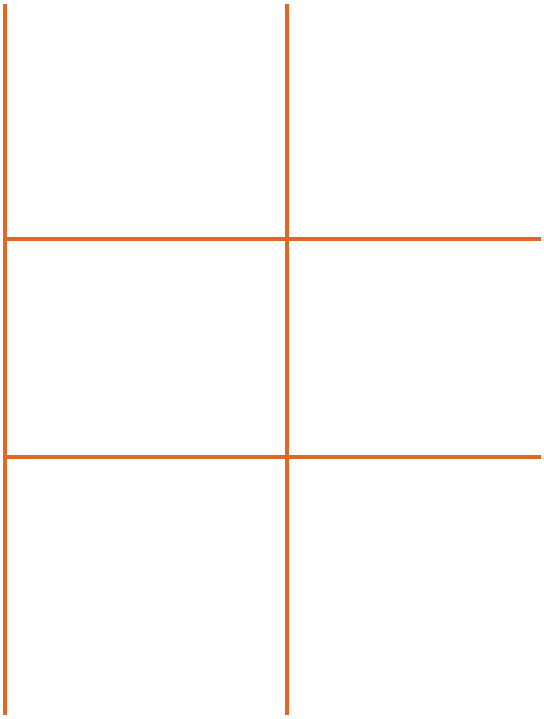
APPENDIX 6 LAND USE SUITABILITY ASSESSMENT

Compliance

Health &

Environmental

Consulting



Land Use Suitability Assessment

Property:

Former Portland Cement Works

Williwa Street Portland, NSW

Client:

Catalyst Project Consulting

110 King Street

Newcastle, NSW 2300

February 2019_CH1060-D9132

Executive Summary

Compliance Health & Environmental Consulting Pty Ltd (CHEC) have been engaged by Catalyst Project Consulting to undertake an environmental assessment of Portland Cement Works in Portland, NSW. The Assessment is required to support an application to Council for the rezoning and subdivision consistent with the proposed concept plan (Attached as Figure 2).

The scope provided to CHEC included a revision of existing reports and obtaining analytical from any identified areas where existing data was insufficient to determine land use suitability in accordance with the proposed development concept plan. This assessment has been provided in the context of an addendum to previous studies and should be read in conjunction with previous reports.

Covering a total of 84ha, the proposed development area includes heritage listed cottages, offices and industrial buildings in the southern area, four water-filled former quarries and a decommissioned dam in the centre and relatively undisturbed open space areas in the northern portion.

Some ash material has been placed as fill in the western and northern areas, whilst concrete hardstand has been constructed throughout the cement production area in the southern extent. Waste oil tanks, Underground petroleum storage and transformers within substations have all been documented as environmental concerns and a train line was known to enter the Site from the east. Some demolition has taken place and minor remedial works have been undertaken including the removal of two underground storage tanks.

CHEC consider that sufficient analysis of the quarry water has been undertaken to determine that the environmental risk associated with the presence of chromium has been reduced since 1996 to an acceptable level. The Site wide groundwater study in 1996 did not identify any significant contamination and no activity has occurred at the Site since closure that would influence that finding.

Sampling in the area of the heritage cottages is also considered adequate to determine that the area is compliant with a land use consistent with either open space or residential as defined by NEPM, 2013. Remedial work further reduced that risk by removing topsoils containing elevated lead concentrations. Due to the nature of the buildings, however, an inspection is warranted to determine the current condition.

Though some contamination may remain in soils within the tank pit adjacent to heritage office building, the proposed development would limit the exposure pathway to vapour intrusion in either a commercial or open space land use scenario. The data that has been provided appears to indicate that under either of those scenarios, the human health risk is acceptable. Existing data also indicates that geological conditions have limited the migration of the contaminants. Though no biochemical data has been analysed, it is reasonable to assume biological processes will assist physical influences such as dispersion to gradually reduce concentrations over time. With no immediate potential exposure to any sensitive receptors, the environmental risk is also considered acceptable.

The Closure Plan that was produced by Boral in October 2013 acknowledged "*the density of soil sampling for the site as a whole, and for the cement works area in particular, was low relative to the current guidelines for detailed site characterisation. Consequently, additional soil sampling may become necessary if parts of the land are to be rezoned for more sensitive land uses*."

The cement works land has now been earmarked for a change in land use to B(4) – Mixed Use; however, that will not increase the risk of exposure to potential contaminants and could actually be considered less than before. Three test pits by Dames & Moore were limited to heavy metals analysis only, though indicated contaminant concentrations complied with Site criteria. Previously occupied buildings have now been demolished, though the concrete surface has at this stage been retained, limiting potential for rainwater infiltration, which would promote migration. The intent is to maintain open space areas, thereby reducing any potential vapour exposure.

Other buildings that are proposed for light commercial/retail usage will be consistent with previous exposure scenarios and limited to short term occupational risk to any potential airborne contaminant. Considering the buildings are heritage listed and the ground covered by dense concrete slabs, intrusive investigations are restricted. Any exposure pathway would be limited to inhalation of volatile hydrocarbon substances, which are generally associated with odour. Though some minor odour was evident in the former workshop due to oil staining, generally the air quality was of no concern within the buildings during the recent Site inspection.

The URS Phase 1 stated that there are four transformers at the Site; however, locations are not specified and only one has been identified by caretaker personnel. Once decommissioned the areas should have representative samples taken from potentially impacted soils and analysed for PCB's.

Of the ten test pits excavated by Dames & Moore, only one was analysed for asbestos. Considering the placement of fill at the property corresponded with a period of unregulated use of asbestos, additional sampling and asbestos analysis was undertaken by CHEC in the Quarry 1 / Quarry 2 fill area.

Rail cuttings to the east of the operational area were reportedly backfilled with overburden. Without extensive excavation it would not be possible to accurately locate the corridor. In the current condition it does not present an actual risk, however, should any excavation in the future encounter the rail line, there is a potential for asbestos fibre from brake linings to be present. In that circumstance soils analysis should be undertaken to allow an informed input for a Long-term management Plan.

Whilst Coffey had undertaken sampling in the proposed small lot areas at the former HWD location, very limited sampling or discussion has been provided in the areas now identified for large lot residential land use. Considering these areas represent some of the most sensitive land use, further investigation was required to document the occurrences of fill or other potential contaminating influence.

Site observation identified some potential for asbestos containing material to have been buried. Anecdotal evidence of the chemicals that were stored indicated that a screen of volatile and semi-volatile hydrocarbons would be an adequate measure to detect any concentrations that would represent a risk.

Significant amounts of ash and potentially contaminated fill was observed that has the potential to contain chlorinated compounds or scheduled chemicals including PCB's. It was also considered appropriate to provide analytical data on heavy metal concentrations, Polycyclic Aromatic Hydrocarbons (PAH), including known carcinogens within that group, to determine land use suitability with an adequate level of confidence in the fill areas.

The housing along Williwa Rd was in generally poor condition. External walls were predominantly brick; however, fibre cement building material had been used for shed construction, patios and some internal walls. One house had significant internal fire damage and broken fibro was observed on most properties. The fibro was confirmed as containing asbestos and had been spread across the ground surface in the vicinity of the structures.

The buildings that remain in the former cement works area were generally in good condition, despite the occasional broken window. Paintwork was aged and flaking and has been reported to be lead-based. On the northern side of the buildings, a significant amount of broken fibro was observed on the ground. Some staining was noted within the former workshop building.

Buildings on the northern side of the heritage area had been demolished to slab level and the area was then covered with 200mm of recovered aggregate and fines.

Fill material was observed around quarry 1 and 2 at the western extent of the property. Foreign materials were not observed within the fill and no staining or odours were apparent. Vegetation was quite dense in most areas limiting access; though also demonstrating that there were no signs of stress. The ground surface throughout the central portion of the quarry area was mostly natural ground or had been land formed with clean overburden.

The eastern and northern side of quarry 4 had access roads cut into the quarry wall. These roads had been top-dressed with a gravelly clay material on which some fragments of fibro were observed. Above the roads in the proposed northeast R5 area was grass covered with occasional small stockpiles containing soil and organic matter, though no foreign material and no ACM was observed.

The proposed R5 zone in the north and northwest of the property contained a significant amount of ash and overburden with some waste materials and building debris. The western portion of that area was steep and well covered with trees. The ash fill was observed to be up 1m thick where gullies had eroded to expose the soil profile.

Across the top of the hill approximately 20 test pits were excavated over an area of approximately 1.6Ha to delineate the extent of filling and type of fill. Ash was observed to extend from the surface to approximately 0.2m in the west and to approximately 1.2m in the eastern portion of the fill area. Overburden had been placed below the ash though often there were alternating layers with the deepest area of fill observed to be approximately 3m. The fill contained occasional inert materials such as corroded metal, timber, metal chains and rubber conveyer belt. No indication of ACM was observed and apart from some surface debris most locations were generally free of significant foreign material.

Five bulk soil samples were obtained from fill materials around Quarry 1 and 2 and analysed for the presence of asbestos. No asbestos was identified in any sample. The four samples in the western 'forested' area of the proposed R5 zone did not contain any concentrations of hydrocarbons, pesticides, PCB's or asbestos above the laboratory limit of detection.

Nine samples from seven of the test pits excavated in the open hill area of the R5 zone were sent for analysis. Of those nine samples, two from the same test pit (R5-2) had minor detections of PAH compounds. Test pit 2 was measured to have a BaP (TEQ) of 0.3mg/kg and total PAH of 3.1mg/kg in the surface ash and some non-carcinogenic PAH's at 0.1mg/kg at a depth of 2.5m. Considering the

residential land use HIL of 3mg/kg (BaP TEQ) and total PAH of 300mg/kg, the results do not indicate an increased level of risk. No other detection of hydrocarbons, pesticides, PCB's or asbestos was observed in any of the samples obtained in the proposed R5 zone.

The heavy metals data obtained from sampling in the R5 zone complied with both residential and ecological screening criteria for all eight heavy metals commonly associated with land contamination that is likely from cement production apart from one sample (R5-6-1). The soil sample at test pit 6 did exceed the ecological screening level for nickel and zinc, though both contaminants complied with the residential HIL's and the absence of elevated concentrations in surrounding soils suggests the distribution is limited.

CHEC has reviewed all documentation provided by Catalyst Project Consulting in relation to contaminated land and water studies at the former Portland Cement Works. With the available data and the development concept plan now finalised, it was possible to gauge a general level of confidence to determine land use suitability within specific land use areas. In addition to that information, it was necessary to provide additional data in some of those areas to improve the overall confidence level.

With the additional sampling program and inspections undertaken by this assessment it is possible to provide the required level of confidence to determine the suitability of the Site for the proposed land use. The proposed zoning limits potential exposure pathways in the former works area and the heritage housing area to occupational activities and visitors to the Site. The fragmented asbestos observed around the houses and the workshop area will require remediation and a clearance in accordance with SafeWork NSW: Code of Practice – How to Safely Remove Asbestos, 2016.

In terms of remediating the heritage listed buildings to eliminate the risk of lead paint contamination and hydrocarbon staining, any proposal would need to be negotiated with the appropriate government bodies. The presence of the concrete hardstand across most of the area provides significant protection from rainwater infiltration and thereby limiting the potential for any mobile contaminants to be transported. Previous data from Dames & Moore, whilst sparse, suggests that the potential for contaminants to be distributed across this area in any quantity that would present a risk to the environment or human health is acceptably low.

Auspower carried out testing of the transformer oil in November 2018 and it was found to be free of PCB's. Due to the absence of historical records for transformer types and maintenance, it is recommended to undertake validation soil testing once the unit is removed from service.

Access roads to the east and north of Quarry 4 will require some of remedial work or control to prevent potential future exposure. The extent of work will be dependent on the final subdivision plan and may range from removal or covering of the contamination to restricting access to the area, which may align with the necessity to limit access to the dam for safety reasons. The roads are not within the proposed residential area and the extent of contamination is expected to be below the bonded criteria of 0.01%w/w. If access is expected; however, the upper 0.1m will need to be free of all asbestos containing material.

Asbestos containing material was not identified in representative soils samples or by visual inspections around Quarry 1 and Quarry 2. In addition to the data provided by the Dames & Moore report, this area is considered suitable for the proposed recreational land use. Similarly, the HWD area being

proposed for standard residential lots is considered suitable for that proposed land use based on the Coffey 2012 data and supported by recent visual assessment.

The north east proposed R5 zone is considered to have a very low likelihood of contamination based on visual assessment and was found to be predominantly natural ground. The proposed R5 area to the northwest was observed to contain significant amounts of fill material including ash. Test pit observations and chemical analysis of representative samples indicates there is negligible risk of contamination. The area may; however, require substantial geotechnical stabilisation to provide for the construction of housing and further advice should be sought from a geotechnical engineer.

Areas requiring remediation have been identified and it is anticipated that the remedial work can be undertaken as part of the Site development once rezoning and subdivision has occurred. It is recommended to develop an appropriate Remedial Action Plan that incorporates the requirements to protect the heritage value of any buildings and the Site generally once the subdivision plans have been finalised and approved.

Based on the available information it considered that the Site can be made suitable for the proposed land use with the implementation of the required remedial work identified in this report.

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1.0 Introduction

Compliance Health & Environmental Consulting Pty Ltd (CHEC) have been engaged by Catalyst Project Consulting Pty Ltd to undertake an environmental assessment of Portland Cement Works in Portland, NSW. The Assessment is required to support an application to Council for the rezoning and subdivision consistent with the proposed concept plan (Attached as Figure 2).

1.1 Scope of Work

The scope provided to CHEC included a revision of existing reports and obtaining analytical from any identified areas where existing data was insufficient to determine land use suitability in accordance with the proposed development concept plan. This assessment has been provided in the context of an addendum to previous studies and should be read in conjunction with the following reports:

- Portland Cement Works Closure Plan (Boral Property Group, October 2013)
- Contamination Assessment and Conceptual Remediation Plan (Dames & Moore, February 1996)
- Environmental Site Assessment (Coffey Geosciences Pty Ltd, 4th February 2002)
- Remediation and Validation Plan (Coffey Geosciences Pty Ltd, 5th March 2004)
- Phase 1 Environmental Site Assessment – Portland Cement Works (URS, June 2010)
- Groundwater Monitoring Event (Coffey Environments Australia Pty Ltd, 27th June 2012)
- Surface Water, Sediment and Stockpile Sampling – May 2012 (Coffey Environments Australia Pty Ltd, 19th July 2012)
- Integrated Development Application (IDA) No. 2013/IDA/043 (APP Corporation Pty Ltd, 28th July 2014)
- Review of Contamination Status Underground Storage Tanks (DLA Environmental Services, 7th May 2015)
- Remediation Status of Groundwater Contamination - Underground Storage Tanks (DLA Environmental Services, DL3588_S03189, July 2015)
- Remediation and Validation of Lead and Zinc Impacted Soils (DLA Environmental Services, DL3588_S03185, July 2015)
- Additional Investigations Former Portland Cement Works, (DLA Environmental Services, DL3588_S005213, August 2016)

This study included:

- A review of all available information for the Former Portland Cement Works, which was related to the current development concept plan and evaluated against relevant tier 1 risk assessment thresholds from the National Environment Protection (Assessment of Site Contamination) Measure (NEPM), 2013.
- Obtaining intrusive soil samples where data gaps were identified from previous investigations.

- Collating the available data to determine land use suitability for the various zonings proposed in accordance with the definitions and thresholds provided by NEPM, 2013.

- Provision of a report to summarise previous findings and results of current field investigations.

For the most part, Site history and risk profiles relating to previous land use have been detailed by all previous reports referenced above and is therefore not warranted for the purpose of this assessment. Whilst they may be summarised by this report, for specific detail, it is recommended to defer to those documents.

1.2 Site Description

Covering a total of 84ha, the proposed development area includes heritage listed cottages, offices and industrial buildings in the southern area, four water-filled former quarries and a decommissioned dam in the centre and relatively undisturbed open space areas in the northern portion. The former cement works property lies on a broad ridge central to the rural town of Portland within the Lithgow City Council area. It is surrounded by residential properties, with some commercial development along the opposite side of Williwa Road at the southern boundary.

Portland is on the catchment divide between the Coxs River, which forms part of the Hawkesbury-Nepean catchment and the Turon River, within the Macquarie River catchment. The Site lies within the Turon River catchment and though quarrying and cement production was undertaken at the Site for over 100 years until 1991, rehabilitation works have now re-established natural drainage from the Site into Limestone Creek.

Some ash material has been placed as fill in the western and northern areas, whilst concrete hardstand has been constructed throughout the cement production area in the southern extent. Waste oil tanks, Underground petroleum storage and transformers within substations have all been documented as environmental concerns and a train line was known to enter the Site from the east. Some demolition has taken place and minor remedial works have been undertaken including the removal of two underground storage tanks.

2.0 Previous Investigations

2.1 Representativeness

A previous development application was being prepared for the Site between 2002 and 2004 that consisted of a residential subdivision along Williwa Street. It's not clear from subsequent reports why that development did not proceed, however, at the time, supporting contamination investigations and remedial plans were provided by Coffey in 2002 and 2004. These were based on intrusive investigations within the sub division area, which was the narrow 1.3ha strip of land along Williwa Street at the southern extent of the Property.

The phase 1 report by URS in 2010 also mentions that it was initiated by a proposed residential and commercial redevelopment of the Site, though does not provide specific detail of the development. The report limits its investigation to the 10.5ha southern 'operational' portion of the Lot and bases its findings on a desktop review of previous data, with the exception of samples obtained from an ash stockpile. The report concludes "*URS makes no warranty, statement or representation of any kind concerning the suitability of the site for any purpose or the permissibility of any use, development or redevelopment of the site.*"

Data for determining soil contaminant concentrations was provided by the Dames & Moore assessments undertaken in 1995 and 1996. The 1995 assessment was for the purpose of assessing a fly ash dump for disposal into the former quarry. The 1996 assessment was initiated by a notice from the NSW EPA under the Environmentally Hazardous Chemicals Act. Whilst few details of that notice are provided, it appears to be focused on concerns about water quality. In addition to water sampling from each quarry and surface waters, the investigation included soil data from ten test pits, consisting of six test pits in the south west corner of the Site, three in the former cement works area and one in a former waste disposal area.

In July 2012, Coffey published findings of their sediment and surface water testing. The testing included nine samples from the footprint of the Hot Water Dam (HWD) that had been drained and another eight samples from the excavated sediments. No specific purpose was provided in the Coffey report for the testing, however the closure plan indicates that it related to the rehabilitation of the dam to a natural terrestrial landscape.

The current development being proposed covers the entire 84ha Lot and includes large lot residential housing (R5) that covers 10ha in the northern portion and approximately 0.8ha to the northeast of Quarry 4. In the centre of the Lot covering approximately 8ha and encompassing the HWD area, standard low-density residential housing is proposed (R1). Mixed use zoning (B4) has been proposed for the footprint areas of the former cement works operation and the heritage protected buildings such as the cottages, stores, the bottle kiln and boiler house. Recreational open space areas make up the remainder of the Lot.

An overlay of the sample locations from previous studies onto the current proposal is provided by Figures 3 and 4, which indicates that apart from the HWD sampling, few data points were within the proposed residential areas. With the exception of the cottage area along Williwa Road and some stockpiles of fly ash, analysis on soils generally has been limited. Considering the sensitive land use being proposed, and the potential for unregulated waste on the property, the existing data set required some additional input to determine land use suitability for the proposed rezoning.

2.2 Documented Environmental Concerns & Remedial Work

2.2.1 Quarry Water Quality

The 1996 Dames & Moore investigation identified Chromium VI concentrations of 60ug/l within Quarries 1 & 2, which marginally exceeded the drinking water Guidelines of 50ug/l. Concentrations of CrVI also exceed the ANZECC ecological threshold of 10ug/l in water from quarry 1, 2 and 3.

The source was identified as kiln dust and refractory bricks placed in Quarry 2. Outflow was prevented from leaving the Site through a disused shaft and the material was capped with over burden and fly ash. Inflow stormwater was diverted away from all three quarries. The capping and diversion strategies appear to have worked in conjunction with natural attenuating factors such as chemical reduction so that concentrations are now below laboratory detection limits.

2.2.2 Underground Storage Tanks

Dames & Moore identified the presence of two underground storage tanks (UST) in their 1996 study. One is a diesel tank located on southern sided of the boiler house, whilst the other they located to the southwest between the office and workshop building. Dames & Moore undertook one hand augured investigation (AH2) on the northern (down gradient) side of the second UST though have not indicated what depth and did not submit the sample for laboratory analysis. Figure 5 of the report places the UST in the area of a small sub-station, though that building is not identified on the drawing.

