	-30	-30
Vacuum before Analysis	Hg"	-7	-6	-4	-6	-6
Date prepared	-	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019
Date analysed	-	04/09/2019	04/09/2019	04/09/2019	04/09/2019	04/09/2019
Propylene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorodifluoromethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorotetrafluoroethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl chloride	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Butadiene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Ethanol	ppbv	<5	<5	<5	<5	<5
Acrolein	ppbv	<5	<5	<5	<5	<5
Trichlorofluoromethane (Freon 11)	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Acetone	ppbv	<5	<5	30	<5	7
Isopropyl Alcohol	ppbv	83	50	57	40	62
1,1-Dichloroethene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorotrifluoroethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride (Dichloromethane)	ppbv	<5	<5	<5	<5	<5
Carbon Disulfide	ppbv	<5	<5	8	<5	<5
trans-1,2-dichloroethene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
MTBE	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,1- Dichloroethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl Acetate	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
MEK	ppbv	<5	<5	30	<5	<5
Hexane	ppbv	<0.5	<0.5	3	2	0.5
cis-1,2-Dichloroethene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Acetate	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroform	ppbv	0.5	<0.5	0.9	<0.5	0.5
Tetrahydrofuran	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	ppbv	0.9	<0.5	<0.5	<0.5	<0.5
Carbon tetrachloride	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5

TO15 in Canisters/Bags						
Our Reference		225266-11	225266-13	225266-15	225266-17	225266-19
Your Reference	UNITS	SV7	SV7	SV9	SV10	BD1
Date Sampled		02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Type of sample		Air, canister	Air, canister	Air, canister	Air, canister	Air, canister
Air Kit Security No.		3521	2282	3496	2246	2268
Cyclohexane	ppbv	<0.5	<0.5	<0.5	<0.5	0.9
Heptane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dioxane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Methyl Methacrylate	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
MIBK	ppbv	<5	<5	<5	<5	<5
cis-1,3-Dichloropropene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	ppbv	1	0.9	1	0.7	0.9
1,1,2-Trichloroethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Methyl Butyl Ketone	ppbv	<0.5	<0.5	1	<0.5	<0.5
Dibromochloromethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethene	ppbv	<0.5	11	0.6	<0.5	<0.5
1,2-Dibromoethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	ppbv	0.5	<0.5	1	<0.5	<0.5
m-& p-Xylene	ppbv	1	<1	5	<1	1
Styrene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	ppbv	0.8	<0.5	27	<0.5	2
Bromoform	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
4-ethyl toluene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,3,5-Trimethylbenzene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,4-Trimethylbenzene	ppbv	0.8	0.5	<0.5	<0.5	0.6
1,3-Dichlorobenzene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Benzyl chloride	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ppbv	0.8	0.5	<0.5	<0.5	0.6
1,2-Dichlorobenzene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,4-Trichlorobenzene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Hexachloro- 1,3-butadiene	ppbv	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate-Bromochloromethane	% rec	105	103	101	102	105
Surrogate -1,4-Difluorobenzene	% rec	93	91	88	89	90
Surrogate-Chlorobenzene-D5	% rec	90	89	86	86	89

TO15 in Canisters ug/m3						
Our Reference		225266-1	225266-3	225266-5	225266-7	225266-9
Your Reference	UNITS	SV1	SV2	SV4	SV5	SV6
Date Sampled		02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Type of sample		Air, canister	Air, canister	Air, canister	Air, canister	Air, canister
Air Kit Security No.		2283	2291	2274	2292	2273
Vacuum before Shipment	Hg"	-30	-30	-30	-30	-30
Vacuum before Analysis	Hg"	-6	-5	-7	-7	-7
Date prepared	-	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019
Date analysed	-	04/09/2019	04/09/2019	04/09/2019	04/09/2019	04/09/2019
Propylene	µg/m³	3	5	13	<0.9	<0.9
Dichlorodifluoromethane	µg/m³	<2.5	46	<2.5	<2.5	<2.5
Chloromethane	µg/m³	<1	<1	<1	<1	<1
1,2-Dichlorotetrafluoroethane	µg/m³	<2.5	<2.5	<2.5	<2.5	<2.5
Vinyl chloride	µg/m³	<1.3	<1.3	<1.3	<1.3	<1.3
1,3-Butadiene	µg/m³	<1.1	<1.1	<1.1	<1.1	<1.1
Bromomethane	µg/m³	<1.9	<1.9	<1.9	<1.9	<1.9
Chloroethane	µg/m³	<1.3	<1.3	<1.3	<1.3	<1.3
Ethanol	µg/m³	<9.4	10	<9.4	<9.4	<9.4
Acrolein	µg/m³	<11	<11	<11	<11	<11
Trichlorofluoromethane (Freon 11)	µg/m³	<2.8	<2.8	<2.8	<2.8	<2.8
Acetone	µg/m³	<12	10	20	20	<12
Isopropyl Alcohol	µg/m³	240	750	310	170	120
1,1-Dichloroethene	µg/m³	<2	<2	<2	<2	<2
1,1,2-Trichlorotrifluoroethane	µg/m³	<3.8	<3.8	<3.8	<3.8	<3.8
Methylene chloride (Dichloromethane)	µg/m³	<17	<17	<17	<17	<17
Carbon Disulfide	µg/m³	<16	<16	<16	<16	<16
trans-1,2-dichloroethene	µg/m³	<2	<2	<2	<2	<2
MTBE	µg/m³	<1.8	<1.8	<1.8	<1.8	<1.8
1,1- Dichloroethane	µg/m³	<2	<2	<2	<2	<2
Vinyl Acetate	µg/m³	<1.8	<1.8	<1.8	<1.8	<1.8
MEK	µg/m³	<15	<15	<15	<15	<15
Hexane	µg/m³	4	<1.8	4	2	3
cis-1,2-Dichloroethene	µg/m³	<2	<2	<2	<2	<2
Ethyl Acetate	µg/m³	<1.8	<1.8	<1.8	<1.8	<1.8
Chloroform	µg/m³	9	<2.4	<2.4	2	<2.4
Tetrahydrofuran	µg/m³	<1.5	<1.5	<1.5	<1.5	<1.5
1,1,1-Trichloroethane	µg/m³	<2.7	<2.7	<2.7	<2.7	<2.7
1,2-Dichloroethane	µg/m³	<2	<2	<2	<2	<2
Benzene	µg/m³	35	6	2	<1.6	10
Carbon tetrachloride	µg/m³	<3.1	<3.1	<3.1	<3.1	<3.1

TO15 in Canisters ug/m3						
Our Reference		225266-1	225266-3	225266-5	225266-7	225266-9
Your Reference	UNITS	SV1	SV2	SV4	SV5	SV6
Date Sampled		02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Type of sample		Air, canister	Air, canister	Air, canister	Air, canister	Air, canister
Air Kit Security No.		2283	2291	2274	2292	2273
Cyclohexane	µg/m³	<1.7	<1.7	<1.7	5	5
Heptane	µg/m³	<2	<2	<2	<2	3
Trichloroethene	µg/m³	<2.7	<2.7	<2.7	<2.7	<2.7
1,2-Dichloropropane	µg/m³	<2.3	<2.3	<2.3	<2.3	<2.3
1,4-Dioxane	µg/m³	<1.8	<1.8	<1.8	<1.8	<1.8
Bromodichloromethane	µg/m³	<3.4	<3.4	<3.4	<3.4	<3.4
Methyl Methacrylate	µg/m³	<2	<2	<2	<2	<2
MIBK	µg/m³	<20	<20	<20	<20	<20
cis-1,3-Dichloropropene	µg/m³	<2.3	<2.3	<2.3	<2.3	<2.3
trans-1,3-Dichloropropene	µg/m³	<2.3	<2.3	<2.3	<2.3	<2.3
Toluene	µg/m³	28	20	6	4	10
1,1,2-Trichloroethane	µg/m³	<2.7	<2.7	<2.7	<2.7	<2.7
Methyl Butyl Ketone	µg/m³	<2	<2	<2	<2	<2
Dibromochloromethane	µg/m³	<1.6	<1.6	<1.6	<1.6	<1.6
Tetrachloroethene	µg/m³	<3.4	<3.4	<3.4	<3.4	<3.4
1,2-Dibromoethane	µg/m³	<3.8	<3.8	<3.8	<3.8	<3.8
Chlorobenzene	µg/m³	<2.3	<2.3	<2.3	<2.3	<2.3
Ethylbenzene	µg/m³	3	6	7	<2.2	7
m-& p-Xylene	µg/m³	10	30	40	5	10
Styrene	µg/m³	3	3	<2.1	<2.1	5
o-Xylene	µg/m³	6	26	51	8	10
Bromoform	µg/m³	<5.2	<5.2	<5.2	<5.2	<5.2
1,1,2,2-Tetrachloroethane	µg/m³	<3.4	<3.4	<3.4	<3.4	<3.4
4-ethyl toluene	µg/m³	<2.5	<2.5	<2.5	<2.5	3
1,3,5-Trimethylbenzene	µg/m³	2	<2.5	<2.5	<2.5	8
1,2,4-Trimethylbenzene	µg/m³	6	7	5	3	10
1,3-Dichlorobenzene	µg/m³	<3	<3	<3	<3	<3
Benzyl chloride	µg/m³	<2.6	<2.6	<2.6	<2.6	<2.6
1,4-Dichlorobenzene	µg/m³	4	6	4	3	<3
1,2-Dichlorobenzene	µg/m³	<3	<3	<3	<3	<3
1,2,4-Trichlorobenzene	µg/m³	<3.7	<3.7	<3.7	<3.7	<3.7
Naphthalene	µg/m³	10	<2.6	3	<2.6	20
Hexachloro- 1,3-butadiene	µg/m³	<5.3	<5.3	<5.3	<5.3	<5.3
Surrogate-Bromochloromethane	% rec	105	105	107	104	104
Surrogate -1,4-Difluorobenzene	% rec	95	94	95	94	92
Surrogate-Chlorobenzene-D5	% rec	92	91	92	91	90

TO15 in Canisters ug/m3						
Our Reference		225266-11	225266-13	225266-15	225266-17	225266-19
Your Reference	UNITS	SV7	SV7	SV9	SV10	BD1
Date Sampled		02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Type of sample		Air, canister	Air, canister	Air, canister	Air, canister	Air, canister
Air Kit Security No.		3521	2282	3496	2246	2268
Vacuum before Shipment	Hg"	-30	-30	-30	-30	-30
Vacuum before Analysis	Hg"	-7	-6	-4	-6	-6
Date prepared	-	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019
Date analysed	-	04/09/2019	04/09/2019	04/09/2019	04/09/2019	04/09/2019
Propylene	µg/m³	<0.9	<0.9	<0.9	<0.9	<0.9
Dichlorodifluoromethane	µg/m³	<2.5	<2.5	<2.5	<2.5	<2.5
Chloromethane	µg/m³	<1	<1	<1	<1	<1
1,2-Dichlorotetrafluoroethane	µg/m³	<2.5	<2.5	<2.5	<2.5	<2.5
Vinyl chloride	µg/m³	<1.3	<1.3	<1.3	<1.3	<1.3
1,3-Butadiene	µg/m³	<1.1	<1.1	<1.1	<1.1	<1.1
Bromomethane	µg/m³	<1.9	<1.9	<1.9	<1.9	<1.9
Chloroethane	µg/m³	<1.3	<1.3	<1.3	<1.3	<1.3
Ethanol	µg/m³	<9.4	<9.4	<9.4	<9.4	<9.4
Acrolein	µg/m³	<11	<11	<11	<11	<11
Trichlorofluoromethane (Freon 11)	µg/m³	<2.8	<2.8	<2.8	<2.8	<2.8
Acetone	µg/m³	<12	<12	70	<12	20
Isopropyl Alcohol	µg/m³	200	100	140	100	150
1,1-Dichloroethene	µg/m³	<2	<2	<2	<2	<2
1,1,2-Trichlorotrifluoroethane	µg/m³	<3.8	<3.8	<3.8	<3.8	<3.8
Methylene chloride (Dichloromethane)	µg/m³	<17	<17	<17	<17	<17
Carbon Disulfide	µg/m³	<16	<16	30	<16	<16
trans-1,2-dichloroethene	µg/m³	<2	<2	<2	<2	<2
MTBE	µg/m³	<1.8	<1.8	<1.8	<1.8	<1.8
1,1- Dichloroethane	µg/m³	<2	<2	<2	<2	<2
Vinyl Acetate	µg/m³	<1.8	<1.8	<1.8	<1.8	<1.8
MEK	µg/m³	<15	<15	94	<15	<15
Hexane	µg/m³	<1.8	<1.8	10	7	2
cis-1,2-Dichloroethene	µg/m³	<2	<2	<2	<2	<2
Ethyl Acetate	µg/m³	<1.8	<1.8	<1.8	<1.8	<1.8
Chloroform	µg/m³	3	<2.4	4	<2.4	2
Tetrahydrofuran	µg/m³	<1.5	<1.5	<1.5	<1.5	<1.5
1,1,1-Trichloroethane	µg/m³	<2.7	<2.7	<2.7	<2.7	<2.7
1,2-Dichloroethane	µg/m³	<2	<2	<2	<2	<2
Benzene	µg/m³	3	<1.6	<1.6	<1.6	<1.6
Carbon tetrachloride	µg/m³	<3.1	<3.1	<3.1	<3.1	<3.1