The Phase 1 by URS in 2010 also recognised the presence of two UST's. One the southern side of the boiler house, though locates the second tank on the northern side of the office building. No mention is made of the tank that Dames & Moore reported to the west near the substation building and further investigation at the Site by CHEC has indicated no evidence of a tank pit in the area of the substation.

The diesel UST adjacent the boiler house was removed in June 2011 by Coffey with no contamination identified in the fill or surrounding residual soil. The second UST adjacent the office building contained petroleum and was corroded, which had led to fill soil containing hydrocarbons in excess of the land use criteria. The closure plan reported that the June 2011 works retained soils in the excavation due to proximity of the heritage listed building and concerns about destabilising the foundations.

To determine the contamination risk associated with the contaminated soils within the petroleum tank pit, Coffey installed three groundwater monitoring wells in August 2011 as part of a Tank Excavation Assessment. One well (MW1) was installed within the tank pit and two others (MW2 and MW3) in a position down hydraulic gradient from the tank pit. Groundwater was encountered at a depth of 11m below ground.

MW1 was found to exceed the adopted Site criteria for BTEX in successive monitoring events by Coffey in August 2011 and June 2012. Soil samples from 5m and 7m within MW1/BH1 also contained benzene concentrations above the adopted criteria. Contaminants were not measured above the laboratory limit of reporting in water samples from MW2 or MW3. Based on the information from these investigations, an application under Section 60 of the Heritage Act was made to demolish part of the building to allow soil remedial works.

In May 2015, DLA identified a limitation of the available data being that the well installed within the tank pit had provided a pathway for contaminants to migrate from soils into the groundwater. Of

note in the DLA report (May, 2015) they suggest that both tank pits were backfilled with clean fill at the time of removal. The June 2011 tank pit assessment by Coffey has not been made available so the conflicting accounts between Boral (2013) and DLA cannot be confirmed. It appears likely that clean fill was not used; however, based on the planned submissions to remediate soil.

DLA (May 2015) also states "Natural attenuation of hydrocarbon contamination in MW1 has been occurring over the period 2011-2014 when monitoring has taken place. The concentrations of hydrocarbons now appear to be acceptable". DLA provide no data to support their conclusion and the only previous data made available to CHEC were from the 2011 Supplementary Tank Assessment and 2012 Groundwater Monitoring Event both issued by Coffey. DLA indicate in their letter report that a monitoring event was undertaken in 2014 by Coffey, however do not discuss the results and that report was not provided for this review, therefore the DLA statement cannot be verified.

DLA filled MW1 in July 2015 with a bentonite slurry to 8m below ground then added an oxidising agent to facilitate the aerobic degradation of volatile hydrocarbons in the perched water and overlying soil. No additional data was provided prior to decommissioning the well. The additional investigation by DLA in August 2016 did not sample the perched water in MW1 nor did they sample MW3. Their sample from MW2 did not detect petroleum contaminants above the laboratory limit of reporting.

Table 2a – MW1 groundwater Monitoring Results (Coffey, 2011 & 2012)

Analyte	C6-C9	Benzene	Toluene	Ethyl-Benzene	m/p Xylene	o-Xylene	C10-C14
Aug-2011	4200	1800	39	110	440	210	2800
May-2012	3200	2600	91	120	350	190	2200

2.2.3 Heritage Cottage Area

Coffey carried out an investigation of soils within the cottage area along Williwa Street in 2002. The investigation included analysis from 14 test pits and 11 hand auger holes that were targeted to areas adjacent to the buildings to account for possible release contaminants from lead-based paints, zinc roofing and asbestos containing construction material. The results indicated ecological exceedances of zinc at seven locations and both copper and arsenic at one location each. Lead was measured to exceed the criteria derived for low density residential land use by the NEPM at six locations.

Locations that were subject to vertical delineation indicated that the observed elevated contaminant concentrations were restricted to surface soils. Whilst consistent depth of sampling was not provided by Coffey, this risk analysis separated the data sets below 0.2m and outside the cottage area as they were considered separate populations. Ecological criteria have been developed further since the 2002 study was undertaken, therefore to determine the reliability of the data in this instance, only the lead concentrations have been considered in relation to health investigation level (HIL).

The maximum measured concentration of lead was 671mg/kg, which is less than 250% of the criteria and therefore excludes the result as a hot spot. Statistical analysis of the results indicated that the 95% upper confidence limit (UCL) was calculated to be 330mg/kg, exceeding the NEPM 300mg/kg HIL. The standard deviation was below 50% of the criteria with a result of 143mg/kg. These tier 1 statistical

criteria, when complied with, are cited by NEPM, 2013 as appropriate for determining the land use suitability without the need for a tier 2 site specific risk assessment.

The exceedance of the 95% UCL indicated that the lead concentrations in surface soils were not suitable for residential land use. On that basis it was appropriate to advance to a Tier 2 risk assessment or undertake some remedial work. The sampling technique needs to be considered in determining the reliability of the Coffey data set. Coffey documented the sampling interval as 0-0.3m in many samples, despite the accepted practice for sampling of surface soils being limited to the upper 0.15m to avoid dilution. In that respect, the measured concentrations may in fact be an underestimate of the true concentration of contaminants.

The other factor to consider is that the sampling was not systematic and targeted areas likely to have the highest concentrations. Additionally, the investigation was undertaken on the basis that the area would be developed for a residential subdivision and, as a result, was compared with the most sensitive land use criteria. The current subdivision plan seeks to maintain the heritage value of the cottages and therefore will not be subject to as sensitive a land use scenario. Based on the information provided to CHEC, open space criteria of 600mg/kg may be more appropriate. Under that scenario, there would be no requirement for remediation if the measured concentrations are to be relied on.

Based on the lack of confidence in the measured values, however, and the uncertainty in development plans at the Site, DLA determined that removal of surface soils at all locations exceeding the Residential HIL to a depth of 0.1m would be an appropriate remedial strategy for lead.

DLA also cited a value of 960mg/kg ecological criterion for zinc as an alternative to the 200mg/kg used by Coffey. In the absence of pH or cation exchange capacity values, however, it is not clear how that value was calculated or if it was appropriate. Zinc concentrations in surrounding soils were generally below 20mg/kg, suggesting that is an appropriate ambient background concentration (ABC) rather than the proposed 220mg/kg (ABC) cited by DLA. Expected pH in the organic topsoils would be relatively neutral to mildly acidic and a maximum expected CEC of 10cmol/kg. Using those assumptions, NEPM 2013 provides an added contaminant limit (ACL) of 400mg/kg, which then results in an ecological criterion of 420mg/kg (ABC + ACL).

It is not clear why DLA proceeded to remove soils at the Coffey TP4 and TP7 locations and then validate for zinc only as these locations complied with their alternative criterion of 960mg/kg. Conversely DLA did not validate zinc concentrations at BH1, BH2, BH5 or BH6 where soils were also removed to account for elevated lead though had similar Zn concentrations. It is also noted that the lead exceedance at BH4 was not remediated within the 'casino' building area. In any regard the zinc concentrations are not considered to be in excess of the ecological criteria for this area of the Site and removal of some surface soils has removed the elevated lead concentrations at those locations.

Table 3a below provides the assessment results with the corresponding validation results by DLA following remedial work in the cottage area in adjacent cells. Coffey test pits 8-14 were outside the inhabited area and were compliant with all relevant criteria.

Table 2b – Heritage Cottage Area Soil Concentrations

Coffey Assessment					DLA Validation		
Sample ID	Depth	Pb	Zn		Sample ID	Pb	Zn
BH1	0-0.3	336	296		V3	170	
					V4	88	
					V6	51	
					V7A	260	
BH2	0-0.3	436	226		V5	210	
BH3	0-0.3	213	78				
BH4	0-0.3	320	104		nt		
BH5	0-0.3	327	264		V2	28	
BH6	0-0.3	671	211		V1	39	
BH7	0-0.3	196	146				
BH8	0-0.3	227	152				
BH9	0-0.3	133	75				
BH10	0-0.3	79	45				
BH11	0-0.3	112	82				
TP2	0.1-0.3	335	358		V9	22	150
TP2	0.4-0.65	21	6				
TP3	0.25-0.45	14	8				
TP4	0.1-0.3	178	220		V10		270
TP4a	0.1-0.3	194	308				
TP5	0.25-0.55	10	9				
TP6	0.25-0.45	9	9				
TP7	0-0.2	253	372		V11		250
					V12		220
TP7	0.35-0.55	100	165				
TP15	0.1-0.3	272	100				

2.2.4 Hot Water Dam (HWD)

In 2012 Coffey obtained 10 samples from sediments within the Hot Water Dam (HWD) and a further eight samples from sediments that had been excavated from the dam and stockpiled. No organic compounds were detected above the laboratory limit of reporting and though heavy metals were detected, none of the concentrations were elevated to the extent that further investigation or remedial work was required. All concentrations complied with the most sensitive residential land use criteria. The criteria referenced in the Coffey report have been maintained with the revised NEPM, 2013 criteria; therefore, the results of the soil testing remain compliant with the low-density residential land use HIL's.

2.3 Gap Analysis

CHEC consider that sufficient analysis of the quarry water has been undertaken to determine that the environmental risk associated with the presence of chromium has been reduced since 1996 to an acceptable level. The Site wide groundwater study in 1996 did not identify any significant contamination and no activity has occurred at the Site since closure that would influence that finding.

Sampling in the area of the heritage cottages is also considered adequate to determine that the area is compliant with a land use consistent with either open space or residential as defined by NEPM, 2013. Remedial work further reduced that risk by removing topsoils containing elevated lead concentrations. Due to the nature of the buildings, however, an inspection is warranted to determine the current condition.

Though some contamination may remain in soils within the tank pit adjacent to heritage office building, the proposed development would limit the exposure pathway to vapour intrusion in either a commercial or open space land use scenario. The data that has been provided appears to indicate that under either of those scenarios, the human health risk is acceptable. Existing data also indicates that geological conditions have limited the migration of the contaminants. Though no biochemical data has been analysed, it is reasonable to assume biological processes will assist physical influences such as dispersion to gradually reduce concentrations over time. With no immediate potential exposure to any sensitive receptors, the environmental risk is also considered acceptable.

The Closure Plan that was produced by Boral in October 2013 acknowledged "*the density of soil sampling for the site as a whole, and for the cement works area in particular, was low relative to the current guidelines for detailed site characterisation. Consequently, additional soil sampling may become necessary if parts of the land are to be rezoned for more sensitive land uses*."

The cement works land has now been earmarked for a change in land use to B(4) – Mixed Use; however, that will not increase the risk of exposure to potential contaminants and could actually be considered less than before. Three test pits by Dames & Moore were limited to heavy metals analysis only, though indicated contaminant concentrations complied with Site criteria. Previously occupied buildings have now been demolished, though the concrete surface has at this stage been retained, limiting potential for rainwater infiltration, which would promote migration. The intent is to maintain open space areas, thereby reducing any potential vapour exposure.

Other buildings that are proposed for light commercial/retail usage will be consistent with previous exposure scenarios and limited to short term occupational risk to any potential airborne contaminant. Considering the buildings are heritage listed and the ground covered by dense concrete slabs, intrusive investigations are restricted. Any exposure pathway would be limited to inhalation of volatile hydrocarbon substances, which are generally associated with odour. Though some minor odour was evident in the former workshop due to oil staining, generally the air quality was of no concern within the buildings during the recent Site inspection.

The URS Phase 1 stated that there are four transformers at the Site; however, locations are not specified and only one has been identified by caretaker personnel. Once decommissioned the areas should have representative samples taken from potentially impacted soils and analysed for PCB's.

Of the ten test pits excavated by Dames & Moore, only one was analysed for asbestos. Considering the placement of fill at the property corresponded with a period of unregulated use of asbestos, additional sampling and asbestos analysis was undertaken by CHEC in the Quarry 1 / Quarry 2 fill area.

Rail cuttings to the east of the operational area were reportedly backfilled with overburden. Without extensive excavation it would not be possible to accurately locate the corridor. In the current condition it does not present an actual risk, however, should any excavation in the future encounter the rail line, there is a potential for asbestos fibre from brake linings to be present. In that

circumstance soils analysis should be undertaken to allow an informed input for a Long-term management Plan.

Whilst Coffey had undertaken sampling in the proposed small lot areas at the former HWD location, very limited sampling or discussion has been provided in the areas now identified for large lot residential land use. Considering these areas represent some of the most sensitive land use, further investigation was required to document the occurrences of fill or other potential contaminating influence.

3.0 Data Quality Objectives

The DQO Process is used to establish performance or acceptance criteria, which serve as the basis for designing a plan for collecting data of sufficient quality and quantity to support the goals of a study. The DQO Process consists of seven iterative steps. While the interaction of these steps is portrayed in a sequential fashion, the nature of the DQO Process allows one or more of these steps to be revisited as more information on the problem is obtained. The Steps are identified as:

1. **State the Problem** –The nature of any potential hazard is identified and consideration is given to the resources needed to address the problem.
2. **Identify the Goal of the Study** – Identifying how environmental data will be used in solving the problem, identify study questions or define alternative outcomes.
3. **Identify Information Inputs** – Identify data sources and other information needed to answer the study questions.
4. **Define the Boundaries of the Study** – Define spatial and temporal limits of data collection and specify the target population.
5. **Develop the Analytical Approach** – Define the parameter of interest and the type of inference that can be made from the findings
6. **Specify Performance or Acceptance Criteria** – Specify probability limits for false positive and false negative errors and define acceptable criteria to make conclusions about the extent of the problem
7. **Develop the Plan for Obtaining Data** – Select an effective sampling and Analysis Plan that meets the performance criteria.

The DQO's are set out below in the following sections.

3.1 Step 1 – The Problem:

During the historical use of the Site for cement production and quarrying, potentially contaminating activities included storage of fuel and chemicals, maintenance of plant and equipment, onsite disposal of waste products and use of asbestos products and building materials.

3.2 Step 2 – The Goal of the Study

The purpose of this investigation is to:

a) Identify any potential areas or contaminants of concern through gathering of land use information.
b) Design and carry out an appropriate field investigation that provides an adequate level of statistical confidence to determine land use suitability.
c) Provide a conclusion that either states the land is suitable for the intended use, determines the extent of remediation required or provides recommendation for further investigation, should that be necessary.

3.3 Step 3 – Information Inputs

The data has been provided from the following sources:

- Anecdotal historical information.
- Historical aerial photography,
- Public register searches,
- Geological and soil conditions,
- Site observation, including test pit excavations,
- Statistical evaluation of soil analytical data.

3.4 Step 4 – Study Boundaries

This study is limited to data obtained from the former cement works property. The study area includes multiple smaller lots and covers an area of 84Ha. The surrounding ecological community and potential sensitive receptors nearby to the Site and associated with the receiving waters are also considered.

3.5 Step 5 – The Analytical Approach

The contaminants analysed provided appropriate screening based on the potential contaminants from historical land use activity and Site observations. Further detail is provided in Section 4.0.

3.6 Step 6 - Performance and Acceptance Criteria

3.6.1 Statistical Performance

A Site under investigation is assumed to be contaminated until statistically proven otherwise (eg: H_0 = soil concentrations > acceptance criteria), therefore two types of error are possible:

- Type 1 error – where the null hypothesis is true but is rejected and the Site is assessed to be uncontaminated when it is actually is. The probability of this occurring = α, whilst the probability of the correct decision is 1- α.
- Type 2 error when the null hypothesis is not rejected even though it is false and the Site is assessed to be contaminated though is actually not. The probability of this occurring = β, whilst the probability of making the correct decision when a null hypothesis is actually false is 1- β.

The α value can be decreased to reduce the probability of this error, however the ability to detect differences when they actually exist is reduced and unnecessary remedial costs are then possible. The more severe consequence is the risk of jeopardising human or environmental health, which outweighs the consequences of additional remediation costs. Environmental investigations regularly use α of 0.05 as this provides a reasonable compromise between detecting contamination and incurring unnecessary cost.

3.6.2 Quality Control

To minimise the chance of error being introduced into the data collection process the following quality control measures were implemented:

Data Precision and Accuracy	
Adequate Sampling Density	Soil sampling frequency was verified in accordance with procedure B of the NSW EPA *Contaminated Sites: Sampling Design Guidelines*, 1995;.
Appropriate Analytical Techniques	Use of analytical laboratories with adequately trained and experienced testing staff experienced in the analyses undertaken, with appropriate NATA certification.
Acceptable field and laboratory Relative Percentage Difference (RPD) for duplicate comparison	>10 x LOR: 30% inorganics; 50% organics (Field) <10 x LOR: Assessed on individual basis (Field)
Trip Spikes	Recoverable concentrations of volatiles between 60 – 140%
Adequate laboratory performance	Based on acceptance criteria of laboratory as specified on certificate of analysis: includes: blank samples, matrix spikes, control samples, and surrogate spike samples
Data Representativeness	
Sample and analysis selection	Representativeness of all potential contaminants
Trip Blanks/ Rinsate Blanks	No Detection above LOR
Trip Spikes	Recoverable concentrations of volatiles between 60 – 140%
Duplicate Samples	Adequate duplicate, split, rinsate and trip blank sample numbers
Laboratory selection	Adequate laboratory internal quality control and quality assurance methods, complying with the NEPM.
Documentation Completeness	
Chain of custody records	Laboratory sample receipt information received confirming receipt of samples intact and appropriate chain of custody
	NATA registered laboratory results certificates provided
Data Completeness	
Analytical Suites	Analysis for all potential contaminants of concern.
Confidence Levels	Field duplicate sample numbers complying with NEPM
Transport and Handling	Trip spike samples prepared and sent with field samples regularly
Comparability	
Analytical Standards	Use of NATA registered laboratories
Data Quality	Test methods consistent for each sample in accordance with the Sampling Analysis and Quality Plan
Traceability	Detailed logs of all sample locations to be recorded
Analytical Methods	Test methods comparable between primary and secondary laboratory
Confidence Levels	Acceptable RPD's between original samples and field duplicates and inter-laboratory triplicate samples.

3.6.3 Site Acceptance Criteria

The null hypothesis being tested is H_0= the 95% Upper Confidence Limit (UCL) for the average soil concentration > NEPM, 2013 Tier 1 criteria. The alternative hypothesis therefore would be that the 95%UCL of average soil concentrations for the contaminants of concern do not exceed the Tier 1 criteria. The 'Pro UCL' software package was utilised to determine the best method to calculate the UCL using goodness of Fit (GOF) testing.

In addition to average concentrations being compliant, NEPM also requires that standard deviation of each contaminant is less than 50% of the Tier 1 criteria and that no individual concentration exceeds the Tier 1 criteria by more than 250%. Residential A criteria are considered appropriate for this assessment as they are the most sensitive of the NEPM investigation levels and also account for the ingestion of home grown produce.

Ecological criteria were derived from the 'Urban residential and Public open space' for the purpose of Tier 1 assessment, however, the criteria for areas of ecological significance were also considered where exceedances occurred.

As a conservative approach, where laboratory analysis had measured concentrations to be below detection limits, half of the detection limit was used to provide a greater sample size and add reliability to the statistical tests.

Refer to Section 4.3 for specific land use investigation levels.

3.7 Step 7 – Obtaining Data

Though some judgement was provided, data from representative samples was generally obtained in a systematic sampling pattern and were compared against respective criteria from the NEPM, 2013. Identified areas of concern were also targeted. Samples were obtained from the exposed natural surface or shallow test pits excavated to a depth where natural ground was encountered.

Sufficient data has been generated by previous reports for surface and groundwater. Based on a review of that data it was not considered to represent a significant potential risk to the suitability of the Site and it was unlikely that the site was contributing to any water contamination.

Refer to Section 4.0 for sampling details.

4.0 Sampling Analysis and Quality Plan

4.1 Sampling Strategy

In developing an appropriate sampling plan for the Site, it was important to consider a number of factors that would determine an appropriate confidence level without incurring unnecessary cost. These included:

- Reasonable baseline data was available from historical investigations at the Site.
- The majority of products and operations associated with cement production generally have limited capacity to present a significant risk to human health or the environment.
- Contamination was most likely limited to scenarios associated with waste burial or dispersal of bonded asbestos products.
- Areas of the Site are not accessible to excavation equipment.
- Significant hardstand areas dominate the area of former operations.
- The areas and chemicals of concern at the Site are readily identifiable.

On the basis of those factors it was decided to obtain samples in a judgemental fashion at a relatively low density, and focused on the more sensitive land use areas, whilst ensuring that each of the identified areas of concern were sampled. This approach was supported by excavating a larger number of locations for physical inspections, historical investigations and previous data. This method was considered the most appropriate for providing confidence in the higher risk areas whilst avoiding unnecessary analysis.

Based on the review of available information the following sampling scope was undertaken by CHEC on Thursday 10th January 2019:

- 5 sample locations in south west quarter targeting fill material analysed for asbestos
- 4 samples from western R5 area for chemical and asbestos analysis
- Excavation and inspection of 20 test pits from R5 area
- Analysis chemical and asbestos concentrations from 9 representative samples obtained within R5 area test pits
- Visual inspections of houses and commercial building in heritage area.

Refer to Figure 2 - Sample Locations

4.2 Analytical Strategy

Site observation identified some potential for asbestos containing material to have been buried. Anecdotal evidence of the chemicals that were stored indicated that a screen of volatile and semi-volatile hydrocarbons would be an adequate measure to detect any concentrations that would represent a risk.

Significant amounts of ash and potentially contaminated fill was observed that has the potential to contain chlorinated compounds or scheduled chemicals including PCB's. It was also considered appropriate to provide analytical data on heavy metal concentrations, Polycyclic Aromatic Hydrocarbons (PAH), including known carcinogens within that group, to determine land use suitability with an adequate level of confidence in the fill areas.

4.3 Tier 1 Assessment Criteria

Acceptance criteria have been sourced from NEPM 2013. The most appropriate human health criteria for non-volatile and semi-volatile contaminants is consistent with an exposure scenario for a low-density residential land use. For this assessment it is acknowledged that the Site will contain various land uses so the most sensitive criteria have been referenced as a general screen.

There are sensitive environmental receptors nearby to the Site such as the Limestone Creek ecological community, which must be considered when assessing environmental risk. It does also need to be recognised that, whilst not an urban area, the immediate catchment land has a history of disturbance and agriculture, therefore, it's reasonable to expect that ambient background and added contaminant limits (ACL) may potentially be above those referred to as areas of ecological significance by NEPM.

Considering the factors discussed above, appropriate Site-specific threshold values have been referenced to assess the risk to both human health and to the environment. The analytical data provided by the laboratory was collated and compared with the relevant threshold values provided in the following tables:

Table -4a: Ecological Screening Levels (ESL) and Management Limits (ML) – Hydrocarbon Fractions

ANALYTES(mg/kg)	ESL (course) Ecological Significance	ML (course) Residential
F1: C_6-C_{10}	180	700
F2: C_{10}-C_{16}	120	1,000
F3: C_{16}-C_{34}	300	2,500
F4: C_{34}-C_{40}	2800	10,000

Table 4b: NEPM Tier 1 Soil Assessment Criteria

	Analytes	Human Health	Ecological [1]
Volatiles	Benzene	0.7	50
	Toluene	480	85
	Ethylbenzene	NL	70
	Xylene	110	105
	F1	50	125
	F2	280	300
	Naphthalene	5	170
HEAVY METALS	Arsenic	100	100
	Cadmium	20	
	Chromium	100	320
	Copper	6000	190
	Lead	300	1100
	Mercury	10	
	Nickel	400	30
	Zinc	7400	230
	PCB	1	
Pesticides/Herbicides	DDT+DDE+DDD	240	180
	Aldrin and dieldrin	6	
	Chlordane	50	
	Endosulfan	270	
	Endrin	10	
	Heptachlor	6	
	HCB	10	
	Methoxychlor	300	
	Mirex	10	
	Toxaphene	20	
PAH	BaP TEQ	3	0.7
	Total PAHs	300	
Asbestos	Bonded ACM	0.01% w/w	
	Friable Asbestos/Asbestos	0.001% w/w	
	Surface Asbestos (0.1m)	Non Visible	

[1]Ecological Added Contaminant Limits (ACL) have been cited alone as preliminary criteria in the absence of reliable Ecological Investigation Levels (EIL's) or data to determine the Ambient Background Concentrations (ABC). ACL values are based on a conservative CEC of 5 and pH of 6 in soils with 5% clay. NL: Not Limiting, where the soil saturation concentration is less than the derived screening level.

4.4 Data Quality Assurance

Sample collection was consistent with techniques provided in AS 4482.1-2005 *Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil Part 1: Non-Volatile and Semi-Volatile Compounds* and the National Environment Protection (Assessment of Site Contamination) Amendment Measure (NEPM), 2013.

To ensure the quality and reliability of the resultant data the following measures were employed:

- Soil was collected using a stainless-steel trowel that was decontaminated between samples.
- Samples were placed directly into 250ml laboratory jars and labelled uniquely to represent each sample recorded in the sample log.
- Sample jars were stored in a chilled esky for transport to the laboratory under a chain of custody.

5.0 Field Observations

5.1 Site Inspection

5.1.1 Heritage Houses

The housing along Williwa Rd was in generally poor condition. External walls were predominantly brick; however, fibre cement building material had been used for shed construction, patios and some internal walls. One house had significant internal fire damage and broken fibro was observed on most properties. The fibro was confirmed as containing asbestos and had been spread across the ground surface in the vicinity of the structures.

5.1.2 Cement Works Area

The buildings that remain in the former cement works area were generally in good condition, despite the occasional broken window. Paintwork was aged and flaking and has been reported to be lead-based. On the northern side of the buildings, a significant amount of broken fibro was observed on the ground. Some staining was noted within the former workshop building.

Buildings on the northern side of the heritage area had been demolished to slab level and the area was then covered with 200mm of recovered aggregate and fines.

5.1.3 Quarries

Fill material was observed around quarry 1 and 2 at the western extent of the property. Foreign materials were not observed within the fill and no staining or odours were apparent. Vegetation was quite dense in most areas limiting access; though also demonstrating that there were no signs of stress. The ground surface throughout the central portion of the quarry area was mostly natural ground or had been land formed with clean overburden.

The eastern and northern side of quarry 4 had access roads cut into the quarry wall. These roads had been top-dressed with a gravelly clay material on which some fragments of fibro were observed. Above the roads in the proposed northeast R5 area was grass covered with occasional small stockpiles containing soil and organic matter, though no foreign material and no ACM was observed.

5.1.4 Northern Precinct

The proposed R5 zone in the north and northwest of the property contained a significant amount of ash and overburden with some waste materials and building debris. The western portion of that area was steep and well covered with trees. The ash fill was observed to be up 1m thick where gullies had eroded to expose the soil profile.

Across the top of the hill approximately 20 test pits were excavated over an area of approximately 1.6Ha to delineate the extent of filling and type of fill. Ash was observed to extend from the surface to approximately 0.2m in the west and to approximately 1.2m in the eastern portion of the fill area. Overburden had been placed below the ash though often there were alternating layers with the deepest area of fill observed to be approximately 3m. The fill contained occasional inert materials such as corroded metal, timber, metal chains and rubber conveyer belt. No indication of ACM was

observed and apart from some surface debris most locations were generally free of significant foreign material.

Refer to Appendix B – Photo Gallery

5.2 Soil Analysis

Five bulk soil samples were obtained from fill materials around Quarry 1 and 2 and analysed for the presence of asbestos. No asbestos was identified in any sample. The four samples in the western 'forested' area of the proposed R5 (W-RE5) zone did not contain any concentrations of hydrocarbons, pesticides, PCB's or asbestos above the laboratory limit of detection.

Nine samples from seven of the test pits excavated in the open hill area of the R5 zone were sent for analysis. Of those nine samples, two from the same test pit had minor detections of PAH compounds. Test pit 2 was measured to have a BaP (TEQ) of 0.3mg/kg and total PAH of 3.1mg/kg in the surface ash and some non-carcinogenic PAH's at 0.1mg/kg at a depth of 2.5m. Considering the residential land use HIL of 3mg/kg (BaP TEQ) and total PAH of 300mg/kg, the results do not indicate an increased level of risk. No other detection of hydrocarbons, pesticides, PCB's or asbestos was observed in any of the samples obtained in the proposed R5 zone.

Table 5a summarises the heavy metals data obtained from sampling in the R5 zone. Concentrations, apart from one sample (R5-6-1) complied with both residential and ecological screening criteria for all eight heavy metals commonly associated with land contamination that is likely from cement production. The soil sample at test pit 6 did exceed the ecological screening level for nickel and zinc, though both contaminants complied with the residential HIL's and the absence of elevated concentrations in surrounding soils suggests the distribution is limited.

Table 5a – Analytical Results Heavy Metals (mg/kg)

Sample	Depth	As	Cd	Cr	Cu	Pb	Hg	Ni	Zn
W-RE5-1	0.2	<1	<0.3	4.4	2.4	6	<0.05	2.9	9.6
W-RE5-2	0.1	2	<0.3	8.4	11	13	<0.05	5.6	28
W-RE5-3	0.1	3	<0.3	8.7	11	13	<0.05	5.1	26
W-RE5-4	0.1	3	<0.3	8.5	6.2	10	<0.05	1.1	7.8
R5-1	0.1	<1	<0.3	4.1	22	9	<0.05	7.4	22
R5-2-1	0.5	2	<0.3	6.7	130	25	0.21	7.2	52
R5-2-2	1.5	4	0.5	15	21	14	0.11	31	79
R5-2-3	2.5	4	<0.3	11	19	13	0.17	17	61
R5-3-1	0.25	2	<0.3	8.4	27	13	<0.05	20	68
R5-4-1	0.25	2	<0.3	17	40	18	0.07	10	49
R5-5-1	0.25	2	<0.3	4.8	13	7	<0.05	9.6	38
R5-6-1	0.5	4	1.7	9.5	35	33	0.07	170	360
R5-7-1	0.5	5	0.7	6.9	23	14	0.07	72	170
Av		3	0.3	9	28	14	0.1	28	75
StD		1	0.4	4	33	7	0.1	47	95
95% UCL		3	0.9	11	50	19	0.14	63	143
HIL		**100**	**20**	**100**	**6000**	**300**	**10**	**400**	**7400**
EIL		**100**		**320**	**190**	**100**		**30**	**230**

6.0 Discussion

CHEC has reviewed all documentation provided by Catalyst Project Consulting in relation to contaminated land and water studies at the former Portland Cement Works. With the available data and the development concept plan now finalised, it was possible to gauge a general level of confidence to determine land use suitability within specific land use areas. In addition to that information, it was necessary to provide additional data in some of those areas to improve the overall confidence level.

With the additional sampling program and inspections undertaken by this assessment it is possible to provide the required level of confidence to determine the suitability of the Site for the proposed land use. The proposed zoning limits potential exposure pathways in the former works area and the heritage housing area to occupational activities and visitors to the Site. The fragmented asbestos observed around the houses and the workshop area will require remediation and a clearance in accordance with SafeWork NSW: Code of Practice – How to Safely Remove Asbestos, 2016.

In terms of remediating the heritage listed buildings to eliminate the risk of lead paint contamination and hydrocarbon staining, any proposal would need to be negotiated with the appropriate government bodies. The presence of the concrete hardstand across most of the area provides significant protection from rainwater infiltration and thereby limiting the potential for any mobile contaminants to be transported. Previous data from Dames & Moore, whilst sparse, suggests that the potential for contaminants to be distributed across this area in any quantity that would present a risk to the environment or human health is acceptably low.

Auspower carried out testing of the transformer oil in November 2018 and it was found to be free of PCB's. Due to the absence of historical records for transformer types and maintenance, it is recommended to undertake validation soil testing once the unit is removed from service.

Access roads to the east and north of Quarry 4 will require some of remedial work or control to prevent potential future exposure. The extent of work will be dependent on the final subdivision plan and may range from removal or covering of the contamination to restricting access to the area, which may align with the necessity to limit access to the dam for safety reasons. The roads are not within the proposed residential area and the extent of contamination is expected to be below the bonded criteria of 0.01%w/w. If access is expected; however, the upper 0.1m will need to be free of all asbestos containing material.

Asbestos containing material was not identified in representative soils samples or by visual inspections around Quarry 1 and Quarry 2. In addition to the data provided by the Dames & Moore report, this area is considered suitable for the proposed recreational land use. Similarly, the HWD area being proposed for standard residential lots is considered suitable for that proposed land use based on the Coffey 2012 data and supported by recent visual assessment.

The north east proposed R5 zone is considered to have a very low likelihood of contamination based on visual assessment and was found to be predominantly natural ground. The proposed R5 area to the northwest was observed to contain significant amounts of fill material including ash. Test pit observations and chemical analysis of representative samples indicates there is negligible risk of contamination. The area may; however, require substantial geotechnical stabilisation to provide for the construction of housing and further advice should be sought from a geotechnical engineer.

7.0 Conclusion

This land use suitability assessment has considered all available data to determine the land use suitability of the former Portland Cement Works in the context of the proposed development concept plan provided by Catalyst Project Consulting.

Areas requiring remediation have been identified and it is anticipated that the remedial work can be undertaken as part of the Site development once rezoning and subdivision has occurred. It is recommended to develop an appropriate Remedial Action Plan that incorporates the requirements to protect the heritage value of any buildings and the Site generally once the subdivision plans have been finalised and approved.

Based on the available information it considered that the Site can be made suitable for the proposed land use with the implementation of the required remedial work identified in this report.

8.0 Limitations

The sole purpose of this report and the associated services performed by Compliance Health & Environmental Consulting Pty Ltd is to fulfil the scope outlined by Catalyst Project Consulting Pty Ltd (hereafter known as the Client). This report has made every effort to assess the Site in a professional manner with the available information and adhering to the technical standards expected to report the representative condition at the time of the assessment.

Compliance Health & Environmental Consulting Pty Ltd derived the information in this report from anecdotal information regarding the site and the project, and field explorations conducted on the dates indicated. The passage of time, manifestation of latent conditions or impacts of future events may require further examination /exploration of the site and subsequent data analyses, together with a re-evaluation of the findings, observations and conclusions expressed in this report.

In preparing this report, Compliance Health & Environmental Consulting Pty Ltd may have relied upon and presumed accurate certain information (or absence thereof) relative to the site. Except as otherwise stated in the report, Compliance Health & Environmental Consulting Pty Ltd has not attempted to verify the accuracy of completeness of any such information (including for example survey data supplied by others). The findings, observations and conclusions expressed by Compliance Health & Environmental Consulting Pty Ltd in this report are not, and should not be considered an opinion concerning the completeness and accuracy of information supplied by others.

No warranty or guarantee, whether express or implied, is made with respect to the data reported or to the findings, observations and conclusions expressed in this report. Further, such data, findings and conclusions are based solely upon site conditions, information and drawings supplied by the Client and legislation etc. in existence at the time of the investigation. This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the provisions of the agreement between Compliance Health & Environmental Consulting Pty Ltd and the Client. Compliance Health & Environmental Consulting Pty Ltd accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party

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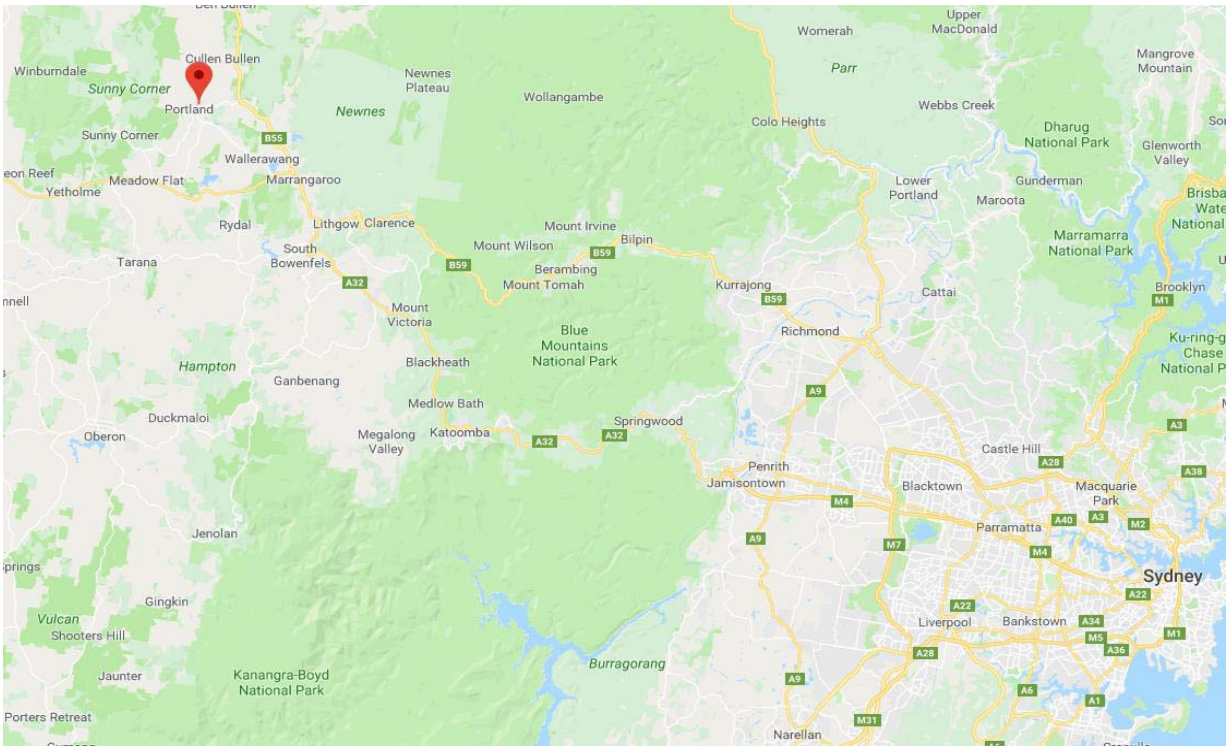
				AWJ Civil Pty Ltd

Figure 1 – Site Location



CHEC PO Box 275, Gosford NSW 2250	**DESIGNED:** CHEC	SITE LOCATION		
	COMPILED: RC	**CLIENT:**	Catalyst Project Consulting	**Date:** 29/01/2019
	Project 1060	**LOCATION:**	Portland Cement Works	**FIGURE:** 1

Figure 2 – Development Concept Plan

- RE1 - Public Recreation
- R1 - General Residential
- R5 Large Lot Residential
- B4 - Mixed Use
- SP2 - Infrastructure (dam)
- Existing Buildings
- Heritage Curtilage
- Site Boundary
- Historic Rail Line
- Important view corridors/ access to be preserved

EXISTING ZONING

CHEC
Sustainable Environmental Management

Date	Revision
09/02/19	Rev. 1

Title: Development Concept Plan

Site Address	Project No.	Figure No.
Williwa St Portland	CH1060	2
Client	**Scale**	**Compiled**
Catalyst Project Consulting	As Shown	RC