TO15 in Canisters ug/m3						
Our Reference		225266-11	225266-13	225266-15	225266-17	225266-19
Your Reference	UNITS	SV7	SV7	SV9	SV10	BD1
Date Sampled		02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Type of sample		Air, canister	Air, canister	Air, canister	Air, canister	Air, canister
Air Kit Security No.		3521	2282	3496	2246	2268
Cyclohexane	µg/m³	<1.7	<1.7	<1.7	<1.7	3
Heptane	µg/m³	<2	<2	<2	<2	<2
Trichloroethene	µg/m³	<2.7	<2.7	<2.7	<2.7	<2.7
1,2-Dichloropropane	µg/m³	<2.3	<2.3	<2.3	<2.3	<2.3
1,4-Dioxane	µg/m³	<1.8	<1.8	<1.8	<1.8	<1.8
Bromodichloromethane	µg/m³	<3.4	<3.4	<3.4	<3.4	<3.4
Methyl Methacrylate	µg/m³	<2	<2	<2	<2	<2
MIBK	µg/m³	<20	<20	<20	<20	<20
cis-1,3-Dichloropropene	µg/m³	<2.3	<2.3	<2.3	<2.3	<2.3
trans-1,3-Dichloropropene	µg/m³	<2.3	<2.3	<2.3	<2.3	<2.3
Toluene	µg/m³	4	4	4	3	4
1,1,2-Trichloroethane	µg/m³	<2.7	<2.7	<2.7	<2.7	<2.7
Methyl Butyl Ketone	µg/m³	<2	<2	5	<2	<2
Dibromochloromethane	µg/m³	<1.6	<1.6	<1.6	<1.6	<1.6
Tetrachloroethene	µg/m³	<3.4	73	4	<3.4	<3.4
1,2-Dibromoethane	µg/m³	<3.8	<3.8	<3.8	<3.8	<3.8
Chlorobenzene	µg/m³	<2.3	<2.3	<2.3	<2.3	<2.3
Ethylbenzene	µg/m³	2	<2.2	6	<2.2	<2.2
m-& p-Xylene	µg/m³	6	<4.3	20	<4.3	5
Styrene	µg/m³	<2.1	<2.1	<2.1	<2.1	<2.1
o-Xylene	µg/m³	4	<2.2	120	<2.2	7
Bromoform	µg/m³	<5.2	<5.2	<5.2	<5.2	<5.2
1,1,2,2-Tetrachloroethane	µg/m³	<3.4	<3.4	<3.4	<3.4	<3.4
4-ethyl toluene	µg/m³	<2.5	<2.5	<2.5	<2.5	<2.5
1,3,5-Trimethylbenzene	µg/m³	<2.5	<2.5	<2.5	<2.5	<2.5
1,2,4-Trimethylbenzene	µg/m³	4	2	<2.5	<2.5	3
1,3-Dichlorobenzene	µg/m³	<3	<3	<3	<3	<3
Benzyl chloride	µg/m³	<2.6	<2.6	<2.6	<2.6	<2.6
1,4-Dichlorobenzene	µg/m³	5	3	<3	<3	4
1,2-Dichlorobenzene	µg/m³	<3	<3	<3	<3	<3
1,2,4-Trichlorobenzene	µg/m³	<3.7	<3.7	<3.7	<3.7	<3.7
Naphthalene	µg/m³	<2.6	<2.6	<2.6	<2.6	<2.6
Hexachloro- 1,3-butadiene	µg/m³	<5.3	<5.3	<5.3	<5.3	<5.3
Surrogate-Bromochloromethane	% rec	105	103	101	102	105
Surrogate -1,4-Difluorobenzene	% rec	93	91	88	89	90
Surrogate-Chlorobenzene-D5	% rec	90	89	86	86	89

TPH Air/ Air Phase Hydrocarbon						
Our Reference		225266-1	225266-3	225266-5	225266-7	225266-9
Your Reference	UNITS	SV1	SV2	SV4	SV5	SV6
Date Sampled		02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Type of sample		Air, canister	Air, canister	Air, canister	Air, canister	Air, canister
Air Kit Security No.		2283	2291	2274	2292	2273
Date prepared	-	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019
Date analysed	-	04/09/2019	04/09/2019	04/09/2019	04/09/2019	04/09/2019
TPH C_5 - C_8 Aliphatic	µg/m^3	210	410	210	<200	<200
TPH C_9 - C_{12} Aliphatic	µg/m^3	230	900	260	220	430
TPH C_9 - C_{10} Aromatic	µg/m^3	<100	<100	<100	<100	<100
TPH C_6 - C_{10} - BTEX (F1)	µg/m^3	<200	<200	<200	<200	<200
TPH >C_{10} - C_{12} - Naphthalene (F2)	µg/m^3	330	1,300	360	240	450

TPH Air/ Air Phase Hydrocarbon						
Our Reference		225266-11	225266-13	225266-15	225266-17	225266-19
Your Reference	UNITS	SV7	SV7	SV9	SV10	BD1
Date Sampled		02/09/2019	02/09/2019	02/09/2019	02/09/2019	02/09/2019
Type of sample		Air, canister	Air, canister	Air, canister	Air, canister	Air, canister
Air Kit Security No.		3521	2282	3496	2246	2268
Date prepared	-	03/09/2019	03/09/2019	03/09/2019	03/09/2019	03/09/2019
Date analysed	-	04/09/2019	04/09/2019	04/09/2019	04/09/2019	04/09/2019
TPH C_5 - C_8 Aliphatic	µg/m^3	<200	<200	<200	<200	<200
TPH C_9 - C_{12} Aliphatic	µg/m^3	390	200	250	210	210
TPH C_9 - C_{10} Aromatic	µg/m^3	<100	<100	<100	<100	<100
TPH C_6 - C_{10} - BTEX (F1)	µg/m^3	<200	<200	<200	<200	<200
TPH >C_{10} - C_{12} - Naphthalene (F2)	µg/m^3	420	230	290	240	220

Method ID	Methodology Summary
AT-005	Measurement of Air-Phase Petroleum Hydrocarbons and Ozone Precursors by GC/MS
AT-008	Determination of volatile organic compounds in charcoal tubes/badges/sorbents using CS2 extraction, based on NIOSH methods. Desorption efficiencies are not applied to results in ug/tube. Note where µg/m^3 results are supplied for SKC badges, the factors used are for 575-001, if 575-001 data is unavailable for an analyte then use 575-002 then 575-003 (exposure time must be supplied).
TO15	USEPA TO15 - Analysis of VOC's in air following USEPA TO15 protocols
USEPA 18	Measurement of Gaseous Organic Compound Emissions by Gas Chromatography using USEPA m18.

QUALITY CONTROL: VOC in Carbon tubes						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			04/09/2019	[NT]	[NT]	[NT]	[NT]	04/09/2019	[NT]
Date analysed	-			04/09/2019	[NT]	[NT]	[NT]	[NT]	04/09/2019	[NT]
Isopropyl Alcohol*	µg/tube	5	AT-008	<5	[NT]	[NT]	[NT]	[NT]	80	[NT]
Surrogate Toluene-d8	%		AT-008	103	[NT]	[NT]	[NT]	[NT]	105	[NT]
Surrogate 4-Bromofluorobenzene	%		AT-008	96	[NT]	[NT]	[NT]	[NT]	100	[NT]

QUALITY CONTROL: TO15 in Canisters/Bags						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Vacuum before Shipment	Hg"			[NT]	1	-30	-30	0	[NT]	[NT]
Vacuum before Analysis	Hg"			[NT]	1	-6	-6	0	[NT]	[NT]
Date prepared	-			03/09/2019	1	03/09/2019	03/09/2019		03/09/2019	[NT]
Date analysed	-			04/09/2019	1	04/09/2019	04/09/2019		04/09/2019	[NT]
Propylene	ppbv	0.5	TO15	<0.5	1	2	2	0	113	[NT]
Dichlorodifluoromethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Chloromethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,2-Dichlorotetrafluoroethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Vinyl chloride	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,3-Butadiene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Bromomethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Chloroethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Ethanol	ppbv	5	TO15	<5	1	<5	<5	0	[NT]	[NT]
Acrolein	ppbv	5	TO15	<5	1	<5	<5	0	[NT]	[NT]
Trichlorofluoromethane (Freon 11)	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Acetone	ppbv	5	TO15	<5	1	<5	<5	0	[NT]	[NT]
Isopropyl Alcohol	ppbv	5	TO15	<5	1	98	98	0	[NT]	[NT]
1,1-Dichloroethene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,1,2-Trichlorotrifluoroethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Methylene chloride (Dichloromethane)	ppbv	5	TO15	<5	1	<5	<5	0	[NT]	[NT]
Carbon Disulfide	ppbv	5	TO15	<5	1	<5	<5	0	[NT]	[NT]
trans-1,2-dichloroethene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
MTBE	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,1- Dichloroethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Vinyl Acetate	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
MEK	ppbv	5	TO15	<5	1	<5	<5	0	[NT]	[NT]
Hexane	ppbv	0.5	TO15	<0.5	1	1	1	0	101	[NT]
cis-1,2-Dichloroethene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Ethyl Acetate	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Chloroform	ppbv	0.5	TO15	<0.5	1	2	2	0	[NT]	[NT]
Tetrahydrofuran	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,1,1-Trichloroethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,2-Dichloroethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Benzene	ppbv	0.5	TO15	<0.5	1	11	11	0	96	[NT]
Carbon tetrachloride	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Cyclohexane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	94	[NT]
Heptane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	106	[NT]

QUALITY CONTROL: TO15 in Canisters/Bags						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Trichloroethene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,2-Dichloropropane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,4-Dioxane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Bromodichloromethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Methyl Methacrylate	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
MIBK	ppbv	5	TO15	<5	1	<5	<5	0	[NT]	[NT]
cis-1,3-Dichloropropene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
trans-1,3-Dichloropropene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Toluene	ppbv	0.5	TO15	<0.5	1	7.3	7.4	1	101	[NT]
1,1,2-Trichloroethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Methyl Butyl Ketone	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Dibromochloromethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Tetrachloroethene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,2-Dibromoethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Chlorobenzene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	ppbv	0.5	TO15	<0.5	1	0.7	0.7	0	102	[NT]
m-& p-Xylene	ppbv	1	TO15	<1	1	3	3	0	114	[NT]
Styrene	ppbv	0.5	TO15	<0.5	1	0.8	0.7	13	91	[NT]
o-Xylene	ppbv	0.5	TO15	<0.5	1	1	1	0	97	[NT]
Bromoform	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,1,2,2-Tetrachloroethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
4-ethyl toluene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	118	[NT]
1,3,5-Trimethylbenzene	ppbv	0.5	TO15	<0.5	1	0.5	0.5	0	110	[NT]
1,2,4-Trimethylbenzene	ppbv	0.5	TO15	<0.5	1	1	1	0	111	[NT]
1,3-Dichlorobenzene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Benzyl chloride	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,4-Dichlorobenzene	ppbv	0.5	TO15	<0.5	1	0.7	0.8	13	[NT]	[NT]
1,2-Dichlorobenzene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,2,4-Trichlorobenzene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Naphthalene	ppbv	0.5	TO15	<0.5	1	2	2	0	[NT]	[NT]
Hexachloro- 1,3-butadiene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Surrogate-Bromochloromethane	% rec		TO15	106	1	105	106	1	114	[NT]
Surrogate -1,4-Difluorobenzene	% rec		TO15	100	1	95	94	1	103	[NT]
Surrogate-Chlorobenzene-D5	% rec		TO15	98	1	92	91	1	101	[NT]

QUALITY CONTROL: TO15 in Canisters/Bags						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Vacuum before Shipment	Hg"			[NT]	13	-30	-30	0	[NT]	[NT]
Vacuum before Analysis	Hg"			[NT]	13	-6	-6	0	[NT]	[NT]
Date prepared	-			[NT]	13	03/09/2019	03/09/2019		[NT]	[NT]
Date analysed	-			[NT]	13	04/09/2019	04/09/2019		[NT]	[NT]
Propylene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Dichlorodifluoromethane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Chloromethane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
1,2-Dichlorotetrafluoroethane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Vinyl chloride	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
1,3-Butadiene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Bromomethane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Chloroethane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Ethanol	ppbv	5	TO15	[NT]	13	<5	<5	0	[NT]	[NT]
Acrolein	ppbv	5	TO15	[NT]	13	<5	<5	0	[NT]	[NT]
Trichlorofluoromethane (Freon 11)	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Acetone	ppbv	5	TO15	[NT]	13	<5	<5	0	[NT]	[NT]
Isopropyl Alcohol	ppbv	5	TO15	[NT]	13	50	50	0	[NT]	[NT]
1,1-Dichloroethene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
1,1,2-Trichlorotrifluoroethane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Methylene chloride (Dichloromethane)	ppbv	5	TO15	[NT]	13	<5	<5	0	[NT]	[NT]
Carbon Disulfide	ppbv	5	TO15	[NT]	13	<5	<5	0	[NT]	[NT]
trans-1,2-dichloroethene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
MTBE	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
1,1- Dichloroethane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Vinyl Acetate	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
MEK	ppbv	5	TO15	[NT]	13	<5	<5	0	[NT]	[NT]
Hexane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
cis-1,2-Dichloroethene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Ethyl Acetate	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Chloroform	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Tetrahydrofuran	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
1,1,1-Trichloroethane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
1,2-Dichloroethane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Benzene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Carbon tetrachloride	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Cyclohexane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Heptane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]

QUALITY CONTROL: TO15 in Canisters/Bags						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Trichloroethene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
1,2-Dichloropropane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
1,4-Dioxane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Bromodichloromethane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Methyl Methacrylate	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
MIBK	ppbv	5	TO15	[NT]	13	<5	<5	0	[NT]	[NT]
cis-1,3-Dichloropropene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
trans-1,3-Dichloropropene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Toluene	ppbv	0.5	TO15	[NT]	13	0.9	0.9	0	[NT]	[NT]
1,1,2-Trichloroethane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Methyl Butyl Ketone	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Dibromochloromethane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Tetrachloroethene	ppbv	0.5	TO15	[NT]	13	11	10	10	[NT]	[NT]
1,2-Dibromoethane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Chlorobenzene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
m-& p-Xylene	ppbv	1	TO15	[NT]	13	<1	<1	0	[NT]	[NT]
Styrene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
o-Xylene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Bromoform	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
1,1,2,2-Tetrachloroethane	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
4-ethyl toluene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
1,3,5-Trimethylbenzene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
1,2,4-Trimethylbenzene	ppbv	0.5	TO15	[NT]	13	0.5	0.5	0	[NT]	[NT]
1,3-Dichlorobenzene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Benzyl chloride	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
1,4-Dichlorobenzene	ppbv	0.5	TO15	[NT]	13	0.5	0.5	0	[NT]	[NT]
1,2-Dichlorobenzene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
1,2,4-Trichlorobenzene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Naphthalene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Hexachloro- 1,3-butadiene	ppbv	0.5	TO15	[NT]	13	<0.5	<0.5	0	[NT]	[NT]
Surrogate-Bromochloromethane	% rec		TO15	[NT]	13	103	100	3	[NT]	[NT]
Surrogate -1,4-Difluorobenzene	% rec		TO15	[NT]	13	91	88	3	[NT]	[NT]
Surrogate-Chlorobenzene-D5	% rec		TO15	[NT]	13	89	86	3	[NT]	[NT]

QUALITY CONTROL: TO15 in Canisters ug/m3						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Vacuum before Shipment	Hg"			[NT]	1	-30	-30	0	[NT]	[NT]
Vacuum before Analysis	Hg"			[NT]	1	-6	-6	0	[NT]	[NT]
Date prepared	-			03/09/2019	1	03/09/2019	03/09/2019		[NT]	[NT]
Date analysed	-			04/09/2019	1	04/09/2019	04/09/2019		[NT]	[NT]
Propylene	µg/m³	0.9	TO15	<0.9	1	3	3	0	[NT]	[NT]
Dichlorodifluoromethane	µg/m³	2.5	TO15	<2.5	1	<2.5	<2.5	0	[NT]	[NT]
Chloromethane	µg/m³	1.0	TO15	<1.0	1	<1	<1	0	[NT]	[NT]
1,2-Dichlorotetrafluoroethane	µg/m³	2.5	TO15	<2.5	1	<2.5	<2.5	0	[NT]	[NT]
Vinyl chloride	µg/m³	1.3	TO15	<1.3	1	<1.3	<1.3	0	[NT]	[NT]
1,3-Butadiene	µg/m³	1.1	TO15	<1.1	1	<1.1	<1.1	0	[NT]	[NT]
Bromomethane	µg/m³	1.9	TO15	<1.9	1	<1.9	<1.9	0	[NT]	[NT]
Chloroethane	µg/m³	1.3	TO15	<1.3	1	<1.3	<1.3	0	[NT]	[NT]
Ethanol	µg/m³	9	TO15	<9	1	<9.4	<9.4	0	[NT]	[NT]
Acrolein	µg/m³	11	TO15	<11	1	<11	<11	0	[NT]	[NT]
Trichlorofluoromethane (Freon 11)	µg/m³	2.8	TO15	<2.8	1	<2.8	<2.8	0	[NT]	[NT]
Acetone	µg/m³	11.9	TO15	<11.9	1	<12	<12	0	[NT]	[NT]
Isopropyl Alcohol	µg/m³	12	TO15	<12	1	240	240	0	[NT]	[NT]
1,1-Dichloroethene	µg/m³	2.0	TO15	<2.0	1	<2	<2	0	[NT]	[NT]
1,1,2-Trichlorotrifluoroethane	µg/m³	3.8	TO15	<3.8	1	<3.8	<3.8	0	[NT]	[NT]
Methylene chloride (Dichloromethane)	µg/m³	17	USEPA 18	<17	1	<17	<17	0	[NT]	[NT]
Carbon Disulfide	µg/m³	16	TO15	<16	1	<16	<16	0	[NT]	[NT]
trans-1,2-dichloroethene	µg/m³	2.0	TO15	<2.0	1	<2	<2	0	[NT]	[NT]
MTBE	µg/m³	1.8	TO15	<1.8	1	<1.8	<1.8	0	[NT]	[NT]
1,1- Dichloroethane	µg/m³	2.0	TO15	<2.0	1	<2	<2	0	[NT]	[NT]
Vinyl Acetate	µg/m³	1.8	TO15	<1.8	1	<1.8	<1.8	0	[NT]	[NT]
MEK	µg/m³	15	TO15	<15	1	<15	<15	0	[NT]	[NT]
Hexane	µg/m³	1.8	TO15	<1.8	1	4	5	22	[NT]	[NT]
cis-1,2-Dichloroethene	µg/m³	2.0	TO15	<2.0	1	<2	<2	0	[NT]	[NT]
Ethyl Acetate	µg/m³	1.8	TO15	<1.8	1	<1.8	<1.8	0	[NT]	[NT]
Chloroform	µg/m³	2.4	TO15	<2.4	1	9	9	0	[NT]	[NT]
Tetrahydrofuran	µg/m³	1.5	TO15	<1.5	1	<1.5	<1.5	0	[NT]	[NT]
1,1,1-Trichloroethane	µg/m³	2.7	TO15	<2.7	1	<2.7	<2.7	0	[NT]	[NT]
1,2-Dichloroethane	µg/m³	2.0	TO15	<2.0	1	<2	<2	0	[NT]	[NT]
Benzene	µg/m³	1.6	TO15	<1.6	1	35	35	0	[NT]	[NT]
Carbon tetrachloride	µg/m³	3.1	TO15	<3.1	1	<3.1	<3.1	0	[NT]	[NT]
Cyclohexane	µg/m³	1.7	TO15	<1.7	1	<1.7	<1.7	0	[NT]	[NT]
Heptane	µg/m³	2.0	TO15	<2.0	1	<2	<2	0	[NT]	[NT]

QUALITY CONTROL: TO15 in Canisters ug/m3						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Trichloroethene	µg/m³	2.7	TO15	<2.7	1	<2.7	<2.7	0	[NT]	[NT]
1,2-Dichloropropane	µg/m³	2.3	TO15	<2.3	1	<2.3	<2.3	0	[NT]	[NT]
1,4-Dioxane	µg/m³	1.8	TO15	<1.8	1	<1.8	<1.8	0	[NT]	[NT]
Bromodichloromethane	µg/m³	3.4	TO15	<3.4	1	<3.4	<3.4	0	[NT]	[NT]
Methyl Methacrylate	µg/m³	2.0	TO15	<2.0	1	<2	<2	0	[NT]	[NT]
MIBK	µg/m³	20	TO15	<20	1	<20	<20	0	[NT]	[NT]
cis-1,3-Dichloropropene	µg/m³	2.3	TO15	<2.3	1	<2.3	<2.3	0	[NT]	[NT]
trans-1,3-Dichloropropene	µg/m³	2.3	TO15	<2.3	1	<2.3	<2.3	0	[NT]	[NT]
Toluene	µg/m³	1.9	TO15	<1.9	1	28	28	0	[NT]	[NT]
1,1,2-Trichloroethane	µg/m³	2.7	TO15	<2.7	1	<2.7	<2.7	0	[NT]	[NT]
Methyl Butyl Ketone	µg/m³	2.0	TO15	<2.0	1	<2	<2	0	[NT]	[NT]
Dibromochloromethane	µg/m³	1.6	TO15	<1.6	1	<1.6	<1.6	0	[NT]	[NT]
Tetrachloroethene	µg/m³	3.4	TO15	<3.4	1	<3.4	<3.4	0	[NT]	[NT]
1,2-Dibromoethane	µg/m³	3.8	TO15	<3.8	1	<3.8	<3.8	0	[NT]	[NT]
Chlorobenzene	µg/m³	2.3	TO15	<2.3	1	<2.3	<2.3	0	[NT]	[NT]
Ethylbenzene	µg/m³	2.2	TO15	<2.2	1	3	3	0	[NT]	[NT]
m-& p-Xylene	µg/m³	4.3	TO15	<4.3	1	10	10	0	[NT]	[NT]
Styrene	µg/m³	2.1	TO15	<2.1	1	3	3	0	[NT]	[NT]
o-Xylene	µg/m³	2.2	TO15	<2.2	1	6	6	0	[NT]	[NT]
Bromoform	µg/m³	5.2	TO15	<5.2	1	<5.2	<5.2	0	[NT]	[NT]
1,1,2,2-Tetrachloroethane	µg/m³	3.4	TO15	<3.4	1	<3.4	<3.4	0	[NT]	[NT]
4-ethyl toluene	µg/m³	2.5	TO15	<2.5	1	<2.5	<2.5	0	[NT]	[NT]
1,3,5-Trimethylbenzene	µg/m³	2.5	TO15	<2.5	1	2	2	0	[NT]	[NT]
1,2,4-Trimethylbenzene	µg/m³	2.5	TO15	<2.5	1	6	6	0	[NT]	[NT]
1,3-Dichlorobenzene	µg/m³	3.0	TO15	<3.0	1	<3	<3	0	[NT]	[NT]
Benzyl chloride	µg/m³	2.6	TO15	<2.6	1	<2.6	<2.6	0	[NT]	[NT]
1,4-Dichlorobenzene	µg/m³	3.0	TO15	<3.0	1	4	5	22	[NT]	[NT]
1,2-Dichlorobenzene	µg/m³	3.0	TO15	<3.0	1	<3	<3	0	[NT]	[NT]
1,2,4-Trichlorobenzene	µg/m³	3.7	TO15	<3.7	1	<3.7	<3.7	0	[NT]	[NT]
Naphthalene	µg/m³	2.6	TO15	<2.6	1	10	10	0	[NT]	[NT]
Hexachloro- 1,3-butadiene	µg/m³	5.3	TO15	<5.3	1	<5.3	<5.3	0	[NT]	[NT]
Surrogate-Bromochloromethane	% rec		TO15	106	1	105	106	1	[NT]	[NT]
Surrogate -1,4-Difluorobenzene	% rec		TO15	100	1	95	94	1	[NT]	[NT]
Surrogate-Chlorobenzene-D5	% rec		TO15	98	1	92	91	1	[NT]	[NT]