Figure 3 – Previous Sampling Overlay

CHEC

Title: Coffey 2012 Sample Locations Overlay

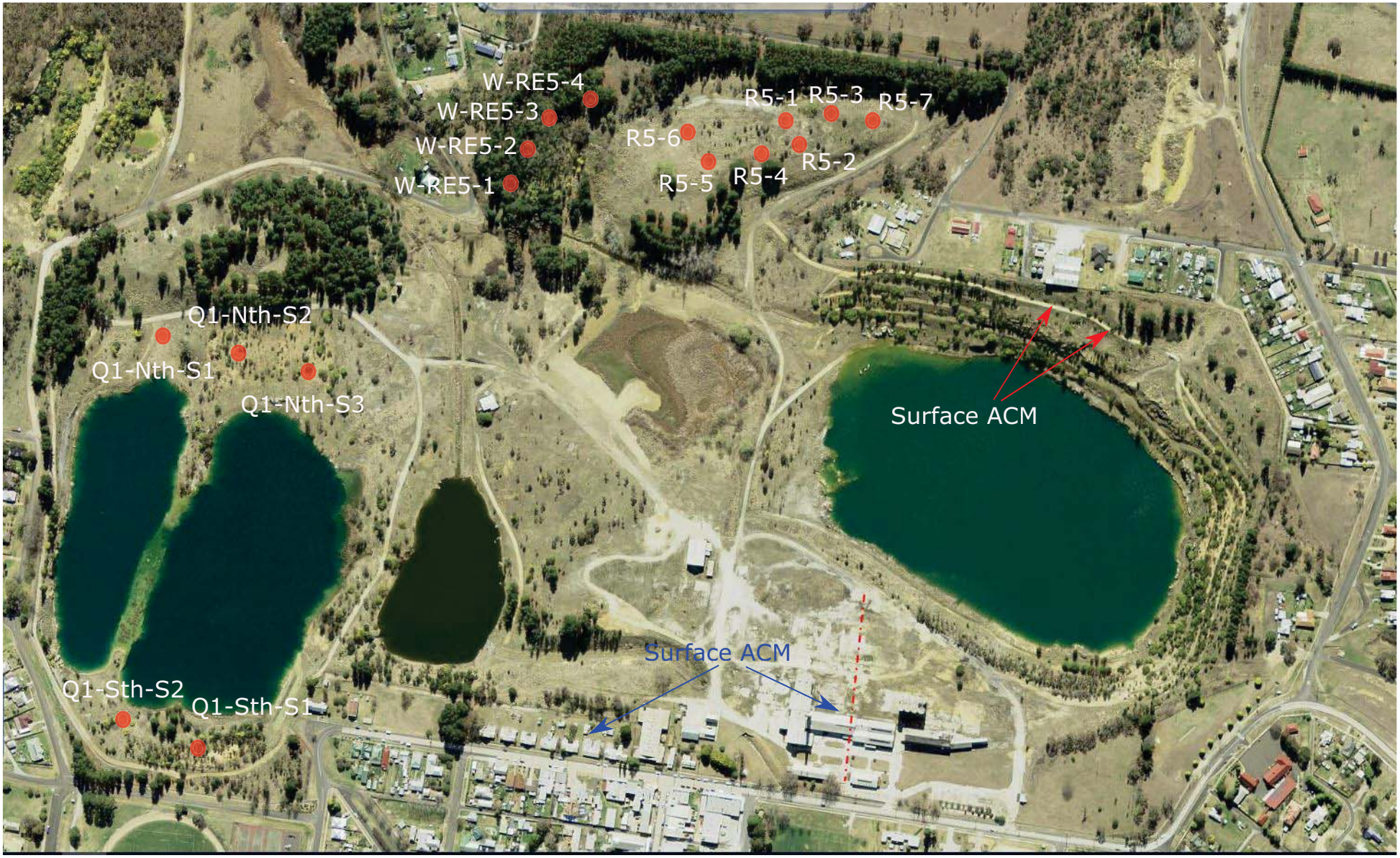
Site Address	Project No.	Figure No.	Date
Williwa St Portland	CH1060	3	09/10/18
Client	**Scale**	**Compiled**	**Revision**
Catalyst Project Consulting	As Shown	RC	Rev. 1

CHEC

Title: D & M Sample Locations Overlay

Site Address	Project No.	Figure No.	Date
Williwa St Portland	CH1060	3a	09/10/18
Client	**Scale**	**Compiled**	**Revision**
Catalyst Project Consulting	As Shown	RC	Rev. 1

Figure 4 – Sampling Locations (CHEC)



CHEC

Title: CHEC 2019 Sample Locations Overlay

Site Address	Project No.	Figure No.	Date
Williwa St Portland	CH1060	4	09/02/19

Client	Scale	Compiled	Revision
Catalyst Project Consulting	As Shown	RC	Rev. 1

Appendix A – NATA Certified Results

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Richard Case	Manager	Huong Crawford
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Project	**1060**	SGS Reference	**SE187983 R0**
Order Number	(Not specified)	Date Received	14 Jan 2019
Samples	18	Date Reported	21 Jan 2019

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

No respirable fibres detected in all soil samples using trace analysis technique.

Sample 1,3,5,7,8,10,12,13: a portion of the sample supplied has been sub-sampled for asbestos according to SGS In-house procedures. We therefore cannot guarantee that the sub-sample is representative of the entire sample supplied. SGS Environmental Services recommends supplying approximately 50-100g of sample in a separate container.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

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Parameter	Units	LOR	Sample Number: SE187983.001 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: W-RE5-1	SE187983.002 Soil 14 Jan 2019 W-RE5-2	SE187983.003 Soil 14 Jan 2019 W-RE5-3	SE187983.004 Soil 14 Jan 2019 W-RE5-4
VOC's in Soil Method: AN433 Tested: 15/1/2019						
Monocyclic Aromatic Hydrocarbons						
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Polycyclic VOCs						
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Surrogates						
Dibromofluoromethane (Surrogate)	%	-	**90**	**70**	**73**	**74**
d4-1,2-dichloroethane (Surrogate)	%	-	**91**	**75**	**78**	**73**
d8-toluene (Surrogate)	%	-	**72**	**83**	**81**	**74**
Bromofluorobenzene (Surrogate)	%	-	**82**	**70**	**77**	**76**
Totals						
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 15/1/2019						
TRH C6-C10	mg/kg	25	<25	<25	<25	<25
TRH C6-C9	mg/kg	20	<20	<20	<20	<20
Surrogates						
Dibromofluoromethane (Surrogate)	%	-	**90**	**70**	**73**	**74**
d4-1,2-dichloroethane (Surrogate)	%	-	**91**	**75**	**78**	**73**
d8-toluene (Surrogate)	%	-	**72**	**83**	**81**	**74**
Bromofluorobenzene (Surrogate)	%	-	**82**	**70**	**77**	**76**
VPH F Bands						
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25

Parameter	Units	LOR	Sample Number: SE187983.001 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: W-RE5-1	SE187983.002 Soil 14 Jan 2019 W-RE5-2	SE187983.003 Soil 14 Jan 2019 W-RE5-3	SE187983.004 Soil 14 Jan 2019 W-RE5-4
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 15/1/2019						
TRH C10-C14	mg/kg	20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110
TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210
TRH F Bands						
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 15/1/2019						
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	**84**	**88**	**102**	**92**
2-fluorobiphenyl (Surrogate)	%	-	**98**	**104**	**108**	**88**
d14-p-terphenyl (Surrogate)	%	-	**86**	**100**	**110**	**96**
OC Pesticides in Soil Method: AN420 Tested: 15/1/2019						
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2

Parameter	Units	LOR	Sample Number: SE187983.001 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: W-RE5-1	SE187983.002 Soil 14 Jan 2019 W-RE5-2	SE187983.003 Soil 14 Jan 2019 W-RE5-3	SE187983.004 Soil 14 Jan 2019 W-RE5-4
OC Pesticides in Soil Method: AN420 Tested: 15/1/2019 (continued)						
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**98**	**99**	**100**	**94**
OP Pesticides in Soil Method: AN420 Tested: 15/1/2019						
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7
Surrogates						
2-fluorobiphenyl (Surrogate)	%	-	**98**	**104**	**108**	**88**
d14-p-terphenyl (Surrogate)	%	-	**86**	**100**	**110**	**96**
PCBs in Soil Method: AN420 Tested: 15/1/2019						
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**98**	**99**	**100**	**94**

Parameter	Units	LOR	Sample Number: SE187983.001 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: W-RE5-1	SE187983.002 Soil 14 Jan 2019 W-RE5-2	SE187983.003 Soil 14 Jan 2019 W-RE5-3	SE187983.004 Soil 14 Jan 2019 W-RE5-4
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 15/1/2019						
Arsenic, As	mg/kg	1	<1	**2**	**3**	**3**
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	**4.4**	**8.4**	**8.7**	**8.5**
Copper, Cu	mg/kg	0.5	**2.4**	**11**	**11**	**6.2**
Nickel, Ni	mg/kg	0.5	**2.9**	**5.6**	**5.1**	**1.1**
Lead, Pb	mg/kg	1	**6**	**13**	**13**	**10**
Zinc, Zn	mg/kg	2	**9.6**	**28**	**26**	**7.8**
Mercury in Soil Method: AN312 Tested: 15/1/2019						
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content Method: AN002 Tested: 15/1/2019						
% Moisture	%w/w	0.5	**7.5**	**13**	**12**	**12**
Fibre Identification in soil Method: AN602 Tested: 18/1/2019						
FibreID						
Asbestos Detected	No unit	-	No	-	No	-
SemiQuant						
Estimated Fibres*	%w/w	0.01	<0.01	-	<0.01	-

Parameter	Units	LOR	Sample Number: SE187983.005 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: R5-1	SE187983.006 Soil 14 Jan 2019 R5-2-1	SE187983.007 Soil 14 Jan 2019 R5-2-2	SE187983.008 Soil 14 Jan 2019 R5-2-3
VOC's in Soil Method: AN433 Tested: 15/1/2019						
Monocyclic Aromatic Hydrocarbons						
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Polycyclic VOCs						
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Surrogates						
Dibromofluoromethane (Surrogate)	%	-	**74**	**78**	**84**	**95**
d4-1,2-dichloroethane (Surrogate)	%	-	**92**	**83**	**93**	**122**
d8-toluene (Surrogate)	%	-	**81**	**77**	**78**	**75**
Bromofluorobenzene (Surrogate)	%	-	**74**	**77**	**74**	**74**
Totals						
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 15/1/2019						
TRH C6-C10	mg/kg	25	<25	<25	<25	<25
TRH C6-C9	mg/kg	20	<20	<20	<20	<20
Surrogates						
Dibromofluoromethane (Surrogate)	%	-	**74**	**78**	**84**	**95**
d4-1,2-dichloroethane (Surrogate)	%	-	**92**	**83**	**93**	**122**
d8-toluene (Surrogate)	%	-	**81**	**77**	**78**	**75**
Bromofluorobenzene (Surrogate)	%	-	**74**	**77**	**74**	**74**
VPH F Bands						
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25

Parameter	Units	LOR	Sample Number: SE187983.005 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: R5-1	SE187983.006 Soil 14 Jan 2019 R5-2-1	SE187983.007 Soil 14 Jan 2019 R5-2-2	SE187983.008 Soil 14 Jan 2019 R5-2-3
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 15/1/2019						
TRH C10-C14	mg/kg	20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110
TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210
TRH F Bands						
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 15/1/2019						
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	**0.6**	<0.1	**0.1**
Anthracene	mg/kg	0.1	<0.1	**0.1**	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	**0.6**	<0.1	**0.1**
Pyrene	mg/kg	0.1	<0.1	**0.6**	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	**0.2**	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	**0.3**	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	**0.2**	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	**0.1**	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	**0.2**	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	**0.1**	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	**0.1**	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	**0.3**	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	**0.4**	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	**0.3**	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	**3.1**	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	**3.1**	<0.8	<0.8
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	**96**	**92**	**96**	**92**
2-fluorobiphenyl (Surrogate)	%	-	**98**	**98**	**98**	**94**
d14-p-terphenyl (Surrogate)	%	-	**94**	**92**	**96**	**92**
OC Pesticides in Soil Method: AN420 Tested: 15/1/2019						
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2

Parameter	Units	LOR	Sample Number: SE187983.005 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: R5-1	SE187983.006 Soil 14 Jan 2019 R5-2-1	SE187983.007 Soil 14 Jan 2019 R5-2-2	SE187983.008 Soil 14 Jan 2019 R5-2-3
OC Pesticides in Soil Method: AN420 Tested: 15/1/2019 (continued)						
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**99**	**97**	**97**	**95**
OP Pesticides in Soil Method: AN420 Tested: 15/1/2019						
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7
Surrogates						
2-fluorobiphenyl (Surrogate)	%	-	**98**	**98**	**98**	**94**
d14-p-terphenyl (Surrogate)	%	-	**94**	**92**	**96**	**92**
PCBs in Soil Method: AN420 Tested: 15/1/2019						
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**99**	**97**	**97**	**95**

Parameter	Units	LOR	Sample Number: SE187983.005 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: R5-1	SE187983.006 Soil 14 Jan 2019 R5-2-1	SE187983.007 Soil 14 Jan 2019 R5-2-2	SE187983.008 Soil 14 Jan 2019 R5-2-3
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 15/1/2019						
Arsenic, As	mg/kg	1	<1	**2**	**4**	**4**
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	**0.5**	<0.3
Chromium, Cr	mg/kg	0.3	**4.1**	**6.7**	**15**	**11**
Copper, Cu	mg/kg	0.5	**22**	**130**	**21**	**19**
Nickel, Ni	mg/kg	0.5	**7.4**	**7.2**	**31**	**17**
Lead, Pb	mg/kg	1	**9**	**25**	**14**	**13**
Zinc, Zn	mg/kg	2	**22**	**52**	**79**	**61**
Mercury in Soil Method: AN312 Tested: 15/1/2019						
Mercury	mg/kg	0.05	<0.05	**0.21**	**0.11**	**0.17**
Moisture Content Method: AN002 Tested: 15/1/2019						
% Moisture	%w/w	0.5	**12**	**11**	**13**	**9.8**
Fibre Identification in soil Method: AN602 Tested: 18/1/2019						
FibreID						
Asbestos Detected	No unit	-	No	-	No	No
SemiQuant						
Estimated Fibres*	%w/w	0.01	<0.01	-	<0.01	<0.01

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE187983.009 Soil 14 Jan 2019 R5-3-1	SE187983.010 Soil 14 Jan 2019 R5-4-1	SE187983.011 Soil 14 Jan 2019 R5-5-1	SE187983.012 Soil 14 Jan 2019 R5-6-1
VOC's in Soil Method: AN433 Tested: 15/1/2019							
Monocyclic Aromatic Hydrocarbons							
Benzene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Polycyclic VOCs							
Naphthalene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
Surrogates							
Dibromofluoromethane (Surrogate)	%	-		**79**	**102**	**77**	**71**
d4-1,2-dichloroethane (Surrogate)	%	-		**77**	**83**	**85**	**92**
d8-toluene (Surrogate)	%	-		**77**	**79**	**75**	**73**
Bromofluorobenzene (Surrogate)	%	-		**78**	**75**	**77**	**79**
Totals							
Total Xylenes	mg/kg	0.3		<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6		<0.6	<0.6	<0.6	<0.6
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 15/1/2019							
TRH C6-C10	mg/kg	25		<25	<25	<25	<25
TRH C6-C9	mg/kg	20		<20	<20	<20	<20
Surrogates							
Dibromofluoromethane (Surrogate)	%	-		**79**	**102**	**77**	**71**
d4-1,2-dichloroethane (Surrogate)	%	-		**77**	**83**	**85**	**92**
d8-toluene (Surrogate)	%	-		**77**	**79**	**75**	**73**
Bromofluorobenzene (Surrogate)	%	-		**78**	**75**	**77**	**79**
VPH F Bands							
Benzene (F0)	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1
TRH C6-C10 minus BTEX (F1)	mg/kg	25		<25	<25	<25	<25

Parameter	Units	LOR	Sample Number: SE187983.009 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: R5-3-1	SE187983.010 Soil 14 Jan 2019 R5-4-1	SE187983.011 Soil 14 Jan 2019 R5-5-1	SE187983.012 Soil 14 Jan 2019 R5-6-1
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 15/1/2019						
TRH C10-C14	mg/kg	20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110
TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210
TRH F Bands						
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 15/1/2019						
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	**94**	**96**	**96**	**96**
2-fluorobiphenyl (Surrogate)	%	-	**96**	**98**	**98**	**96**
d14-p-terphenyl (Surrogate)	%	-	**96**	**96**	**96**	**92**
OC Pesticides in Soil Method: AN420 Tested: 15/1/2019						
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE187983.009 Soil 14 Jan 2019 R5-3-1	SE187983.010 Soil 14 Jan 2019 R5-4-1	SE187983.011 Soil 14 Jan 2019 R5-5-1	SE187983.012 Soil 14 Jan 2019 R5-6-1
OC Pesticides in Soil Method: AN420 Tested: 15/1/2019 (continued)						
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**99**	**93**	**93**	**93**
OP Pesticides in Soil Method: AN420 Tested: 15/1/2019						
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7
Surrogates						
2-fluorobiphenyl (Surrogate)	%	-	**96**	**98**	**98**	**96**
d14-p-terphenyl (Surrogate)	%	-	**96**	**96**	**96**	**92**
PCBs in Soil Method: AN420 Tested: 15/1/2019						
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**99**	**93**	**93**	**93**

Parameter	Units	LOR	Sample Number: SE187983.009 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: R5-3-1	SE187983.010 Soil 14 Jan 2019 R5-4-1	SE187983.011 Soil 14 Jan 2019 R5-5-1	SE187983.012 Soil 14 Jan 2019 R5-6-1
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 15/1/2019						
Arsenic, As	mg/kg	1	**2**	**2**	**2**	**4**
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	**1.7**
Chromium, Cr	mg/kg	0.3	**8.4**	**17**	**4.8**	**9.5**
Copper, Cu	mg/kg	0.5	**27**	**40**	**13**	**35**
Nickel, Ni	mg/kg	0.5	**20**	**10**	**9.6**	**170**
Lead, Pb	mg/kg	1	**13**	**18**	**7**	**33**
Zinc, Zn	mg/kg	2	**68**	**49**	**38**	**360**
Mercury in Soil Method: AN312 Tested: 15/1/2019						
Mercury	mg/kg	0.05	<0.05	**0.07**	<0.05	**0.07**
Moisture Content Method: AN002 Tested: 15/1/2019						
% Moisture	%w/w	0.5	**20**	**12**	**13**	**11**
Fibre Identification in soil Method: AN602 Tested: 18/1/2019						
FibreID						
Asbestos Detected	No unit	-	-	No	-	No
SemiQuant						
Estimated Fibres*	%w/w	0.01	-	<0.01	-	<0.01

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE187983.013 Soil 14 Jan 2019 R5-7-1	SE187983.014 Soil 14 Jan 2019 Q1-NTH-S1	SE187983.015 Soil 14 Jan 2019 Q1-NTH-S2	SE187983.016 Soil 14 Jan 2019 Q1-NTH-S3
VOC's in Soil Method: AN433 Tested: 15/1/2019						
Monocyclic Aromatic Hydrocarbons						
Benzene	mg/kg	0.1	<0.1	-	-	-
Toluene	mg/kg	0.1	<0.1	-	-	-
Ethylbenzene	mg/kg	0.1	<0.1	-	-	-
m/p-xylene	mg/kg	0.2	<0.2	-	-	-
o-xylene	mg/kg	0.1	<0.1	-	-	-
Polycyclic VOCs						
Naphthalene	mg/kg	0.1	<0.1	-	-	-
Surrogates						
Dibromofluoromethane (Surrogate)	%	-	**111**	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	**92**	-	-	-
d8-toluene (Surrogate)	%	-	**85**	-	-	-
Bromofluorobenzene (Surrogate)	%	-	**77**	-	-	-
Totals						
Total Xylenes	mg/kg	0.3	<0.3	-	-	-
Total BTEX	mg/kg	0.6	<0.6	-	-	-
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 15/1/2019						
TRH C6-C10	mg/kg	25	<25	-	-	-
TRH C6-C9	mg/kg	20	<20	-	-	-
Surrogates						
Dibromofluoromethane (Surrogate)	%	-	**111**	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	**92**	-	-	-
d8-toluene (Surrogate)	%	-	**85**	-	-	-
Bromofluorobenzene (Surrogate)	%	-	**77**	-	-	-
VPH F Bands						
Benzene (F0)	mg/kg	0.1	<0.1	-	-	-
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	-	-	-