QUALITY CONTROL: TO15 in Canisters ug/m3						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Vacuum before Shipment	Hg"			[NT]	13	-30	-30	0	[NT]	[NT]
Vacuum before Analysis	Hg"			[NT]	13	-6	-6	0	[NT]	[NT]
Date prepared	-			[NT]	13	03/09/2019	03/09/2019		[NT]	[NT]
Date analysed	-			[NT]	13	04/09/2019	04/09/2019		[NT]	[NT]
Propylene	µg/m³	0.9	TO15	[NT]	13	<0.9	<0.9	0	[NT]	[NT]
Dichlorodifluoromethane	µg/m³	2.5	TO15	[NT]	13	<2.5	<2.5	0	[NT]	[NT]
Chloromethane	µg/m³	1.0	TO15	[NT]	13	<1	<1	0	[NT]	[NT]
1,2-Dichlorotetrafluoroethane	µg/m³	2.5	TO15	[NT]	13	<2.5	<2.5	0	[NT]	[NT]
Vinyl chloride	µg/m³	1.3	TO15	[NT]	13	<1.3	<1.3	0	[NT]	[NT]
1,3-Butadiene	µg/m³	1.1	TO15	[NT]	13	<1.1	<1.1	0	[NT]	[NT]
Bromomethane	µg/m³	1.9	TO15	[NT]	13	<1.9	<1.9	0	[NT]	[NT]
Chloroethane	µg/m³	1.3	TO15	[NT]	13	<1.3	<1.3	0	[NT]	[NT]
Ethanol	µg/m³	9	TO15	[NT]	13	<9.4	<9.4	0	[NT]	[NT]
Acrolein	µg/m³	11	TO15	[NT]	13	<11	<11	0	[NT]	[NT]
Trichlorofluoromethane (Freon 11)	µg/m³	2.8	TO15	[NT]	13	<2.8	<2.8	0	[NT]	[NT]
Acetone	µg/m³	11.9	TO15	[NT]	13	<12	<12	0	[NT]	[NT]
Isopropyl Alcohol	µg/m³	12	TO15	[NT]	13	100	100	0	[NT]	[NT]
1,1-Dichloroethene	µg/m³	2.0	TO15	[NT]	13	<2	<2	0	[NT]	[NT]
1,1,2-Trichlorotrifluoroethane	µg/m³	3.8	TO15	[NT]	13	<3.8	<3.8	0	[NT]	[NT]
Methylene chloride (Dichloromethane)	µg/m³	17	USEPA 18	[NT]	13	<17	<17	0	[NT]	[NT]
Carbon Disulfide	µg/m³	16	TO15	[NT]	13	<16	<16	0	[NT]	[NT]
trans-1,2-dichloroethene	µg/m³	2.0	TO15	[NT]	13	<2	<2	0	[NT]	[NT]
MTBE	µg/m³	1.8	TO15	[NT]	13	<1.8	<1.8	0	[NT]	[NT]
1,1- Dichloroethane	µg/m³	2.0	TO15	[NT]	13	<2	<2	0	[NT]	[NT]
Vinyl Acetate	µg/m³	1.8	TO15	[NT]	13	<1.8	<1.8	0	[NT]	[NT]
MEK	µg/m³	15	TO15	[NT]	13	<15	<15	0	[NT]	[NT]
Hexane	µg/m³	1.8	TO15	[NT]	13	<1.8	<1.8	0	[NT]	[NT]
cis-1,2-Dichloroethene	µg/m³	2.0	TO15	[NT]	13	<2	<2	0	[NT]	[NT]
Ethyl Acetate	µg/m³	1.8	TO15	[NT]	13	<1.8	<1.8	0	[NT]	[NT]
Chloroform	µg/m³	2.4	TO15	[NT]	13	<2.4	<2.4	0	[NT]	[NT]
Tetrahydrofuran	µg/m³	1.5	TO15	[NT]	13	<1.5	<1.5	0	[NT]	[NT]
1,1,1-Trichloroethane	µg/m³	2.7	TO15	[NT]	13	<2.7	<2.7	0	[NT]	[NT]
1,2-Dichloroethane	µg/m³	2.0	TO15	[NT]	13	<2	<2	0	[NT]	[NT]
Benzene	µg/m³	1.6	TO15	[NT]	13	<1.6	<1.6	0	[NT]	[NT]
Carbon tetrachloride	µg/m³	3.1	TO15	[NT]	13	<3.1	<3.1	0	[NT]	[NT]
Cyclohexane	µg/m³	1.7	TO15	[NT]	13	<1.7	<1.7	0	[NT]	[NT]
Heptane	µg/m³	2.0	TO15	[NT]	13	<2	<2	0	[NT]	[NT]

QUALITY CONTROL: TO15 in Canisters ug/m3						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Trichloroethene	µg/m³	2.7	TO15	[NT]	13	<2.7	<2.7	0	[NT]	[NT]
1,2-Dichloropropane	µg/m³	2.3	TO15	[NT]	13	<2.3	<2.3	0	[NT]	[NT]
1,4-Dioxane	µg/m³	1.8	TO15	[NT]	13	<1.8	<1.8	0	[NT]	[NT]
Bromodichloromethane	µg/m³	3.4	TO15	[NT]	13	<3.4	<3.4	0	[NT]	[NT]
Methyl Methacrylate	µg/m³	2.0	TO15	[NT]	13	<2	<2	0	[NT]	[NT]
MIBK	µg/m³	20	TO15	[NT]	13	<20	<20	0	[NT]	[NT]
cis-1,3-Dichloropropene	µg/m³	2.3	TO15	[NT]	13	<2.3	<2.3	0	[NT]	[NT]
trans-1,3-Dichloropropene	µg/m³	2.3	TO15	[NT]	13	<2.3	<2.3	0	[NT]	[NT]
Toluene	µg/m³	1.9	TO15	[NT]	13	4	3	29	[NT]	[NT]
1,1,2-Trichloroethane	µg/m³	2.7	TO15	[NT]	13	<2.7	<2.7	0	[NT]	[NT]
Methyl Butyl Ketone	µg/m³	2.0	TO15	[NT]	13	<2	<2	0	[NT]	[NT]
Dibromochloromethane	µg/m³	1.6	TO15	[NT]	13	<1.6	<1.6	0	[NT]	[NT]
Tetrachloroethene	µg/m³	3.4	TO15	[NT]	13	73	71	3	[NT]	[NT]
1,2-Dibromoethane	µg/m³	3.8	TO15	[NT]	13	<3.8	<3.8	0	[NT]	[NT]
Chlorobenzene	µg/m³	2.3	TO15	[NT]	13	<2.3	<2.3	0	[NT]	[NT]
Ethylbenzene	µg/m³	2.2	TO15	[NT]	13	<2.2	<2.2	0	[NT]	[NT]
m-& p-Xylene	µg/m³	4.3	TO15	[NT]	13	<4.3	<4.3	0	[NT]	[NT]
Styrene	µg/m³	2.1	TO15	[NT]	13	<2.1	<2.1	0	[NT]	[NT]
o-Xylene	µg/m³	2.2	TO15	[NT]	13	<2.2	<2.2	0	[NT]	[NT]
Bromoform	µg/m³	5.2	TO15	[NT]	13	<5.2	<5.2	0	[NT]	[NT]
1,1,2,2-Tetrachloroethane	µg/m³	3.4	TO15	[NT]	13	<3.4	<3.4	0	[NT]	[NT]
4-ethyl toluene	µg/m³	2.5	TO15	[NT]	13	<2.5	<2.5	0	[NT]	[NT]
1,3,5-Trimethylbenzene	µg/m³	2.5	TO15	[NT]	13	<2.5	<2.5	0	[NT]	[NT]
1,2,4-Trimethylbenzene	µg/m³	2.5	TO15	[NT]	13	2	2	0	[NT]	[NT]
1,3-Dichlorobenzene	µg/m³	3.0	TO15	[NT]	13	<3	<3	0	[NT]	[NT]
Benzyl chloride	µg/m³	2.6	TO15	[NT]	13	<2.6	<2.6	0	[NT]	[NT]
1,4-Dichlorobenzene	µg/m³	3.0	TO15	[NT]	13	3	3	0	[NT]	[NT]
1,2-Dichlorobenzene	µg/m³	3.0	TO15	[NT]	13	<3	<3	0	[NT]	[NT]
1,2,4-Trichlorobenzene	µg/m³	3.7	TO15	[NT]	13	<3.7	<3.7	0	[NT]	[NT]
Naphthalene	µg/m³	2.6	TO15	[NT]	13	<2.6	<2.6	0	[NT]	[NT]
Hexachloro- 1,3-butadiene	µg/m³	5.3	TO15	[NT]	13	<5.3	<5.3	0	[NT]	[NT]
Surrogate-Bromochloromethane	% rec		TO15	[NT]	13	103	100	3	[NT]	[NT]
Surrogate -1,4-Difluorobenzene	% rec		TO15	[NT]	13	91	88	3	[NT]	[NT]
Surrogate-Chlorobenzene-D5	% rec		TO15	[NT]	13	89	86	3	[NT]	[NT]

QUALITY CONTROL: TPH Air/ Air Phase Hydrocarbon						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			03/09/2019	1	03/09/2019	03/09/2019		03/09/2019	[NT]
Date analysed	-			04/09/2019	1	04/09/2019	04/09/2019		04/09/2019	[NT]
TPH C_5 - C_8 Aliphatic	µg/m³	200	AT-005	<200	1	210	210	0	92	[NT]
TPH C_9 - C_{12} Aliphatic	µg/m³	50	AT-005	<50	1	230	230	0	[NT]	[NT]
TPH C_9 - C_{10} Aromatic	µg/m³	100	AT-005	<100	1	<100	<100	0	90	[NT]
TPH C_6 - C_{10} - BTEX (F1)	µg/m³	200	TO15	<200	1	<200	<200	0	93	[NT]
TPH >C_{10} - C_{12} - Naphthalene (F2)	µg/m³	40	TO15	<40	1	330	320	3	93	[NT]

QUALITY CONTROL: TPH Air/ Air Phase Hydrocarbon						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	13	03/09/2019	03/09/2019		[NT]	[NT]
Date analysed	-			[NT]	13	04/09/2019	04/09/2019		[NT]	[NT]
TPH C_5 - C_8 Aliphatic	µg/m³	200	AT-005	[NT]	13	<200	<200	0	[NT]	[NT]
TPH C_9 - C_{12} Aliphatic	µg/m³	50	AT-005	[NT]	13	200	210	5	[NT]	[NT]
TPH C_9 - C_{10} Aromatic	µg/m³	100	AT-005	[NT]	13	<100	<100	0	[NT]	[NT]
TPH C_6 - C_{10} - BTEX (F1)	µg/m³	200	TO15	[NT]	13	<200	<200	0	[NT]	[NT]
TPH >C_{10} - C_{12} - Naphthalene (F2)	µg/m³	40	TO15	[NT]	13	230	230	0	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86694.03	**Suburb:**	Silverwater	**To:**	Envirolab Services
Project Name:	Wilson Park	**Order Number**			12 Ashley Street, Chatswood
Project Manager:	Paul Gorman	**Sampler:**	KP	**Attn:**	Aileen
Emails:	paul.gorman / kurt.plambeck / celine.Li @douglaspartners.com.au			**Phone:**	612 9910 6200
Date Required:	~~Standard~~ 48h			**Email:**	ahie@envirolab.com.au

Prior Storage: ☐ Esky ☐ Fridge ☐ Shelved Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Lab ID	Date Sampled	Sample Type	Serial No.s: Canister / Carbon Tube	Serial No.s: Restrictor	Analytes: TO15	Analytes: HOLD	Analytes: TPH (F1/F2)	Analytes: IPA	Sample Details: Start Time	Sample Details: Stop Time	Sample Details: Flow Rate	Sample Details: sample duration (min)	Sample Details: PID	Weather
SV1	1		S	2283	1779	X		X		12:20	12:29				21°C 41% Fine -6
SV1	2		C	7221406850			X			12:30	12:35	113 ml/m	5		-6
SV2	3		S	2291	1752	X		X		14:00	14:09				21° 43% -6
SV2	4		C	7221406855			X			14:10	14:15	113 ml/m	5		
				(2274) DF											
SV4	5		S	1627	1754	X		X		13:30	13:39				21°C 43% -6
SV4	6		C	7221406215 JW			X			13:40	13:45		113 ml/m	5	
SV5	7		S	2292	1749	X		X		11:15	11:24				21°C 40% -7
SV5	8		C	7221406851			X			11:25	11:30		113 ml/m	5	
SV6	9		S	2273	831	X		X		10:00	10:09				19°C, 44% -6
SV6	10		C	7221406353			X			10:10	10:05		113 ml/m	5	
SV7	11		S	3521	1875	X		X		10:30	10:39				20°C, 44% -6
SV7	12		C	7221406848			X			10:40	10:45		113 ml/m	5	
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐		

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 225266

Total number of samples in container: **Relinquished by:** **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Signed: 7:00 3/9 **Received by:** HINGO ELS 03/09/19 09:30 HL **Date & Time:** 09:30Am HL

Date Received: 03/09/19
Time Received:
Received By:
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	86694.03	**Suburb:**	Silverwater	**To:**	Envirolab Services
Project Name:	Wilson Park	**Order Number**			12 Ashley Street, Chatswood
Project Manager:	Paul Gorman	**Sampler:**	KP	**Attn:**	Aileen
Emails:	paul.gorman / kurt.plambeck / celine.Li @douglaspartners.com.au			**Phone:**	612 9910 6200
Date Required:	~~Standard~~ 48hr			**Email:**	ahie@envirolab.com.au