Parameter	Units	LOR	Sample Number: SE187983.013 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: R5-7-1	SE187983.014 Soil 14 Jan 2019 Q1-NTH-S1	SE187983.015 Soil 14 Jan 2019 Q1-NTH-S2	SE187983.016 Soil 14 Jan 2019 Q1-NTH-S3
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 15/1/2019						
TRH C10-C14	mg/kg	20	<20	-	-	-
TRH C15-C28	mg/kg	45	<45	-	-	-
TRH C29-C36	mg/kg	45	<45	-	-	-
TRH C37-C40	mg/kg	100	<100	-	-	-
TRH C10-C36 Total	mg/kg	110	<110	-	-	-
TRH C10-C40 Total (F bands)	mg/kg	210	<210	-	-	-
TRH F Bands						
TRH >C10-C16	mg/kg	25	<25	-	-	-
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	-	-	-
TRH >C16-C34 (F3)	mg/kg	90	<90	-	-	-
TRH >C34-C40 (F4)	mg/kg	120	<120	-	-	-
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 15/1/2019						
Naphthalene	mg/kg	0.1	<0.1	-	-	-
2-methylnaphthalene	mg/kg	0.1	<0.1	-	-	-
1-methylnaphthalene	mg/kg	0.1	<0.1	-	-	-
Acenaphthylene	mg/kg	0.1	<0.1	-	-	-
Acenaphthene	mg/kg	0.1	<0.1	-	-	-
Fluorene	mg/kg	0.1	<0.1	-	-	-
Phenanthrene	mg/kg	0.1	<0.1	-	-	-
Anthracene	mg/kg	0.1	<0.1	-	-	-
Fluoranthene	mg/kg	0.1	<0.1	-	-	-
Pyrene	mg/kg	0.1	<0.1	-	-	-
Benzo(a)anthracene	mg/kg	0.1	<0.1	-	-	-
Chrysene	mg/kg	0.1	<0.1	-	-	-
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	-	-	-
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	-	-	-
Benzo(a)pyrene	mg/kg	0.1	<0.1	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	-	-	-
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	-	-	-
Benzo(ghi)perylene	mg/kg	0.1	<0.1	-	-	-
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	-	-	-
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	-	-	-
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	-	-	-
Total PAH (18)	mg/kg	0.8	<0.8	-	-	-
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	-	-	-
Surrogates						
d5-nitrobenzene (Surrogate)	%	-	**94**	-	-	-
2-fluorobiphenyl (Surrogate)	%	-	**96**	-	-	-
d14-p-terphenyl (Surrogate)	%	-	**92**	-	-	-
OC Pesticides in Soil Method: AN420 Tested: 15/1/2019						
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	-	-	-
Alpha BHC	mg/kg	0.1	<0.1	-	-	-
Lindane	mg/kg	0.1	<0.1	-	-	-
Heptachlor	mg/kg	0.1	<0.1	-	-	-
Aldrin	mg/kg	0.1	<0.1	-	-	-
Beta BHC	mg/kg	0.1	<0.1	-	-	-
Delta BHC	mg/kg	0.1	<0.1	-	-	-
Heptachlor epoxide	mg/kg	0.1	<0.1	-	-	-
o,p'-DDE	mg/kg	0.1	<0.1	-	-	-
Alpha Endosulfan	mg/kg	0.2	<0.2	-	-	-
Gamma Chlordane	mg/kg	0.1	<0.1	-	-	-
Alpha Chlordane	mg/kg	0.1	<0.1	-	-	-
trans-Nonachlor	mg/kg	0.1	<0.1	-	-	-
p,p'-DDE	mg/kg	0.1	<0.1	-	-	-
Dieldrin	mg/kg	0.2	<0.2	-	-	-
Endrin	mg/kg	0.2	<0.2	-	-	-

Parameter	Units	LOR	Sample Number: SE187983.013 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: R5-7-1	SE187983.014 Soil 14 Jan 2019 Q1-NTH-S1	SE187983.015 Soil 14 Jan 2019 Q1-NTH-S2	SE187983.016 Soil 14 Jan 2019 Q1-NTH-S3
OC Pesticides in Soil Method: AN420 Tested: 18/1/2019 (continued)						
o,p'-DDD	mg/kg	0.1	<0.1	-	-	-
o,p'-DDT	mg/kg	0.1	<0.1	-	-	-
Beta Endosulfan	mg/kg	0.2	<0.2	-	-	-
p,p'-DDD	mg/kg	0.1	<0.1	-	-	-
p,p'-DDT	mg/kg	0.1	<0.1	-	-	-
Endosulfan sulphate	mg/kg	0.1	<0.1	-	-	-
Endrin Aldehyde	mg/kg	0.1	<0.1	-	-	-
Methoxychlor	mg/kg	0.1	<0.1	-	-	-
Endrin Ketone	mg/kg	0.1	<0.1	-	-	-
Isodrin	mg/kg	0.1	<0.1	-	-	-
Mirex	mg/kg	0.1	<0.1	-	-	-
Total CLP OC Pesticides	mg/kg	1	<1	-	-	-
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**94**	-	-	-
OP Pesticides in Soil Method: AN420 Tested: 15/1/2019						
Dichlorvos	mg/kg	0.5	<0.5	-	-	-
Dimethoate	mg/kg	0.5	<0.5	-	-	-
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	-	-	-
Fenitrothion	mg/kg	0.2	<0.2	-	-	-
Malathion	mg/kg	0.2	<0.2	-	-	-
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	-	-	-
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	-	-	-
Bromophos Ethyl	mg/kg	0.2	<0.2	-	-	-
Methidathion	mg/kg	0.5	<0.5	-	-	-
Ethion	mg/kg	0.2	<0.2	-	-	-
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	-	-	-
Total OP Pesticides*	mg/kg	1.7	<1.7	-	-	-
Surrogates						
2-fluorobiphenyl (Surrogate)	%	-	**96**	-	-	-
d14-p-terphenyl (Surrogate)	%	-	**92**	-	-	-
PCBs in Soil Method: AN420 Tested: 15/1/2019						
Arochlor 1016	mg/kg	0.2	<0.2	-	-	-
Arochlor 1221	mg/kg	0.2	<0.2	-	-	-
Arochlor 1232	mg/kg	0.2	<0.2	-	-	-
Arochlor 1242	mg/kg	0.2	<0.2	-	-	-
Arochlor 1248	mg/kg	0.2	<0.2	-	-	-
Arochlor 1254	mg/kg	0.2	<0.2	-	-	-
Arochlor 1260	mg/kg	0.2	<0.2	-	-	-
Arochlor 1262	mg/kg	0.2	<0.2	-	-	-
Arochlor 1268	mg/kg	0.2	<0.2	-	-	-
Total PCBs (Arochlors)	mg/kg	1	<1	-	-	-
Surrogates						
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**94**	-	-	-

Parameter	Units	LOR	Sample Number: SE187983.013 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: R5-7-1	SE187983.014 Soil 14 Jan 2019 Q1-NTH-S1	SE187983.015 Soil 14 Jan 2019 Q1-NTH-S2	SE187983.016 Soil 14 Jan 2019 Q1-NTH-S3
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 15/1/2019						
Arsenic, As	mg/kg	1	**5**	-	-	-
Cadmium, Cd	mg/kg	0.3	**0.7**	-	-	-
Chromium, Cr	mg/kg	0.3	**6.9**	-	-	-
Copper, Cu	mg/kg	0.5	**23**	-	-	-
Nickel, Ni	mg/kg	0.5	**72**	-	-	-
Lead, Pb	mg/kg	1	**14**	-	-	-
Zinc, Zn	mg/kg	2	**170**	-	-	-
Mercury in Soil Method: AN312 Tested: 15/1/2019						
Mercury	mg/kg	0.05	**0.07**	-	-	-
Moisture Content Method: AN002 Tested: 15/1/2019						
% Moisture	%w/w	0.5	**8.8**	-	-	-
Fibre Identification in soil Method: AN602 Tested: 18/1/2019						
FibreID						
Asbestos Detected	No unit	-	No	No	No	No
SemiQuant						
Estimated Fibres*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01

Parameter	Units	LOR	Sample Number: SE187983.017 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: Q1-STH-S1	Sample Number: SE187983.018 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: Q1-STH-S2
VOC's in Soil Method: AN433 Tested: 18/1/2019				
Monocyclic Aromatic Hydrocarbons				
Benzene	mg/kg	0.1	-	-
Toluene	mg/kg	0.1	-	-
Ethylbenzene	mg/kg	0.1	-	-
m/p-xylene	mg/kg	0.2	-	-
o-xylene	mg/kg	0.1	-	-
Polycyclic VOCs				
Naphthalene	mg/kg	0.1	-	-
Surrogates				
Dibromofluoromethane (Surrogate)	%	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-
d8-toluene (Surrogate)	%	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-
Totals				
Total Xylenes	mg/kg	0.3	-	-
Total BTEX	mg/kg	0.6	-	-
Volatile Petroleum Hydrocarbons in Soil Method: AN433 Tested: 18/1/2019				
TRH C6-C10	mg/kg	25	-	-
TRH C6-C9	mg/kg	20	-	-
Surrogates				
Dibromofluoromethane (Surrogate)	%	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-
d8-toluene (Surrogate)	%	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-
VPH F Bands				
Benzene (F0)	mg/kg	0.1	-	-
TRH C6-C10 minus BTEX (F1)	mg/kg	25	-	-

Parameter	Units	LOR	Sample Number: SE187983.017 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: Q1-STH-S1	Sample Number: SE187983.018 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: Q1-STH-S2
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403 Tested: 17/1/2019				
TRH C10-C14	mg/kg	20	-	-
TRH C15-C28	mg/kg	45	-	-
TRH C29-C36	mg/kg	45	-	-
TRH C37-C40	mg/kg	100	-	-
TRH C10-C36 Total	mg/kg	110	-	-
TRH C10-C40 Total (F bands)	mg/kg	210	-	-
TRH F Bands				
TRH >C10-C16	mg/kg	25	-	-
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	-	-
TRH >C16-C34 (F3)	mg/kg	90	-	-
TRH >C34-C40 (F4)	mg/kg	120	-	-
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 Tested: 18/1/2019				
Naphthalene	mg/kg	0.1	-	-
2-methylnaphthalene	mg/kg	0.1	-	-
1-methylnaphthalene	mg/kg	0.1	-	-
Acenaphthylene	mg/kg	0.1	-	-
Acenaphthene	mg/kg	0.1	-	-
Fluorene	mg/kg	0.1	-	-
Phenanthrene	mg/kg	0.1	-	-
Anthracene	mg/kg	0.1	-	-
Fluoranthene	mg/kg	0.1	-	-
Pyrene	mg/kg	0.1	-	-
Benzo(a)anthracene	mg/kg	0.1	-	-
Chrysene	mg/kg	0.1	-	-
Benzo(b&j)fluoranthene	mg/kg	0.1	-	-
Benzo(k)fluoranthene	mg/kg	0.1	-	-
Benzo(a)pyrene	mg/kg	0.1	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	-	-
Dibenzo(ah)anthracene	mg/kg	0.1	-	-
Benzo(ghi)perylene	mg/kg	0.1	-	-
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	-	-
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	-	-
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	-	-
Total PAH (18)	mg/kg	0.8	-	-
Total PAH (NEPM/WHO 16)	mg/kg	0.8	-	-
Surrogates				
d5-nitrobenzene (Surrogate)	%	-	-	-
2-fluorobiphenyl (Surrogate)	%	-	-	-
d14-p-terphenyl (Surrogate)	%	-	-	-
OC Pesticides in Soil Method: AN420 Tested: 18/1/2019				
Hexachlorobenzene (HCB)	mg/kg	0.1	-	-
Alpha BHC	mg/kg	0.1	-	-
Lindane	mg/kg	0.1	-	-
Heptachlor	mg/kg	0.1	-	-
Aldrin	mg/kg	0.1	-	-
Beta BHC	mg/kg	0.1	-	-
Delta BHC	mg/kg	0.1	-	-
Heptachlor epoxide	mg/kg	0.1	-	-
o,p'-DDE	mg/kg	0.1	-	-
Alpha Endosulfan	mg/kg	0.2	-	-
Gamma Chlordane	mg/kg	0.1	-	-
Alpha Chlordane	mg/kg	0.1	-	-
trans-Nonachlor	mg/kg	0.1	-	-
p,p'-DDE	mg/kg	0.1	-	-

Parameter	Units	LOR	Sample Number: SE187983.017 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: Q1-STH-S1	Sample Number: SE187983.018 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: Q1-STH-S2
OC Pesticides in Soil Method: AN420 Tested: 18/1/2019 (continued)				
Dieldrin	mg/kg	0.2	-	-
Endrin	mg/kg	0.2	-	-
o,p'-DDD	mg/kg	0.1	-	-
o,p'-DDT	mg/kg	0.1	-	-
Beta Endosulfan	mg/kg	0.2	-	-
p,p'-DDD	mg/kg	0.1	-	-
p,p'-DDT	mg/kg	0.1	-	-
Endosulfan sulphate	mg/kg	0.1	-	-
Endrin Aldehyde	mg/kg	0.1	-	-
Methoxychlor	mg/kg	0.1	-	-
Endrin Ketone	mg/kg	0.1	-	-
Isodrin	mg/kg	0.1	-	-
Mirex	mg/kg	0.1	-	-
Total CLP OC Pesticides	mg/kg	1	-	-
Surrogates				
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-
OP Pesticides in Soil Method: AN420 Tested: 18/1/2019				
Dichlorvos	mg/kg	0.5	-	-
Dimethoate	mg/kg	0.5	-	-
Diazinon (Dimpylate)	mg/kg	0.5	-	-
Fenitrothion	mg/kg	0.2	-	-
Malathion	mg/kg	0.2	-	-
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	-	-
Parathion-ethyl (Parathion)	mg/kg	0.2	-	-
Bromophos Ethyl	mg/kg	0.2	-	-
Methidathion	mg/kg	0.5	-	-
Ethion	mg/kg	0.2	-	-
Azinphos-methyl (Guthion)	mg/kg	0.2	-	-
Total OP Pesticides*	mg/kg	1.7	-	-
Surrogates				
2-fluorobiphenyl (Surrogate)	%	-	-	-
d14-p-terphenyl (Surrogate)	%	-	-	-

Parameter	Units	LOR	Sample Number: SE187983.017 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: Q1-STH-S1	Sample Number: SE187983.018 Sample Matrix: Soil Sample Date: 14 Jan 2019 Sample Name: Q1-STH-S2
PCBs in Soil Method: AN420 Tested: 18/1/2019				
Arochlor 1016	mg/kg	0.2	-	-
Arochlor 1221	mg/kg	0.2	-	-
Arochlor 1232	mg/kg	0.2	-	-
Arochlor 1242	mg/kg	0.2	-	-
Arochlor 1248	mg/kg	0.2	-	-
Arochlor 1254	mg/kg	0.2	-	-
Arochlor 1260	mg/kg	0.2	-	-
Arochlor 1262	mg/kg	0.2	-	-
Arochlor 1268	mg/kg	0.2	-	-
Total PCBs (Arochlors)	mg/kg	1	-	-
Surrogates				
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 17/1/2019				
Arsenic, As	mg/kg	1	-	-
Cadmium, Cd	mg/kg	0.3	-	-
Chromium, Cr	mg/kg	0.3	-	-
Copper, Cu	mg/kg	0.5	-	-
Nickel, Ni	mg/kg	0.5	-	-
Lead, Pb	mg/kg	1	-	-
Zinc, Zn	mg/kg	2	-	-
Mercury in Soil Method: AN312 Tested: 17/1/2019				
Mercury	mg/kg	0.05	-	-
Moisture Content Method: AN002 Tested: 17/1/2019				
% Moisture	%w/w	0.5	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE187983.017 Soil 14 Jan 2019 Q1-STH-S1	SE187983.018 Soil 14 Jan 2019 Q1-STH-S2
Fibre Identification in soil **Method: AN602** **Tested: 18/1/2019**					
FibreID					
Asbestos Detected	No unit	-		No	No
SemiQuant					
Estimated Fibres*	%w/w	0.01		<0.01	<0.01

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Mercury in Soil **Method: ME-(AU)-[ENV]AN312**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Mercury	LB164649	mg/kg	0.05	<0.05	32 - 56%	97%	101%

Moisture Content **Method: ME-(AU)-[ENV]AN002**

Parameter	QC Reference	Units	LOR	DUP %RPD
% Moisture	LB164647	%w/w	0.5	8 - 17%

OC Pesticides in Soil **Method: ME-(AU)-[ENV]AN420**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Hexachlorobenzene (HCB)	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Alpha BHC	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Lindane	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Heptachlor	LB164646	mg/kg	0.1	<0.1	0%	96%	100%
Aldrin	LB164646	mg/kg	0.1	<0.1	0%	96%	98%
Beta BHC	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Delta BHC	LB164646	mg/kg	0.1	<0.1	0%	80%	84%
Heptachlor epoxide	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
o,p'-DDE	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Alpha Endosulfan	LB164646	mg/kg	0.2	<0.2	0%	NA	NA
Gamma Chlordane	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Alpha Chlordane	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
trans-Nonachlor	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
p,p'-DDE	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Dieldrin	LB164646	mg/kg	0.2	<0.2	0%	89%	90%
Endrin	LB164646	mg/kg	0.2	<0.2	0%	89%	91%
o,p'-DDD	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
o,p'-DDT	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Beta Endosulfan	LB164646	mg/kg	0.2	<0.2	0%	NA	NA
p,p'-DDD	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
p,p'-DDT	LB164646	mg/kg	0.1	<0.1	0%	82%	92%
Endosulfan sulphate	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Endrin Aldehyde	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Methoxychlor	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Endrin Ketone	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Isodrin	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Mirex	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Total CLP OC Pesticides	LB164646	mg/kg	1	<1	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB164646	%	-	98%	4 - 5%	95%	100%

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

OP Pesticides in Soil Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Dichlorvos	LB164646	mg/kg	0.5	<0.5	0%	107%	100%
Dimethoate	LB164646	mg/kg	0.5	<0.5	0%	NA	NA
Diazinon (Dimpylate)	LB164646	mg/kg	0.5	<0.5	0%	109%	96%
Fenitrothion	LB164646	mg/kg	0.2	<0.2	0%	NA	NA
Malathion	LB164646	mg/kg	0.2	<0.2	0%	NA	NA
Chlorpyrifos (Chlorpyrifos Ethyl)	LB164646	mg/kg	0.2	<0.2	0%	109%	107%
Parathion-ethyl (Parathion)	LB164646	mg/kg	0.2	<0.2	0%	NA	NA
Bromophos Ethyl	LB164646	mg/kg	0.2	<0.2	0%	NA	NA
Methidathion	LB164646	mg/kg	0.5	<0.5	0%	NA	NA
Ethion	LB164646	mg/kg	0.2	<0.2	0%	105%	113%
Azinphos-methyl (Guthion)	LB164646	mg/kg	0.2	<0.2	0%	NA	NA
Total OP Pesticides*	LB164646	mg/kg	1.7	<1.7	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
2-fluorobiphenyl (Surrogate)	LB164646	%	-	108%	4 - 6%	94%	106%
d14-p-terphenyl (Surrogate)	LB164646	%	-	114%	2%	98%	92%

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Naphthalene	LB164646	mg/kg	0.1	<0.1	0%	115%	113%
2-methylnaphthalene	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
1-methylnaphthalene	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Acenaphthylene	LB164646	mg/kg	0.1	<0.1	0%	115%	119%
Acenaphthene	LB164646	mg/kg	0.1	<0.1	0%	123%	118%
Fluorene	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Phenanthrene	LB164646	mg/kg	0.1	<0.1	0 - 33%	124%	119%
Anthracene	LB164646	mg/kg	0.1	<0.1	0%	115%	111%
Fluoranthene	LB164646	mg/kg	0.1	<0.1	0 - 24%	115%	112%
Pyrene	LB164646	mg/kg	0.1	<0.1	0 - 30%	123%	120%
Benzo(a)anthracene	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Chrysene	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(b&j)fluoranthene	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(k)fluoranthene	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(a)pyrene	LB164646	mg/kg	0.1	<0.1	0%	119%	112%
Indeno(1,2,3-cd)pyrene	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Dibenzo(ah)anthracene	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(ghi)perylene	LB164646	mg/kg	0.1	<0.1	0%	NA	NA
Carcinogenic PAHs, BaP TEQ <LOR=0	LB164646	TEQ (mg/kg)	0.2	<0.2	0%	NA	NA
Carcinogenic PAHs, BaP TEQ <LOR=LOR	LB164646	TEQ (mg/kg)	0.3	<0.3	0%	NA	NA
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	LB164646	TEQ (mg/kg)	0.2	<0.2	0%	NA	NA
Total PAH (18)	LB164646	mg/kg	0.8	<0.8	0%	NA	NA
Total PAH (NEPM/WHO 16)	LB164646	mg/kg	0.8	<0.8			

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
d5-nitrobenzene (Surrogate)	LB164646	%	-	98%	4 - 6%	92%	92%
2-fluorobiphenyl (Surrogate)	LB164646	%	-	108%	4 - 6%	94%	106%
d14-p-terphenyl (Surrogate)	LB164646	%	-	114%	2%	98%	92%

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

PCBs in Soil **Method: ME-(AU)-[ENV]AN420**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arochlor 1016	LB164646	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1221	LB164646	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1232	LB164646	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1242	LB164646	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1248	LB164646	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1254	LB164646	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1260	LB164646	mg/kg	0.2	<0.2	0%	113%	116%
Arochlor 1262	LB164646	mg/kg	0.2	<0.2	0%	NA	NA
Arochlor 1268	LB164646	mg/kg	0.2	<0.2	0%	NA	NA
Total PCBs (Arochlors)	LB164646	mg/kg	1	<1	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB164646	%	-	98%	4 - 5%	96%	103%