Prior Storage: ☐ Esky ☐ Fridge ☐ Shelved Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Lab ID	Sampling Date	Sample Type	Container Type ID	Analytes									Notes/preservation
					TO15	HOLD	TPH (F1/F2)	IPA	Start Time	Stop Time	Flow Rate	sample dura	PID	Final Pr
SV8	13		S	2282 / 1988	X		X		8:30	8:39				14°C 72% -6
SV8	14		C	7221406814		X			8:40	8:45	113 ml/m	5		
SV9	15	2/9	S	3496 / 1748	X		X		8:00	8:09				14°C, 72% -6
SV9	16	2/9	C	7221406854		X			8:10	8:15	113 ml/m	5		
SV10	17		S	2246 / 614	X		X		9:30	9:39				18°C, 65% -6
SV10	18		C	7221406847		X			9:40	9:45	113 ml/m	5		
BD1	19		S	2268 / 1751	X		X		11:30	11:39				-6
BD1	20		C	7221406852		X			11:40	11:45	113 ml/m	5		
shroud 2	21		C	7221406849				X			113	0.5min		
PQL (S) mg/kg												**ANZECC PQLs req'd for all water analytes** ☐		

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: **Relinquished by:** **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Signed: 7:30 8/9 **Received by:** **Date & Time:**

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd
Attention	Paul Gorman

Sample Login Details

Your reference	86694.03, Wilson Park
Envirolab Reference	225266
Date Sample Received	03/09/2019
Date Instructions Received	03/09/2019
Date Results Expected to be Reported	05/09/2019

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	10xAir canisters, 11xCarbon Tubes
Turnaround Time Requested	2 days
Temperature on Receipt (°C)	n/a
Cooling Method	Not applicable
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	VOC in Carbon tubes	VOC in Carbon tubes	TO15 in Canisters/Bags	TO15 in Canisters ug/m3	TPH Air/ Air Phase Hydrocarbon	On Hold
SV1			✓	✓	✓	
SV1						✓
SV2			✓	✓	✓	
SV2						✓
SV4			✓	✓	✓	
SV4						✓
SV5			✓	✓	✓	
SV5						✓
SV6			✓	✓	✓	
SV6						✓
SV7			✓	✓	✓	
SV7						✓
SV7			✓	✓	✓	
SV8						✓
SV9			✓	✓	✓	
SV9						✓
SV10			✓	✓	✓	
SV10						✓
BD1			✓	✓	✓	
BD1						✓
Shroud 2	✓	✓				

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Appendix G

Douglas Partners SAQP

Douglas Partners
Geotechnics / Environment / Groundwater

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
96 Hermitage Road
West Ryde NSW 2114
PO Box 472
West Ryde NSW 1685
Phone (02) 9809 0666

Cox Architecture Pty Ltd
Level 6, 155 Clarence Street
Sydney NSW 2000

Project 86694.03
25 September 2019
86694.03.R.001.Rev0
CL:jlb

Attention: Anthony Crozier

Email: Anthony.crozier@cox.com.au

Dear Sirs

Environmental Investigations
Sampling and Analysis Quality Plan (SAQP)
Wilson Park, 4 Newington Road, Silverwater

1. Introduction

This Sampling and Analysis Quality Plan (SAQP) has been prepared for proposed soil, groundwater and soil vapour investigation works (as a detailed site investigation) to be undertaken to assess the site for its suitability based on the proposed development and the associated land use changes; and to meet the requirements of the Secretary's Environmental Assessment Requirements(SEARs), issued as a result of the State Significant Development Application (SSDA) at the site for the proposed Western Sydney Cricket and Community Centre development at Wilson Park, Newington Rd, Silverwater.

The work will be undertaken in accordance with Douglas Partners Pty Ltd (DP) proposal dated 15 August 2019 (Proposal ref: SYD190618.P.001.Rev0). The work was commissioned by Cox Architecture Pty Ltd on behalf of the client, NSW Cricket Association.

DP has completed a recent preliminary site investigation (PSI) for the project (DP Reference 86694.00.R.001.Rev0, dated 11 April 2019), including a review of historical reports and documents relevant to the contamination issues at the site. This SAQP outlines a plan to investigated soil, soil vapour and groundwater conditions at the site, building on the existing information, to assess the suitability of the site for the proposed development.

The objective of the detailed site investigation (DSI) is to assess the suitability of the site for the proposed Western Sydney Cricket and Community Centre development, as well as to provide sufficient information to inform a remediation action plan (RAP) for the site (if required) and to inform the construction environmental management plan (CEMP), which will be required for the proposed development.

It is understood that this report will be submitted to the appointed Site Auditor Frank Mohen of AECOM for review and approval prior to the commencement of works.

2. Background – Previous Investigations

The Waste Service NSW, *Wilson Park Draft Remediation Action Plan – Stage 2*, May 1999 (WS 1999) states that the fill at the Park is reported as mainly comprised of dredged estuarine sand and mud, demolition rubble, industrial and household waste. The fill thickness had been shown by previous investigations to range from 0.5 to 1.5 metres in depth and generally consisting of clayey gravels and sands. Dutch cone penetration tests carried out in 1997 indicated that fill is present to depths of approximately 2.8 metres in parts of the Park.

Groundwater has been found in previous investigations to be present at shallow levels in the northern part of the site, where fill has been laid over the estuarine sediments. The groundwater levels fluctuate between clayey sand units (alluvium) and deposited fill, i.e. between 2 and 3 metres depth and this water bearing zone may be influenced by tidal and rainfall variations.

Environmental assessments performed by Groundwater Technology (GT) during 1994 and 1995 indicate that the groundwater flows in a northerly direction towards the Parramatta River at Wilson Park.

The main contaminants of concern at the Park (soil and groundwater), based on previous investigations, include a range of heavy metals (primarily zinc, lead, cadmium, chromium and copper), hydrocarbons (TPH, BTEX), PAH and phenols.

The mixing of tar with crushed sandstone and dispersing as a fill layer across the Park may have resulted in widespread contamination.

North-West. Concentrations of TPH (C10-C36) exceeded the NSW EPA (1994) guidelines at nine locations; mostly in the depth range of 1 to 2 m. BTEX concentrations also exceeded the same guidelines in five of the samples. Three of the seven samples submitted for PAH analysis exceeded the NEHF guidelines for parks and open space (NEHF E). A soil sample from a depth of 2 m in the north-western car park following observations of a white precipitate found high concentrations of TPH, BTEX and PAH, exceeding NEHF E. Concentrations of some metals recorded in groundwater in the single well on the site exceeded ANZECC (1992) guidelines for the protection of marine waters. PCB and phenols were detected above the laboratory detection limits.

South-West. Test results indicated the presence of TPH (C10-C36) exceeding the NSW EPA (1994) guidelines at two bore locations not far from one of the tar pits in the north east quarter. The presence of tar was noted in one bore at a depth of 1 m. All BTEX concentrations were low. Concentrations of PAH, metals, OCP, PCB and cyanide were low. Concentrations of PAH and some metals recorded in groundwater in the single well on the site exceeded ANZECC (1992) guidelines for the protection of marine waters. PCB and phenols were detected above the laboratory detection limits.

South-East. Concentrations of TPH (C10-C36) exceeded the NSW EPA (1994) guidelines at six locations, mostly in the depth range of 1 to 2 m. BTEX concentrations also exceeded the same guidelines in three of the samples. Four samples submitted for PAH analysis exceeded the NEHF guidelines for parks and open space, whilst metals and cyanide concentrations were below the same guidelines. Concentrations of some metals recorded in groundwater in the single well on the site exceeded ANZECC (1992) guidelines for the protection of marine waters. No exceedances were

reported for PAH or hydrocarbons. PCB and phenols were detected above the laboratory detection limits.

Based on the previous investigations carried out, minimal remediation was required. It was proposed that a shallow drain running east-west would be installed, and that soils excavated in the process will be relocated to the north-east quarter to be capped. The Site Auditor considered that subject to appropriate management of these measures, and validation of the soils for the intended land use, the southern half of the Park would be suitable for release to the public.

The distribution of contamination (TPH, BTEX, PAH) in soil greater than 0.5 m depth, across the north-west quarter was variable and primarily related to crushed sandstone and tar mixed fill. It was proposed to grade this quarter, cap with a cover of crushed sandstone and clay, then 0.1 m of topsoil. It was also proposed to pre-load the cap in the hope of bringing hydrocarbon impacted shallow soils to the surface for excavation and relocation to the north-east quarter to be capped.

Sandstone and shale were imported to the site for crushing and mixing with compost to form the artificial capping of the north-west quarter. The materials were imported from various sites and validated as being suitable to use at the Park. The Auditor concurred that the materials were suitable for use at the Park.

A soil gas survey was conducted after the placement of the artificial soil, and the subsequent replacement of the validated surface soils that had been stripped and stockpiled. All reported concentrations were low and met the objectives of the monitoring. Subsurface monitoring for soil gas (using a probe) identified highest levels in the north-west quarter, at depths of 0.5m (no deeper monitoring is understood to have been undertaken). Those locations in which soil gas was measured by PID at concentrations of >20 ppm are shown on the attached Drawing 1.

On the basis of the outcomes reported in the SAR, the Site Auditor issued a Site Audit Statement (SAS) under the Contaminated Land Management Act 1997, which states that the south-east, south-west and north-west quarters of the Park are suitable for recreational, open space and park uses, subject to:

- Preparation and implementation of an auditor approved Environmental Management Plan including but not limited to controls to alterations of landforms and excavations below a depth of 0.5 m; and
- Implementation of an auditor approved groundwater monitoring programme to assess the impact of residual soil contamination on groundwater quality and potential risk of harm to the environment.

Wilson Park (including the playing fields) are subject to a Maintenance of Remediation Notice issued by NSW EPA under Section 26 of the Contaminated Land Management Act 1997 (Notice number 28040). The Remediation Notice is applicable to seven (7) Sydney Olympic Park Authority (SOPA) landfills (‘regulated landfills’) one of which is located within Wilson Park.

The current Environmental Management Pan (EMP) for Wilson Park is presented in the document Sydney Olympic Park Authority *Remediated Lands Management Plan* (RLMP).

Four wells possibly remain to the north and south (M1, M8, M10, MW1 – possibly the same wells as those labelled MP1, MP2, MP3, MP4).

All previous contamination investigations used to inform the Site Audit Report (SAR) were pre-NEPC (2013). NEPC (2013) health and ecological based investigation and screening levels are generally not too dissimilar to NEPC (1999) and earlier ANZECC guidelines.

Recent (July 2019) CBR bores (refer to Figure 1 below) from DP (14 locations) found potential asbestos containing material (ACM) at two locations in the fill (CPT27 and CPT39). A slight hydrocarbon odour was noted at CPT22. Topsoil was found at most locations overlying generally clay or sandy clay fill to a nominal depth of 0.7m (termination depth). It is not clear whether the fill comprises the imported capping material, underlying fill, or both. There was no logged evidence of tar in the fill, however only two locations were in the north-west quarter.

Figure 1: Previous Geotechnical Investigation Sampling Locations

3. Proposed Development

It is understood that the proposed development will involve the construction of two playing fields, practice wickets, viewing platforms, training facilities and administrating facilities. The main building for the development is understood to be located between a set of practice wickets in the north-west portion of the site. The general proposed layout is shown on the attached Drawing 3.

As part of the proposed development, fence realignment is proposed at the south-west corner of the north-eastern portion of Wilson Park, as shown on the attached Drawings 1 and 2. The fence realignment is designed to accommodate vehicular thoroughfare and at grade car parking, as shown on the attached Drawing 3.

Preliminary earthworks plans indicated that the site levels will typically be raised to achieve appropriate surface levels and cross falls for the site drainage. There is some lowering of the site proposed to the south east.

Under Clause 15 of the SEARs (23 July 2019), in relation to contamination, states that the EIS shall:

- Demonstrate compliance with the requirements of requirements of State Environmental Planning Policy No.55 – Remediation of Land and the Contaminated Land Management Act 1997 Notice Number: 28040 issued in relation to the site and regulated by the NSW Environment Protection Authority (EPA);
- Provide detailed geotechnical and contamination reports to be prepared and reviewed by the EPA accredited site auditor, to assess the site's subsurface conditions, including any soil and groundwater contamination, and determine the suitability of the site for the proposed development; and
- Include a hazardous materials survey of all existing structures and infrastructure prior to any demolition or site preparation works.