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES **Method: ME-(AU)-[ENV]AN040/AN320**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arsenic, As	LB164648	mg/kg	1	<1	46 - 98%	111%	97%
Cadmium, Cd	LB164648	mg/kg	0.3	<0.3	0 - 34%	98%	105%
Chromium, Cr	LB164648	mg/kg	0.3	<0.3	0 - 6%	106%	105%
Copper, Cu	LB164648	mg/kg	0.5	<0.5	1 - 2%	101%	114%
Nickel, Ni	LB164648	mg/kg	0.5	<0.5	15 - 42%	96%	104%
Lead, Pb	LB164648	mg/kg	1	<1	6 - 15%	97%	109%
Zinc, Zn	LB164648	mg/kg	2	<2.0	11 - 31%	106%	104%

TRH (Total Recoverable Hydrocarbons) in Soil **Method: ME-(AU)-[ENV]AN403**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH C10-C14	LB164646	mg/kg	20	<20	0%	100%	110%
TRH C15-C28	LB164646	mg/kg	45	<45	0%	100%	68%
TRH C29-C36	LB164646	mg/kg	45	<45	0%	95%	80%
TRH C37-C40	LB164646	mg/kg	100	<100	0%	NA	NA
TRH C10-C36 Total	LB164646	mg/kg	110	<110	0%	NA	NA
TRH C10-C40 Total (F bands)	LB164646	mg/kg	210	<210	0%	NA	NA

TRH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH >C10-C16	LB164646	mg/kg	25	<25	0%	100%	105%
TRH >C10-C16 - Naphthalene (F2)	LB164646	mg/kg	25	<25	0%	NA	NA
TRH >C16-C34 (F3)	LB164646	mg/kg	90	<90	0%	98%	53%
TRH >C34-C40 (F4)	LB164646	mg/kg	120	<120	0%	100%	NA

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

VOC's in Soil Method: ME-(AU)-[ENV]AN433

Monocyclic Aromatic Hydrocarbons

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Benzene	LB164645	mg/kg	0.1	<0.1	0%	75%
Toluene	LB164645	mg/kg	0.1	<0.1	0%	84%
Ethylbenzene	LB164645	mg/kg	0.1	<0.1	0%	84%
m/p-xylene	LB164645	mg/kg	0.2	<0.2	0%	87%
o-xylene	LB164645	mg/kg	0.1	<0.1	0%	86%

Polycyclic VOCs

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Naphthalene	LB164645	mg/kg	0.1	<0.1	0%	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Dibromofluoromethane (Surrogate)	LB164645	%	-	117%	6%	76%
d4-1,2-dichloroethane (Surrogate)	LB164645	%	-	129%	3 - 5%	90%
d8-toluene (Surrogate)	LB164645	%	-	71%	3 - 6%	90%
Bromofluorobenzene (Surrogate)	LB164645	%	-	90%	0 - 1%	95%

Totals

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Total Xylenes	LB164645	mg/kg	0.3	<0.3	0%	NA
Total BTEX	LB164645	mg/kg	0.6	<0.6	0%	NA

Volatile Petroleum Hydrocarbons in Soil Method: ME-(AU)-[ENV]AN433

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
TRH C6-C10	LB164645	mg/kg	25	<25	0%	89%
TRH C6-C9	LB164645	mg/kg	20	<20	0%	87%

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Dibromofluoromethane (Surrogate)	LB164645	%	-	117%	6%	76%
d4-1,2-dichloroethane (Surrogate)	LB164645	%	-	129%	3 - 5%	90%
d8-toluene (Surrogate)	LB164645	%	-	71%	3 - 6%	90%
Bromofluorobenzene (Surrogate)	LB164645	%	-	90%	0 - 1%	95%

VPH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Benzene (F0)	LB164645	mg/kg	0.1	<0.1	0%	NA
TRH C6-C10 minus BTEX (F1)	LB164645	mg/kg	25	<25	0%	102%

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Recoverable Hydrocarbons - Silica (TRH-Si) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf) The fibres detected may or may not be asbestos fibres.

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples , Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."
AN602	The sample can be reported “no asbestos found at the reporting limit of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
		NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calcuated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

STATEMENT OF QA/QC PERFORMANCE

SE187983 R0

CLIENT DETAILS

Contact	Richard Case
Client	COMPLIANCE HEALTH AND ENVIRONMENTAL CONSUL
Address	PO Box 275 Gosford NSW 2250
Telephone	0403 971 360
Facsimile	(Not specified)
Email	richard.case@complianceenviro.com.au
Project	**1060**
Order Number	(Not specified)
Samples	18

LABORATORY DETAILS

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Email	au.environmental.sydney@sgs.com
SGS Reference	**SE187983 R0**
Date Received	14 Jan 2019
Date Reported	21 Jan 2019

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Duplicate	Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES	2 items
Matrix Spike	TRH (Total Recoverable Hydrocarbons) in Soil	1 item

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice
Samples received in correct containers	Yes	Sample counts by matrix	17 Soil
Date documentation received	14/1/2019	Type of documentation received	COC
Number of eskies/boxes received		Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	3.4°C
Sufficient sample for analysis	Yes	Turnaround time requested	Standard

HOLDING TIME SUMMARY

SE187983 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Fibre Identification in soil

Method: ME-(AU)-[ENV]AN602

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W-RE5-1	SE187983.001	LB164859	14 Jan 2019	14 Jan 2019	14 Jan 2020	18 Jan 2019	14 Jan 2020	18 Jan 2019
W-RE5-3	SE187983.003	LB164859	14 Jan 2019	14 Jan 2019	14 Jan 2020	18 Jan 2019	14 Jan 2020	18 Jan 2019
R5-1	SE187983.005	LB164859	14 Jan 2019	14 Jan 2019	14 Jan 2020	18 Jan 2019	14 Jan 2020	18 Jan 2019
R5-2-2	SE187983.007	LB164859	14 Jan 2019	14 Jan 2019	14 Jan 2020	18 Jan 2019	14 Jan 2020	18 Jan 2019
R5-2-3	SE187983.008	LB164859	14 Jan 2019	14 Jan 2019	14 Jan 2020	18 Jan 2019	14 Jan 2020	18 Jan 2019
R5-4-1	SE187983.010	LB164859	14 Jan 2019	14 Jan 2019	14 Jan 2020	18 Jan 2019	14 Jan 2020	18 Jan 2019
R5-6-1	SE187983.012	LB164859	14 Jan 2019	14 Jan 2019	14 Jan 2020	18 Jan 2019	14 Jan 2020	18 Jan 2019
R5-7-1	SE187983.013	LB164859	14 Jan 2019	14 Jan 2019	14 Jan 2020	18 Jan 2019	14 Jan 2020	18 Jan 2019
Q1-NTH-S1	SE187983.014	LB164859	14 Jan 2019	14 Jan 2019	14 Jan 2020	18 Jan 2019	14 Jan 2020	18 Jan 2019
Q1-NTH-S2	SE187983.015	LB164859	14 Jan 2019	14 Jan 2019	14 Jan 2020	18 Jan 2019	14 Jan 2020	18 Jan 2019
Q1-NTH-S3	SE187983.016	LB164859	14 Jan 2019	14 Jan 2019	14 Jan 2020	18 Jan 2019	14 Jan 2020	18 Jan 2019
Q1-STH-S1	SE187983.017	LB164859	14 Jan 2019	14 Jan 2019	14 Jan 2020	18 Jan 2019	14 Jan 2020	18 Jan 2019
Q1-STH-S2	SE187983.018	LB164859	14 Jan 2019	14 Jan 2019	14 Jan 2020	18 Jan 2019	14 Jan 2020	18 Jan 2019

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W-RE5-1	SE187983.001	LB164649	14 Jan 2019	14 Jan 2019	11 Feb 2019	15 Jan 2019	11 Feb 2019	17 Jan 2019
W-RE5-2	SE187983.002	LB164649	14 Jan 2019	14 Jan 2019	11 Feb 2019	15 Jan 2019	11 Feb 2019	17 Jan 2019
W-RE5-3	SE187983.003	LB164649	14 Jan 2019	14 Jan 2019	11 Feb 2019	15 Jan 2019	11 Feb 2019	17 Jan 2019
W-RE5-4	SE187983.004	LB164649	14 Jan 2019	14 Jan 2019	11 Feb 2019	15 Jan 2019	11 Feb 2019	17 Jan 2019
R5-1	SE187983.005	LB164649	14 Jan 2019	14 Jan 2019	11 Feb 2019	15 Jan 2019	11 Feb 2019	17 Jan 2019
R5-2-1	SE187983.006	LB164649	14 Jan 2019	14 Jan 2019	11 Feb 2019	15 Jan 2019	11 Feb 2019	17 Jan 2019
R5-2-2	SE187983.007	LB164649	14 Jan 2019	14 Jan 2019	11 Feb 2019	15 Jan 2019	11 Feb 2019	17 Jan 2019
R5-2-3	SE187983.008	LB164649	14 Jan 2019	14 Jan 2019	11 Feb 2019	15 Jan 2019	11 Feb 2019	17 Jan 2019
R5-3-1	SE187983.009	LB164649	14 Jan 2019	14 Jan 2019	11 Feb 2019	15 Jan 2019	11 Feb 2019	17 Jan 2019
R5-4-1	SE187983.010	LB164649	14 Jan 2019	14 Jan 2019	11 Feb 2019	15 Jan 2019	11 Feb 2019	17 Jan 2019
R5-5-1	SE187983.011	LB164649	14 Jan 2019	14 Jan 2019	11 Feb 2019	15 Jan 2019	11 Feb 2019	17 Jan 2019
R5-6-1	SE187983.012	LB164649	14 Jan 2019	14 Jan 2019	11 Feb 2019	15 Jan 2019	11 Feb 2019	17 Jan 2019
R5-7-1	SE187983.013	LB164649	14 Jan 2019	14 Jan 2019	11 Feb 2019	15 Jan 2019	11 Feb 2019	17 Jan 2019

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W-RE5-1	SE187983.001	LB164647	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	20 Jan 2019	17 Jan 2019
W-RE5-2	SE187983.002	LB164647	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	20 Jan 2019	17 Jan 2019
W-RE5-3	SE187983.003	LB164647	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	20 Jan 2019	17 Jan 2019
W-RE5-4	SE187983.004	LB164647	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	20 Jan 2019	17 Jan 2019
R5-1	SE187983.005	LB164647	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	20 Jan 2019	17 Jan 2019
R5-2-1	SE187983.006	LB164647	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	20 Jan 2019	17 Jan 2019
R5-2-2	SE187983.007	LB164647	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	20 Jan 2019	17 Jan 2019
R5-2-3	SE187983.008	LB164647	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	20 Jan 2019	17 Jan 2019
R5-3-1	SE187983.009	LB164647	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	20 Jan 2019	17 Jan 2019
R5-4-1	SE187983.010	LB164647	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	20 Jan 2019	17 Jan 2019
R5-5-1	SE187983.011	LB164647	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	20 Jan 2019	17 Jan 2019
R5-6-1	SE187983.012	LB164647	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	20 Jan 2019	17 Jan 2019
R5-7-1	SE187983.013	LB164647	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	20 Jan 2019	17 Jan 2019

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W-RE5-1	SE187983.001	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
W-RE5-2	SE187983.002	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
W-RE5-3	SE187983.003	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
W-RE5-4	SE187983.004	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-1	SE187983.005	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-2-1	SE187983.006	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-2-2	SE187983.007	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-2-3	SE187983.008	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-3-1	SE187983.009	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-4-1	SE187983.010	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-5-1	SE187983.011	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-6-1	SE187983.012	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-7-1	SE187983.013	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019

HOLDING TIME SUMMARY

SE187983 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W-RE5-1	SE187983.001	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
W-RE5-2	SE187983.002	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
W-RE5-3	SE187983.003	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
W-RE5-4	SE187983.004	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-1	SE187983.005	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-2-1	SE187983.006	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-2-2	SE187983.007	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-2-3	SE187983.008	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-3-1	SE187983.009	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-4-1	SE187983.010	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-5-1	SE187983.011	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-6-1	SE187983.012	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-7-1	SE187983.013	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W-RE5-1	SE187983.001	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
W-RE5-2	SE187983.002	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
W-RE5-3	SE187983.003	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
W-RE5-4	SE187983.004	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-1	SE187983.005	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-2-1	SE187983.006	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-2-2	SE187983.007	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-2-3	SE187983.008	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-3-1	SE187983.009	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-4-1	SE187983.010	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-5-1	SE187983.011	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-6-1	SE187983.012	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-7-1	SE187983.013	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W-RE5-1	SE187983.001	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
W-RE5-2	SE187983.002	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
W-RE5-3	SE187983.003	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
W-RE5-4	SE187983.004	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-1	SE187983.005	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-2-1	SE187983.006	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-2-2	SE187983.007	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-2-3	SE187983.008	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-3-1	SE187983.009	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-4-1	SE187983.010	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-5-1	SE187983.011	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-6-1	SE187983.012	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
R5-7-1	SE187983.013	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W-RE5-1	SE187983.001	LB164648	14 Jan 2019	14 Jan 2019	13 Jul 2019	15 Jan 2019	13 Jul 2019	17 Jan 2019
W-RE5-2	SE187983.002	LB164648	14 Jan 2019	14 Jan 2019	13 Jul 2019	15 Jan 2019	13 Jul 2019	17 Jan 2019
W-RE5-3	SE187983.003	LB164648	14 Jan 2019	14 Jan 2019	13 Jul 2019	15 Jan 2019	13 Jul 2019	17 Jan 2019
W-RE5-4	SE187983.004	LB164648	14 Jan 2019	14 Jan 2019	13 Jul 2019	15 Jan 2019	13 Jul 2019	17 Jan 2019
R5-1	SE187983.005	LB164648	14 Jan 2019	14 Jan 2019	13 Jul 2019	15 Jan 2019	13 Jul 2019	17 Jan 2019
R5-2-1	SE187983.006	LB164648	14 Jan 2019	14 Jan 2019	13 Jul 2019	15 Jan 2019	13 Jul 2019	17 Jan 2019
R5-2-2	SE187983.007	LB164648	14 Jan 2019	14 Jan 2019	13 Jul 2019	15 Jan 2019	13 Jul 2019	17 Jan 2019
R5-2-3	SE187983.008	LB164648	14 Jan 2019	14 Jan 2019	13 Jul 2019	15 Jan 2019	13 Jul 2019	17 Jan 2019
R5-3-1	SE187983.009	LB164648	14 Jan 2019	14 Jan 2019	13 Jul 2019	15 Jan 2019	13 Jul 2019	17 Jan 2019
R5-4-1	SE187983.010	LB164648	14 Jan 2019	14 Jan 2019	13 Jul 2019	15 Jan 2019	13 Jul 2019	17 Jan 2019
R5-5-1	SE187983.011	LB164648	14 Jan 2019	14 Jan 2019	13 Jul 2019	15 Jan 2019	13 Jul 2019	17 Jan 2019
R5-6-1	SE187983.012	LB164648	14 Jan 2019	14 Jan 2019	13 Jul 2019	15 Jan 2019	13 Jul 2019	17 Jan 2019
R5-7-1	SE187983.013	LB164648	14 Jan 2019	14 Jan 2019	13 Jul 2019	15 Jan 2019	13 Jul 2019	17 Jan 2019

HOLDING TIME SUMMARY

SE187983 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W-RE5-1	SE187983.001	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	17 Jan 2019
W-RE5-2	SE187983.002	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	17 Jan 2019
W-RE5-3	SE187983.003	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	17 Jan 2019
W-RE5-4	SE187983.004	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	17 Jan 2019
R5-1	SE187983.005	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	17 Jan 2019
R5-2-1	SE187983.006	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	17 Jan 2019
R5-2-2	SE187983.007	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	17 Jan 2019
R5-2-3	SE187983.008	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	17 Jan 2019
R5-3-1	SE187983.009	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	17 Jan 2019
R5-4-1	SE187983.010	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	17 Jan 2019
R5-5-1	SE187983.011	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	17 Jan 2019
R5-6-1	SE187983.012	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	17 Jan 2019
R5-7-1	SE187983.013	LB164646	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	17 Jan 2019

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W-RE5-1	SE187983.001	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
W-RE5-2	SE187983.002	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
W-RE5-3	SE187983.003	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
W-RE5-4	SE187983.004	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019
R5-1	SE187983.005	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019
R5-2-1	SE187983.006	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019
R5-2-2	SE187983.007	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019
R5-2-3	SE187983.008	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019
R5-3-1	SE187983.009	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019
R5-4-1	SE187983.010	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019
R5-5-1	SE187983.011	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019
R5-6-1	SE187983.012	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019
R5-7-1	SE187983.013	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
W-RE5-1	SE187983.001	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
W-RE5-2	SE187983.002	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
W-RE5-3	SE187983.003	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	18 Jan 2019
W-RE5-4	SE187983.004	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019
R5-1	SE187983.005	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019
R5-2-1	SE187983.006	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019
R5-2-2	SE187983.007	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019
R5-2-3	SE187983.008	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019
R5-3-1	SE187983.009	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019
R5-4-1	SE187983.010	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019
R5-5-1	SE187983.011	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019
R5-6-1	SE187983.012	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019
R5-7-1	SE187983.013	LB164645	14 Jan 2019	14 Jan 2019	28 Jan 2019	15 Jan 2019	24 Feb 2019	21 Jan 2019

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	W-RE5-1	SE187983.001	%	60 - 130%	98
	W-RE5-2	SE187983.002	%	60 - 130%	99
	W-RE5-3	SE187983.003	%	60 - 130%	100
	W-RE5-4	SE187983.004	%	60 - 130%	94
	R5-1	SE187983.005	%	60 - 130%	99
	R5-2-1	SE187983.006	%	60 - 130%	97
	R5-2-2	SE187983.007	%	60 - 130%	97
	R5-2-3	SE187983.008	%	60 - 130%	95
	R5-3-1	SE187983.009	%	60 - 130%	99
	R5-4-1	SE187983.010	%	60 - 130%	93
	R5-5-1	SE187983.011	%	60 - 130%	93
	R5-6-1	SE187983.012	%	60 - 130%	93
	R5-7-1	SE187983.013	%	60 - 130%	94

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	W-RE5-1	SE187983.001	%	60 - 130%	98
	W-RE5-2	SE187983.002	%	60 - 130%	104
	W-RE5-3	SE187983.003	%	60 - 130%	108
	W-RE5-4	SE187983.004	%	60 - 130%	88
	R5-1	SE187983.005	%	60 - 130%	98
	R5-2-1	SE187983.006	%	60 - 130%	98
	R5-2-2	SE187983.007	%	60 - 130%	98
	R5-2-3	SE187983.008	%	60 - 130%	94
	R5-3-1	SE187983.009	%	60 - 130%	96
	R5-4-1	SE187983.010	%	60 - 130%	98
	R5-5-1	SE187983.011	%	60 - 130%	98
	R5-6-1	SE187983.012	%	60 - 130%	96
	R5-7-1	SE187983.013	%	60 - 130%	96
d14-p-terphenyl (Surrogate)	W-RE5-1	SE187983.001	%	60 - 130%	86
	W-RE5-2	SE187983.002	%	60 - 130%	100
	W-RE5-3	SE187983.003	%	60 - 130%	110
	W-RE5-4	SE187983.004	%	60 - 130%	96
	R5-1	SE187983.005	%	60 - 130%	94
	R5-2-1	SE187983.006	%	60 - 130%	92
	R5-2-2	SE187983.007	%	60 - 130%	96
	R5-2-3	SE187983.008	%	60 - 130%	92
	R5-3-1	SE187983.009	%	60 - 130%	96
	R5-4-1	SE187983.010	%	60 - 130%	96
	R5-5-1	SE187983.011	%	60 - 130%	96
	R5-6-1	SE187983.012	%	60 - 130%	92
	R5-7-1	SE187983.013	%	60 - 130%	92

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	W-RE5-1	SE187983.001	%	70 - 130%	98
	W-RE5-2	SE187983.002	%	70 - 130%	104
	W-RE5-3	SE187983.003	%	70 - 130%	108
	W-RE5-4	SE187983.004	%	70 - 130%	88
	R5-1	SE187983.005	%	70 - 130%	98
	R5-2-1	SE187983.006	%	70 - 130%	98
	R5-2-2	SE187983.007	%	70 - 130%	98
	R5-2-3	SE187983.008	%	70 - 130%	94
	R5-3-1	SE187983.009	%	70 - 130%	96
	R5-4-1	SE187983.010	%	70 - 130%	98
	R5-5-1	SE187983.011	%	70 - 130%	98
	R5-6-1	SE187983.012	%	70 - 130%	96
	R5-7-1	SE187983.013	%	70 - 130%	96
d14-p-terphenyl (Surrogate)	W-RE5-1	SE187983.001	%	70 - 130%	86
	W-RE5-2	SE187983.002	%	70 - 130%	100
	W-RE5-3	SE187983.003	%	70 - 130%	110
	W-RE5-4	SE187983.004	%	70 - 130%	96

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d14-p-terphenyl (Surrogate)	R5-1	SE187983.005	%	70 - 130%	94
	R5-2-1	SE187983.006	%	70 - 130%	92
	R5-2-2	SE187983.007	%	70 - 130%	96
	R5-2-3	SE187983.008	%	70 - 130%	92
	R5-3-1	SE187983.009	%	70 - 130%	96
	R5-4-1	SE187983.010	%	70 - 130%	96
	R5-5-1	SE187983.011	%	70 - 130%	96
	R5-6-1	SE187983.012	%	70 - 130%	92
	R5-7-1	SE187983.013	%	70 - 130%	92
d5-nitrobenzene (Surrogate)	W-RE5-1	SE187983.001	%	70 - 130%	84
	W-RE5-2	SE187983.002	%	70 - 130%	88
	W-RE5-3	SE187983.003	%	70 - 130%	102
	W-RE5-4	SE187983.004	%	70 - 130%	92
	R5-1	SE187983.005	%	70 - 130%	96
	R5-2-1	SE187983.006	%	70 - 130%	92
	R5-2-2	SE187983.007	%	70 - 130%	96
	R5-2-3	SE187983.008	%	70 - 130%	92
	R5-3-1	SE187983.009	%	70 - 130%	94
	R5-4-1	SE187983.010	%	70 - 130%	96
	R5-5-1	SE187983.011	%	70 - 130%	96
	R5-6-1	SE187983.012	%	70 - 130%	96
	R5-7-1	SE187983.013	%	70 - 130%	94

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	W-RE5-1	SE187983.001	%	60 - 130%	98
	W-RE5-2	SE187983.002	%	60 - 130%	99
	W-RE5-3	SE187983.003	%	60 - 130%	100
	W-RE5-4	SE187983.004	%	60 - 130%	94
	R5-1	SE187983.005	%	60 - 130%	99
	R5-2-1	SE187983.006	%	60 - 130%	97
	R5-2-2	SE187983.007	%	60 - 130%	97
	R5-2-3	SE187983.008	%	60 - 130%	95
	R5-3-1	SE187983.009	%	60 - 130%	99
	R5-4-1	SE187983.010	%	60 - 130%	93
	R5-5-1	SE187983.011	%	60 - 130%	93
	R5-6-1	SE187983.012	%	60 - 130%	93
	R5-7-1	SE187983.013	%	60 - 130%	94

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	W-RE5-1	SE187983.001	%	60 - 130%	82
	W-RE5-2	SE187983.002	%	60 - 130%	70
	W-RE5-3	SE187983.003	%	60 - 130%	77
	W-RE5-4	SE187983.004	%	60 - 130%	76
	R5-1	SE187983.005	%	60 - 130%	74
	R5-2-1	SE187983.006	%	60 - 130%	77
	R5-2-2	SE187983.007	%	60 - 130%	74
	R5-2-3	SE187983.008	%	60 - 130%	74
	R5-3-1	SE187983.009	%	60 - 130%	78
	R5-4-1	SE187983.010	%	60 - 130%	75
	R5-5-1	SE187983.011	%	60 - 130%	77
	R5-6-1	SE187983.012	%	60 - 130%	79
	R5-7-1	SE187983.013	%	60 - 130%	77
d4-1,2-dichloroethane (Surrogate)	W-RE5-1	SE187983.001	%	60 - 130%	91
	W-RE5-2	SE187983.002	%	60 - 130%	75
	W-RE5-3	SE187983.003	%	60 - 130%	78
	W-RE5-4	SE187983.004	%	60 - 130%	73
	R5-1	SE187983.005	%	60 - 130%	92
	R5-2-1	SE187983.006	%	60 - 130%	83
	R5-2-2	SE187983.007	%	60 - 130%	93
	R5-2-3	SE187983.008	%	60 - 130%	122

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d4-1,2-dichloroethane (Surrogate)	R5-3-1	SE187983.009	%	60 - 130%	77
	R5-4-1	SE187983.010	%	60 - 130%	83
	R5-5-1	SE187983.011	%	60 - 130%	85
	R5-6-1	SE187983.012	%	60 - 130%	92
	R5-7-1	SE187983.013	%	60 - 130%	92
d8-toluene (Surrogate)	W-RE5-1	SE187983.001	%	60 - 130%	72
	W-RE5-2	SE187983.002	%	60 - 130%	83
	W-RE5-3	SE187983.003	%	60 - 130%	81
	W-RE5-4	SE187983.004	%	60 - 130%	74
	R5-1	SE187983.005	%	60 - 130%	81
	R5-2-1	SE187983.006	%	60 - 130%	77
	R5-2-2	SE187983.007	%	60 - 130%	78
	R5-2-3	SE187983.008	%	60 - 130%	75
	R5-3-1	SE187983.009	%	60 - 130%	77
	R5-4-1	SE187983.010	%	60 - 130%	79
	R5-5-1	SE187983.011	%	60 - 130%	75
	R5-6-1	SE187983.012	%	60 - 130%	73
	R5-7-1	SE187983.013	%	60 - 130%	85
Dibromofluoromethane (Surrogate)	W-RE5-1	SE187983.001	%	60 - 130%	90
	W-RE5-2	SE187983.002	%	60 - 130%	70
	W-RE5-3	SE187983.003	%	60 - 130%	73
	W-RE5-4	SE187983.004	%	60 - 130%	74
	R5-1	SE187983.005	%	60 - 130%	74
	R5-2-1	SE187983.006	%	60 - 130%	78
	R5-2-2	SE187983.007	%	60 - 130%	84
	R5-2-3	SE187983.008	%	60 - 130%	95
	R5-3-1	SE187983.009	%	60 - 130%	79
	R5-4-1	SE187983.010	%	60 - 130%	102
	R5-5-1	SE187983.011	%	60 - 130%	77
	R5-6-1	SE187983.012	%	60 - 130%	71
	R5-7-1	SE187983.013	%	60 - 130%	111

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	W-RE5-1	SE187983.001	%	60 - 130%	82
	W-RE5-2	SE187983.002	%	60 - 130%	70
	W-RE5-3	SE187983.003	%	60 - 130%	77
	W-RE5-4	SE187983.004	%	60 - 130%	76
	R5-1	SE187983.005	%	60 - 130%	74
	R5-2-1	SE187983.006	%	60 - 130%	77
	R5-2-2	SE187983.007	%	60 - 130%	74
	R5-2-3	SE187983.008	%	60 - 130%	74
	R5-3-1	SE187983.009	%	60 - 130%	78
	R5-4-1	SE187983.010	%	60 - 130%	75
	R5-5-1	SE187983.011	%	60 - 130%	77
	R5-6-1	SE187983.012	%	60 - 130%	79
	R5-7-1	SE187983.013	%	60 - 130%	77
d4-1,2-dichloroethane (Surrogate)	W-RE5-1	SE187983.001	%	60 - 130%	91
	W-RE5-2	SE187983.002	%	60 - 130%	75
	W-RE5-3	SE187983.003	%	60 - 130%	78
	W-RE5-4	SE187983.004	%	60 - 130%	73
	R5-1	SE187983.005	%	60 - 130%	92
	R5-2-1	SE187983.006	%	60 - 130%	83
	R5-2-2	SE187983.007	%	60 - 130%	93
	R5-2-3	SE187983.008	%	60 - 130%	122
	R5-3-1	SE187983.009	%	60 - 130%	77
	R5-4-1	SE187983.010	%	60 - 130%	83
	R5-5-1	SE187983.011	%	60 - 130%	85
	R5-6-1	SE187983.012	%	60 - 130%	92
	R5-7-1	SE187983.013	%	60 - 130%	92
d8-toluene (Surrogate)	W-RE5-1	SE187983.001	%	60 - 130%	72

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Volatile Petroleum Hydrocarbons in Soil (continued) — **Method: ME-(AU)-[ENV]AN433**

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d8-toluene (Surrogate)	W-RE5-2	SE187983.002	%	60 - 130%	83
	W-RE5-3	SE187983.003	%	60 - 130%	81
	W-RE5-4	SE187983.004	%	60 - 130%	74
	R5-1	SE187983.005	%	60 - 130%	81
	R5-2-1	SE187983.006	%	60 - 130%	77
	R5-2-2	SE187983.007	%	60 - 130%	78
	R5-2-3	SE187983.008	%	60 - 130%	75
	R5-3-1	SE187983.009	%	60 - 130%	77
	R5-4-1	SE187983.010	%	60 - 130%	79
	R5-5-1	SE187983.011	%	60 - 130%	75
	R5-6-1	SE187983.012	%	60 - 130%	73
	R5-7-1	SE187983.013	%	60 - 130%	85
Dibromofluoromethane (Surrogate)	W-RE5-1	SE187983.001	%	60 - 130%	90
	W-RE5-2	SE187983.002	%	60 - 130%	70
	W-RE5-3	SE187983.003	%	60 - 130%	73
	W-RE5-4	SE187983.004	%	60 - 130%	74
	R5-1	SE187983.005	%	60 - 130%	74
	R5-2-1	SE187983.006	%	60 - 130%	78
	R5-2-2	SE187983.007	%	60 - 130%	84
	R5-2-3	SE187983.008	%	60 - 130%	95
	R5-3-1	SE187983.009	%	60 - 130%	79
	R5-4-1	SE187983.010	%	60 - 130%	102
	R5-5-1	SE187983.011	%	60 - 130%	77
	R5-6-1	SE187983.012	%	60 - 130%	71
	R5-7-1	SE187983.013	%	60 - 130%	111

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result
LB164649.001	Mercury	mg/kg	0.05	<0.05

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB164646.001		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
		Alpha BHC	mg/kg	0.1	<0.1
		Lindane	mg/kg	0.1	<0.1
		Heptachlor	mg/kg	0.1	<0.1
		Aldrin	mg/kg	0.1	<0.1
		Beta BHC	mg/kg	0.1	<0.1
		Delta BHC	mg/kg	0.1	<0.1
		Heptachlor epoxide	mg/kg	0.1	<0.1
		Alpha Endosulfan	mg/kg	0.2	<0.2
		Gamma Chlordane	mg/kg	0.1	<0.1
		Alpha Chlordane	mg/kg	0.1	<0.1
		p,p'-DDE	mg/kg	0.1	<0.1
		Dieldrin	mg/kg	0.2	<0.2
		Endrin	mg/kg	0.2	<0.2
		Beta Endosulfan	mg/kg	0.2	<0.2
		p,p'-DDD	mg/kg	0.1	<0.1
		p,p'-DDT	mg/kg	0.1	<0.1
		Endosulfan sulphate	mg/kg	0.1	<0.1
		Endrin Aldehyde	mg/kg	0.1	<0.1
		Methoxychlor	mg/kg	0.1	<0.1
		Endrin Ketone	mg/kg	0.1	<0.1
		Isodrin	mg/kg	0.1	<0.1
		Mirex	mg/kg	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	98

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB164646.001		Dichlorvos	mg/kg	0.5	<0.5
		Dimethoate	mg/kg	0.5	<0.5
		Diazinon (Dimpylate)	mg/kg	0.5	<0.5
		Fenitrothion	mg/kg	0.2	<0.2
		Malathion	mg/kg	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
		Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
		Bromophos Ethyl	mg/kg	0.2	<0.2
		Methidathion	mg/kg	0.5	<0.5
		Ethion	mg/kg	0.2	<0.2
		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	108
		d14-p-terphenyl (Surrogate)	%	-	114

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result
LB164646.001	Naphthalene	mg/kg	0.1	<0.1
	2-methylnaphthalene	mg/kg	0.1	<0.1
	1-methylnaphthalene	mg/kg	0.1	<0.1
	Acenaphthylene	mg/kg	0.1	<0.1
	Acenaphthene	mg/kg	0.1	<0.1
	Fluorene	mg/kg	0.1	<0.1
	Phenanthrene	mg/kg	0.1	<0.1
	Anthracene	mg/kg	0.1	<0.1
	Fluoranthene	mg/kg	0.1	<0.1
	Pyrene	mg/kg	0.1	<0.1
	Benzo(a)anthracene	mg/kg	0.1	<0.1
	Chrysene	mg/kg	0.1	<0.1
	Benzo(a)pyrene	mg/kg	0.1	<0.1

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB164646.001		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
		Dibenzo(ah)anthracene	mg/kg	0.1	<0.1
		Benzo(ghi)perylene	mg/kg	0.1	<0.1
		Total PAH (18)	mg/kg	0.8	<0.8
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	98
		2-fluorobiphenyl (Surrogate)	%	-	108
		d14-p-terphenyl (Surrogate)	%	-	114

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB164646.001		Arochlor 1016	mg/kg	0.2	<0.2
		Arochlor 1221	mg/kg	0.2	<0.2
		Arochlor 1232	mg/kg	0.2	<0.2
		Arochlor 1242	mg/kg	0.2	<0.2
		Arochlor 1248	mg/kg	0.2	<0.2
		Arochlor 1254	mg/kg	0.2	<0.2
		Arochlor 1260	mg/kg	0.2	<0.2
		Arochlor 1262	mg/kg	0.2	<0.2
		Arochlor 1268	mg/kg	0.2	<0.2
		Total PCBs (Arochlors)	mg/kg	1	<1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	98

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number		Parameter	Units	LOR	Result
LB164648.001		Arsenic, As	mg/kg	1	<1
		Cadmium, Cd	mg/kg	0.3	<0.3
		Chromium, Cr	mg/kg	0.3	<0.3
		Copper, Cu	mg/kg	0.5	<0.5
		Nickel, Ni	mg/kg	0.5	<0.5
		Lead, Pb	mg/kg	1	<1
		Zinc, Zn	mg/kg	2	<2.0

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result
LB164646.001		TRH C10-C14	mg/kg	20	<20
		TRH C15-C28	mg/kg	45	<45
		TRH C29-C36	mg/kg	45	<45
		TRH C37-C40	mg/kg	100	<100
		TRH C10-C36 Total	mg/kg	110	<110

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB164645.001	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1
	Hydrocarbons	Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	117
		d4-1,2-dichloroethane (Surrogate)	%	-	129
		d8-toluene (Surrogate)	%	-	71
		Bromofluorobenzene (Surrogate)	%	-	90
	Totals	Total BTEX	mg/kg	0.6	<0.6

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB164645.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	117
		d4-1,2-dichloroethane (Surrogate)	%	-	129
		d8-toluene (Surrogate)	%	-	71

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187956.003	LB164649.021	Mercury	mg/kg	0.05	0.06	0.11	90	56
SE187983.010	LB164649.014	Mercury	mg/kg	0.05	0.07	0.05	108	32

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187956.003	LB164647.018	% Moisture	%w/w	0.5	15	18	36	17
SE187983.010	LB164647.011	% Moisture	%w/w	0.5	12	11	39	8

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187956.003	LB164646.021		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Lindane	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor	mg/kg	0.1	<0.1	<0.1	200	0
			Aldrin	mg/kg	0.1	<0.1	<0.1	200	0
			Beta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Delta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	200	0
			o,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
			Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
			trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
			Dieldrin	mg/kg	0.2	<0.2	<0.2	200	0
			Endrin	mg/kg	0.2	<0.2	<0.2	200	0
			o,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
			o,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
			Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
			p,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
			Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	200	0
			Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	200	0
			Methoxychlor	mg/kg	0.1	<0.1	<0.1	200	0
			Endrin Ketone	mg/kg	0.1	<0.1	<0.1	200	0
			Isodrin	mg/kg	0.1	<0.1	<0.1	200	0
			Mirex	mg/kg	0.1	<0.1	<0.1	200	0
			Total CLP OC Pesticides	mg/kg	1	<1	<1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.15	0.14	30	5
SE187983.008	LB164646.023		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Lindane	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor	mg/kg	0.1	<0.1	<0.1	200	0
			Aldrin	mg/kg	0.1	<0.1	<0.1	200	0
			Beta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Delta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	200	0
			o,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
			Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
			trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
			Dieldrin	mg/kg	0.2	<0.2	<0.2	200	0
			Endrin	mg/kg	0.2	<0.2	<0.2	200	0
			o,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
			o,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
			Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
			p,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187983.008	LB164646.023		p,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
			Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	200	0
			Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	200	0
			Methoxychlor	mg/kg	0.1	<0.1	<0.1	200	0
			Endrin Ketone	mg/kg	0.1	<0.1	<0.1	200	0
			Isodrin	mg/kg	0.1	<0.1	<0.1	200	0
			Mirex	mg/kg	0.1	<0.1	<0.1	200	0
			Total CLP OC Pesticides	mg/kg	1	<1	<1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.14	0.14	30	4

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187956.003	LB164646.021		Dichlorvos	mg/kg	0.5	<0.5	<0.5	200	0
			Dimethoate	mg/kg	0.5	<0.5	<0.5	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	200	0
			Fenitrothion	mg/kg	0.2	<0.2	<0.2	200	0
			Malathion	mg/kg	0.2	<0.2	<0.2	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	200	0
			Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	200	0
			Methidathion	mg/kg	0.5	<0.5	<0.5	200	0
			Ethion	mg/kg	0.2	<0.2	<0.2	200	0
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	200	0
			Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	6
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2
SE187983.009	LB164646.023		Dichlorvos	mg/kg	0.5	<0.5	<0.5	200	0
			Dimethoate	mg/kg	0.5	<0.5	<0.5	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	200	0
			Fenitrothion	mg/kg	0.2	<0.2	<0.2	200	0
			Malathion	mg/kg	0.2	<0.2	<0.2	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	200	0
			Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	200	0
			Methidathion	mg/kg	0.5	<0.5	<0.5	200	0
			Ethion	mg/kg	0.2	<0.2	<0.2	200	0
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	200	0
			Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	4
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187956.003	LB164646.021	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
		Phenanthrene	mg/kg	0.1	0.1	0.1	113	33
		Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluoranthene	mg/kg	0.1	0.2	0.2	89	24
		Pyrene	mg/kg	0.1	0.1	0.2	91	30
		Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	163	0
		Chrysene	mg/kg	0.1	<0.1	<0.1	163	0
		Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	148	0
		Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	163	0
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	197	0
		Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	197	0
		Carcinogenic PAHs, BaP TEQ <LOR=0	mg/kg	0.2	<0.2	<0.2	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187956.003	LB164646.021		Carcinogenic PAHs, BaP TEQ <LOR=LOR	mg/kg	0.3	<0.3	<0.3	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	<0.2	<0.2	175	0
			Total PAH (18)	mg/kg	0.8	<0.8	<0.8	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	30	6
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	6
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2
SE187983.009	LB164646.023		Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
			Phenanthrene	mg/kg	0.1	<0.1	<0.1	200	0
			Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Chrysene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	mg/kg	0.2	<0.2	<0.2	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	mg/kg	0.3	<0.3	<0.3	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	<0.2	<0.2	175	0
			Total PAH (18)	mg/kg	0.8	<0.8	<0.8	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	30	4
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	4
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187956.003	LB164646.021		Arochlor 1016	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1221	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1232	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1242	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1248	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1254	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1260	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1262	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1268	mg/kg	0.2	<0.2	<0.2	200	0
			Total PCBs (Arochlors)	mg/kg	1	<1	<1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0	30	5
SE187983.008	LB164646.023		Arochlor 1016	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1221	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1232	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1242	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1248	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1254	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1260	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1262	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1268	mg/kg	0.2	<0.2	<0.2	200	0
			Total PCBs (Arochlors)	mg/kg	1	<1	<1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0	30	4

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate		Parameter	Units	LOR

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES (continued)