4. Scope of Works

In order to complete a detailed contamination investigation report complying with Clause 15 of the SSDA conditions, we propose the following scope of works:

- Obtain all relevant previous reports and drawings not previously made available to DP. Specifically, this includes two drawings, namely 085-G-G-0008 Rev.C and 001-G-G-0112 Rev.B, and the full RLMP;
- Review all plans and documents detailing the proposed development;
- Assess previously reported analytical results (as made available) against the NEPC (2013) criteria relevant to a commercial land use (building footprints and hardstand), in addition to an open space / recreational land use. These are not intended to be tabulated again, however identified exceedances will be tabulated and discussed;
- Purge, develop and sample groundwater from the four existing monitoring wells (MP1 to MP4). Analysis of the groundwater samples for metals, TRH, BTEX, PAH, phenols, and VOC (locations shown on the attached Drawing 1);
- Conduct soil gas (vapour) sampling at the following locations, as shown on Drawings 1 and 2. Samples will be analysed for general VOC, TRH (F1 and F2) and BTEX:
    - Four locations in the footprint of the proposed main building, with locations lined up (where possible) with previously reported higher concentrations of soil gas;
    - Three locations at and close to the proposed fence line adjustment at the southern end of the western most soil mound in the north-east quarter; and
    - Two locations in the footprint of the proposed maintenance sheds (and carpark) in the north-east portion of the site.

- Conduct soil sampling and testing at three locations at the southern end of the mound formed in the north-east quarter, due to the proposed fence realignment, as shown on Drawing 1. Samples will be analysed for metals, TRH, BTEX, PAH, phenols, and VOC;
- Preparation of a Field Work Safety and Environment Plan (FWSEP), Safe Work Method Statement (SWMS), and Work Permit Application for approval by the Sydney Olympic Park Authority (SOPA);
- Set out and survey of test locations using a differential global positioning system (dGPS);
- Scanning for buried services using an accredited service locator. The scanning exercise will aim to locate buried services shown on utility plans provided through the Dial-Before-You-Dig service and SOPA;
- Reinstatement of all holes with a low permeability bentonite/cement grout mix in accordance with RLPM;
- Preparation of a DSI report, which will present a summary of the results of the historical investigations, in addition to the results of the proposed investigation; and
- Develop an unexpected finds protocol to be implemented during the proposed civil and construction works, and to be incorporated into a construction environmental management plan (CEMP).

Apart from the two sampling locations due to the fence realignment, additional sampling and testing of soils for chemical contaminants is not proposed, given the extensive testing previously undertaken. However, should the proposed works above identify a need or data gap in this respect we will propose testing as appropriate.

It is envisaged that the long term environmental management plan (LTEMP) will be developed under the scope of the appointed contractor undertaking the works.

5. Site Identification and Location

The site is currently occupied by Wilson Park, and is bounded by Parramatta River to the north, Silverwater Road to the west and Silverwater Jail to the east, as shown on the attached Drawing 1. The site covers approximately 8 hectares and forms the bulk of Lot C in Deposit Plan 421320. Site details are summarised in Table 1 below.

Table 1: Summary of Site Details

Street Address	4 Newington Road, Silverwater
Lot and Plan	Lot C in DP 421320
Size	8 ha
Current Zoning	RE1 Public Recreation; SP2 Infrastructure (north east portion of Wilson Park) Note: The current land use zoning is under the SEPP (State Significant Precincts) 2005
Current Use	Wilson Park

It is noted that the land zoned as SP2 Infrastructure has been declared as not suitable for any beneficial use.

Adjacent land uses comprise:

- North: Parramatta River;
- East: Blaxland bioremediation pond and Silverwater correctional complex;
- South: Industrial/commercial land uses and
- West: Silverwater Road.

6. Objective of Works

The scope of the contamination investigation has been designed to assess the site for its suitability based on the proposed development and the associated land use changes; and to meet the requirements of the SEARs, issued as a result of the SSDA. The assessment is also designed to provide sufficient information to inform a RAP for the site (if required), as well as to inform the CEMP, which will be required for the proposed development.

7. Data Quality Objectives

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

(1) State the Problem

The site is proposed to be developed for the construction of cricket training and administration facilities, as well as a community center. Previous investigations have indicated that potential contamination is present as a result of the filling (containing variable tar) located on the site, and the previous heavy industry at the site. The containment of impacted material in the tar pits located on the adjacent lot (i.e. north-eastern part of Wilson Park), and the encroachment of the development on that adjacent lot, that has been previously assessed as not suitable for recreational/open space land use. The “problem” to be addressed is that additional information is required to inform the assessment on the site’s suitability for its proposed land use and the requirement for a detailed RAP for the proposed development.

(2) Identify the Decision

Additional environmental data is required to address the data gaps associated with the proposed land use change and associated development, and to permit an informed determination on site suitability, in addition to meet the requirements of the SEARs.

(3) Identify Inputs into the Decision

Inputs into the decisions are as follows:

- Results of previous investigations (as discussed in Section 2 above);
- Historical and new groundwater data collected from the site and any relevant available data;
- Soil vapour data collected from the site;
- Soil data collected from the site;
- Proposed development plans;
- Relevant Groundwater Investigation Levels (GIL), soil Site Assessment Criteria (SAC) and soil vapour screening criteria, predominantly obtained from NEPC (2013); and
- Field and laboratory QA/QC data to assess the suitability of the environmental data for the assessment, including duplicates and replicates for soil, soil vapour and groundwater.

(4) Define the Study Boundaries

The site is defined in Section 4. The approximate lateral site boundaries are defined on the attached Drawing 1. The soil investigation will be undertaken to the depths of the filling plus a nominal 0.5 m into natural soils (for soil sampling) and a maximum 1 m depth for soil vapour sampling and nominally 2 m below groundwater level for the groundwater wells installation (if required).

(5) Specify Limits on the Decision Error

Limits on decision errors for the proposed investigation will be as follows:

- The analyte selection is based on the available site history, past site activities, site features and the findings of previous reports (as made available to DP). The potential for contaminants other than those proposed to be analysed is considered to be low;
- The SAC and GIL will be adopted from established from NEPC (2013) which is endorsed by the EPA. Where not available, recognised national and international guidelines will be used. The SAC and GIL have risk probabilities already incorporated; and
- The acceptance limits for laboratory QA/QC parameters are based on the laboratory reported acceptance limits and those stated in NEPC (2013) "*Guideline on Laboratory Analysis of Potentially Contaminated Soils*".

(6) Develop the Analytical Approach (or decision rule)

The information obtained through the proposed SAQP will be used to characterise the groundwater, soil and vapour impacts in terms of risk to human health and/or the environment. The analyte selection is based on the available site history, past site activities, site features and the findings of previous reports (as made available to DP).

Laboratory test results will only be accepted and considered useable for the assessment under the following conditions:

- All laboratories used are accredited by NATA for the analyses undertaken. DP proposes to use Envirolab Services as the primary laboratory and ALS as the secondary laboratory for all analysis and all sampled media;
- All practical quantitation limits (PQL) set by the laboratories fall below the GIL and SAC adopted, or indicate across the board lack of detection (i.e. it is noted that some of the water assessment criteria are difficult to achieve at PQL);
- The differences between the reported concentrations of analytes in the intra-laboratory and inter-laboratory replicate samples and the corresponding original samples are generally within adopted acceptance limits; and
- The quality assurance / quality control (QA/QC) protocols and results reported by the laboratories comply with the requirements of NEPC (2013).

(7) Optimise the Design for Obtaining Data

Data collection points have been determined to assess the soil, vapour and groundwater impacts at the site around the identified areas of concern, as discussed in Section 2. Data collection points will be agreed with SOPA and the Site Auditor. Proposed sampling from three soil sampling locations, four groundwater sampling locations and nine soil vapour sampling locations is outlined in Sections 8, 9 and 10.

Data Quality Indicators

Based on the analysis of quality control samples i.e. duplicates/replicates and in-house laboratory QA/QC procedures, the following data quality indicators will require to be achieved:

- Conformance with specified holding times;
- Accuracy of spiked samples will be in the range of 70-130%;
- Field and laboratory duplicates and replicates samples will have a general precision average of +/- 30% (inorganics) and +/- 50% (organics) relative percent difference (RPD), and
- Field duplicates/replicates will be collected at a frequency of 10% of all samples.

Note that duplicated and replicates will be collected for each of the sample types(i.e. soil, groundwater and soil gas)

8. Groundwater Sampling Methodology

SOPA has advised that regular groundwater monitoring data exists for Monitoring Wells MP1 to MP4. These results will be obtained from SOPA and reported as part of the DSI. An inspection of the site revealed that all four wells remain viable and available for sampling.

Groundwater levels will be measured using an interface meter and the wells will be developed by removing a minimum of 3 bore volumes of water, using a disposable bailer or a submersible pump.

The wells will be allowed to recharge groundwater levels re-measured and the measurement of any identified phase separated hydrocarbons (PSH) recorded.

The wells will be micro-purged using a low flow pump until field parameters (pH, temperature, dissolved oxygen, conductivity, turbidity and redox) have stabilised as per the criteria in Table 2, below (taken from *Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers* by Douglas Yeskis and Bernard Zavala 2002).

Table 2: Stabilised Criteria with Reference for Water-Quality-Indicator Parameters

Parameter	Stabilisation Criteria
pH	+/- 0.1
Electrical Conductivity	+/- 3%
Oxidation/reduction potential	+/- 10 millivolts
Turbidity	+/- 10% (when turbidity is greater than 10 NTUs)
Dissolve Oxygen	+/- 0.3 mg/L

Once field parameters have stabilised samples will be collected using a low flow pump. Samples will be placed with a minimum of aeration into appropriately preserved bottles. Groundwater samples will be collected from the mid-screen, unless separate phase product is detected.

For analysis of metals the relevant sample fraction will be filtered using a sterilized 0.45 μm filter.

The sample pump and all non-disposable sampling equipment will be decontaminated between samples via a “triple rinse” procedure i.e. a rinse of all particulates in tap water followed a decontamination using a 3% Decon 90 solution and a final rinse in deionised water.

Sample containers, supplied by the laboratory (listed below), will be labelled with individual and unique identification, including project number and sample number. Appropriate containers and preservation will be used as below:

- VOC - 2 x 40 ml HCl preserved glass vial cooled to 4°C;
- TPH – 1 L unpreserved glass;
- BTEX – 2 x 40 ml HCL glass vials;
- PAH – 1000 ml glass;
- Phenol – 250 ml plastic;
- Heavy metals and hardness – filtered, 50 ml HNO_3 preserved plastic; and
- pH – 20 ml plastic or glass.

The sample management will be as follows:

- Collecting 10% replicate samples for QA/QC purposes. In addition laboratory prepared trip spikes and blanks will be taken into the field unopened to as additional QA/QC samples;

- Samples will placed in insulated coolers and maintained at a temperature of approximately 4°C until transported to the analytical laboratory, and
- Chain of custody documentation will be maintained at all times and countersigned by the receiving laboratory on transfer of samples.

All samples will be dispatched to NATA accredited laboratories for analysis.

The adopted groundwater analytical regime will target the contaminants of concern identified in Section 2.

Where available, low level or trace level analysis will be specified in order to ensure that laboratory reporting levels are less than the adopted GIL or at least as close as possible to the GILs.

9. Soil Gas / Vapour Installation and Sampling Methodology

The proposed soil vapour probe in the centre of the existing sports oval will be driven to a nominal depth of 1.0 m bgl. The probe will be advanced via the below general methodology:

- Using the solid rods and solid end point a pilot hole will be driven to the target depth and then the rods extracted; and
- The retractor tip will then be attached to a nylon tube which will be inserted to the hollow stem rods. The retractor tip will be driven the target depth and then rods will be raised exposing the gas inlet of the retractor tip (refer to Figure 2 below).

Figure 2: Retractor Tip

- A hydrated bentonite plug will be inserted into the top 0.05 m around the rods to limit atmospheric interferences; and
- The retractor tip and rods will be extracted and the hole backfilled with hydrated bentonite, once the sampling is completed as outlined below.

The remaining soil vapour sampling locations will be permanent installations, such that soil vapour sampling can be undertaken at later dates. The soil vapour wells will be designed and installed in general accordance with CRC Care Technical Report No. 13 *Field Assessment of Vapours* (August 2009) as follows:

- A geoprobe drilling rig will form a bore of 50 mm diameter to a depth of 1.0 m below ground level; and
- Installation of a soil vapour well (one per bore) to the target depth (close to the base of the bore) connected with 1/8-inch diameter nylon tubing. The nylon tubing will be connected to a brass fitting which will be cement/bentonite grouted at close to ground level. The installations will be backfilled with washed gravel (around the SV probe, approximately 400 mm in length) and bentonite (remainder of the bore). A plastic Gatic cover will be installed at the ground surface to prevent public access to the sampler and eliminate trip hazards. The well installation diagram is depicted on in Figure 3, below.