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187956.003	LB164648.021	Arsenic, As	mg/kg	1	4	2	65	46
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.3	22	22	32	0
		Copper, Cu	mg/kg	0.5	12	12	34	1
		Nickel, Ni	mg/kg	0.5	2.8	3.2	47	15
		Lead, Pb	mg/kg	1	39	42	32	6
		Zinc, Zn	mg/kg	2	36	40	35	11
SE187983.010	LB164648.014	Arsenic, As	mg/kg	1	2	5	63	98 ②
		Cadmium, Cd	mg/kg	0.3	<0.3	0.4	126	34
		Chromium, Cr	mg/kg	0.3	17	16	33	6
		Copper, Cu	mg/kg	0.5	40	41	31	2
		Nickel, Ni	mg/kg	0.5	10	16	34	42 ②
		Lead, Pb	mg/kg	1	18	21	35	15
		Zinc, Zn	mg/kg	2	49	67	33	31

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187956.003	LB164646.021		TRH C10-C14	mg/kg	20	<20	<20	200	0
			TRH C15-C28	mg/kg	45	<45	<45	200	0
			TRH C29-C36	mg/kg	45	<45	<45	200	0
			TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	<110	<110	200	0
			TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0
SE187983.009	LB164646.023		TRH C10-C14	mg/kg	20	<20	<20	200	0
			TRH C15-C28	mg/kg	45	<45	<45	200	0
			TRH C29-C36	mg/kg	45	<45	<45	200	0
			TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	<110	<110	200	0
			TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187956.003	LB164645.021	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
			Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.9	5.6	50	6
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.2	4.3	50	3
			d8-toluene (Surrogate)	mg/kg	-	4.3	4.2	50	3
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.9	3.9	50	1
		Totals	Total Xylenes	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0
SE187983.010	LB164645.014	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
			Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.1	4.8	50	6
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.2	4.0	50	5
			d8-toluene (Surrogate)	mg/kg	-	4.0	4.2	50	6
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.8	3.8	50	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187983.010	LB164645.014	Totals	Total Xylenes	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE187956.003	LB164645.021		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.9	5.6	30	6
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.2	4.3	30	3
			d8-toluene (Surrogate)	mg/kg	-	4.3	4.2	30	3
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.9	3.9	30	1
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0
SE187983.010	LB164645.014		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.1	4.8	30	6
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.2	4.0	30	5
			d8-toluene (Surrogate)	mg/kg	-	4.0	4.2	30	6
			Bromofluorobenzene (Surrogate)	mg/kg	-	3.8	3.8	30	0
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164649.002	Mercury	mg/kg	0.05	0.19	0.2	70 - 130	97

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164646.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	96
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	96
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	80
		Dieldrin	mg/kg	0.2	<0.2	0.2	60 - 140	89
		Endrin	mg/kg	0.2	<0.2	0.2	60 - 140	89
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	82
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.14	0.15	40 - 130	95

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164646.002		Dichlorvos	mg/kg	0.5	2.1	2	60 - 140	107
		Diazinon (Dimpylate)	mg/kg	0.5	2.2	2	60 - 140	109
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	2.2	2	60 - 140	109
		Ethion	mg/kg	0.2	2.1	2	60 - 140	105
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	94
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	98

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164646.002		Naphthalene	mg/kg	0.1	4.6	4	60 - 140	115
		Acenaphthylene	mg/kg	0.1	4.6	4	60 - 140	115
		Acenaphthene	mg/kg	0.1	4.9	4	60 - 140	123
		Phenanthrene	mg/kg	0.1	5.0	4	60 - 140	124
		Anthracene	mg/kg	0.1	4.6	4	60 - 140	115
		Fluoranthene	mg/kg	0.1	4.6	4	60 - 140	115
		Pyrene	mg/kg	0.1	4.9	4	60 - 140	123
		Benzo(a)pyrene	mg/kg	0.1	4.8	4	60 - 140	119
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	92
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	94
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	98

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164646.002	Arochlor 1260	mg/kg	0.2	0.5	0.4	60 - 140	113

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164648.002	Arsenic, As	mg/kg	1	370	336.32	79 - 120	111
	Cadmium, Cd	mg/kg	0.3	410	416.6	69 - 131	98
	Chromium, Cr	mg/kg	0.3	37	35.2	80 - 120	106
	Copper, Cu	mg/kg	0.5	380	370.46	80 - 120	101
	Nickel, Ni	mg/kg	0.5	200	210.88	79 - 120	96
	Lead, Pb	mg/kg	1	100	107.87	79 - 120	97
	Zinc, Zn	mg/kg	2	320	301.27	80 - 121	106

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164646.002		TRH C10-C14	mg/kg	20	40	40	60 - 140	100
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	100
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	95
	TRH F Bands	TRH >C10-C16	mg/kg	25	40	40	60 - 140	100
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	98
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	100

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number	Parameter	Units	LOR

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164645.002	Monocyclic	Benzene	mg/kg	0.1	2.2	2.9	60 - 140	75
	Aromatic	Toluene	mg/kg	0.1	2.4	2.9	60 - 140	84
		Ethylbenzene	mg/kg	0.1	2.4	2.9	60 - 140	84
		m/p-xylene	mg/kg	0.2	5.0	5.8	60 - 140	87
		o-xylene	mg/kg	0.1	2.5	2.9	60 - 140	86
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.8	5	60 - 140	76
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.5	5	60 - 140	90
		d8-toluene (Surrogate)	mg/kg	-	4.5	5	60 - 140	90
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.7	5	60 - 140	95

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB164645.002		TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	89
		TRH C6-C9	mg/kg	20	20	23.2	60 - 140	87
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.8	5	60 - 140	76
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.5	5	60 - 140	90
		d8-toluene (Surrogate)	mg/kg	-	4.5	5	60 - 140	90
		Bromofluorobenzene (Surrogate)	mg/kg	-	4.7	5	60 - 140	95
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	7.25	60 - 140	102

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187983.001	LB164649.004	Mercury	mg/kg	0.05	0.21	<0.05	0.2	101

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187983.003	LB164646.022		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	-	-
			Alpha BHC	mg/kg	0.1	<0.1	<0.1	-	-
			Lindane	mg/kg	0.1	<0.1	<0.1	-	-
			Heptachlor	mg/kg	0.1	0.2	<0.1	0.2	100
			Aldrin	mg/kg	0.1	0.2	<0.1	0.2	98
			Beta BHC	mg/kg	0.1	<0.1	<0.1	-	-
			Delta BHC	mg/kg	0.1	0.2	<0.1	0.2	84
			Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	-	-
			o,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	-
			Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	-	-
			Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	-	-
			Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	-	-
			trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	-	-
			p,p'-DDE	mg/kg	0.1	<0.1	<0.1	-	-
			Dieldrin	mg/kg	0.2	<0.2	<0.2	0.2	90
			Endrin	mg/kg	0.2	<0.2	<0.2	0.2	91
			o,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	-
			o,p'-DDT	mg/kg	0.1	<0.1	<0.1	-	-
			Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	-	-
			p,p'-DDD	mg/kg	0.1	<0.1	<0.1	-	-
			p,p'-DDT	mg/kg	0.1	0.2	<0.1	0.2	92
			Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	-	-
			Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	-	-
			Methoxychlor	mg/kg	0.1	<0.1	<0.1	-	-
			Endrin Ketone	mg/kg	0.1	<0.1	<0.1	-	-
			Isodrin	mg/kg	0.1	<0.1	<0.1	-	-
			Mirex	mg/kg	0.1	<0.1	<0.1	-	-
			Total CLP OC Pesticides	mg/kg	1	1	<1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.15	0.15	-	100

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187983.002	LB164646.022		Dichlorvos	mg/kg	0.5	2.0	<0.5	2	100
			Dimethoate	mg/kg	0.5	<0.5	<0.5	-	-
			Diazinon (Dimpylate)	mg/kg	0.5	1.9	<0.5	2	96
			Fenitrothion	mg/kg	0.2	<0.2	<0.2	-	-
			Malathion	mg/kg	0.2	<0.2	<0.2	-	-
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	2.1	<0.2	2	107
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	-	-
			Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	-	-
			Methidathion	mg/kg	0.5	<0.5	<0.5	-	-
			Ethion	mg/kg	0.2	2.3	<0.2	2	113
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	-	-
			Total OP Pesticides*	mg/kg	1.7	8.3	<1.7	-	-
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	106
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	92

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187983.002	LB164646.022	Naphthalene	mg/kg	0.1	4.5	<0.1	4	113
		2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Acenaphthylene	mg/kg	0.1	4.8	<0.1	4	119
		Acenaphthene	mg/kg	0.1	4.7	<0.1	4	118
		Fluorene	mg/kg	0.1	<0.1	<0.1	-	-
		Phenanthrene	mg/kg	0.1	4.8	<0.1	4	119

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187983.002	LB164646.022		Anthracene	mg/kg	0.1	4.5	<0.1	4	111
			Fluoranthene	mg/kg	0.1	4.5	<0.1	4	112
			Pyrene	mg/kg	0.1	4.9	<0.1	4	120
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Chrysene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(a)pyrene	mg/kg	0.1	4.5	<0.1	4	112
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	-	-
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	4.5	<0.2	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	4.6	<0.3	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	4.5	<0.2	-	-
			Total PAH (18)	mg/kg	0.8	37	<0.8	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.4	-	92
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	106
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	92

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187983.003	LB164646.022		Arochlor 1016	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1221	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1232	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1242	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1248	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1254	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1260	mg/kg	0.2	0.5	<0.2	0.4	116
			Arochlor 1262	mg/kg	0.2	<0.2	<0.2	-	-
			Arochlor 1268	mg/kg	0.2	<0.2	<0.2	-	-
			Total PCBs (Arochlors)	mg/kg	1	<1	<1	-	-
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0	-	103

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187983.001	LB164648.004	Arsenic, As	mg/kg	1	49	<1	50	97
		Cadmium, Cd	mg/kg	0.3	53	<0.3	50	105
		Chromium, Cr	mg/kg	0.3	57	4.4	50	105
		Copper, Cu	mg/kg	0.5	59	2.4	50	114
		Nickel, Ni	mg/kg	0.5	55	2.9	50	104
		Lead, Pb	mg/kg	1	60	6	50	109
		Zinc, Zn	mg/kg	2	62	9.6	50	104

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE187983.002	LB164646.022		TRH C10-C14	mg/kg	20	48	<20	40	110
			TRH C15-C28	mg/kg	45	53	<45	40	68
			TRH C29-C36	mg/kg	45	68	<45	40	80
			TRH C37-C40	mg/kg	100	<100	<100	-	-
			TRH C10-C36 Total	mg/kg	110	170	<110	-	-
			TRH C10-C40 Total (F bands)	mg/kg	210	<210	<210	-	-
		TRH F Bands	TRH >C10-C16	mg/kg	25	48	<25	40	105
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	48	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	40	53 ⑨
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	-	-

MATRIX SPIKE DUPLICATES

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Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to Analytical Report comments for further information.

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Richard Case
Client	COMPLIANCE HEALTH AND ENVIRONMENTAL CONSUL
Address	PO Box 275 Gosford NSW 2250
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Project	**1060**
Order Number	(Not specified)
Samples	13

LABORATORY DETAILS

Manager	Huong Crawford
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SGS Reference	**SE187983 R0**
Date Received	14 Jan 2019
Date Reported	21 Jan 2019

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

No respirable fibres detected in all soil samples using trace analysis technique.

Sample 1,3,5,7,8,10,12,13: a portion of the sample supplied has been sub-sampled for asbestos according to SGS In-house procedures. We therefore cannot guarantee that the sub-sample is representative of the entire sample supplied. SGS Environmental Services recommends supplying approximately 50-100g of sample in a separate container.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

Bennet Lo
Senior Organic Chemist/Metals Chemis

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

Ravee Sivasubramaniam
Hygiene Team Leader

Teresa Nguyen
Organic Chemist

RESULTS

Fibre Identification in soil — Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	Est.%w/w*
SE187983.001	W-RE5-1	Soil	52g Clay,Rocks	14 Jan 2019	No Asbestos Found Organic Fibres Detected	<0.01
SE187983.003	W-RE5-3	Soil	27g Soil,Rocks	14 Jan 2019	No Asbestos Found	<0.01
SE187983.005	R5-1	Soil	48g Soil,Rocks	14 Jan 2019	No Asbestos Found	<0.01
SE187983.007	R5-2-2	Soil	56g Clay,Rocks	14 Jan 2019	No Asbestos Found	<0.01
SE187983.008	R5-2-3	Soil	51g Clay,Soil,Rocks	14 Jan 2019	No Asbestos Found	<0.01
SE187983.010	R5-4-1	Soil	36g Soil,Rocks	14 Jan 2019	No Asbestos Found	<0.01
SE187983.012	R5-6-1	Soil	60g Clay,Rocks	14 Jan 2019	No Asbestos Found	<0.01
SE187983.013	R5-7-1	Soil	59g Clay,Rocks	14 Jan 2019	No Asbestos Found	<0.01
SE187983.014	Q1-NTH-S1	Soil	213g Clay,Rocks	14 Jan 2019	No Asbestos Found	<0.01
SE187983.015	Q1-NTH-S2	Soil	248g Clay,Soil,Rocks	14 Jan 2019	No Asbestos Found	<0.01
SE187983.016	Q1-NTH-S3	Soil	272g Clay,Rocks	14 Jan 2019	No Asbestos Found Organic Fibres Detected	<0.01
SE187983.017	Q1-STH-S1	Soil	266g Clay,Rocks	14 Jan 2019	No Asbestos Found	<0.01
SE187983.018	Q1-STH-S2	Soil	314g Clay,Rocks	14 Jan 2019	No Asbestos Found	<0.01

METHOD SUMMARY

SE187983 R0

METHOD	METHODOLOGY SUMMARY
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf) The fibres detected may or may not be asbestos fibres.
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples , Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."
AN602	The sample can be reported “no asbestos found at the reporting limit of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed, Not Required
Crocidolite	-	Blue Asbestos	*	-	NATA accreditation does not cover the performance of this service .
Amphiboles	-	Amosite and/or Crocidolite	**	-	Indicative data, theoretical holding time exceeded.

(In reference to soil samples only) This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Sampled by the client.

Where reported: 'Asbestos Detected': Asbestos detected by polarised light microscopy, including dispersion staining.
Where reported: 'No Asbestos Found': No Asbestos Found by polarised light microscopy , including dispersion staining.
Where reported: 'UMF Detected': Mineral fibres of unknown type detected by polarised light microscopy, including dispersion staining. Confirmation by another independent analytical technique may be necessary.

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos -containing bulk materials using polarised light microscopy. This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/ Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

Test Results

Oil_Test_Certificate | Full_History | Create PDF | **Back | Home | Logout**

Test Results

Customer Name	**Auspower**	**Sample Work Order (SWO)**	10221
Location	**Portland Cement**	**Test Performed**	Standard, PCB, Furan,
Customer WO#	00		

Transformer Details

Trans Number	Not stated	**KVA**	200	**Phase/Cycle**	3/50
MFG	Crompton Parkinson	**Pri Volts**	11000	**Litres**	515
MFG Date		**Sec Volts**	415	**Imp**	4.85
S/N	11985	**Trans Class**	onan	**kg**	1718
Radiators	Yes	**Conservator**	No		
Fans	No	**LTC Compartment**	Not Determined	**Nitrogen_Blanket**	No
Water Cooled	Not Determined	**Free Breather**	No	**Sealed_Unit**	No
Oil Pumps	Not Determined			**Customer Asset #**	

TRANSCARE Recommendation

Test Rating

FAIL

New Sample ID	**18110317**	**Sample ID**	155597
SWO Entered Date	16 Nov 2018	**Sample drawn from**	Main Tank
Date Sample Taken	10 Nov 2018	**Regeneration Required**	Yes
Next Sample Due	10 Nov 2019	**Dehydration Required**	No
Comments	Fail Oil: Retrofill Oil. DGA: Retest 12 months. Fail : Furans are considered extremely high. Action is recommended.		

Visual Inspection History

Date	Level	Temp C	Paint	Leaks	Drawn From	Weather
10 Nov 2018	TNT	TNT	fair	TNT	Main Tank	Unknown

Inspection Comments : TNT

Liquid Screen Test History

Date	Service	Sample Temp C	Moisture ppm		% Dry Weight		Colour		Visual		Resistivity 90c	
10 Nov 2018	Service	23.7	39	U	TNT	NA	TNT	NA	clear amber, particles	U	TNT	NA

Date	Acidity (NN) mgK OH/g		Interfacial Tension (IFT) mN/m		Density @ 25C g/ml		Dielectric Dissipation Factor % (DDF) 90C		Breakdown kV	
10 Nov 2018	1.71	U	10.7	U	0.8777	A	TNT	NA	81.9	A

Inhibitor Content (% by Weight) DBPC			PCB Content ppm		Sulphur
Date	Inhibitor %		Date	Total PCB's	Results
10 Nov 2018	TNT	NA	10 Nov 2018	<2 positive	TNT

Dissolved Gas Analysis History (DGA ppm)

Date	Hydrogen	Oxygen	Nitrogen	Methane	Carbon Monoxide	Carbon Dioxide	Ethylene	Ethane	Acetylene	Total Combust.	Total Gas
10 Nov 2018	<10	7741	50352	3	314	1146	2	1	<1	331	59570

Furan Analysis History (parts per billion)

Date	5H2F	2FOL	2FAL	2ACF	5M2F	TOTAL
10 Nov 2018	<10	<10	1920	<10	<10	1920

Summary of Test Results

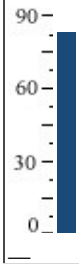
The comments offered below are based on the test results presented and are without the benefit of any previous history on the transformer or information on the past or present operating parameters. Please note that estimated winding moisture is based on a calculation made using “Industry” curves. As results obtained when sampling temperatures are less than 25C are not representative no result has been entered.
This oil is rated as category 7 (oil in disastrous condition). It is significantly deteriorated and immediate corrective action should be undertaken. In this category, advanced, irreversible damage has occurred to the major insulation. Significant levels of sludge can be expected to have been deposited in and on transformer parts in 100% of units. Acidity, IFT, Moisture in Oil and Visual are unacceptable. Particles were noted in the sample. Oil regeneration will restore the oil quality as described in AS 1883 “Guide to Maintenance and Supervision of Insulating Oils in Service” Page 24 Table 1. Note: In this case, due to the small transformer oil volume in this unit, it is recommended a retrofill be undertaken, rather than regenerating the oil, as a more cost effective method to correct the deteriorated oil condition.
DGA: Results appear satisfactory.
Furan levels are considered extremely high. This is an indication of very significant irreversible deterioration of the transformer major insulation. Furan (2FAL) measured 1920ppb. That figure represents an estimated Degree of Polymerisation (DP) of 350 which approximates to an estimated remaining winding insulation life of 34%. The winding insulation is now considered very fragile. At this level of winding deterioration the insulation, by definition, is approaching the theoretical “End of Life” point. This definition is recognised Internationally. It is recommended transformer replacement planning action be considered.
Oil is PCB “free”.

RESULTS INDICATE THE OIL QUALITY IN THIS UNIT IS SIGNIFICANTLY DEGRADED. IT IS CONSIDERED THAT MORE THAN ONE RETROFILL, SEPARATED BY (SAY) 6 MONTHS, MAY BE REQUIRED TO RESTORE THE OIL QUALITY IN THIS UNIT.
IN ADDITION, THE WINDING INSULATION INTEGRITY IS APPROACHING "END OF LIFE" BY DEFINITION. THE DETERIORATION IN WINDING INSULATION IS PERMANENT AND CANNOT BE CORRECTED.
IT IS RECOMMENDED CONSIDERATION BE GIVE TO A COST BENEFIT ANALYSIS ON THIS UNIT BEFORE DETERMINING THE BEST COURSE OF ACTION.

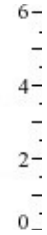
Legend:
A Acceptable **U** Unacceptable **NA** Not Applicable **TNT** Test Not Taken **Q** Questionable **I** Investigate **ND** Not Detected **ppm** parts per million

Graphs

Breakdown kV Graph

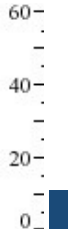


DDF 90C Graph



Acidity (NN) Graph

IFT Graph



Appendix B – Photo Gallery

	
UST Remediation Area	Heritage Buildings
	
Northern Side of building – fibro on ground	Northern Slabs in Cement Works Area
	
Central Hill Area of R5 Zone	Central Hill Area of R5 Zone
	
Central Hill Area of R5 Zone	Eastern Area of R5 Zone
	
Western Hill Area of R5 Zone	Western R5 Area

	
Overlooking Proposed R1 Zone	Reeds at entry to Limestone Creek
	
Northeast access track – Fibro on surface	Northeastern R5 Zone