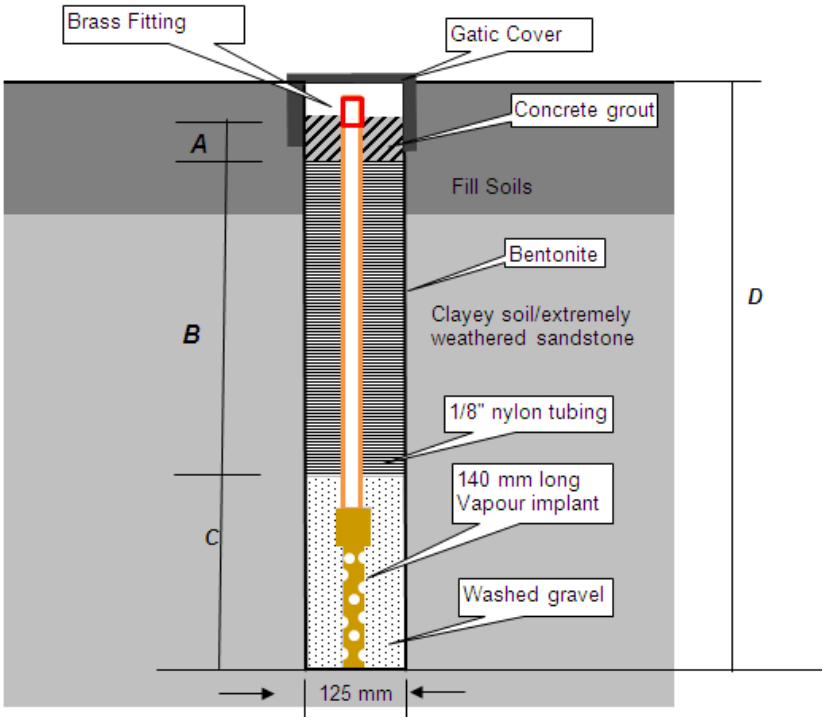

Figure 3: Schematic Design of Soil Vapour Probe

The soil vapour sampling will be undertaken in general accordance with CRC Care Technical Report No. 13 *Field Assessment of Vapours* (August 2009) and CRC Care Technical Report No. 23 *Petroleum Hydrocarbon Vapour Intrusion Assessment Australian Guidance* (July 2013) and as follows ASTM D7663-12 *Standard Practice for Active Soil Gas Sampling in the Vadose Zone for Vapour Intrusions* and current industry best practice. The sampling and analytical methodology to be adopted is as follows:

- Performance of sampling train shut in tests on the sampling train prior to sampling to demonstrate that there are no leaks in the sampling train;

- Purging of the vapour probe prior to sampling by removing one volume of air/vapour from the probe and sampling tube. Care will be taken not to purge more than the volume of the tubing and the internal part of the implant (only a small volume);
- Introduction of liquid isopropyl alcohol (IPA) into a sampling shroud to be placed over the sampling equipment at the point that the probe intersects with the ground to act as a tracer gas for leaks in the soil vapour ports and/or the sampling train. All samples will be analysed for IPA as part of the TO15 analysis;
- Field screening of the shroud and sampling line using a PID. If the PID levels significantly increase upon application of the IPA tracer sampling lines will be checked and replaced as necessary and / or further bentonite will be added at the surface to provide a better plug;
- Sampling of vapours from the vapour probe, undertaken by an experienced environmental scientist;
- Primary samples collected directly from the by connecting the sampling tube directly to 1L Summa Canisters with a flow regulator set by the analytical laboratory (at approximately 0.1 L/min). The regulators will be supplied by the analytical laboratory and decontaminated by the laboratory prior to shipment;
- Back-up samples will be collected directly into solid carbon tubes using an SKC constant flow air-sampling pump, low flow adapter and rotameter to confirm the flowrate (0.1 L/min);
- Collection of one shroud sample to a carbon tube to conduct analysis for IPA and determine the concentration of the tracer compound in the shroud;

  Field reading of general gases will be measured for a period of up to 5 minutes using a GA5000 and methane, oxygen, carbon dioxide, carbon monoxide and hydrogen sulphide levels will be recorded;
- Analysis for VOC will performed according to TO15 USEPA Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air Second Edition. Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS); and
- Total recoverable hydrocarbons (TRH), F1 and F2 fractions will be determined by measurement of air-phase petroleum hydrocarbons and ozone precursors by GC/MS.

10. Soil Sampling Methodology

Soil sampling will be undertaken using the following process:

- Drilling of three boreholes with a Geoprobe rig;
- Collection of disturbed soil samples from all soil sampling locations at the surface (0 to 0.2 m), 0.5 m, 1.0 m bgl and every metre thereafter to the base of the investigation bore. The bores will be terminated at a minimum of 0.5 m into natural soil or at refusal;
- Transfer of samples into laboratory-prepared glass jars, completely filled to ensure the headspace within the sample jar was minimised, and capped immediately to minimise loss of volatiles;
- Labelling of sample containers with individual and unique identification, including project number, sample location and sample depth;

- Placement of the glass jars, with Teflon lined lid, into a cooled, insulated and sealed container for transport to the laboratory;
- Additional soil samples will be collected should visual or olfactory evidence of contamination be identified;
- All sampling information will be accurately recorded and quality control maintained throughout the investigation; and
- Soils penetrated during the investigations will be described in general accordance with the Unified Soil Classification system, with features such as seepage, discolouration, staining, odours and other indications of contamination being noted.

11. Groundwater Investigation Levels and Site Assessment Criteria

The GIL for the groundwater investigation will include:

- The Health Screening Levels (HSL) for commercial and open space land use from NEPC (2013); and
- The Australian and New Zealand Governments (ANZG), *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2018* (ANZG, 2018). The criteria will be based on the protection of aquatic ecosystems for a slightly to moderately disturbed marine water system; and
- Where criteria are not available, other national or international threshold may be adopted.

The SAC for the soil investigation will include:

- The generic health and ecological based investigation and screening levels in NEPC (2013), for a commercial and an open space / recreational land use.

The SAC for the soil vapour investigation will include:

- The interim health-based investigation levels (HIL) in NEPC (2013) for a commercial / industrial and open space / recreational land use for chlorinated hydrocarbons; and
- The soil vapour HSLs for vapour intrusion in NEPC (2013) for a commercial / industrial and open space / recreational land use for petroleum hydrocarbons.

12. Quality Assurance

DP's quality assurance (QA) and quality control (QC) procedures will be adopted throughout the field sampling program to assess sampling precision and accuracy and prevent cross-contamination. The QA program will be carried out during the soil, groundwater and soil vapour assessment.

DP will assess sampling accuracy and precision through the analysis of up to 10% field duplicate/replicate samples (including inter-laboratory and intra-laboratory replicates).

Appropriate sampling procedures will be undertaken to limit cross contamination and they will follow procedures described in DP's *Standard Operating Procedures Manual*. This specifies that:-

- Standard operating procedures are followed;
- Site specific work statement and safety plans are developed prior to commencement of works;
- 10% duplicate or replicate field samples are collected and analysed (5% inter-laboratory analysis and 5% intra-laboratory analysis);
- Replicate samples will be analysed for the full analytical suite of the primary samples;
- Trip spike and trip blank samples will be taken out into the field on a daily basis. Trip spike samples will be analysed for BTEX and trip blank samples for heavy metals, PAH and TPH. One trip spike and one trip blank will be analysed for each sample batch;
- Rinsate samples will be collected from non-disposable sampling equipment following decontamination and analysed for the full analytical suite of the primary samples. One rinsate sample from each day of fieldwork will be analysed where non-disposable equipment is used;
- Samples are stored under secure, temperature controlled conditions. An ice box (esky) continually topped with ice will be used for storage during the fieldwork. All recovered samples will be returned to the refrigerator at the DP office at the completion of each day, and forwarded in an ice box to the laboratories on the following day;

The QA and QC procedures adopted throughout the soil vapour monitoring will include the following:

- Adoption of appropriate chain-of-custody procedures from site to the laboratory;
- Documenting sample receipt conditions to verify the validity of the sample;
- Equipment calibration conducted regularly;
- Checking of canister vacuum pressure at the commencement and completion of sampling in comparison to the pressures at dispatch and upon final receipt by the laboratory;
- Performance of sample train shut-in leak tests;
- Analysis of samples within recommended holding times;
- Collection and analysis of a field sample duplicate for intra-laboratory duplicate analysis; and
- Analysis of the tracer gas (isopropyl alcohol (IPA)) introduced into the sampling shroud to assess for leaks in the sampling train and for interference from atmospheric gases. A sample of the shroud gas will be collected onto a carbon tube for analysis.

13. Laboratory QA/QC

The contract laboratories will be NATA accredited and will conduct in-house QA/QC procedures involving the routine testing of:

- Reagent blanks;
- Spike recovery analysis;
- Laboratory duplicate analysis;
- Analysis of control standards;

- Calibration standards and blanks; and
- Statistical analysis of QC data including control standards and recovery plots.

Samples will be analysed using NATA accredited methods. Samples will be temporarily stored on site and transported to the laboratory in a portable cooler with ice blocks. All samples will be analysed within the required holding times.

An assessment of the laboratory reported QA/QC outcomes will be undertaken by DP in order that DP can have confidence in the reported outcomes.

14. Concluding Statement

Following this SAQP will assist in providing sampling and analysis results to address data gaps in the characterisation of contamination risk at the site and in association with the concerned areas, in terms of potential impact to the site and proposed development. The results of the proposed sampling and testing will also be used to assess the need for further investigations and/or remediation.

The SAQP should be reviewed and agreed to by the Site Auditor prior to implementation.

In accordance with the SMWS and the Environmental Management Plan, landfill and hydrocarbon gas will be monitored using PID and a multi gas meter onsite. All work will be carried out consistent with the requirement of Section 10 of the RLMP.

The following action shall be taken in the event of a high alarm in the ambient air of the work area:

1. Stop work and shut down potential ignition sources (if safe to do so) and notify SPOA's Remediated Lands Team.
2. Remove all workers to an area upwind of the site (at least 10 metres).
3. Allow gases/vapours to dissipate by natural ventilation.
4. Return to the work area with the multi gas detector and take readings at 15min intervals.
5. Repeat process until multi-gas detector alarm no longer sounds prior to recommencing work.

In addition, the field staff will contact the Project Manager to discuss any required emergency response measures, possible recovery options and action triggers in the event of continued exceedance.

Several of the planned soil and soil vapour investigation locations will be in close proximity to the former tar pit in the north-eastern quarter of Wilson Park, as shown on the attached Drawing 2. Should the bore locations intercept the tar pit, the following measures will be enacted:

- Drilling / sampling will cease;
- The bore will be immediately backfilled with a bentonite / cement grout;
- The location will be surveyed using dGPS for records;
- SOPA will be advised of the find; and

- Bore relocation will be considered (to be approved through an amendment to the works permit).

15. Limitations

Douglas Partners (DP) has prepared this report for this project at Lot 5 Deposited Plan 421320, Newington Road, Silverwater, in accordance with DP's proposal dated 15 August 2019 (Proposal No. SYD190618.P.002.Rev3). This report is provided for the exclusive use of Cox Architecture Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

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

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

Please contact the undersigned if you have any questions on this matter.

Yours faithfully
Douglas Partners Pty Ltd

pp: J. Beacon

Celine Li
Environmental Engineer

Reviewed by

Paul Gorman
Principal

Attachments: About this Report
Drawing 1 - Proposed Sampling Locations with former soil gas survey results
Drawing 2 - Proposed Sampling Locations overlay
Drawing 3 - Proposed Sampling Locations on the proposed development layout

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

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

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

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

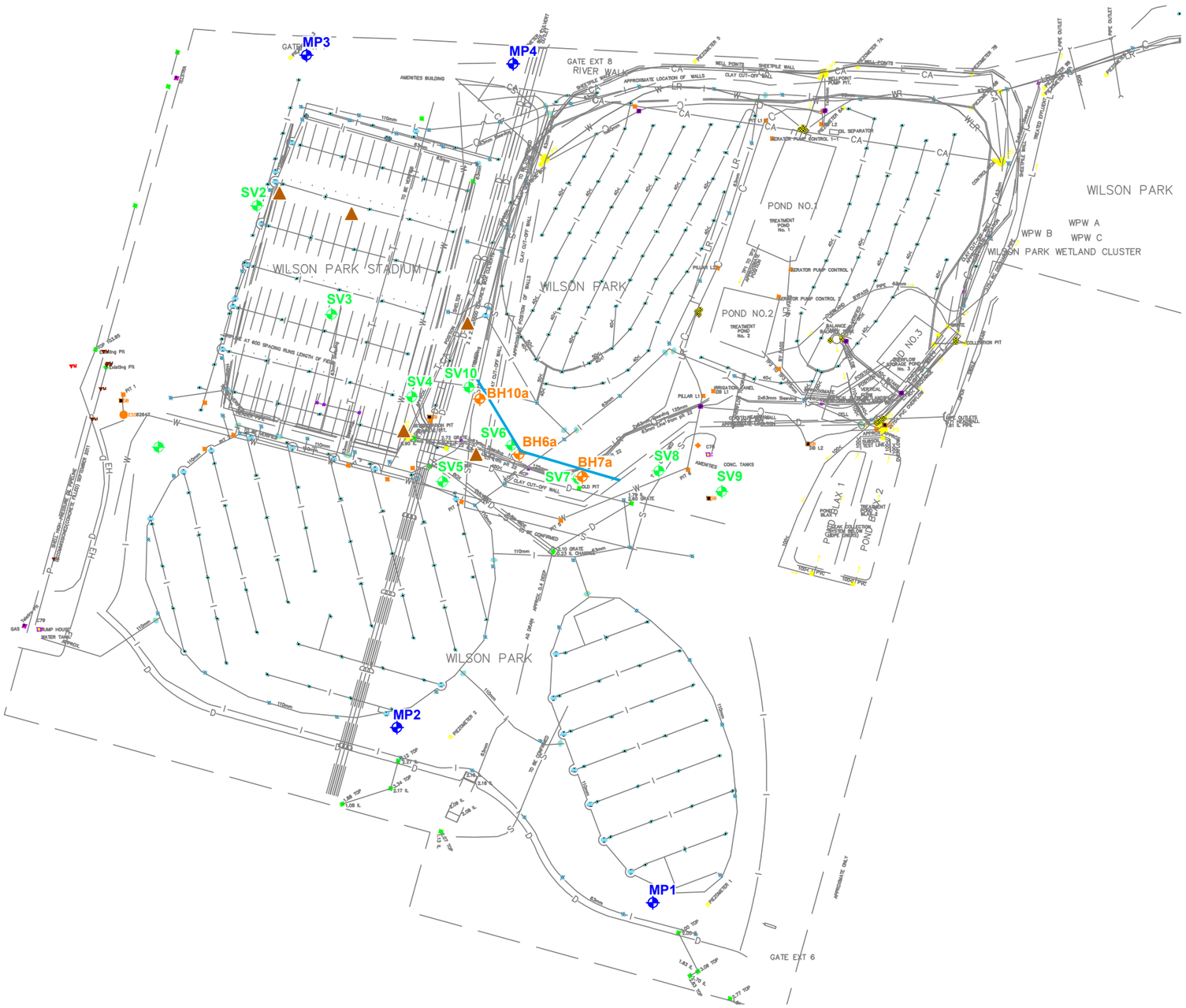
In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later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

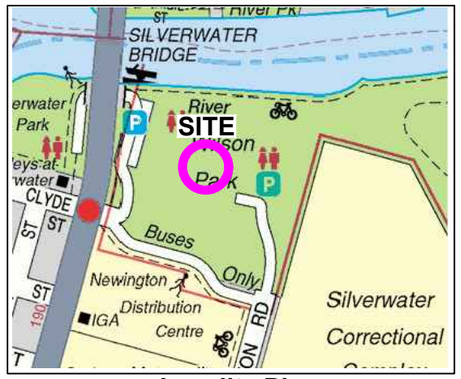
Information for Contractual Purposes

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

Site Inspection

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





Locality Plan

0 10 20 30 40 50 75 100m

1:1000 @ A3

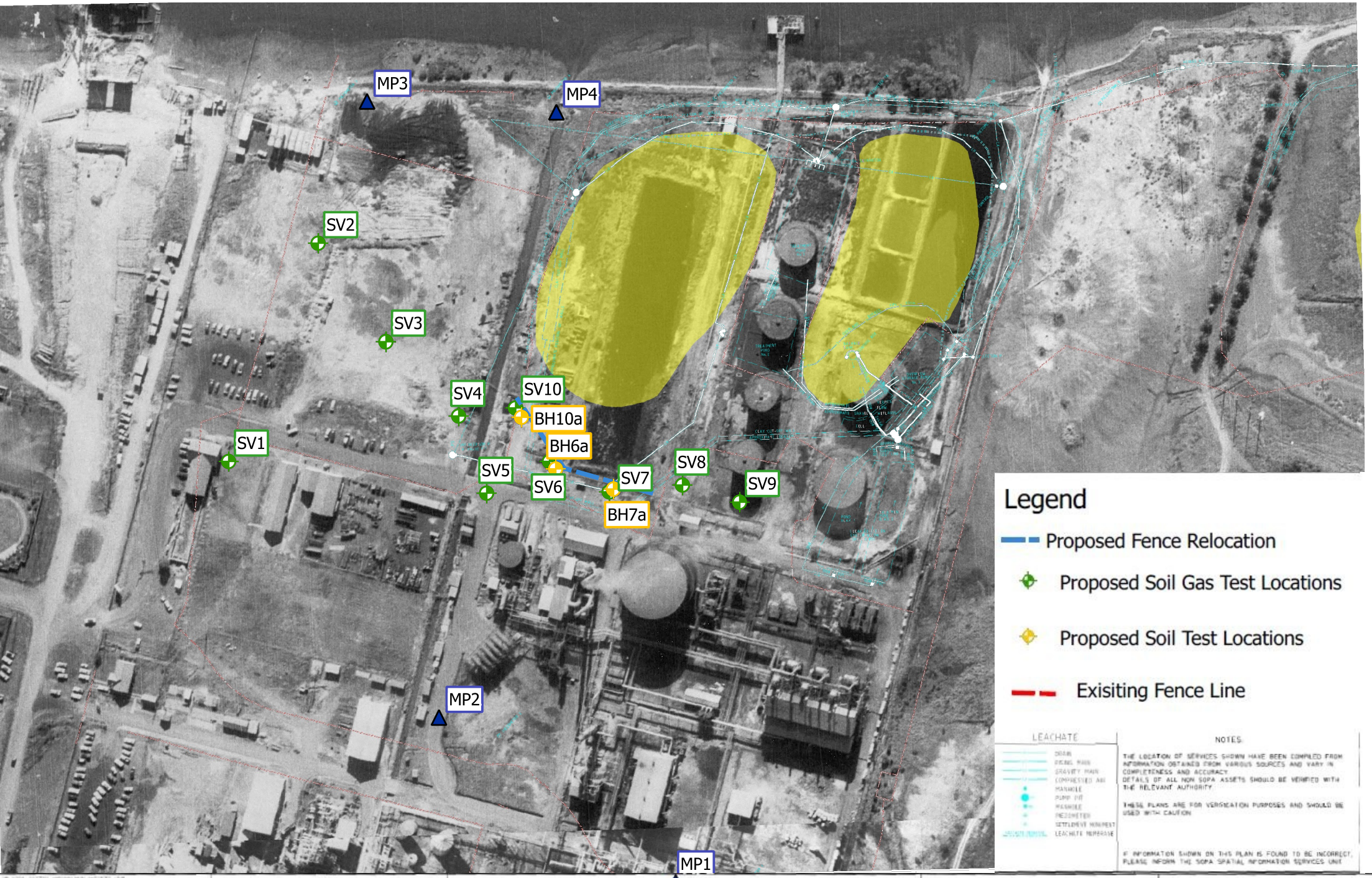
NOTE:
1: Base image from Sydney Olympic Park Authority (Dwg 085-P-P-0176REV.N, Dated 2.7.2019)
2: Test locations are approximate only and have been estimated based on historical drawings with reference to existing features.

LEGEND

- Proposed soil gas probes (10)
- Proposed soil sampling (3)
- Groundwater monitoring wel
- Soil probe locations (1999) with PID >20pm all at depths of 0.5m
- Proposed fence relocation

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Cox Architecture pty Ltd		TITLE: **Test Location Plan**	PROJECT No: 86694.03
OFFICE: Sydney	DRAWN BY: PSCH	**Western Sydney Cricket and Community Centre**	DRAWING No: 1
SCALE: 1:2000 @ A3	DATE: 4.9.2019	**Wilson Park, SILVERWATER**	REVISION: 0



NOTES

SYDNEY OLYMPIC PARK

WILSON PARK

Plan Showing Leachate Infrastructure, Extents of Waste and Fence Lines (Date of Photography: 1961)

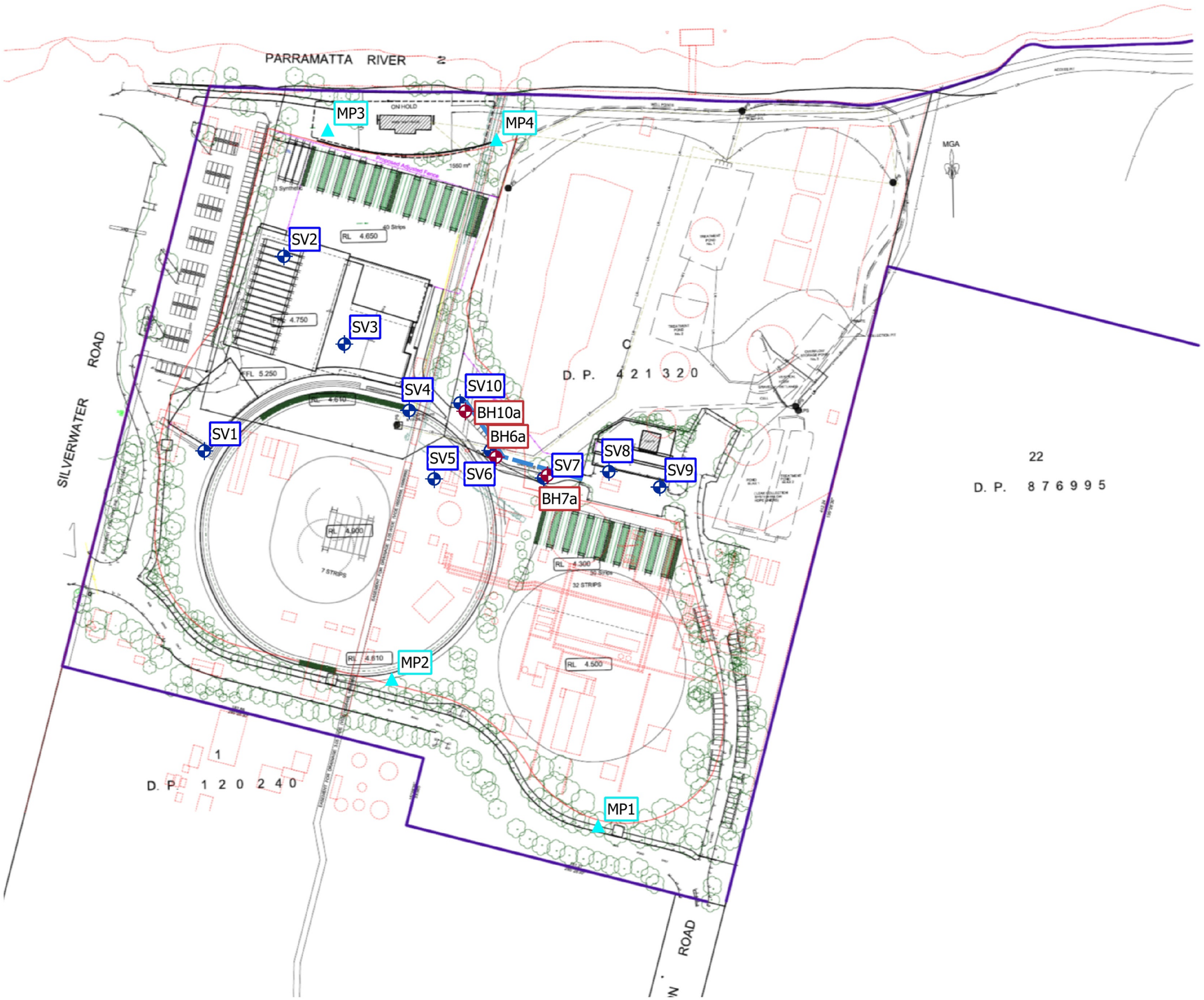
SYDNEY OLYMPIC PARK AUTHORITY

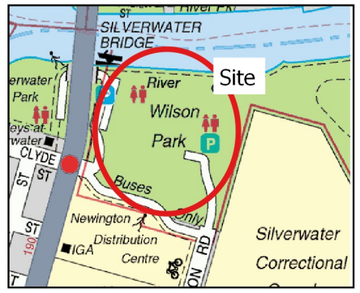
DISTRIBUTION CONTROL

SydneyOlympicPark

DRG. NO.: 085-P-P-0183 REV. A

SCALE: AS PER SCALE BAR





Locality Plan

Legend

- Groundwater Monitoring Well
- Proposed Soil Test Locations
- Proposed Soil Gas Test Locations
- Proposed Fence Relocation

0 50 100 150 200 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	Cox Architecture Pty Ltd		
OFFICE:	Sydney	DRAWN BY:	NW
SCALE:	1:2200 @ A3	DATE:	26.8.2019

TITLE: **Test Location Plan**
Western Sydney Cricket and Community Centre
Wilson Park, SILVERWATER

N

PROJECT No:	86694.03
DRAWING No:	3
REVISION:	0